

GARDEN CITY UNIVERSITY

**SCHOOL OF COMPUTATIONAL SCIENCES AND INFORMATION
TECHNOLOGY**

MASTER OF SCIENCE (IT) (AI & ML & CLOUD COMPUTING) (2020-22)

SEMESTER- I

COURSE: CLOUD COMPUTING

CODE:05BMSIT20161

CREDITS: 04

UNIT I:INTRODUCTION

Cloud Computing definition, private, public and hybrid cloud. Cloud types; IaaS, PaaS, SaaS. Benefits and challenges of cloud computing, public vs private clouds, role of virtualization in enabling the cloud. Business Agility: Benefits and challenges to Cloud architecture. Application availability, performance, security and disaster recovery; next generation Cloud Applications.

UNIT II: CLOUD TECHNOLOGIES

Technologies and the processes required when deploying web services; Deploying a web service from inside and outside a cloud architecture, advantages and disadvantages. Designing Cloud Based Applications: Role of business analyst, requirements gathering, UML, use of state diagrams. Wire frame prototypes, use of design tools such as Balsamiq. Selecting front end technologies and standards. Impact of growth in mobile computing on functional design and technology decisions.

UNIT III:INFRASTRUCTURES AND SERVICES

Reliability, availability and security of services deployed from the cloud. Performance and scalability of services, tools and technologies used to manage cloud services deployment. Cloud Economics: Cloud computing infrastructures available for implementing cloud based services. Economics of choosing a Cloud platform for an organization, based on application requirements, economic constraints and business. Service creation environments to develop cloud based applications. Development environments for service development; Amazon, Azure, Google App. Analysis of Case Studies when deciding to adopt cloud computing architecture. – Decision on the cloud requirements.

UNIT IV: SECURITY AND CRYPTOGRAPHIC SYSTEMS

Confidentiality, privacy, integrity, authentication, non-repudiation, availability, access control, defense in depth, least privilege, how these concepts apply in the cloud. User authentication in the cloud; Cryptographic Systems- Symmetric cryptography, stream ciphers, block ciphers. Modes of operation, public-key cryptography, hashing, digital signatures. Public-key infrastructures, key management, X.509 certificates, OpenSSL. Cloud Security Applications – Case Study on Public Cloud Computing Security - Cloud Computing Compliance, Audit and Data Governance.

References:

- Gautam Shroff, “Enterprise Cloud Computing Technology Architecture Applications”, Cambridge University Press; 1 edition, 2010.
- Toby Velte, Anthony Velte, Robert Elsenpeter, “Cloud Computing, A Practical Approach” McGraw-Hill Osborne Media; 1 edition, 2009.
- Dimitris N. Chorafas, “Cloud Computing Strategies” CRC Press; 1 edition, 2010.
- Jim Webber, Savas Parastatidis, Ian Robinson, “REST in Practice” O'Reilly Media; 1 edition, 2010.
- Greg Schulz, “Cloud and Virtual Data Storage Networking”, Auerbach Publication, 2011.
- Marty Poniatowski, “Foundations of Green IT” Prentice Hall; 1 edition, 2009.
- EMC, “Information Storage and Management” Wiley; 2 editions [ISBN: 978-0470294215], 2012.
- Volker Herminghaus, Albrecht Scribes, “Storage Management in Data Centers” Springer; edition. 2009.
- Klaus Schmidt, “High Availability and Disaster Recovery” Springer; edition, 2006.

COURSE: CORE JAVA**CODE:05BMSIT20162****CREDITS: 04****UNIT I - INTRODUCTION**

Java Evolution: Java History, Java Features, How Java Differs from C and C++, Java and Internet, Java Support Systems, Java Environment, Structure of Java Program, Java Virtual Machine. - Overview of JAVA Language: Simple Java program, More of Java Statements, implementing a Java Program, Command Line Arguments, Constants, Variables, Data Types, Declaration of Variables, Giving Values to Variables, Scope of Variables, Symbolic Constants, Type Casting, Getting Values of Variables, Standard Default Values. - Operators and Expressions: Introduction, Arithmetic Operators, Relational Operators Logical Operators, Assignment Operators, Increment and Decrements Operators, Conditional Operators, Bitwise Operators, Special Operators, Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic Operators, Type Conversion and Associativity, Mathematical Functions.

UNIT II : CONSTRUCTORS

Decision Making and Branching: Introduction, Decision Making with if Statement, Simple if Statement, The if....else Statement, Nesting of if.....Else Statements, The else if Ladder, The Switch Statement, The ?: Operator. Decision Making and Looping: Introduction. The while Statement, the do...while Statement, the for Statement, Jumps in Loops, LabeledLoops. - Classes, Objects and Methods: Introduction, defining a Class, Adding Variables, Adding Methods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods. - Arrays, Strings and Vectors: Introduction to Arrays, One-dimensional Arrays, creating an Array, Two -Dimensional Arrays, Creating an Array, Two – dimensional Arrays, Strings, Vectors, WrapperClasses.

UNIT III: INHERITANCE

Inheritance: Introduction, Extending a Class, Superclass variable referring to a sub class, Creating a Multilevel Hierarchy, Order of calling constructors, Final Variables and Methods, Finalizer methods, Abstract Methods and Classes, VisibilityControl - Polymorphism:Introduction, Method Overloading, Method Overriding, Dynamic Method Binding, Interfaces Defining Interfaces, Extending Interfaces, ImplementingInterfacesImplementing multiple Inheritance by using Interface.Accessing Interface Variable. - Packages: Introduction, Putting Classes together, Java API Packages, Using System Packages, Naming Conventions, Creating Packages, accessing a Package, using a Package, adding a Class to a Package, HidingClasses. - Multithreaded Programming: Introduction, Creating Threads, Extending the Thread Class, Stopping and Blocking a thread, Life Cycle of a thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the 'Runnable' Interface.

UNIT IV : APPLET PROGRAMMING

Exception Handling: Introduction, Types of Errors, Exceptions, Types of exceptions, try and catch, Multiple catch, Nested Try, throw, throws, finally and built-in exceptions, Throwing our own exceptions. - Applet Programming: Introduction, How Applets Differ from Applications, preparing to Write Applets, Building Applet Code, Applet Life Cycle, creating an Executable applet, designing a Web Page, Applet Tag, Adding Applet to HTML File,

running the Applet, More About HTML Tags, Displaying Numerical Values, Getting Input from the User, passing parameters to applets.- Event Handling: Introduction, Event handling Mechanisms, Delegation Event Model, Event Classes, Sources of Events, Event Listener Interfaces, Handling Mouse and Keyboard Events, Adapter Classes. - AWT Classes: Introduction, Window Fundamentals, working with frame windows, creating a frame window in an applet, creating a windowed program, Displaying Control Fundamentals ,Labels, Buttons, Check Boxes, Check Box Group, Choice Control, Lists, Scroll Bar, Text Field, Text Area, Layout Managers.

JAVA LAB

CODE:05BMSIT20166

Credits: 02

1. Write a program to find factorial of list of number reading input as command line argument
2. Write a program to find area of geometrical figures using method.
3. Write a program in java, in which a method named add is overloaded. The add method sums two integer values, one integer value and one double value, two double values.
4. Design a class to represent a bank account include the following members:
5. Account Number Name of the Depositor Balance amount
6. To assign initial values To deposit an amount
7. To withdraw an amount after checking balance To display the details
8. Write a program to implement constructor overloading by passing different number of parameter of different types.
9. Write a program to show inheritance in java.
10. Write a program to calculate bonus for different departments using method overriding.
11. Write a program to sort list of elements in ascending and descending order and show the exception handling.
12. Write a program to implement thread, applets and graphics by implementing animation of ball moving.
13. Write a java program to implement the concept of exception handling using pre defined exception.
14. Write a java program to implement applet concept which shows the sum of two numbers.
15. Write an Applet program in which you place a button and a text area. When you click on button, in text area Your name and address is displayed. You have to take your name and address using<PARAM>.
16. Write a program to implement mouse events and keyboard events.

References:

1. C.Xavier ,” Programming with JAVA 2” , SCITECH Publications (India) Pvt Ltd, 2008
2. Advanced java 1.1 programming by Jeffrey C. Rice
3. Ken Arnold, James Gosling, David Holmes, "The Java TM Programming Language", Addison- Wesley, 2006.
4. Bill Venners, "Inside the Java 2 Virtual Machine", McGraw-Hill, 2nd edition, 2000.
5. Santhosh, “Spring and Hibernate”, Tata McGraw-Hill, 2009.

COURSE: COURSE TITLE: DATA MINING AND KDD

CODE: 05BMSIT20163

CREDITS: 04

UNIT I: INTRODUCTION TO DATA MINING

Introduction To Data Mining, KDD Process, KDD Versus Data Mining, Stages of Data Mining Process, Data Mining Techniques, Data Mining Goals, Knowledge, Representation Methods, Applications. Data Warehouse and OLAP, Data Warehouse and DBMS, Multidimensional data model ,OLAP operations. Data preprocessing -Data cleaning ,Data transformation ,Data reduction, Discretization and generating concept hierarchies.

UNIT II : FREQUENT ITEMSET MINING AND ASSOCIATION PATTERNS

Data mining knowledge representation - Task relevant data, Background knowledge, Interestingness measures, Representing input data and output knowledge, Visualization techniques. Attribute-oriented analysis -Attribute generalization, Attribute relevance, Class comparison, Statistical measures. Data mining algorithms: Association rules Frequent Itemset Generation, Rule Generation, Compact Representation of Frequent Itemsets, Alternative methods for generating Frequent Item sets, FP Growth Algorithm, Evaluation of Association Patterns

UNIT III : CLASSIFICATION TECHNIQUES

Classification :Basics, General approach to solve classification problem, Decision Trees. Rule Based Classifiers, Nearest Neighbor Classifiers. Classification 2 – Bayesian Classifiers, Estimating Predictive accuracy of classification methods. Improving accuracy of clarification methods, Evaluation criteria for classification methods, Multiclass Problem.

UNIT IV: CLUSTERING AND WEB MINING

Clustering Techniques: Overview, Features of cluster analysis, Types of Data and Computing Distance. Types of Cluster Analysis Methods, Partitioned Methods, Hierarchical Methods, Density Based Methods, Quality and Validity of Cluster Analysis, Data Mining Tools. Web Mining: Introduction, Web content mining, Text Mining, UnstructuredText, Text clustering, Mining Spatial and Temporal Databases.

DATA MINING AND KDD LAB

CODE:05BMSIT20167

Credits: 02

UNIT 1: Experiments on Data cleaning ,Data transformation ,Data reduction, Discretization

UNIT 2: Experiments on Frequent Itemset Mining And Association Patterns

UNIT III : Experiments on Classification Techniques- Decision Trees, Nearest Neighbor Classifiers etc.

UNIT IV: Experiments on Clustering and Web Mining- Hierarchical Methods, Partitioned Methods, Web content mining.

REFERENCES

1. Jiawei Han and MichelineKamber, —Data Mining: Concepts and Techniquesl, Morgan Kaufmann Publishers, Third Edition, 2011.
2. Alex Berson and Stephen J. Smith, —Data Warehousing, Data Mining and OLAPl, Tata McGraw Hill Edition, Tenth Reprint 2007.
3. G. K. Gupta, —Introduction to Data Mining with Case Studiesl, Easter Economy Edition, Prentice Hall of India, 2006.

COURSE: ARTIFICIAL INTELLIGENCE

CODE: 05BMSIT20164

CREDITS: 04

UNIT I- INTRODUCTION TO AI

Introduction to AI, AI Applications, AI Representation, Properties of internal representation. Heuristic search techniques – Best first search, mean and end analysis. A* and AO* Algorithm, Game Playing, Minimize Search procedure, Alpha beta cutoffs – Waiting for Quiescence, Secondary Search.

UNIT II - PLANNING OF AI

Block world, strips, Implementation using goal stack, Nonlinear planning with goal stacks, Hierarchical planning. List commitment strategy – Perception – Action, Robot Architecture – Vision, Texture and Images. Representing and recognizing scenes, waltz algorithm, constraint determination – Trihedral and non-trihedral figures labeling. Learning as induction matching algorithms – Failure driver learning, learning in general problem solving – Concept learning. Qualitative analysis only – neural net architecture and applications.

UNIT III - NATURAL LANGUAGE PROCESSING

Syntactic – semantic analysis – RTN, ATN, understanding sentences. Expert system: utilization and functionality, architecture of expert system. Knowledge representation – two case studies on expert systems. Introduction: procedural (imperative) and declarative (logical, functional) Programming paradigms

UNIT IV – FUZZY SET THEORY AND NEURAL NETWORK

Basic Concept Of Fuzzy Logic, Fussy Set And Crisp Set, Fuzzy Set Theory, Introduction To Neural Network, Neural Network Architecture, Perceptron Model, Probabilistic Learning. Multi-layer feed-forward networks; the back-propagation learning algorithm.

References:

1. E. Charniak and D. McDermott, Introduction to artificial Intelligence, Pearson Education 2012.
2. Dan W. Patterson, “Introduction to Artificial Intelligence and Expert Systems”, PHI 2013.
3. Artificial Intelligence: A Modern Approach, 3rd Edition, Sturatt Russell.
4. E. Rich and K. Knight, “Artificial Intelligence”, Tata McGraw Hill, 2013.
5. Nils and K. Knight, “Principles of Artificial Intelligence”, Narosa Publishing Co. 2012.
6. S. Rajasekaran and G.A. Vijayalakshmi Pai, —Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis and Applications, Prentice Hall of India, 2003.
7. N.P. Padhy, Artificial Intelligence and Intelligent Systems, Oxford University Press, 2005.
8. J.S.R. Jang, C.T. Sun and E. Mizutani, —Neuro-Fuzzy and Soft Computing, Pearson Education, 2004.

COURSE: RESEARCH METHODOLOGY

CODE: 05BMSIT20165

CREDITS: 02

UNIT-I RESEARCH METHODOLOGY

Introduction, Basics definition, scope, objectives, Linear Programming Problem, Graphical solution of LPP, Simplex Method, Artificial variables, big-M method, two phase method, degeneracy and unbound solutions

UNIT-II RESEARCH DESIGN

Principles of experimental design Working with Literature Importance, finding literature, using your resources, managing the literature, keep track of references, using the literature, literature review On-line Searching: Database – SciFinder – Scopus - Science Direct - Searching research articles - Citation Index –Impact Factor - H-index etc,

UNIT-III RESEARCH DATA AND STATISTICS

Measurement of Scaling: Quantitative, Qualitative, Classification of Measure scales, Data Collection, Data Preparation - Descriptive Statistics Measures of Central Tendency, Measures of Dispersion, Measure of Skewness, Kurtosis, Measure of Relationship Linear Regression Analysis: Dependent and Independent variables, Simple Linear Regression model

UNIT-IV REPORT WRITING

Scientific Writing and Report Writing: Significance, Steps, Layout, Types, Mechanics and Precautions, Latex: Introduction, text, tables, figures, equations, citations, referencing, and templates(IEEE style), paper writing for international journals, Writing scientific report.

References:

1. C. R. Kothari, Research Methodology Methods and Techniques, 3rd. ed. New Delhi: New Age International Publishers, Reprint 2014.
2. Zina O’Leary, The Essential Guide of Doing Research, New Delhi: PHI, 2005.
3. J. W. Creswell, Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, 4th. ed. SAGE Publications, 2014.
4. .Kumar, Research Methodology: A Step by Step Guide for Beginners, 3rd. ed. Indian: PE, 2010.