Scheme of Examination

Second Semester
Master of Computer Application
(wef-2020-21)

S.No	Subject Code	Subject Name	Periods per week			Credits	Maximum Marks (Theory Slot)			Maximum Marks (Practical Slot)		Total Marks
			L	T	P		End sem. Exam	Tests (Two)	Assignment /Quiz	End Sem Practical / Viva	Practical record/ Assignment/Quiz/ Presentation	
1	MCA 201	Artificial Intelligence & Applications	3	1	-	4	70	20	10	-	-	100
2	MCA 202	Mobile Computing	3	1	-	4	70	20	10	-	-	100
3	MCA 203	Statistics for Computer Application	3	1	-	4	70	20	10	-	-	100
4	MCA 204	Design & Analysis of Algorithms	3	1	-	4	70	20	10	-	-	100
5	MCA 205	Java Programming & Technologies	3	1	-	4	70	20	10	-	-	100
6	MCA 206	Minor Project -I	-	-	8	8	-	-	-	120	80	200
7	MCA 207	Programming Lab In Java	-	-	2	2	-	-	-	30	20	50
		Total	**15**	**5**	**10**	**30**	**350**	**100**	**50**	**150**	**100**	**750**

L: Lecture - T: Tutorial - P: Practical

MCA-201 Artificial Intelligence & Applications

Course objectives

The primary objective of this course is to introduce the basic principles, techniques, and applications of Artificial Intelligence. Specifically:

1. Gain a historical perspective of AI and its foundations.
2. Become familiar with basic principles of AI toward problem solving, inference, perception, knowledge representation, and learning.
3. Investigate applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
4. Experience AI development tools such as an 'AI language', expert system shell, and/or data mining tool.
5. Experiment with a machine learning model for simulation and analysis.
6. Explore the current scope, potential, limitations, and implications of intelligent systems.

Total (60 Hours)

Unit-I (12 Hours)

General Issues and Overview of AI

The AI problems, what is an AI technique, Characteristics of AI applications. Introduction to LISP Programming: Syntax and numeric functions, Basic list manipulation functions, predicates and Conditionals, input output and local variables, iteraction and recursion, property lists and arrays.

Unit-II (12 Hours)

Problem Solving, Search and Control Strategies

General problem solving, production systems, control strategies forward and backward chaining, Exhausive searches depth first breadth first search. Heuristic Search Techniques Hill climbing, branch and bound technique, best first search & A* algorithm, AND / OR graphs, problem Reduction & AO* algorithm, constraint satisfaction problems.

Unit-III (12Hours)

Knowledge Representations

First order predicate calculus, skolemization, resolution principle & unification, interface mechanisms, Horn's clauses, semantic networks, frame systems and value inheritance, scripts, conceptual dependency.

Unit-IV (12 Hours)

Natural Language processing: Parsing techniques, context free grammar, recursive transitions nets (RNT), augmented transition nets (ATN), case and logic grammar, semantic analysis. Game playing minimax search procedure, alpha-beta cutoffs, additional refinments. Planning Overview an example domain the block word, component of planning systems, goal stack planning, and nonlinear planning.

Unit-V (12 Hours)

Probabilistic Reasoning and Uncertainty: Probability theory, baye's theorem and bayesian networks, Certainty factor. **Expert Systems** Introduction to expert system and application of expert systems, various expert system shells, knowledge acquisition, case studies, MYCIN. Learning Rote learning, learning by induction, explanation based learning.

Course outcomes:

1. Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.
2. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
3. Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
4. Demonstrate proficiency developing applications in an 'AI language', expert system shell, or data mining tool.
5. Demonstrate proficiency in applying scientific method to models of machine learning.
6. Demonstrate an ability to share in discussions of AI, its current scope and limitations, and societal implications.

Books

1. Elaine Rich and Kevin Knight "Artificial Intelligence" - Tata McGraw Hill.

2. Dan W. Patterson "Introduction to Artificial Intelligence and Expert Systems", Prentice India.

3. Nils J. Nilson "Principles of Artificial Intelligence", Narosa Publishing House.

MCA-202 Mobile Computing

Course Objectives

1. This course introduces the basic concepts and principles in mobile computing.
2. This includes the major techniques involved, and networks & systems issues for the design and implementation of mobile computing systems and applications.
3. This course also provides an opportunity for students to understand the key components and technologies involved and to gain hands-on experiences in building mobile applications.

Total (60 Hours)

Unit-I (12 Hours)

Overview of OSI Model: Significance of layered Model, PDUs, SDUs, IDUs, Higher layer Protocols. Switching and Components. Introduction, Applications, history, of wired & wireless Communication Systems. Radio Transmission: Frequencies, signal propagation, antenna, types of modulation, FHSS, DSSS. Multiple Access technology for Wireless Communication: FDMA, TDMA, CDMA Cellular System: Introduction, types.

Unit-II (12 Hours)

Mobile Data Communication: Cellular Telephony, Structure, Fading, Small scale fading, Multi-path Fading, Speech Coding, Error Coding and Correction, Hand off Management, Switching and authentication, MTSO interconnections, frequency hopping, frequency reuse. Circuit Switched Data Services & Packet Switched Data Services on Cellular Networks, Personal Communication Systems (PCS) Architecture, Digital Enhanced Cordless Telecommunications (DECT,) Personal Access Comm. System (PACS).

Unit-III (12 Hours)

Digital Cellular Systems and Standards: GSM System overview, Architecture, GSM Protocol Model, GSM Mobility Management, SMS security aspects. Broadcast System overview. General Packet Service (GRPS)Architecture, GRPS Network, Interfaces and Procedures (2.5 G), 3G Mobile Services: UMTS and International Mobile Telecommunications (IMT-2000), W-C DMA and CDMA 2000,Quality of service in3G.

Unit-IV (12 Hours)

WLAN: Components and working of Wireless LAN, Transmission Media for WLAN, Infrastructure & Types of WLAN, IEEE 802.11 Standards, Protocols for WLAN, MACA, MACAW, Infrared technology. Wireless Application Protocol (WAP) model, architecture, Gateway, WAP protocols and WML.

Unit-V (12 Hours)

Introduction to Bluetooth technology, Wireless in local loop(WLL)architecture, products, Satellite as a switch, Components of VSAT system, VSAT topologies, access schemes Special topics: Wireless and Mobile Computation SS7, GSM, CDMA, Mobile IP, Wireless Mobile ATM, Multicast Routing Protocols, Location Management, Mobile Agents, Mobility Management.

Course outcomes:

1. Describe the basic concepts and principles in mobile computing
2. Understand the concept of Wireless LANs, PAN, Mobile Networks, and Sensor Networks
3. Explain the structure and components for Mobile IP and Mobility Management
4. Understand positioning techniques and location-based services and applications
5. Describe the important issues and concerns on security and privacy

Books

1. Jochen Schiller “Mobile Communication”, Pearson Education.
2. Raj Panadaya “Mobile and Personal Communication System & services
3. Lee “Mobile Cellular Telecom” 1995 Mc Graw Hill

MCA -203 Statistics for Computer Application

Course Objectives:

1. The objective of this course is to familiarize the students with Statistical technique.
2. To develop the students ability to deal with numerical and quantitative issues in decision Making.
3. To enable the use of statistical, graphical and algebraic techniques wherever relevant.
4. To have a proper understanding of Statistical applications in Computer Science.

Total-(60 Hours)

UNIT-1(12 Hours)

Variables & Graphs: Statistics, population & sample, discrete & continuous variables, graphs, logarithms, Frequency distributions: frequency distributions, histogram, frequency polygons. Frequency curve, cumulative frequency distribution, ogive curve.

UNIT-II(12 Hours)

Measures of central tendency: The arithmetic mean, weighted arithmetic mean geometric mean, harmonic mean, mean power of numbers, root mean square, median, mode, quartiles, deciles & percentiles. Measures of dispersion: The range, mean deviation, semi inter quartile range for quartiles, deviation, absolute & related dispersion, coefficient of variation.

UNIT-III(12 Hours)

Skewness & kurtosis: Moments of various types, relation between moments, sheppard's correction to moments, skewness & kurtosis, moment generating function. Elementary probability theory: sample space, events, classical definition of portability Independent & dependent event, mutually exclusive event, mathematical expectation.

UNIT-IV(12 Hours)

Theoretical distributions discrete & continuous probability distribution. Basic concepts & applications of degenerate, Bernoulli, Binomial, geometric negative binomial. Hyper geometric & Poisson distributions, normal distribution Curve fitting & the method of last squares: curve fitting the method of least square, the least square lines, the least square parabola, regression.

UNIT-V(12 Hours)

Correlation theory : Linear correlation, Measures of correlation, the least square regression lines expected & unexpected variation, coefficient of correlation, rank correlation, correlation index, multiple & partial correlation for three variables; Theory of attributes: Consistency of data, association of attributes, coefficient of association, contingency tables.

Books

1. Statistical methods, S.P. Gupta, Sultan Chand & Sons.
2. Statistics schaum's outline series, Spiegel, M.R.McGraw Hill Publishing Company.
3. Mathematical statistics Kapoor & Saxena : - S,Chand & sons.

Course Outcomes:

1. Quantify uncertainty using probability, learn how to find probability using the concepts of random variables and distribution functions, obtain characteristics of the underlying distributions, and study functional relationships between two random variables.
2. Know various discrete and continuous probability distributions along with their characteristics and identify the situations where they provide realistic models.
3. Learn about sampling and sampling distributions along with their characteristics which will help them analyze the population or phenomenon from which the sample is drawn.
4. Learn inferential methods wherein the distributional form of population or phenomenon from which the sample is drawn.

MCA-204 Design and Analysis of Algorithms

Course Objectives:

1. Analyze the asymptotic performance of algorithms.
2. Write rigorous correctness proofs for algorithms.
3. Demonstrate a familiarity with major algorithms and data structures.
4. Apply important algorithmic design paradigms and methods of analysis.
5. Synthesize efficient algorithms in common engineering design situations.

Total- (60 Hours)

UNIT-I (12 Hours)

Pre-requisites: Data structure & Discrete structures, models of computation, algorithm analysis, order Architecture, time space complexities average and worst case analysis.

UNIT-II (12 Hours)

Divide and conquer: Structure of divide-and-conquer algorithms: examples; Binary search, quick sort, Strassen Multiplication; Analysis of divide and conquer run time recurrence relations.
Graph searching and Traversal: Overview, Traversal methods (depth first and breadth first search)

UNIT-III (12 Hours)

Greedy Method: Overview of the greedy paradigm examples of exact optimization solution (minimum Cost spanning tree), approximate solution (Knapsack problem), Single source shortest paths.
Branch and bound: LC searching Bounding, FIFO branch and bound, LC branch and bound application: 0/1 Knapsack problem, Traveling Salesman Problem, searching & sorting algorithms.

UNIT-IV (12 Hours)

Dynamic programming: Overview, difference between dynamic programming and divide and conquer, Applications: Shortest path in graph, Matrix multiplication, Traveling salesman Problem, longest Common sequence.
Back tracking: Overview, 8-queen problem, and Knapsack problem

UNIT-V (12 Hours)

Computational Complexity: Complexity measures, Polynomial Vs non-polynomial time complexity; NP-hard and NP-complete classes, examples.
Combinational algorithms, string processing algorithm, Algebric algorithms, set algorithms

Course Outcomes

1. For a given algorithms analyze worst-case running times of algorithms based on asymptotic analysis and justify the correctness of algorithms.
2. Describe the greedy paradigm and explain when an algorithmic design situation calls for it. For a given problem develop the greedy algorithms.
3. Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Synthesize divide-and-conquer algorithms. Derive and solve recurrence relation.
4. Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. For a given problems of dynamic-programming and develop the dynamic programming algorithms, and analyze it to determine its computational complexity.
5. For a given model engineering problem model it using graph and write the corresponding algorithm to solve the problems.

BOOKS:

1. Ullman "Analysis and Design of Algorithm" TMH
2. Sara Basse, A. V. Gelder, " Computer Algorithms," Addison Wesley
3. T. H. Cormen, Leiserson , Rivest and Stein, "Introduction of Computer algorithm," PHI
4. E. Horowitz, S. Sahni, and S. Rajsekaran, "Fundamentals of Computer Algorithms," Galgotia Publication

MCA-205 Java Programming & Technologies

Course Objectives:

1. Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
2. Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
3. Be aware of the important topics and principles of software development.
4. Have the ability to write a computer program to solve specified problems.
5. Be able to use the Java SDK environment to create, debug and run simple Java programs.

Total-(60 Hours)

UNIT-I (12 Hours)

The Java Environment: History of Java: Comparison of Java and C++; Java as an object oriented language: Java buzzwords; A simple program, its compilation and execution; the concept of CLASSPATH; Basic idea of application and applet; Basics: Data types; Operators- precedence and associativity; Type conversion; The decision making – if, if-else, switch; loops – for, while, do…while; special statements–return, break, continue, labeled break, labeled continue; Modular programming methods; arrays; memory allocation and garbage collection in java keywords.
Object Oriented Programming in Java: Class; Packages; scope and lifetime; Access specifies; Constructors; Copy constructor; this pointer; finalize () method; arrays; Memory allocation and garbage collection in java keywords
Inheritance: Inheritance basics, method overriding, dynamics method dispatch, abstract classes.

UNIT-II (12 Hours)

Interfaces: defining an interface, implementing & applying interfaces, variables in interfaces, extending interfaces.
Multithreading and Exception Handling: Basic idea of multithreaded programming; The lifecycle of a thread; Creating thread with the thread class and runnable interface; Thread synchronization; Thread scheduling; Producer-consumer relationship; Daemon thread, Selfish threads; Basic idea of exception handling; The try, catch and throw; throws Constructor and finalizers in exception handling; Exception Handling.

UNIT-III (12 Hours)

Applets: Applet security restrictions; the class hierarchy for applets; Life cycle of applet; HTML Tags for applet.
The AWT: The class hierarchy of window fundamentals; The basic user interface components Label, Button, Check Box, Radio Button, Choice menu, Text area, Scroll list, Scroll bar; Frame; Layout managers flow
layout, Grid layout, Border layout, Card layout.
The Java Event Handling Model: Java's event delegation model – lgnoring the event, self-contained events, Delegating events; The event class hierarchy; The relationship between interface, methods called, parameters and event source; Adapter classes; Event classes action Event, Adjustment Event, Container Event, Focus Event, Item Event, Mouse Event, Text Event, Window Event.

UNIT-IV (12 Hours)

Input/output: Exploring Java i.o., Directories, stream classes
The Byte stream: Input stream, output stream, file input stream, file output stream, print stream, Random access file, the character streams, Buffered reader, buffered writer, print writer, serialization.
JDBC: JDBC-ODBC bridge; The connectivity model; The driver manager; Navigating the result set object contents; java. sql Package; The JDBC exception classes; Connecting to Remote database.

UNIT-V (12 Hours)

Networking & RMI: Java Networking: Networking Basics: Socket, Client server, reserved sockets, proxy Servers, Inet address, TCP sockets, UDP sockets. ; RMI for distributed computing; RMI registry services; Steps of creating RMI Application and an example.
Collections: The collections framework, collection interfaces, collection classes.

Course outcomes

1. Knowledge of the structure and model of the Java programming language, (knowledge)
2. Use the Java programming language for various programming technologies (understanding)
3. Develop software in the Java programming language, (application)

BOOKS

1. Naughton & Schildt "The Complete Reference Java 2", Tata McGraw Hill
2. Deitel "Java- How to Program:" Pearson Education, Asia
3. Horstmann & Cornell "Core Java 2" (Vol I & II), Sun Microsystems
4. lvan Bayross "Java 2.0" : BPB publications
5. Ivor Horton's "Beginning Java 2, JDK 5 Ed., Wiley India.

List of Program to be perform (Expandable)

1. Installation of J2SDK
2. Write a program to show Scope of Variables
3. Write a program to show Concept of CLASS in Java
4. Write a program to show Type Casting in Java
5. Write a program to show How Exception Handling is in Java
6. Write a Program to show Inheritance
7. Write a program to show Polymorphism
8. Write a program to show Access Specifiers (Public, Private, Protected) in Java
9. Write a program to show use and Advantages of CONTRUCTOR
10. Write a program to show Interfacing between two classes
11. Write a program to Add a Class to a Package
12. Write a program to show Life Cycle of a Thread
13. Write a program to demonstrate AWT.
14. Write a program to Hide a Class
15. Write a Program to show Data Base Connectivity Using Java
16. Write a Program to show "HELLO Java" in Explorer using Applet
17. Write a Program to show Connectivity using JDBC
18. Write a program to demonstrate multithreading using Java.