Scheme of Examination for
Master of Computer Applications (MCA)
Two-Year Programme under CBCS Scheme
w.e.f. Academic Session 2020-2021

MCA SEMESTER-I

Course No.	Course Title	Credit	Int.	Ext.	Total
MCA-11	Computer Architecture and Parallel Processing	4	30	70	100
MCA-12	Computer Networks	4	30	70	100
MCA-13	Software Engineering	4	30	70	100
MCA-14	Operating Systems	4	30	70	100
MCA-15	Java and [dot]NET	4	30	70	100
MCA-16	Software Lab – Java	2	-	50	50
MCA-17	Software Lab – [dot]NET	2	-	50	50
Total		**24**	**150**	**450**	**600**

MCA SEMESTER –II

Course No.	Course Title	Credit	Int.	Ext.	Total
MCA-21	Data Structures	4	30	70	100
MCA-22	Computer Graphics	4	30	70	100
MCA-23	Database Systems	4	30	70	100
MCA-24	Artificial Intelligence	4	30	70	100
MCA-25	J2EE and ASP[dot]NET	4	30	70	100
MCA-26	Software Lab- J2EE	2	-	50	50
MCA-27	Software Lab – ASP[dot]NET	2	-	50	50
Total		**24**	**150**	**450**	**600**

Note: Every MCA student shall attend a 6-8 weeks' industry-based Internship/Summer Training after 2nd semester examination/during summer vacations. A report shall be submitted to the Department by every student at the completion of the internship. Internal presentation and external viva voce examination of the internship/summer training will be held during 3rd semester of MCA programme.

MCA SEMESTER-III

Course No.	Course Title	Credit	Int.	Ext.	Total
MCA-31	Web Development	4	30	70	100
MCA-32	IoT and Cloud Computing	4	30	70	100
MCA-33	Elective – I	4	30	70	100
MCA-34	Elective – II	4	30	70	100
MCA-35	Elective – III	4	30	70	100
MCA-36	Software Lab - Web Development	2	-	50	50
MCA-37	Software Lab - Linux/Android	2	-	50	50
MCA-38	Presentation/Viva on Internship	4	-	100	100
Total		**28**	**150**	**550**	**700**

MCA – 33 Elective – I Courses' List

(i) Linux and Shell Script
(ii) Android Software Development

MCA – 34 Elective –II Courses' List

(i) Network Security
(ii) Wireless Networks

MCA – 35 Elective – III Courses' List

(i) Discrete Mathematics
(ii) Theory of Computations
(iii) Compiler Construction

MCA SEMESTER-IV

Course No.	Course Title	Credit	Int.	Ext.	Total
MCA-41	Python Programming	4	30	70	100
MCA-42	R Programming	4	30	70	100
MCA-43	Elective – IV	4	30	70	100
MCA-44	Elective – V	4	30	70	100
MCA-45	Project Work	8	50	150	200
MCA-46	Software Lab –Python Lab	2	-	50	50
MCA-47	Software Lab –R Prog. Lab	2	-	50	50
Total		**28**	**170**	**530**	**700**

MCA – 43 Elective – IV Courses' List

(i) Soft Computing
(ii) Machine Learning
(iii) Genetic Algorithms

MCA – 44 Elective –V Courses' List

(i) Data Warehousing and Data Mining
(ii) Big Data Analytics
(iii) Data Science

Total Programme Credits
MCA 2–Year under CBCS
w.e.f. Academic Session 2020-2021

Semester	Max. Marks	Credits
I	600	24
II	600	24
III	700	28
IV	700	28
Sub-total	**2600**	**104**
Open Elective Courses	300	12
Programme Total	**2900**	**116**

MCA 11- Computer Architecture and Parallel Processing

L/T - 4 **Total Credits – 4** **Internal - 30 Marks**

External – 70 Marks

Note: Total 09 questions are to be set by the examiner. First question will be compulsory consisting of 5 short answer type questions (each carry 2 marks) covering the entire syllabus uniformly. In addition, 08 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A Candidate is required to attempt five questions in all selecting one from each unit including the compulsory question.

Course Objectives: The objective of this course aims that the students know and strengthen key aspects of analysis, design and implementation of classic sequential architectures ,the immediate improvements within this classic paradigm, and the existence of alternatives architectures.

Learning Outcomes: The student will be able to identify, understand and apply different number systems and codes. Understand the digital representation of data in a computer system, general concepts in digital logic design, including logic elements and their use in combinational and sequential logic circuit design

Unit I

Boolean Algebra and Logic Gates: Basic Definitions, Boolean Functions, Digital Logic Gates, Simplification of Boolean Functions- Canonical and Standard form, K-Map Method, Prime Implicants, Information Representation -Fixed and Floating Point Representation, Number System and Codes. Binary Arithmetic Operations, Error detecting and correcting codes

Unit II

Design of Combinational and Sequential Circuit: Adders and Subtractors, Multiplexer and Demultiplexer, Encoder and Decoder, Comparators

Sequential Circuit: Flip-Flops, Counters and Registers

Unit III

Basic Computer Organisation: Relation between Computer organisation and Computer architecture, Instruction Codes, Instruction Format, Machine Instructions, Instruction Cycle, Addressing Modes, Flow Chart of Instruction Cycle, Interrupts and Types of Interrupts, Interrupts Cycle, Register Transfer and Micro operations.

Unit IV

Concepts related to Architecture and Parallel Processing: Memory Hierarchy, Basic of Pipelining, Parallel computers- Flynn's Classification, Memory –Interleaving, Data Transfer between CPU, Memory and I/O devices, I/O processor, Direct Memory Access (DMA), Microprogramming Concepts, Hardwired and Micro Programmed Control unit, RISC/CISC.

Reference Books:

1. "Computer System Architecture" M. Morris Mano
2. "Digital Logic and Computer Design" by M. Morris Mano
3. "Computer Architecture and Parallel Processing" by Kai Hwang
4. "Parallel Computers – Architecture and Programming" by Rajaraman V

MCA-12 COMPUTER NETWORKS

L/T - 4 **Total Credits – 4** **Internal - 30 Marks**
External – 70 Marks

Note:- Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

Course Objectives:

Objective of this course is to make the students familiar with the basic concepts of Networking. It will also make the students familiar with the working of latest network technologies and applications.

Learning Outcomes:

After getting though this course student will gain the knowledge of Networking models, different media for transmission, addressing types and their difference, routing protocols. Students will also gain knowledge of layered structure and working of different network technologies used in today's world.

Unit-I

Network Concepts : Goals and applications of computer Networks; Topologies; Categories of Networks - LAN, MAN, WAN Internet works; point-to point, and broadcast networks.

Networks architecture: Concepts of protocols & services; OSI model and functions of its layers; TCP/IP reference model. TCP/IP: Elements of Transport Protocols; Transmission Control Protocol (TCP); user datagram protocol (UDP); Internet Protocol (IP).

Unit-II

Data communication concepts: Components of a data communication system; transmission modes; transmission media – guided and wireless media; introduction to switching (circuit, message and packet) and multiplexing (frequency division and time division); concept of Modems. Introduction to SMDS, X:25, Networks ISDN, frame relay and ATM networks.

Unit III

Framing and Error control: Framing techniques; Error control-error detection & correction.

Data Link Control: Acknowledgments, sliding Window protocols. Multiple Access Control, Flow and Error Control, , token bus, token ring, DQDB

Unit-IV

Routing: Deterministic and Adaptive routing; Centralized and distributed routing; shortest-path; flooding; flow based; optimal; distance vector, link-state, hierarchical; routing for mobile hosts; broadcast and multicast routing.

Congestion Control: Principles of congestion control; Traffic Shaping; Choke packets; load shading; RSVP.

Reference:

- Andrews, Tananbaum, Computer Networks – PHI.
- Fred Halsall, Addison Wesley, Data Communications, Computer Networks and Open Systems, fourth edition.
- Behrouz, Frozen, Introduction to Data Communications and Networking- Tata MC-Graw Hill.
- William Stalling, Data and Computer Communications, 5th edition-, PHI.

MCA-13 Software Engineering

L/T - 4 **Total Credits – 4** **Internal - 30 Marks**
External – 70 Marks

Note:- Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

Course Objectives:

1. To study fundamental concepts in software engineering, SDLC, Software requirements specification, formal requirements specification and verification.
2. To study the basic techniques for improving quality of software.
3. Understand the fundamental principles of Software Project management & will also have a good knowledge of responsibilities of project manager and how to handle these.
4. To understand the basic knowledge of Estimation model.

Learning Outcomes:

1. Ability to analyze and specify software requirements.
2. Ability to apply software engineering principles and techniques to develop large-scale software systems.
3. Ability to plan and work effectively in a team.

Unit-I

Software and software engineering, Software characteristics, software crisis, software engineering paradigms, Planning and software project, Software cost estimation , project scheduling, personnel planning, team structure.

Unit-II

Software configuration management, quality assurance, project monitoring, risk management.
Software requirement analysis - structured analysis, object oriented analysis and data modeling, software requirement specification, validation.

Unit-III

Design and implementation of software - software design fundamentals, Structured design methodology and Object Oriented design, design verification, monitoring and control, coding.
Software Reliability - metric and specification, fault avoidance and tolerance, exception handling, defensive programming.

Unit-IV

Testing - Testing fundamentals, white box and black box testing, software testing strategies: unit testing, integration testing, validation testing, system testing, debugging.
Software maintenance - maintenance characteristics, maintainability, maintenance tasks, maintenance side effects. CASE tools.

References:

- Fundamentals of Software Engineering, Rajib Mall.
- Software Engineering, a book by Aggarwal K.K, Singh Yogesh, New Age International
- Pressman S. Roger, Software Engineering, Tata McGraw-Hill.
- Jalote Pankaj, An integrated Approach to software, Engineering, Narosa Publishing House.

MCA-14 Operating Systems

L/T - 4 **Total Credits – 4** **Internal - 30 Marks**
External – 70 Marks

Note: Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

Course Objectives:
Some basic concepts of operating systems will be covered in this course. The objective of this course is to study, learn, and understand the basic concepts of operating systems, namely, types of operating systems, memory management, process management, deadlock management and file protection, etc.

Learning Outcomes:
From viewpoints of knowledge and understanding, a learner shall be able to appreciate the working of a computer system in general. Cognitively, the learners shall be able to understand the management of computing resources namely, processor/processes, primary and secondary storage, etc.

Unit-I
Introductory concepts: Operating system goals and functions, types of operating systems – batch operating system, multitasking operating system, time-sharing operating systems, real-time operating systems, distributed operating systems, system calls and their types, layered architecture of operating system; modules of kernel of operating system their functions.

Unit-II
Memory management: Functions of memory management module, memory allocation methods – contiguous and non-contiguous memory allocation; real and virtual memory allocation; fragmentation – internal and external, paging, segmentation, virtual memory concepts, demand paging, page replacement algorithms, thrashing, Belady's anomaly.

Unit-III
Process management: Process concept, PCB, Process switch and mode switch; system state and state space, state transition diagram; scheduling criteria, preemptive and non-preemptive scheduling, starvation and its mitigation, process scheduling algorithms, levels of scheduling, comparison of scheduling algorithms, inter-process communication, critical code section, mutual exclusion and its implementation, semaphore, hardware support for mutual exclusion.

Unit-IV
Deadlock - concept, conditions; deadlock management – prevention, avoidance, deadlock detection and recovery, practical considerations – ostrich approach; file – concept, file protection, file access control, file access methods; directory structure; disk space allocation; disk scheduling algorithms and their performance comparison.

Reference:

- Peterson, J.L. &Silberschatz, A, Operating System concept, Addison Wesley reading.
- Brinsh, Hansen, Operating System Principles, Prentice Hall of Indio a.
- Hageman, A.N., Introducing to Operation System Design Galgotia Publication, New Delhi.
- Tanenbaum, A.S., Operating system.
- Hansen P.B., Architecture Concurrent Programs, PHI.
- Shaw, A.C., Logic design of Operating Systems, PHI.
- Deitel, H.M., Operating System, John Wiley/Addison Wesley.

MCA-15 Java and [dot]NET

L/T - 4 **Total Credits – 4** **Internal - 30 Marks**
External – 70 Marks

Notes: - Total 09 questions are to bet set by the examiner. First question will be compulsory consisting of 5 short answer type question (each carry 2 marks) covering the entire syllabus uniformly. In addition, 08 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A Candidate is required to attempt five questions in all selecting one from each unit including the compulsory question.

Course Objectives:

1. Illustrate the basic concepts and building blocks of Java and C#.Net language programming using module's approach which gives emphasize to small programs.
2. Learn how to write moderately complex programs efficiently.
3. Learn making GUI based application in Java as well as C#.Net.

Course Outcomes:

1. Knowing essential concepts, principles and theories of Java and C# technology relating the Desktop application.
2. Develop real world programming problems and applications efficiently using advanced libraries of both technologies.

Unit I

Introduction to Java and [dot]Net. Environments, Languages, Basic Concepts, Data Types, Scaler Data Types, Reference Types, Operators and its types, Decision Controls, Control Statements, Loops, Array, String, Functions. Boxing Unboxing. Scope of variables.

Unit II

Introduction to OOPS: Encapsulation, Class, Object, Constructors, Destructors, Polymorphism: Function Overloading and Operator Overloading, Inheritance, Interface, Abstract Class, Packages. Wrapper Classes. Exception Handling.

Unit III

Introduction to Multithreading: Thread Model, Multithreading Supporting classes and methods. Creating Single and Multiple Thread. Context Switching, Thread Synchronization. Interthread Communication. Dead Lock. Working with GUI: AWT.

Unit IV

Event Handling. Collection framework: Interfaces and Classes for collection. List, Set, Map. Date and Time. i18n. File Stream: Input and output Stream. File handling operations.

Reference:

- Dongles E.Comet, Compiler Networks & Internet , 2nd edition, Addison Wesley.
- Darrel Ince & Adam Freeman, Programming the Internet with Java, revised edition-, Addison Wesley.
- E.Balaguruswamy, Programming with Java –2nd Edition, TNH
- Herbert Schildt, The complete reference Java 2
- Mug Hal K.A., Rasmussen R.W., Addison Wesley, A Programmer's guide to Java certification
- E.Balaguruswami , Programming with Java, Tata MacGraw Hill.
- Herbert Schildt, The complete reference Java, Tata MacGraw Hill.
- K.A. Mug Hal, R.W. Rasmussen, Programmer's guide to Java certification, Addison Wesley.
- E. Balaguruswamy, Programming in C #, Tata McGraw Hill.
- Herbert Schildt, C #: A Beginner's Guide, Tata McGraw Hill.

MCA-21 Data Structures

L/T - 4 **Total Credits – 4** **Internal - 30 Marks**
External – 70 Marks

Note: Total 09 questions are to be set by the examiner. First question will be compulsory consisting of 5 short answer type questions (each carry 2 marks) covering the entire syllabus uniformly. In addition, 08 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A Candidate is required to attempt five questions in all selecting one from each unit including the compulsory question.

Course Objectives:

1. To provide the knowledge of basic Data structures and their implementation.
2. To understand importance of data structures in context of writing efficient programs.
3. To develop skills to apply appropriate data structures in problem solving.

Learning Outcomes:

Students will be able to:

1. Select appropriate data structures to specified problem definition.
2. Implement operations like searching, sorting, insertion, deletion and traversing on various data structures.
3. Determine and analyze the complexity of given Algorithms.

Unit I

Data Structure and algorithm preliminaries: Definitions, Time and Space analysis of Algorithms, Time-Space Tradeoff, Mathematical Notation and functions, Asymptotic Notations for complexity of algorithms, Recursion, Divide and Conquer Strategy

Unit II

Linear Data Structures: Abstract Data Types, Array based implementation, Stack -Operations and application of Stacks, Queues- Operation on Queues, Circular queue, Priority queues and deQueue, Linked list and its variations, Implementation of Linked list, Header linked list for Polynomial manipulation.

Unit III

Non-linear Data Structures : Trees –Binary tree ,Tree Traversals, Binary Search Tree, Threaded Binary Tree ,AVL Trees, B-Tree, B+ tree , Heap and its applications, Huffman coding.

Graph- Representation of Graphs, Types of Graph, Graph Traversals , Topological Sort, Minimum Spanning trees , Kruskal and Prim's Algorithm, Application of Graphs.

Unit IV

Searching, Sorting and Hashing Techniques: Searching –Linear Search, Binary Search. Sorting- Bubble sort, Selection sort, Insertion sort, Radix sort, Shell sort, Merge Sort ,Quick Sort, Heap sort , Hashing- Hash functions, open addressing ,chaining, Rehashing.

References:

1. Seymour Lipschutz, Data Structures, McGraw-Hill Book Company,Schaum's Outline series, NewYork (1986).
2. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, Pearson Education, 2002.
3. Tanenbaum A.M., Langsam Y, Augenstien M.J., Data Structures using C & C++, Prentice Hall of India, 2002.
4. Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) Pvt.Ltd, 2nd edition, Universities Press Orient Longman Pvt. Ltd.

MCA-22 COMPUTER GRAPHICS

L/T - 4 **Total Credits – 4** **Internal - 30 Marks**
External – 70 Marks

Note: - Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

Course Objectives:
Objective of this course is to make the students familiar with the basic concepts of Computer Graphics. It will also make the students familiar with the working various graphic devices and applications.

Learning Outcomes:
After getting though this course student will gain the knowledge of graphic devices, different algorithms used in computer graphics. Students will also gain knowledge of various graphic operations.

Unit-I

Introduction: Survey of computer Graphics and its applications; Interactive and passive graphics; Introduction to GKS Primitives; display processors;
Graphic Devices: Display system-refresh CRTs, raster scan and random scan monitors Grey shades, Interlacing, beam penetration shadow mask monitors, lock up tables, plasma panel, LED and LCD Monitors, LCD Monitors, VGA and SVGA resolution; Hard copy Devices-printers, plotters

Unit-II

Drawing Geometry: Coordinate system; resolution; use of homogeneous coordinate system; scan conversion: symmetrical DDA, simple DDA, Bresenhams line drawing algorithm, generation of ellipse.
2-D Transformations: Translation; rotation; scaling; mirror reflection; shearing: Zooming; panning; input techniques-pointing, positioning, rubber and methods and dragging; tweezing.

Unit-III

Graphic operations: Clipping-line clipping using Sutherland-Cohen and midpoint: sub-division algorithm, polygon clipping; window and view port; windowing transformation; Filling-stack based fill algorithm
Multimedia: concepts of Hypertext/Hypermedia; multimedia applications; multimedia authoring; multimedia hardware; images; bitmaps; windows paint brush.

Unit-IV

3-D Graphics: 3D modeling of objects; 3D display techniques; coordinate system; 3D transformation matrices for translation, scaling and rotation; parallel projection; perspective projection; Hidden-surface removal – z- buffer, back face, scan-line, depth-sorting, area subdivision; shading- modeling light intensities, gourad shading, phong shading.

Reference:

- Donald Hearn, Computer Graphics, M.Pauline Baker, PHI.
- Newman & Sproull, Principles of Interactive Computer Graphics, McGraw Hill.
- John F. Koegel Bufore, Multimedia systems, Addison Wesley.
- Foley, Computer Graphics Principles & Practice, Addison Wesley.
- Rogers, Procedural elements of Computer Graphics, McGraw Hill.
- D.P. Mukherjee, Fundamentals of computer Graphics and Multimedia, PHI.

MCA-23 Database Systems

L/T - 4 **Total Credits – 4** **Internal - 30 Marks**

External – 70 Marks

Note: Total 09 questions are to be set by the examiner. First question will be compulsory consisting of 5 short answer type questions (each carry 2 marks) covering the entire syllabus uniformly. In addition, 08 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A Candidate is required to attempt five questions in all selecting one from each unit including the compulsory question.

Course Objectives: The objective of the course is to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve information from a database efficiently and effectively. This syllabus covers issues arising related to transaction processing in multiuser database systems.

Learning Outcomes:

Upon successful completion of this course, students should be able to:

- Describe the fundamental elements of RDBMS.
- Differentiate between Legacy data models and high-level data models.
- Improve the database design by Normalization.
- Formulate SQL queries on data

Unit-I

Basic Concepts: A Historical perspective, File System vs. DBMS, Characteristics of the Data Base Approach, Abstraction and Data Integration, Database users, Advantages and Disadvantages of a DBMS, Implication of Data Base approach. **Database System concepts and Architecture-** Data Models, Schemas and Instances, DBMS architecture and Data Independence Data Base languages & Interfaces, DBMS functions and component modules.

Unit-II

Entity-Relationship Model: Entity Types, Entity Sets, Attributes & Keys, Relationships, Relationship Types, Roles and Structural Constraints, Design issues, Weak entity types, E-R Diagrams, Design of an E-R Data Base Schema, **Conventional Data Models**- An overview of Network and Hierarchical Data Models**, Relational Data Model-** Relational Model concepts, Integrity constraints over Relations, Relational Algebra – Basic operations.

Unit-III

SQL: Data Definition, Constraints, & Schema changes in SQL, Insert, Delete & update statements in SQL, View in SQL, Specifying constraints and Indexes in SQL, Queries in SQL. **ORACLE –** A Historical perspective, Basic Structure, Data Base Structure and its manipulation in ORACLE, Storage Organization in ORACLE Programming ,ORACLE Applications.

Relational Data Base Design: Functional Dependencies, Decomposition, Desirable properties of decomposition, normal forms based on primary keys (1 NF, 2 NF, 3 NF and BC NF), **Practical Data Base Design:** Role of Information systems in organizations, Data Base Design process, physical Data Base Design in Relational Data bases.

Unit-IV

Transaction Processing concepts : Introduction to Transaction Processing, Transaction & System Concepts, Properties of Transaction, Schemes and Recoverability, Serializability of Schedules, **Concurrency Control Techniques**: Locking Techniques, Time stamp ordering, Multiversion Techniques, Optimistic Techniques, **Recovery Techniques**: Recovery concepts, recovery Techniques in centralized DBMS, **Database Security**: Introduction to Database Security issues.

References:

- Elmasri & Navathe : Fundamentals of Database System, 3rd Edition, Addison Wesley, New Delhi.
- Korth & Silberschatz: Database System Concept, 4th Edition, McGraw Hill International Edition.
- C.J. Date: An Introduction to Database System 7th Edition, Addison Western New Delhi.
- Abbey Abramson & Cory: ORACLE SI-A Beginner's Guide Tata McGraw Hill Publishing Company Ltd.

MCA-24 ARTIFICAL INTELLIGENCE

L/T - 4 **Total Credits – 4** **Internal - 30 Marks**
External – 70 Marks

Note:- Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

Course Objectives:

- To study about Intelligent agent and search methods.
- To study the concept of expert systems.
- To study about representing knowledge.
- To construct plan and methods for generating knowledge.
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Learning Outcomes: By the end of the course students will be able to:

- Understand what the AI is.
- Apply search and knowledge representation techniques to solve AI problems.
- Have ability to identify the solution of AI problems.

UNIT-I

The predicate calculus

Syntax and semantic for propositional logic and FOPL, Censual form, inference rules, resolution and unification.

Knowledge: representation: Network representation-Associative network & conceptual graphs, structured representation: Frames & Scripts.

UNIT-II

Search Strategies & Production Systems

Strategies for state space search-data driven and goal driven search; search algorithms- uninformed search (depth first, breadth first, depth first with iterative deepening) and informed search (Hill climbing best first, AN algorithm, mini-max etc.), computational complexity, Properties of search algorithms-Admissibility, Monotonicity, Optimality, Dominance, etc.

Types of production system control of search in production system.

UNIT-III

Rule based expert systems

Architecture, development, managing uncertainty in expect systems (Bayesian probability theory, Non-monotonic logic and reasoning with beliefs.

Fuzzy logic: definition, Fuzzy logic systems architecture, difference between Boolean and fuzzy logic.

UNIT-IV

Knowledge acquisition& Prolog

Types of learning, learning automata, genetic algorithms, intelligent editors, learning by induction, Programming with Prolog.

Reference:

- George F. Luger, William A. Stubblefield, Artificial Intelligence, The Benjamin/Cummings Publishing Company, Inc.
- Dan W. Patterson, Introduction to Artificial Intelligence and Expert system, PHI.
- Eugene Charniak, Drew McDermott, Introduction to Artificial Intelligence" Addison Wesley.
- Wils J. Nilsson, Principles of Artificial Intelligence, Narosa Publishing house.
- Jackson Peter, Introduction to Expert systems, 3rd edition, (Addison Wesley -2000).

MCA-25 J2EE and ASP[dot]NET

L/T - 4 **Total Credits – 4** **Internal - 30 Marks**

External – 70 Marks

Notes: - Total 09 questions are to bet set by the examiner. First question will be compulsory consisting of 5 short answer type question (each carry 2 marks) covering the entire syllabus uniformly. In addition, 08 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A Candidate is required to attempt five questions in all selecting one from each unit including the compulsory question.

Course Objectives:

- Illustrate the basic concepts and building blocks of J2EE and ASP.Net language programming using tire architecture approach.
- Learn how to write moderately complex programs efficiently.
- Learn making Web based application in J2EE as well as ASP.Net.

Learning Outcomes:

- Knowing essential concepts, principles and theories of J2EE and ASP.Net technology relating the Web application.
- Develop real world programming problems and applications efficiently using advanced libraries of both technologies.
- Knowing about advanced technologies using by experts in field of Information Technology.

Unit I

Data Base Connectivity, Data Base Programming, Queries, Functions, Procedures, Views. Methods of Database connectivity. Database management classes and methods of classes for DDL, DML, DCL.

Unit II

Introduction to J2EE and ASP.Net. HTML tags, XML tags, Java Script Basics: Data Types, operators, decision statements, Loops and Functions. HTML DOM. Events and Cookies. Java Script objects.

Unit III

Application Server, Web Server. Web Development using JSP and Servlet. Life Cycle. Web Development in ASP.Net. Cookies handling. Request Response Objects. Session.

Unit IV

MVC in java and .net. Introduction to: Struts. Spring. Hibernate, AJAX, EJB, SignalR, React, AngularJS.

References:

- Thomas A Powell, HTML-The Complete Reference, Tata McGraw Hill.
- ScoteGuelich, ShishirGundavaram, Gunther Birzniek; CGI Programming with Perl 2/e. O'Reilly.
- Pardi, XML in Action, Web Technology, PHI.
- Aaron weiss, Rebecca Taply, Kim Daniels, Stuven Mulder, Jeff Kaneshki, Web Authoring Desk Reference, Techmedia Publication.
- Jeffery R. Shapiro, The Complete Reference Visual Basic .NET, Tata McGraw Hill
- E. Ealaguruswamy , Programming in C # , Tata McGraw Hill.
- V.P. Jain , The Complete Guide to C # Programming .
- Herbert Schildt, C #: A Beginner's Guide, Tata McGraw Hill
- Servlet and JSP. Joel Murach. Murach, 2e. 2014.
- The Complete Reference ASP.NET. Methew Macdonald. Osborne.
- ASP.NET Core 2.0. Jon Galloway, Wrox Publication.