KAKATIYA UNIVERSITY, WARANGAL

DEPARTMENT OF COMPUTER SCIENCE

MCA COURSE STRUCTURE WITH EFFECT FROM 2013-14

MCA III YEAR I SEMESTER:

Paper No	Paper Title / Subject	Workload Per week (Theory : Lab)	MARKS		
			Internal	External	Total
MCA311	Artificial Intelligence	T (4)	20	80	100
MCA312	Cryptography and Network Security	T (4)	20	80	100
MCA313	Multimedia Application Development	T (4)	20	80	100
MCA314	Elective - I	T (4)	20	80	100
MCA315	Elective – I I	T (4)	20	80	100
MCA316	Multimedia Application Development Laboratory	L (4)	--	50	50
MCA317	Cryptography and Network Security Laboratory	L (4)	--	50	50
MCA318	Mini Project Laboratory	L (4)	--	50	50
					650

Elective - I	Elective – I I
A. Cloud Computing	A .Design Patterns
B .Soft Computing	B.
C .Design and Analysis of Algorithms	C.

MCA311	CLOUD COMPUTING	CC
WORK LOAD: 4 PPW	**INTERNAL MARKS: 20**	**EXTERNAL MARKS: 80**

U N I T – I

INTRODUCTION: Essentials, Benefits and need for Cloud Computing - Business and IT Perspective - Cloud and Virtualization - Cloud Services Requirements - Cloud and Dynamic Infrastructure - Cloud Computing Characteristics Cloud Adoption. CLOUD MODELS: Cloud Characteristics - Measured Service - Cloud Models - Security in a Public Cloud Public versus Private Clouds - Cloud Infrastructure Self Service. CLOUD AS A SERVICE: Gamut of Cloud Solutions - Principal Technologies - Cloud Strategy Cloud Design and Implementation using SOA - Conceptual Cloud Model - Cloud Service Defined

U N I T – II

CLOUD SOLUTIONS: Cloud Ecosystem - Cloud Business Process Management - Cloud Service Management - Cloud Stack - Computing on Demand (CoD) – Cloud is sourcing. CLOUD OFFERINGS: Information Storage, Retrieval, Archive and Protection - Cloud Analytics Testing under Cloud - Information Security - Virtual Desktop Infrastructure - Storage Cloud. CLOUD MANAGEMENT: Resiliency – Provisioning - Asset Management - Cloud Governance - High Availability and Disaster Recovery - Charging Models, Usage Reporting, Billing and Metering.

U N I T – III

CLOUD VIRTUALIZATION TECHNOLOGY: Virtualization Defined - Virtualization Benefits - Server Virtualization - Virtualization for x86 Architecture - Hypervisor Management Software - Logical Partitioning (LPAR)- VIO Server - Virtual Infrastructure Requirements. CLOUD VIRTUALIZATION: Storage virtualization - Storage Area Networks - Network-Attached storage - Cloud Server Virtualization - Virtualized Data Center.

U N I T – IV

CLOUD AND SOA: SOA Journey to Infrastructure - SOA and Cloud - SOA Defined - SOA and IaaS - SOA-based Cloud Infrastructure Steps - SOA Business and IT Services. CLOUD INFRASTRUCTURE BENCHMARKING: OLTP Benchmark - Business Intelligence Benchmark e-Business Benchmark - ISV Benchmarks - Cloud Performance Data Collection and Performance Monitoring Commands - Benchmark Tools.

TEXT BOOK:
    1. Cloud Computing – Insight into New Era Infrastructure, Dr. Kumar Saurabh, Wiley India.

REFERENCE BOOKS:

    1. Cloud Computing, Roger Jennings, Wiley India
    2. Cloud Computing Explained, John Rhoton, Recursive Press
    3. Cloud Computing Bible, Barry Sosinsky, Wiley
    4. Cloud Computing: Principles and Paradigms, Rajkumar Buyya, James Broberg, Wiley
    5. Cloud Computing for Dummies, Judith Hurwiz, Wiley Publishing.
    6. The Cloud at your service, Rosenberg and Matheos, Manning Publications

MCA312	CRYPTOGRAPHY AND NETWORK SECURITY	CNS
WORK LOAD: 4 PPW	**INTERNAL MARKS: 20**	**EXTERNAL MARKS: 80**

U N I T – I

INTRODUCTION: Attacks, Services, and Mechanisms, Security Services. CONVENTIONAL ENCRYPTION TECHNIQUES: Cryptography, Steganography, Classical Encryption Techniques. MODERN TECHNIQUES: Simplified DES, The Data Encryption Standard, Differential and Linear Cryptanalysis, Block Cipher Modes of Operation.

U N I T – II

CONFIDENTIALITY USING CONVENTIONAL ENCRYPTION: - Traffic Confidentiality, Random Number Generation. PUBLIC-KEY CRPTOGRAPHY: - Principles of Public-Key Cryptosystems, the RSA Algorithm, Diffie - Hellman Key Exchange, Elliptic Curve Cryptography. INTRODUCTION TO NUMBER THEORY: - Prime and Relatively Prime Numbers, Fermat's and Euler's Theorem, Euclid's Algorithm, The Chinese Remainder Theorem, And Discrete Logarithms.

U N I T – III

MESSAGE AUTHENTICATION AND HASH FUNCTIONS: - Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and MACs. DIGITAL SIGNATURES AND AUTHENTICATION PROTOCOLS: - Digital Signatures, Authentication Protocols, Digital Signature Standard.

U N I T – IV

ELECTRONIC MAIL SECURITY: S/MIME.IP SECURITY: IP Security Overview, IP Security Architecture, Encapsulating Security Payload, Key Management. FIREWALLS: Firewall Design Principles, Trusted Systems.

TEXT BOOK:

CRYPTOGRAPHY AND NETWORK SECURITY principles and Practice FOURTH Edition By William Stallings (Pearson Asia)

REFERENCE BOOKS

1. DAVIES & PRICE : SECURITY FOR COMPUTER NETWORKS - Wiley (1984)
2. MAYER & MATYAS : CRYPTOGRAPHY – Wiley B. SCHNEIER : APPLIED CRYPTOGRAPHY - (John Wiley)
3. CRYPTOGRAPHY IN C AND C++ :WEISCHANBACH – A PRESS
4. CRYPTOGRAPHY MYSTIFIED :HERSHEY
5. INTRODUCTION TO CRYPTOGRAPHY BY J A BUCHANAN (SPRINGER)

MCA313	MULTIMEDIA APPLICATION DEVELOPMENT	MAD
WORK LOAD: 4 PPW	**INTERNAL MARKS: 20**	**EXTERNAL MARKS: 80**

U N I T – I

INTRODUCTION TO MULTIMEDIA: What is Multimedia, Multimedia and Hypermedia, World Wide Web, Overview of Multimedia Software Tools. GRAPHICS AND IMAGE DATA REPRESENTATIONS –Graphics/Image Data Types, Popular File Formats, Fundamental Concepts in Video, Types of Video Signals, Analog Video, Digital Video. (Chapters: 1, 3, 5)

U N I T –II

Basics of Digital Audio-Digitization of Sound, MIDI, Quantization and Transmission of Audio. Multimedia Data Compression – Lossless Compression Algorithms – Introduction, Basics of Information Theory Run Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding, Lossless Image Compression. Lossy Compression Algorithms – Introduction, Distortion Measures, The Rate Distortion Theory, Quantization, Transform Coding, Wavelet-Based Coding, Wavelet Packets, Embedded Zero tree of Wavelet Coefficients, Set Partitioning in Hierarchical Trees (SPIHT).   (Chapters: 6, 7, 8)

U N I T – III

ACTION SCRIPT 2.0 LANGUAGE – Action Script 2.0 Overview, Action Script 2.0 Features, Features Introduced by Flash Player 7, Action Script 1.0 and 2.0 in Flash Player 6 and 7,Changes to Action Script 1.0 in Flash Player 7. Data types and Type Checking Classes - Authoring an Action Script 2.0 Class – Class Authoring Quick Start, Designing the Image Viewer Class from Functional Requirements to Code.   (Chapters: 1, 3, 4, 5)

U N I T – IV

Basic Video Compression Techniques – Introduction to Video Compression, Video Compression Based on Motion Compression, Search for Motion Vectors. PEG Video Coding, G.726 ADPCM, Vocoders.   (Chapters: 10.1, 10.2, 10.3, 11, 13)

TEXT-BOOKS:

1. Fundamentals of Multimedia by Ze-Nian Li and Mark S. Drew PH / Pearson Education
2. Essentials Action Script 2.0, Colin Moock, SPD O' REILLY.

MCA314	ELECTIVE - I	E-I
WORK LOAD: 4 PPW	**INTERNAL MARKS: 20**	**EXTERNAL MARKS: 80**

A. ARTIFICIAL INTELLIGENCE

UNIT – I

ARTIFICIAL INTELLIGENCE: ITS ROOTS AND SCOPE, AI: HISTORY AND APPLICATIONS: From Eden to ENIAC: Attitudes toward Intelligence, Knowledge, and Human Artifice, Overview of AI Application Areas. ARTIFICIAL INTELLIGENCE AS REPRESENTATION AND SEARCH**:** Introduction, The Prepositional Calculus, The Predicate Calculus, Using co Rules to Produce Predicate Calculus Expressions, Application: A Logic-Based Financial Advisor.
(Chapters 1 & 2)

UNIT – II

STRUCTURES AND STRATEGIES FOR STATE SPACE SEARCH: Introduction, Graph Theory, Strategies for State Space Search, Using the State Space to Represent Reasoning with the Predicate Calculus. HEURISTIC SEARCH: Introduction, An Algorithm for Heuristic Search, Admissibility, Monotonicity, and Informed ness, Using Heuristics in Games, Complexity Issues. CONTROL AND IMPLEMENTATION OF STATE SPACE SEARCH: Introduction, Recursion-Based Search, Pattern-Directed Search, production Systems, The Blackboard Architecture for Problem Solving.   (Chapters 3, 4 and 5)

UNIT – III

REPRESENTATION AND INTELLIGENCE: THE AI CHALLENGE: KNOWLEDGE REPRESENTATION: Issues in Knowledge Representation, A Brief History of AI Representational Systems, Conceptual Graphs: A Network Language, Alternatives to Explicit Representation, Agent Based and Distributed Problem Solving. STRONG METHOD PROBLEM SOLVING: Introduction, Overview of Expert System Technology, Rule- Based Expert Systems, Model-Based, Case Based, and Hybrid Systems, Planning. (Chapters 6 and 7)

UNIT – IV

REASONING IN UNCERTAIN SITUATIONS: Introduction, Logic-Based Adductive Inference, Abduction: Alternatives to Logic, the Stochastic Approach to Uncertainty.   (Chapter 8)

TEXT BOOK:

1. ARTIFICIAL INTELLIGENCE by George F Luger, Pearson Education.

REFERENCE BOOKS
1. ARTIFICIAL INTELLIGENCES by Ritch & Knight.
2. INTRODUCTION TO ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS By D.W. Patterson,(PHI-2001)
3. ARTIFICIAL INTELLIGENCE By Patrick Henry Winston(Pearson)
4. PRINCIPLES OF ARTIFICIAL INTELLIGENCE (Narosa)
5. Artificial Intelligence By Shiart Russel Peter Norvig (Pearson)
6. EXPERT SYSTEMS SYSTEMS AND PRACTICE By Giarratano & Riely (Thomson)
7. ARTIFICIAL INTELLIGENCE APPLICATIONS PROGRAMMING By M Tim Jones (Dreamtech)

B. DISTRIBUTED OPERATING SYSTEMS

UNIT - I

INTRODUCTION TO DISTRIBUTED SYSTEMS: Definition of Distributed systems - Hardware Concepts Software concepts. Communication in Distributed systems: The Client - Server model - Remote Procedure Call Group Communication.

UNIT - II

SYNCHRONIZATION IN DISTRIBUTED SYSTEMS: Clock Synchronization - Mutual Exclusion - Election Algorithms - Atomic Transactions - Deadlock in Distributed Systems. PROCESSES AND PROCESSORS IN DISTRIBUTED SYSTEMS: Threads - System Models - Processor Allocation - Scheduling in Distributed Systems - Real time Distributed Systems.

UNIT - III

DISTRIBUTE FILE SYSTEMS: Distributed File System Design - Distributed File System implementation - Trends in Distributed file systems. DISTRIBUTED SHARED MEMORY: Concept of Shared Memory - Consistency Models - Page -based Distributed Shared Memory - Shared-variable Distributed Shared Memory.

UNIT IV

INTRODUCTION TO MACH: Introduction - Process Management in MACH - Memory Management in MACH - communication in MACH - Unix Emulation in MACH.

TEXT BOOK

1. DISTRIBUTED OPERATING SYSTEMS, PROF. A. S. TANENBAUM, PEAR SON

REFERENCE BOOKS:

1) Silberschatz, Peter Galvin, Breg Gagne, Applied Operating System Concepts, John Wiley & sons
2) Operating Systems, William Stallings (Pearson)
3) Advanced concepts in Operating Systems, M. Shigha & NG shirvratri (TMH)
4) Distributed Systems Concepts & Design By G Coulouris et al (Pearson)
5) Distributed Systems and Networks By Buchanan (TMH)

C. DESIGN AND ANALYSIS OF ALGORITHMS

UNIT I

INTRODUCTION: Algorithm, Psuedo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized analysis. Disjoint Sets- disjoint set operations, union and find algorithms, spanning trees, connected components and connected components.

UNIT II

DIVIDE AND CONQUER: General method , applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication. Greedy method: General method, applications-Job sequencing with dead lines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

UNIT III

DYNAMIC PROGRAMMING: General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem,Travelling sales person problem, Reliability design. Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

UNIT IV

BRANCH AND BOUND: General method, applications - Travelling sales person problem,0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution. NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP - Hard and NPComplete classes, Cook's theorem.

TEXT BOOKS:

1. Fundamentals of Computer Algorithms, Ellis Horowitz,Satraj Sahni and Rajasekharam,Galgotia publications Pvt. Ltd.

2. Algorithm Design: Foundations, Analysis and Internet examples, M.T.Goodrich and R.Tomassia, John Wiley and sons.

REFERENCE BOOKS:

1) Introduction to Algorithms, secondedition,T.H.Cormen, C.E.Leiserson, R.L.Rivest,and C.Stein,PHI Pvt. Ltd./ Pearson Education.

2) Introduction to Design and Analysis of Algorithms A strategic approach, R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc Graw Hill.

3) Data structures and Algorithm Analysis in C++, Allen Weiss, Second edition, Pearson education. Design and Analysis of algorithms, Aho, Ullman and Hopcroft,Pearson education.

4) Algorithms – Richard Johnson Baugh and Marcus Schaefer, Pearson Education

MCA315	ELECTIVE - II	E-II
WORK LOAD: 4 PPW	**INTERNAL MARKS: 20**	**EXTERNAL MARKS: 80**

A.DESIGN PATTERNS

UNIT - I

INTRODUCTION: What Is a Design Pattern? Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.A CASE STUDY: Designing a Document Editor: Design Problems, Document Structure, formatting, embellishing the User Interface, supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation.

UNIT- II

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns. Structural Pattern Part-I: Adapter, Bridge, composite.

UNIT- III

Structural Pattern Part-II: Decorator, arcade, Flyweight, Proxy. Behavioral Patterns Part-I: Chain of Responsibility, Command, Interpreter, Iterator.

UNIT- IV

Behavioral Patterns Part-II: Mediator, Memento, Observer, State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns. What to Expect from Design Patterns, A Brief History, The Pattern Community An Invitation, A Parting Thought.

TEXT BOOK

1. DESIGN PATTERNS BY ERICH GAMMA, PEARSON EDUCATION

REFERENCE BOOKS

1) Pattern's in JAVA Vol-I By Mark Grand, Wiley DreamTech.
2) JAVA Enterprise Design Patterns Vol-III By Mark Grand, Wiley DreamTech.
3) Head First Design Patterns By Eric Freeman-Oreilly-spd
4) Design Patterns Explained By Alan Shalloway,Pearson Education.

B. INFORMATION RETRIEVAL SYSTEMS

UNIT I

INTRODUCTION: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses, INFORMATION RETRIEVAL SYSTEM CAPABILITIES - Search, Browse, Miscellaneous. CATALOGING AND INDEXING: Objectives, Indexing Process, Automatic Indexing, Information Extraction, Data Structures: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure.

UNIT II

AUTOMATIC INDEXING: Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages. DOCUMENT AND TERM CLUSTERING: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters. USER SEARCH TECHNIQUES: Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, weighted searches of Boolean systems, Searching the Internet and hypertext - INFORMATION VISUALIZATION: Introduction, Cognition and perception, Information visualization technologies.

UNIT III

TEXT SEARCH ALGORITHMS: Introduction, Software text search algorithms, Hardware text search systems. INFORMATION SYSTEM EVALUATION: Introduction, Measures used in system evaluation, Measurement example – TREC results. PARALLEL AND DISTRIBUTE IR - Parallel Computing, Performance Measures, Parallel IR - MIMD and SIMD Architectures, Distributed IR – Collection Partitioning, Source Selection, Query Processing, Web Issues, Trends and Research Issues.

UNIT IV

MULTIMEDIA INFORMATION RETRIEVAL – Models and Languages – Data Modeling, Query Languages, Indexing and Searching. BRARIES AND BIBLIOGRAPHICAL SYSTEMS – Online IR Systems, OPACs, Digital Libraries.

TEXT BOOK:

1. Information Storage and Retrieval Systems: Theory and Implementation By Kowalski, Gerald, Mark T Maybury Kluwer Academic Press, 2000.

REFERENCES:

1. Modern Information Retrival By Ricardo Baeza-Yates, Pearson Education, 2007.

2. Information Retrieval: Algorithms and Heuristics By David A Grossman and Ophir Frieder, 2nd Edition, Springer International Edition, 2004.

3. Information Retrieval Data Structures and Algorithms By William B Frakes, Ricardo Baeza-Yates, Pearson Education, 1992.

4. Information Storage & Retieval By Robert Korfhage – John Wiley & Sons.

5. Introduction to Information Retrieval By Christopher D. Manning and Prabhakar,Raghavan, Cambridge University Press, 2008.

C. SOCIAL NETWORKS AND SEMANTIC WEB

UNIT I

WEB INTELLIGENCE: Thinking and Intelligent Web Applications, The Information Age, The World Wide Web, Limitations of Today's Web, The Next Generation Web, Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Web Road Map, Logic on the semantic Web. KNOWLEDGE REPRESENTATION FOR THE SEMANTIC WEB: Ontologies and their role in the semantic web,Ontologies Languages for the Semantic Web –Resource Description Framework(RDF) / RDF Schema, Ontology Web Language(OWL),UML,XML/XML Schema.

UNIT III

ONTOLOGY ENGINEERING: Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping, Logic, Rule and Inference Engines. Semantic Web Applications, Services and Technology Semantic Web applications and services, Semantic Search,e-learning,Semantic Bioinformatics, Knowledge Base ,XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology.

UNIT III

SOCIAL NETWORK ANALYSIS: Networks Analysis, Development of Social Networks Analysis, Key concepts and measures in network analysis – The global structure of networks, The macro-structure of social networks, Personal networks. ELECTRONIC SOURCES FOR NETWORK ANALYSIS: Electronic Discussion networks, Blogs and Online Communities, Web-based Networks.Modelling and aggregating social network data State-of-art in network data representation, Ontological representation of social individuals, Ontological representation of social relationships, Aggregating and reasoning with social network data.

UNIT IV

DEVELOPING SOCIAL-SEMANTIC APPLICATIONS: Building Semantic Web Applications with social network features, Flink: the social networks of the Semantic Web community, Evaluation of web-based social network extraction. SEMANTIC-BASED SOCIAL NETWORK ANALYSIS IN THE SCIENCES
Methodology – Data acquisition, Representation, storage and reasoning, Visualization and Analysis, Results
Descriptive analysis, Structural and cognitive effects on scientific performance.

TEXT BOOKS:

1.Thinking on the Web - Berners Lee,Godel and Turing,Wiley interscience,2008.

2.Social Networks and the Semantic Web ,Peter Mika,Springer,2007.

REFERENCE BOOKS:

1. Semantic Web Technologies ,Trends and Research in Ontology Based Systems,J.Davies,Rudi Studer,Paul Warren,JohnWiley&Sons.
2. Semantic Web and Semantic Web Services -Liyang Lu,Chapman and Hall/CRC
Publishers,(Taylor & Francis Group)
3. Information Sharing on the semantic Web - Heiner Stuckenschmidt;Frank Van Harmelen, Springer Publications.
4. Programming the Semantic Web,T.Segaran,C.Evans,J.Taylor,O‟Reilly,SPD.

5 MCA L- 1	MAD LAB	MRIAL
WORK LOAD: 4 PPW	**ASSIGNMENTS ASSESSMENT**	**EXTERNAL MARKS: 50**

NOTE:
- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about PG standard programs it should be minimum 45 – 50.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.
- External Viva-voce is compulsory.

5 MCA L- 2	J2EE LAB	J2EEL
WORK LOAD: 4 PPW	**ASSIGNMENTS ASSESSMENT**	**EXTERNAL MARKS: 50**

J2EE Platform, XML Fundamentals, Application Servers, Web Servers RMI with JDBC, Servelet Programming, JSP Basics, JSP: tag extensions, Java mail, Java Messaging Service, Java Transactions, Java Cryptography Extensions, EJB architecture and design, session Beans and Business logic, Entity Beans, Message Driver Beans, J2EE Connect, architecture, Web Services.

Development, deployment should be any open source IDE s/w like https://netbeans.org or http://www.eclipse.org

TEXT BOOK: J2EE 1.4 Bible (Dreamtech-2003) (Chapters 1 to 20)

REFERENCE BOOKS

1. Mastering EJB by Roman (John Wiley)
2. J2EE by Wrox (SPD)
3. J2EE 1.4 By A.E.Walsh (Dreamtech)
4. PROFESSIONAL JAVA SERVER PROGRAMMING ALLAMRAJU ET

5 MCA L- 3	MINI PROJECT LAB	MPL
WORK LOAD: 4 PPW	**ASSIGNMENTS ASSESSMENT**	**EXTERNAL MARKS: 50**

Using Database Server and front end tool Middleware Technologies like .NET / JAVA or any other Open Source Technologies.