

Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.)

Program / Semester: B.Tech (VI Sem)	Branch: Data Sciences
Subject: Compiler Design	Course Code: C109611(022)
Total / Minimum-Pass Marks (End Semester Exam): 100 / 35	L: 3 T: 1 P: 0 Credits: 4
Class Tests & Assignments to be conducted: 2 each	Duration (End Semester Exam): 03 Hours

Course Objectives:

- Course objective is to make the student to understand the process involved in a compiler, create an overall view of various types of translators, linkers, loaders, and phases of a compiler, understand what is syntax analysis, various types of parsers especially the top down approach, awareness among students the various types of bottom up parsers, understand the semantic analysis and intermediate code generation, the role of symbol table and its organization, Code generation, machine dependent code optimization.

UNIT-I: Introduction

Introduction to Compiler, single and multi-pass compilers, Translators, Phases of Compilers, Compiler writing tools, Finite Automata and Lexical Analyzer: Role of Lexical Analyzer, Specification of tokens, Recognition of tokens, Regular expression, Finite automata, from regular expression to finite automata, transition diagrams, Implementation of lexical analyzer with LEX.

UNIT-II: Syntax Analysis and Parsing Techniques

Context free grammars, Bottom-up parsing and top down parsing, Top down Parsing : elimination of left recursion, recursive descent parsing, Predicative Parsing, Bottom Up Parsing : Operator precedence parsing, LR parsers, Construction of SLR, Canonical LR and LALR parsing tables, Construction of SLR parse tables for Ambiguous grammar, parser generator- YACC, error recovery in top down and bottom up parsing.

UNIT-III: Syntax Directed Translation & Intermediate Code Generation

Synthesized and inherited attributes, Construction of syntax trees, bottom up and top down evaluation of attributes, S- attributed and L-attributed definitions, Postfix notation; Three address codes, quadruples, triples and indirect triples, Translation of assignment statements, control flow, Boolean expression and Procedure Calls.

UNIT-IV: Run-time Environment

Storage organization, activation trees, activation records, allocation strategies, Parameter passing symbol table, dynamic storage allocation.

UNIT-V:

Code Optimization and Code Generation

Basic blocks and flow graphs, Optimization of basic blocks, Loop optimization, Global data flow analysis, Loop invariant computations. Issue in the design of Code generator, register allocation, the target machine, and simple Code generator.

Text Books:

1. Compilers Principles, Techniques and Tools, Alfred V. Aho, Ravi Sethi and Ullman J.D., Addison Wesley.
2. Principle of Compiler Design, Alfred V. Aho and J.D. Ullman, Narosa Publication.
3. Introduction to Compiler Techniques, J.P. Bennet, Tata McGraw-Hill.

Reference Books:

1. Compiler Design in C, A.C. Holub, PHI.
2. Compiler construction (Theory and Practice), A. Barret William and R.M., Bates, Galgotia Publication.
3. Compiler Design, O.G. Kakde, Laxmi Publication.

Course Outcomes: On successful completion of the course, the student will be able to:

- Explain the concepts of Compilers and roles of the lexical analyzer.
- Apply the concepts of different Parsing techniques and implement the knowledge to Yacc tool.
- Develop syntax directed translation schemes.
- Implement the principles of scoping, parameter passing and runtime memory management.
- Use the new code optimization techniques to improve the performance of a program in terms of speed & space and develop algorithms to generate code for a target machine.

Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.)

Program / Semester: B.Tech (VI Sem)	Branch: Data Sciences
Subject: Computer Networks	Course Code: C109612(022)
Total / Minimum-Pass Marks (End Semester Exam): 100 / 35	L: 3 T: 1 P: 0 Credits: 4
Class Tests & Assignments to be conducted: 2 each	Duration (End Semester Exam): 03 Hours

Course Objectives:

- Understand the division of network functionalities into layers.
- Familiarize the student with the basic taxonomy and terminology of the computer networking area.
- Introduce the student to advanced networking concepts.
- Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

UNIT-I:

Introduction to Computer Networks: Internet and history of internet. OSI and TCP/IP Reference Model, Network Topologies, Network Classification: LAN, MAN, WAN. Wireless LAN and its component. Transmission media and switching: Coaxial, twisted pair wireless and fiber optics, switching: Packet switching and circuit switching. Networking Devices. Line Encoding (NRZ, NRZ-I, Manchester)

UNIT-II:

Data link layer: Framing, Error detection and correction techniques, Flow Control: stop and wait, Data Link Layer Addressing: MAC addresses, ARP, RARP, IEEE 802.3: Ethernet standards. Asynchronous Transfer Mode (ATM). Media Access Control: Random Access Protocol: ALOHA, CSMA. Channel partitioning Protocol: TDMA, FDMA, CDMA.

UNIT-III:

Network Layer: Forwarding and addressing in the Internet: Internet Protocol (IP): IPv4 and IPv6, IP Addressing, Sub-netting and Super-netting, DHCP, Mobile-IP. Routing Algorithms: Link State Routing, Distance Vector Routing, Routing in the Internet: Intra AS routing in the Internet: RIP, OSPF. Inter AS routing in the Internet: BGP, Introduction to Multicast Routing and Broadcast Routing. ICMP.

UNIT- IV:

Transport Layer: Transport Layer Services, Connectionless and Connection-Oriented Protocols, Flow Control and Reliable Data Transfer: Sliding window, Go Back N and selective repeat. Connectionless Protocols: UDP, User Datagram, UDP Services, and UDP Applications. Transmission Control Protocols: Connection-Oriented Protocols: TCP Segment, RTT estimation, Connection Management, Congestion Control.

UNIT-V:

Application Layer: Application Layer Protocols: The Web and HTTP, FTP, DNS, Electronic mail in the internet: SMTP, POP, Multimedia in the internet: Multimedia data, Real-Time Streaming Protocol (RTSP).

Text Books:

1. Data Communications and Networking -Fifth Edition, Behrouz A. Forouzan, McGraw Hill.
2. Computer Networking: A Top-Down Approach Featuring the Internet- Sixth edition, James F. Kurose and Keith W. Ross, Pearson Education.

Reference Books:

1. Computer Networks- Fifth Edition, Andrew Tanenbaum, David Wetherall, Prentice-Hall.
2. Computer Networks: A Systems Approach (The Morgan Kaufmann Series in Networking) - Fifth Edition, Larry L. Peterson and Bruce S. Davie, Morgan Kaufmann.
3. The TCP/IP Guide: A Comprehensive, Illustrated Internet Protocols Reference- First Edition, Charles M. Kozierok, No Starch Press.
4. Data and Computer Communications- Tenth Edition, William Stallings, Pearson Education.
5. TCP/IP Illustrated: The Protocols- Second Edition, W. Richard Stevens and G. Gabriani, Pearson Education.

Course Outcomes: After undergoing the course, students will be able to:

- Understand the basic structure of an abstract layered Network protocol model for any Networking environment
- Understand and apply channel allocation, framing, error and flow control techniques
- Describe the functions of Network Layer i.e. Logical addressing, subnetting & Routing Mechanism
- Explain the different Transport Layer function i.e. Port addressing, Connection Management, Error control and Flow control mechanism.
- Understand different protocols, software in different application domains.

Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.)

Program / Semester: B.Tech (VI Sem)	Branch: Data Sciences
Subject: Software Engineering and Project Management	Course Code: C109613(022)
Total / Minimum-Pass Marks (End Semester Exam): 100 / 35	L: 2 T: 1 P: 0 Credits: 4
Class Tests & Assignments to be conducted: 2 each	Duration (End Semester Exam): 03 Hours

Course objectives:

- To provide knowledge to identify problems associated with conventional software development process models and solving through modern component based software development process models.
- To provide knowledge to develop software requirement specification.
- To represent workflow environment in the software industry.
- To provide knowledge to estimate various checkpoints during software development.
- To provide comprehensive knowledge for software project development and assessment.

UNIT-I:

Introduction to software engineering- scope of software engineering, — historical aspects, economic aspects, maintenance aspects, specification and design aspects, team programming aspects. Software engineering a layered technology — processes, methods and tools. Software process models — prototyping models, incremental models, spiral model, waterfall model. Process Framework Models: Capability maturity model (CMM), ISO 9000. Phases in Software development — requirement analysis- requirements elicitation for software, analysis principles, software prototyping, specification.

UNIT-II:

Types of Requirements, Feasibility Study, Requirement Analysis and Design: DFD, Data Dictionary, HIPO Chart, Warnier Orr Diagram, Requirement Elicitation: Interviews, Questionnaire, Brainstorming, Facilitated Application Specification Technique (FAST), Use Case Approach. SRS Case study, Software Estimation: Size Estimation: Function Point. Cost Estimation: COCOMO.

UNIT-III:

Planning phase — project planning objective, software scope, empirical estimation models- COCOMO, single variable model, staffing and personal planning. Design phase — design process, principles, concepts, effective modular design, top down, bottom-up strategies, stepwise refinement. Coding — programming practice, verification, size measures, complexity analysis, coding standards. Testing — fundamentals, white box testing, control structure testing, black box testing, basis path testing, code walk-throughs and inspection, testing strategies-Issues, Unit testing, integration testing, Validation testing, System testing. Maintenance-Overview of maintenance process, types of maintenance. Risk management: software risks - risk identification-risk monitoring and management.

UNIT-IV:

Project Management concept: People — Product-Process-Project. An Overview of IT Project Management: Define project, project management framework, The role of project Manager, Systems View of Project Management, Stakeholder management. Project scheduling and tracking. Project Scope management: Scope definition and Project Scope management, Creating the Work Breakdown Structures, Scope Verification, Scope Control.

UNIT-V:

Software configuration management: Basics and standards User interface design - rules. Computer aided software engineering tools - CASE building blocks, taxonomy of CASE tools, integrated CASE environment.

Text Books:

1. Software Engineering, Roger S Pressman, McGraw Hill publication.
2. Software Engineering, Ian Sommerville, Pearson Education.
3. Software Project Management: A unified framework, Walker Royce, Pearson Education.

Reference Books:

1. Software Engineering, K.K. Aggarwal and Yogesh Singh, New age International Publishers.
2. Software Project Management: A concise study, S.A. Kelkar, PHI.
3. Software Engineering Project Management, Richard H. Thayer, Wiley India Publication.

Course outcomes:

- The student will have a fair idea about the importance of using software engineering principles in real life projects.
- The student will be able to prepare software requirement sheet for a real life project, keeping in mind the properties of an SRS document.
- The student will be able to use mathematical models for calculating the size, cost and duration of real life projects.
- Apply the concepts of project planning and management.
- The student will be able to develop projects using standard procedures and CASE tools.

Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.)

Program / Semester: B.Tech (VI Sem)	Branch: Data Sciences
Subject: Cloud Computing	Course Code: C109631(022)
Total / Minimum-Pass Marks (End Semester Exam): 40/20	L: 2 T: 1 P: 0 Credits: 3

UNIT-I:

Introduction to Cloud Computing: The Emergence of Cloud Computing, Cloud-Based Service Offerings, Benefits of using a Cloud Model, Key Characteristics of Cloud Computing, and Understanding- Public & Private cloud environments, The Evolution of Cloud Computing – Hardware & Internet Software Evolution.

UNIT-II:

Cloud Security Challenges: Software-as-a-Service, Security Management People, Security Governance, Security Portfolio Management, Security Architecture Design, Identity Access Management (IAM), Data Security.

UNIT-III:

Cloud as: Communication-as-a-Service (CAAS), Infrastructure-as-a-Service (IAAS), Monitoring-as-a- Service (MAAS), Platform-as-a-Service (PAAS), Software-as-a-Service (SAAS).

UNIT-IV:

The MSP Model: Evolution from the MSP Model to Cloud Computing and Software-as-a Service, The Cloud Data Center, Basic Approach to a Data Center-Based SOA, Open Source Software, Service- Oriented Architectures as a Step Toward Cloud Computing.

UNIT-V:

Virtualization concepts & Smartphone: virtualization benefits, Hardware virtualization, Software Virtualization, Memory Virtualization, Storage Virtualization, Data Virtualization, Network Virtualization, Virtualization Security Recommendations, Introduction to Various Virtualization OS VMware , KVM, Virtual Machine Security, Smartphone, Mobile Operating Systems for Smartphone's (I Phone, Windows Mobile), Google(Android) Blackberry, Ubuntu Mobile Internet.

Text Books:

1. Toby Velte, Anthony Vote and Robert Elsenpeter, "Cloud Computing: A Practical Approach", McGraw Hill, 2002.

Reference Books:

1. George Reese, "Cloud Application Architectures: Building Applications and Infrastructures in the Cloud", O'Reilly Media, 2003.
2. Tim Matherm, Subra Kumaraswamy and Shahed Latif, "Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance", O'Reilly Media, 2005.

Course Outcomes: [After undergoing the course, students will be able to:]

- Students will be able to perform cloud oriented analysis.
- Students will be able to model cloud candidate derived from existing business documentation.
- Students will be able to design the composition of a cloud services.
- Students will be able to design application services for technology abstraction.

Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.)

Program / Semester: B.Tech (VI Sem)	Branch: Data Sciences
Subject: Big Data Analytics Using Hadoop <i>(Professional Elective - II)</i>	Course Code: C109632(022)
Total / Minimum-Pass Marks (End Semester Exam): 100 / 35	L: 2 T: 1 P: 0 Credits: 3
Class Tests & Assignments to be conducted: 2 each	Duration (End Semester Exam): 03 Hours

Course Objectives:

- Understand the Big data platform and its use cases.
- Provide an overview of Apache Hadoop.
- Provide HDFS concepts and interfacing with HDFS.
- Understand Map Reduce Jobs.
- Apply analytics on structured and unstructured data.

UNIT-I:

INTRODUCTION TO BIG DATA: Introduction to Big Data ,Characteristics of Big Data(5 V's Of Big Data),Sources of Big Data, Challenges of Conventional Systems, Analysis vs Analytics, Types of Data Analytics, Analysis vs Reporting ,Visualizations - Visual data analysis techniques. Case studies of application Big Data.

UNIT-II:

MINING DATA STREAMS: Introduction To Streams Concepts, Stream Data, Model and Architecture Sampling Data in a Stream, Filtering Streams, Counting Distinct Elements in a Stream, Estimating, Counting Oneness in a Window, Decaying Window.

UNIT-III:

INTRODUCTION TO HADOOP: Components of Hadoop, Map Reduce, YARN, COMMON, Hadoop Cluster, How Map Reduce Works, Anatomy of a Map Reduce, Job Scheduling, Shuffle and Sort, Map Reduce Types and Formats, Map Reduce Features.

UNIT-IV:

HDFS (Hadoop Distributed File System)

The Design of HDFS, HDFS Concepts , Command line interface, Hadoop file system Interfaces, Data Flow, Data Ingest with Flume and Scoop and Hadoop Archives, Hadoop I/O: Compression, Serialization, Avro and File based Data Structures.

UNIT-V:

Hadoop EcoSystem:

Pig: Introduction to Pig , Execution Modes of Pig, Comparison of Pig with databases, Grunt, Pig Latin, User defined functions, Data Processing operators.

Hive: Hive Shell , Hive services, Hive Meta Store, Comparison of with traditional databases, HiveQL, Tables, Querying Data and User defined functions.

Hbase: Hbasics, Concepts, Clients, Exaple, Hbase vs RDBMS Applications on Big Data Using Pig, Hive, Zookeeper Maintenance of Hadoop Cluster, Hadoop benchmarks.

Text Books:

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
2. Tom White "Hadoop: The Definitive Guide" Third Edition, O'reilly Media, 2012.
3. Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", Cambridge University Press, 2012.

Course outcomes:

The students will be able to:

- Identify big data and its business implications
- List the components of Hadoop and Hadoop Eco System
- Access and process data on Distributed File System
- Manage Job Execution in Hadoop environment
- Develop Big data solutions using Hadoop ecosystem

Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.)

Program / Semester: B.Tech (VI Sem)	Branch: Data Sciences
Subject: Soft Computing (<i>Professional Elective - II</i>)	Course Code: C109633(022)
Total / Minimum-Pass Marks (End Semester Exam): 100 / 35	L: 2 T: 1 P: 0 Credits: 3
Class Tests & Assignments to be conducted: 2 each	Duration (End Semester Exam): 03 Hours

Course Objectives:

- The main objective of the course is to expose the students to soft computing, various types of soft computing techniques, and applications of soft computing.

UNIT-I:

Introduction: Concept of computing systems. What is Soft Computing? Difference between Hard and Soft computing, Requirement of Soft computing, Major Areas of Soft Computing, Applications of Soft Computing

UNIT-II:

Fuzzy logic : Introduction to Fuzzy logic. Fuzzy sets and membership functions. Operations on Fuzzy sets. Fuzzy relations, rules, propositions, implications and inferences. Defuzzification techniques. Fuzzy logic controller design. Some applications of Fuzzy logic. Fuzzy rule base system : Fuzzy propositions, formation, decomposition & aggregation of fuzzy Rules, fuzzy reasoning, fuzzy inference systems, fuzzy decision making & Applications of fuzzy logic.

UNIT-III:

Artificial Neural Networks: Neural Network: Structure and Function of a single neuron: Biological neuron, artificial neuron, definition of ANN, Taxonomy of neural net, Difference b/w ANN and human brain, characteristic and applications of ANN, single layer network. Perceptron: Perceptron training algorithm, Linear separability Introduction of MLP, different activation functions, Error back propagation algorithm, Applications of ANNs to solve some real life problems.

UNIT-IV:

Genetic Algorithms: Fundamental, basic concepts, working principle, encoding, fitness function, reproduction, Genetic modeling: Inheritance operator, cross over, inversion & deletion, mutation operator, Bitwise operator ,Generational Cycle, Convergence of GA, Applications & advances in GA, Differences & similarities between GA & other traditional methods.

UNIT-V:

V Multi-objective Optimization Problem Solving: Concept of multi-objective optimization problems (MOOPs) and issues of solving them. Multi-Objective Evolutionary Algorithm (MOEA). Non-Pareto approaches to solve MOOPs, Pareto-based approaches to solve MOOPs, Some applications with MOEAs.

Text Books:

- Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis & Applications, S.Rajasekaran, G. A. Vijayalakshami, PHI.
- Neural Networks and Learning Machines, (3rd Edn.), Simon Haykin, PHI Learning, 2011.
- Soft Computing, D. K. Pratihari, Narosa, 2008.

Reference Books:

- Fuzzy Logic: A Practical approach, F. Martin, , Mc neill, and Ellen Thro, AP Professional, 2000.
- Genetic Algorithms In Search, Optimization And Machine Learning, David E. Goldberg, Pearson Education, 2002.

Course Outcomes:

[After undergoing the course, students will be able to:]

- Understand the fundamental concepts of soft computing and major application areas.
- Understand Fuzzy logic and apply to real word problems.
- Understand artificial neural networks and its application in real life problems.
- Solve single-objective optimization problems using GAs.
- Solve multi-objective optimization problems using Evolutionary algorithms (MOEAs).
- Apply Soft computing techniques to solve problems in varieties of application domains.

Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.)

Program / Semester: B.Tech (VI Sem)	Branch: Data Sciences
Subject: Data Security and Privacy (<i>Professional Elective - II</i>)	Course Code: C109634(022)
Total / Minimum-Pass Marks (End Semester Exam): 100 / 35	L: 2 T: 1 P: 0 Credits: 3
Class Tests & Assignments to be conducted: 2 each	Duration (End Semester Exam): 03 Hours

Course Objectives:

- The main objective of the course is to expose the students to various security threats, cryptographic fundamental principles, privacy and security concerns in Cloud and IoT and how to manage security threats and protect data.

UNIT-I:

Introduction to Data Privacy and Security Overview of data privacy and security concepts Importance of data protection in the digital age, Legal and ethical considerations. Data Protection Regulations-Introduction to major data protection regulations (e.g., GDPR, CCPA).

UNIT-II:

Threats to Data Privacy and Security Common types of security threats (e.g., hacking, malware, and social engineering) Vulnerabilities in computer systems and networks, Risks associated with data breaches and identity theft. Data Privacy and Security Policies-Designing and implementing privacy policies.

UNIT-III:

Data Encryption and Cryptography Fundamentals of encryption and decryption. Symmetric and asymmetric encryption algorithms, Public key infrastructure (PKI) and digital certificates Secure protocols (e.g., SSL/TLS) and secure sockets, Wireless network security considerations.

UNIT-IV:

Privacy and Security in Cloud Computing

Cloud computing models (e.g., SaaS, PaaS, IaaS) Privacy and security risks in cloud environments Cloud service provider selection and auditing Conducting privacy impact assessments (PIAs) Risk management frameworks and methodologies.

UNIT-V:

Privacy concerns in latest technologies

Artificial intelligence (AI) and machine learning (ML) in data privacy, Privacy considerations in block chain and decentralized systems. Roles and responsibilities of data privacy professionals for auditing and ensuring compliance with data protection regulations.

Text Books:

- Principles of Information Security, Michael E. Whitman and Herbert J. Mattord, Cengage Learning.
- Information Security: The Complete Reference, Mark Rhodes-Ousley, McGraw Hill.

Reference Books:

- Data Privacy: Principles and Practice, William J. Buchanan, Springer International.
- Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole and Sunit Belpure, Wiley.
- Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.

Course outcomes:

- Understanding the most important privacy and security requirements required for any security systems.
- Have an advanced understanding of the theoretical underpinnings of data privacy and threats to privacy and security.
- Understand Fundamentals of cryptographic concepts and utilize encryption algorithms required to achieve confidentiality.
- Understand the technology, policies, and processes for privacy and security in cloud computing.
- Understand the privacy and security considerations in AI, ML, Blockchain.
- Gain understanding of responsibilities of data privacy professionals.

Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.)

Program / Semester: B.Tech (VI Sem)	Branch: Data Sciences
Subject: Cryptography and Network Security (<i>Open Elective - I</i>)	Course Code: C000651(022)
Total / Minimum-Pass Marks (End Semester Exam): 100 / 35	L: 3 T: 0 P: 0 Credits: 2
Class Tests & Assignments to be conducted: 2 each	Duration (End Semester Exam): 03 Hours

Course Objectives:

- To understand the principles and practices of cryptography and network security.
- To understand the practical applications that have been implemented and are in use to provide network security.

UNIT-I:

INTRODUCTION: Security trends, Legal, Ethical and Professional Aspects of Security, Need for Security at Multiple levels, Security Policies, Model of network security, Security attacks, services and mechanisms, OSI security architecture, Classical encryption techniques: substitution techniques, transposition techniques.

UNIT-II:

Symmetric Ciphers: MATHEMATICS OF SYMMETRIC KEY CRYPTOGRAPHY: Algebraic structures, Modular arithmetic, Euclid's algorithm, Congruence and matrices, Groups, Rings, Fields, Finite fields, SYMMETRIC KEY CIPHERS: DES, Block cipher Principles of DES, Strength of DES, Differential and linear cryptanalysis, Block cipher design principles, Block cipher mode of operation, Evaluation criteria for AES, Advanced Encryption Standard, RC4, Key distribution.

UNIT-III:

Asymmetric (Public Key) Ciphers: MATHEMATICS OF ASYMMETRIC KEY CRYPTOGRAPHY: Primes, Primality Testing, Factorization, Euler's totient function, Fermat's and Euler's Theorem, Chinese Remainder Theorem, Exponentiation and logarithm, ASYMMETRIC KEY CIPHERS: RSA cryptosystem, Key distribution, Key management, Diffie Hellman key exchange, Elliptic curve arithmetic, Elliptic curve cryptography.

UNIT-IV:

Asymmetric Ciphers (continued): Message Authentication and Hash functions: Authentication requirement, Authentication function, MAC, Hash function, Security of hash function and MAC, SHA, Digital signature and authentication protocols, DSS, Authentication applications, Kerberos, X.509

UNIT-V:

Network Security applications: Authentication applications: Electronic mail security: PGP, S/MIME. Overview of IP Security. Web Security: Web security considerations, SSL and TLS, Secure electronic transaction. System Security: Intruders, Intrusion detection, password management, viruses and related threats, virus counter measures.

Text Books:

1. Cryptography and Network Security: Principles and Practice" by William Stallings, Pearson Education, Prentice Hall, 4th Edition.
2. Cryptography and Network Security, Atul Kahate, McGraw Hill Education (India) Private Limited; Third edition.

References:

1. Applied Cryptography: Protocols & Algorithms, Schneier & Bruce, MGH International.
2. Cryptography and Security, by Dr T R Padmanabhan N Harini, Wiley India Pvt Ltd, 2011.
3. Handbook of Applied Cryptography" by Alfred J Menezes and Scott A Vanstone.
4. Cryptography and Network Security" by Behrouz A Forouzan and Debdeep Mukhopadhyay.
5. Network Security: The Complete Reference, Tata McGraw-Hill Education, by Roberta Bragg, Mark RhodesOusley, Keith Strassberg.

Course Outcome: After successful completion of this course, the students will be able to explain

1. Conventional encryption algorithms for confidentiality and their design principles.
2. Public key encryption algorithms and their design principles.
3. Use of message authentication codes, hash functions, digital signature and public key certificates.
4. Network security tools and applications.
5. System-level security issues like threat of and countermeasures for intruders and viruses, and the use of firewalls and trusted systems.

Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.)

Program / Semester: B.Tech (VI Sem)	Branch: Data Sciences
Subject: Data Warehousing and Mining (<i>Open Elective - I</i>)	Course Code: C000652(022)
Total / Minimum-Pass Marks (End Semester Exam): 100 / 35	L: 3 T: 0 P: 0 Credits: 2
Class Tests & Assignments to be conducted: 2 each	Duration (End Semester Exam): 03 Hours

Course Outcome:

- Understand the functionality of the various data mining and data warehousing component.
- Appreciate the strengths and limitations of various data mining and data warehousing models.
- Explain the analyzing techniques of various data.
- Describe different methodologies used in data mining and data warehousing.
- Compare different approaches of data warehousing and data mining with various technologies.

UNIT-I:

Data warehouse: Introduction to Data warehouse, Difference between operational database systems and data warehouses, Data warehouse Characteristics, Data warehouse Architecture and its Components, Extraction-Transformation-Loading, Logical (Multi Dimensional), Data Modeling, Schema Design, Star and Snow-Flake Schema, Fact Constellation, Fact Table, Dimension Table Characteristics; OLAP Cube, OLAP Operations, OLAP Server Architecture - ROLAP, MOLAP and HOLAP.

UNIT-II:

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or Data Warehouse System, Major issues in Data Mining. Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration & Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT-III:

Classification: Problem Definition, General Approaches to solving a classification problem, Classification techniques, Decision Trees-Decision tree Construction, Methods for Expressing attribute test conditions, Measures for Selecting the Best Split, Algorithm for Decision tree Induction ;Naive-Bayes Classifier. Prediction: Accuracy and Error measures, Evaluating the accuracy of classifier or a predictor.

UNIT-IV:

Association Rules: Problem Definition, Frequent Item Set Generation, The APRIORI Principle, Support and Confidence Measures, Association Rule Generation; APRIORI Algorithm, The Partition Algorithms, FP-Growth Algorithms, Compact Representation of Frequent Item Set-Maxima L frequent Item Set, Closed Frequent Item Set.

UNIT-V:

Clustering: Clustering Overview- A Categorization of Major Clustering Methods, Partitioning Clustering-K- Means Algorithm, PAM Algorithm; Hierarchical Clustering-Agglomerative Methods and divisive methods, Outlier Detection. Advanced Concepts: Web Mining: Web Content Mining, Web Structure Mining, Web Usage mining, Spatial mining, Temporal mining, Multimedia Data mining, Text Mining.

Text Books:

1. Data Mining – Concepts and Techniques, Jiawei Han & Micheline Kamber, Elsevier.
2. Data Mining Introductory and Advanced topics, Margaret H Dunham, PEA.
3. Introduction to Data Mining, Psng Ning Tan, Vipin Kumar, Michael Steinbach, Pearson Educator.

Reference Books:

1. Data Mining Techniques, Arun K Pujari, Universities Press.
2. Data Mining, Vikaram Pudi, P Radha Krishna, Oxford University.
3. Data Warehousing Fundamentals, Paulraj Ponniah, John Willey.

Course Objective:

- Be familiar with mathematical foundations of data mining tools.
- Understand and implement classical models and algorithms in data warehouses and data mining
- Characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering.
- Master data mining techniques in various applications like social, scientific and environmental context.
- Develop skill in selecting the appropriate data mining algorithm for solving practical problems.

Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.)

Program / Semester: B.Tech (VI Sem)	Branch: Data Sciences
Subject: Network Programming (<i>Open Elective - I</i>)	Course Code: C000653(022)
Total / Minimum-Pass Marks (End Semester Exam): 100 / 35	L: 3 T: 0 P: 0 Credits: 2
Class Tests & Assignments to be conducted: 2 each	Duration (End Semester Exam): 03 Hours

Course Objectives:

Having successfully completed this course, the student will be able to:

1. Demonstrate mastery of main protocols comprising the Internet.
2. Develop skills in network programming techniques.
3. Implement network services that communicate through the Internet.
4. Apply the client-server model in networking applications.
5. Practice networking commands available through the operating systems.

UNIT-I: Networking & TCP/IP: Communication protocols, Network architecture, UUCP, XNS, IPX/SPX for LANs, TCP & IP headers, IPv4 & v6 address structures, Programming Applications: Time & date routines, Internet protocols: Application layer, Transport layer, Network layer, Datalink layer protocols, Chat, Email, Web server working method & programming.

UNIT-II: Socket Programming: Creating sockets, Posix data type, Socket addresses, Assigning address to a socket, Java socket programming, Thread programming, Berkeley Sockets: Overview, socket address structures, byte manipulation & address conversion functions, elementary socket system calls – socket, connect, bind, listen, accept, fork, exec, close, TCP ports (ephemeral, reserved), Berkeley Sockets: I/O asynchronous & multiplexing models, select & poll functions, signal & fcntl functions, socket implementation (client & server programs), UNIX domain protocols.

UNIT-III: APIs & Winsock Programming: Windows socket API, window socket & blocking I/O model, blocking sockets, blocking functions, timeouts for blocking I/O, API overview, Different APIs & their programming technique, DLL & new API's, DLL issues.

UNIT- IV: Web Programming & Security: Distributed System Design concept, RMI, Component technology, CGI programming PHP/PERL, Overview of JavaScript, Firewall & security technique, Cryptography, Digital Signature.

UNIT-V: Client Server Programming: Java network programming, packages Client side programming: Creating sockets, implementing generic network client, Parsing data using string Tokenizer, Retrieving file from an HTTP server, Retrieving web documents by using the URL class. Server side programming: Steps for creating server, Accepting connection from browsers, creating an HTTP server.

Text Books:

1. UNIX Network Programming, Steven .W.R, PHI (VOL I & II).
2. Window Socket Programming by Bobb Quinn and Dave Schutes.
3. TCP/IP Protocol Suite by Behrouz A. Forouzan.

Reference Books:

1. Windows Network Programming, Davis.R., Addison Wesley.
2. Network Programming With Windows Socket By Baner .P, PH New Jersey.

Course Outcome: After successful completion of the course, students will be

- Familiar with protocols, network interfaces, and Design/performance issues in local area networks and wide area networks,
- Familiar with basics of Socket and Socket programming.
- Familiar with contemporary issues in networking technologies,
- Familiar with network tools and network programming.
- Familiar with client server programming.

Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.)

Program / Semester: B.Tech (VI Sem)	Branch: Data Sciences
Subject: Operation Research (Open Elective - I)	Course Code: C000654(014)
Total / Minimum-Pass Marks (End Semester Exam): 100 / 35	L: 3 T: 0 P: 0 Credits: 2
Class Tests & Assignments to be conducted: 2 each	Duration (End Semester Exam): 03 Hours

Course Objectives:

- To introduce students to allocation model, solve problems involving assignment of jobs to machine, blending, productmix, advertising media selection, least cost diet, distribution, transportation.
- To make students use the concept of inventory control to determine Economics Order Quantity safety stock, reorder level.
- To make students learn PERT & CPM in planning, scheduling in projects.

UNIT-I:

LINEAR PROGRAMMING - LP formulations, Graphical method for solving LP with 2 variables, Simplex method, Application of simplex method for maximization and minimization of LP problems, Artificial variable technique for finding the initial basic feasible solution, The Big-M method, Two phase method, Degeneracy in simplex method, Duality theory in LP, Dual simplex method.

UNIT-II:

TRANSPORTATION MODEL - North – West corner rule, Least cost method, Vogel's approximation method, Modi method, Assignment problem, Dynamic Programming: Basic concepts, Bellman's optimality principle, Dynamic programming approach in decision making, Optimal subdivision problem.

UNIT-III:

INVENTORY MODELS - Introduction to the inventory problem, Deterministic models, The classical EOQ(Economic order quantity) model, Purchasing model with no shortage, Manufacturing model with no shortage, purchasing model with shortage, Manufacturing model with shortage, Inventory models with probabilistic demand.

UNIT-IV:

SEQUENCING AND QUEUING THEORY- Sequencing problem, Johnson's algorithm for processing Njobs through 2 machine problem, N-jobs through 3 machine problem, 2- job through N machine by graphical method, Characteristics of queuing system- steady state M/M/1, M/M/1K and M/M/C queuing models.

UNIT-V:

CPM and PERT - Arrow network, Time estimates – Earliest expected time, Latest allowable occurrence time and slack, Critical path, Probability of meeting scheduled date of completion of project, Calculation on CPM network, Various floats for activities, Critical Path, Updating project, Operation time cost trade off curve &project time cost trade off curve, selection of schedule based on cost analysis.

Text Books:

1. B.E. Gillet Introduction to Operations Research, A Computer Oriented Algorithmic Approach – Tata McGraw Hill publishing Co. Ltd. New York.
2. P.K. Gupta & D.S. Hira, Operations Research, S. Ch and & Co.

Reference Books:

1. J.K. Sharma "Operation Research" Theory and Applications" Mac Millan.
2. H.A. Taha, Operations Research – An Introduction, Fifth Edition, Mac Millan publishing Co. Ltd. New York.
3. S.D. Sharma "Operations Research, KedarNath, Ram Nath, Mecrut.
4. KantiSwarup, Operations Research, S. Chand & Sons.

Course Outcomes:

- Students should be able to design a model using optimization techniques.
- Students should be design an inventory system with reorder level calculation.
- Students should be able to schedule a project using PERT CPM.

Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.)

Program / Semester: B.Tech (VI Sem)	Branch: Data Sciences
Subject: Decision Support and Executive Information System (Open Elective - I)	Course Code: C000655(022)
Total / Minimum-Pass Marks (End Semester Exam): 100 / 35	L: 3 T: 0 P: 0 Credits: 2
Class Tests & Assignments to be conducted: 2 each	Duration (End Semester Exam): 03 Hours

Course Objective:

- To review and clarify the fundamental terms, concepts and theories associated with Decision Support Systems, computerized decision aids, expert systems, group support systems and executive information systems.
- To examine examples and case studies documenting computer support for organizational decision making, and various planning, analysis and control tasks.
- To understand that most Decision Support Systems are designed to support rather than replace decision makers and the consequences of this perspective for designing DSS.
- To discuss organizational and social implications of Decision Support Systems.

UNIT-I:

Overview of different types of decision-making: Strategic, tactical and operational. Consideration of organizational structures. Mapping of databases, MIS, EIS, KBS, expert systems OR modeling systems and simulation, decision analytic systems onto activities within an organization. Extension to other 'non organizational' areas of decision making. Relationship with knowledge management systems.

UNIT-II:

Studies of human cognition in relation to decision making and the assimilation of information: Cultural issues. Implications for design of decision-making support. Communication issues.

UNIT-III:

Normative, descriptive and prescriptive analysis: requisite modeling. Contrast with recognition primed decision tools.

UNIT-IV:

Database, MIS, EIS, KBS, Belief nets, data mining. OR modeling tools: simulation and optimization. History, design, implementation: benefits and pitfalls. Risk assessment. Decision analysis and strategic decision support.

UNIT-V:

Group decision support systems and decision conferencing. Intelligent decision support systems: tools and applications. Cutting-edge decision support technologies. History, design, implementation: benefits and pitfalls. Deliberative e-democracy and e-participation.

Text Books:

1. P.R. Kleindorfer, H.C. Kunreuther, P.J.H. Schoemaker , “Decision Sciences: an integration Perspective”,
2. Cambridge University Press 1993
3. G.M. Marakas, Decision support Systems in the 21st Century, Prentice Hall.

References:

1. E. Turban and J.E. Aronson, Decision support Systems and Intelligent Systems. Prentice Hall
2. V.S.Janakiraman and K.Sarukesi, Decision Support Systems, PHI
3. Efreem G. Mallach, Decision Support and Data Warehouse Systems, tata McGraw-Hill

Course outcome: At the end of the course students will-

1. Recognize the relationship between business information needs and decision making.
2. Appraise the general nature and range of decision support systems.
3. Appraise issues related to the Analyse, design, development and implement a DSS.
4. Select appropriate modeling techniques.

Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.)

Program / Semester: B.Tech (VI Sem)	Branch: Data Sciences
Subject: Android (Lab)	Course Code: C109621(022)
Total / Minimum-Pass Marks (End Semester Exam): 40/20	L: 0 T: 0 P: 2 Credits: 1

Objectives:

- Understand how Android applications work, their life cycle, manifest, Intents, and using external resources
- Design and develop useful Android applications with compelling user interfaces by using, extending, and creating your own layouts and Views and using Menus.
- Secure, tune, package, and deploy Android applications
- Use Android's communication APIs for SMS, telephony, network management, and internet resources (HTTP).

List of Experiments:

(Each student should perform, at least, 10 experiments.)

1.
 - a) Create an android application to display CSVTU Text Message.
 - b) Create an android application to display CSVTU Message by using Button.
2. Create an android application to call different activities by using Implicit and Explicit Intents.
3.
 - a) Create an android application to select item from given list by using AutoCompleteTextView (ACTV).
 - b) Create an android application to display dropdown menu items and pick one item by using Spinner Component.
4.
 - a) Create an android application to display internal storage data using Array Adapter.
 - b) Create an android application to display internal storage data in vertical format by using Custom Adapter.
5. Create an android application to display WhatsApp videos in grid view by using Custom Adapter.
6. Create an android application to display webpage by using Web view Component.
7. Create an android application to display different webpages in fragments by using Fragments Component.
8. Create an android application to store the data by using Shared Preferences.
9. Create an android application to demonstrate concept of SQLite Database Storage method
10. Create an android application to perform different types of operations (Send SMS, Making call and sending email) by using Telephony app.
11. Write an android program to develop Media player application.
12.
 - a) Write an android program to develop Video view application
 - b) Write an android program to develop Audio Recording application.
13.
 - a) Write an android program to develop Video Recording application.
 - b) Write an android program to develop Camera and Gallery application.
14.
 - a) Create an android application to get latitude and longitude value by using Location Service.
 - b) Create an android application to display X, Y Sensor values by using Sensor Service.
15.
 - a) Create an android application to get the notifications on Notification Bar by Using Notification Service.
 - b) Create an android application to display available Wi-Fi devices and Paired Wi-Fi devices by using Wi-Fi Service.

16.

- a) Create an android application to get the Bluetooth devices and list of devices using Bluetooth and Vibrator Service.
- b) Create an android application to get the System Announcements by using Broadcast Receiver.

17. Create an android application to share the data between multiple applications by using Content Provider.

18. Create an android application to display different Dialog Boxes.

19. Create an android application to display current location on Google maps by using Google-Maps Service.

References:

1. Android Application Development (with Kitkat Support), Black Book by Pradeep Kothari.
2. Beginning Android
- 3 Application Development by Wei-Meng Lee.
4. Android Application Development for Dummies by Michael Burton

Outcomes:

- Display proficiency in coding on a mobile programming platform.
- Understand the limitations and features of developing for mobile devices.
- Creating a complete Mobile app with a significant programming component, involving the sensors and hardware features of the phone.
- Practice existing state of mobile app development via researching existing apps, meeting with industry professionals, and formulating new ideas.
- Display proficiency in coding on a mobile programming platform.
- Good knowledge of economics and features of the app marketplace by offering the app for download.

Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.)

Program / Semester: B.Tech (VI Sem)	Branch: Data Sciences
Subject: Computer Network (Lab)	Course Code: C109622(022)
Total / Minimum-Pass Marks (End Semester Exam): 40/20	L: 0 T: 0 P: 2 Credits: 1

List of Experiments

(At least Ten experiments are to be performed by each student)

1. Introduction to Local Area Network (LAN) with and topologies.
2. Working with basic networking commands and Study of various cables, and connectors used in Local Area Network (LAN).
3. Build Unshielded Twisted Pair (UTP) Ethernet crossover cable and Straight through cable.
4. Create a simple peer-to-peer network between two PCs.
5. Create a simple network with PCs using a switch.
6. Case Study of Ethernet (10 base 5, 10 base 2, 10 base T).
7. Configuring Switch/Router
8. Installation and basic operation of a packet sniffer tool Ethereal/Wireshark.
9. Analyze protocols like HTTP, ARP, Ethernet, IP in operation using packet capturing tool Ethereal/Wireshark.
10. Analyze TCP and UDP in operation using packet capturing tool Ethereal/Wireshark.
11. Simulation of LAN protocol using NETSIM/Packet Tracer/LAN Trainer Kit
12. Simulation of Routing protocol using NETSIM/Packet Tracer/LAN Trainer Kit
13. Installation and working with FTP (File Transfer Protocol).
14. Introduction to Server administration.
15. Installation of Windows 2003 server/ Windows 2000 server.

Text Books:

1. Data Communications and Networking -Fifth Edition, Behrouz A. Forouzan, McGraw Hill.
2. Computer Networking: A Top- Down Approach Featuring the Internet- Sixth edition, James F. Kurose and Keith W. Ross, Pearson Education.

Reference Books:

1. Computer Networks- Fifth Edition, Andrew Tanenbaum, David Wetherall, Prentice-Hall.
2. Computer Networks: A Systems Approach (The Morgan Kaufmann Series in Networking) – Fifth Edition, Larry L. Peterson and Bruce S. Davie, Morgan Kaufmann.
3. The TCP/IP Guide: A Comprehensive, Illustrated Internet Protocols Reference-First Edition, Charles M. Kozierok, No Starch Press.
4. Data and Computer Communications- Tenth Edition, William Stallings, Pearson Education.
5. TCP/IP Illustrated: The Protocols- Second Edition, W. Richard Stevens and G. Gabriani, Pearson Education.

Lab Outcomes:

At the end of the course, the student should be able to

- Identify and use various networking components Understand different transmission media and design cables for establishing a network.
- Use simulation tools.
- Implement the various networking protocols.
- Analyse the performance of the protocols in different layers.
- Install and configure servers.

Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.)

Program / Semester: B.Tech (VI Sem)	Branch: Data Sciences
Subject: Cloud Computing (Lab)	Course Code: C109631(022)
Total / Minimum-Pass Marks (End Semester Exam): 40/20	L: 0 T: 0 P: 2 Credits: 1

Objectives:

- To develop web applications in cloud.
- To learn the design and development process involved in creating a cloud based application.

List of Experiments:-

1. Install Virtualbox/VMware Workstation with different flavours of linux or windows OS on top of windows7 or 8.
2. Install a C compiler in the virtual machine created using virtual box and execute Simple Programs.
3. Install Google App Engine. Create hello world app and other simple web applications using python/java.
4. Use GAE launcher to launch the web applications.
5. Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.
6. Find a procedure to transfer the files from one virtual machine to another virtual machine.
7. Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version).
8. Install Hadoop single node cluster and run simple applications like word count.
9. Create an application (Ex: Word Count) using HadoopMap/Reduce.
10. Case Study: PAAS (Facebook, Google App Engine)
11. Case Study: Amazon Web Services.

Text Books:

1. Cloud Computing- A Practical Approach Velte TMH Pub.
2. Cloud Computing Kumar Saurabh Wiley Pub.
3. Hadoop: The Definitive Guide Tom White O'Reilly.

Outcomes: On successful completion of the course, the student will be able to:

1. Configure various virtualization tools such as Virtual Box, VMware workstation.
2. Design and deploy a web application in a PaaS environment.
3. Learn how to simulate a cloud environment to implement new schedulers.
4. Install and use a generic cloud environment that can be used as a private cloud.
5. Manipulate large data sets in a parallel environment.

Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.)

Program / Semester: B.Tech (VI Sem)	Branch: Data Sciences
Subject: Big Data Analytics using Hadoop (Lab)	Course Code: C109632(022)
Total / Minimum-Pass Marks (End Semester Exam): 40/20	L: 0 T: 0 P: 2 Credits: 1

List of Experiments:-

1. Install Apache Hadoop.
2. Develop a MapReduce program to calculate the frequency of a given word in a given file.
3. Develop a MapReduce program to find the maximum temperature in each year.
4. Develop a MapReduce program to find the grades of student.
5. Develop a MapReduce program to implement Matrix Multiplication.
6. Develop a MapReduce to find the maximum electrical consumption in each year given electrical consumption for each month in each year.
7. Develop a MapReduce to analyze weather data set and print whether the day is sunny or cool day.
8. Develop a MapReduce program to find the tags associated with each movie by analyzing movie lens data.
9. Develop a MapReduce program to analyze Uber data set to find the days on which each basement has more trips using the following dataset.
10. Write queries to sort and aggregate the data in a table using HiveQL.
11. Develop a Java application to find the maximum temperature using Spark.

Lab Outcomes:

Upon completion of the course the students should be able to-

- Configure Hadoop and perform File management tasks.
- Apply MapReduce programs to real time issues like word count, weather dataset, and sales of a company.
- Critically analyze huge data set using Hadoop and Mapreduce
- Apply data processing tools.

Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.)

Program / Semester: B.Tech (VI Sem)	Branch: Data Sciences
Subject: Soft Computing (Lab)	Course Code: C109633(022)
Total / Minimum-Pass Marks (End Semester Exam): 40/20	L: 0 T: 0 P: 2 Credits: 1

List of Experiments:-

1. Writing programs using basic scalar Data types and user input output operations.
2. Writing programs creating various vectors and basic operations on vector types.
3. Writing programs creating Matrices and basic operations on matrix types.
4. Plotting 1D AND 2D Data Sets in MATLAB.
5. Plotting and configure various charts/Figures.
6. Problem–Solving using Linear System Equations.
7. Solving Quadratic Equations in MATLAB.
8. Solving Polynomial equations in MATLAB.
9. Working with User Defined Function.
10. Working with Control Structures and Recursion.
11. Design Neural Network Simulation for the following problem solving:
 - a. Create a perceptron with appropriate no. of inputs and outputs. Train it using fixed increment learning algorithm until no change in weights is required. Output the final weights.
 - b. Create a simple ADALINE network with appropriate no. of input and output nodes. Train it using delta learning rule until no change in weights is required. Output the final weights.
 - c. Train the autocorrelator by given patterns: $A1=(-1,1,-1,1)$, $A2=(1,1,1,-1)$, $A3=(-1, -1, -1, 1)$. Test it using patterns: $Ax=(-1,1,-1,1)$, $Ay=(1,1,1,1)$, $Az=(-1,-1,-1,-1)$.
 - d. Train the hetrocorrelator using multiple training encoding strategy for given patterns: $A1=(000111001)$ $B1=(010000111)$, $A2=(111001110)$ $B2=(100000001)$, $A3=(110110101)$ $B3=(101001010)$.
12. Implement Union, Intersection, Complement and Difference operations on fuzzy sets. Also create fuzzy relation by Cartesian product of any two fuzzy sets and perform maxmin composition on any two fuzzy relations.
13. Implementing simulations using Fuzzy Tool Box.
14. Implementing simulations using GA Tool Box.
15. Solving Real world Toy Projects in MATLAB.

List of Equipment / Machine Required: MATLAB / SciLAB / OCTAVE

Recommended Books:

1. Python Data Analytics– Fabio Nelli, APRESS.
2. Python for Data Analysis, Wes McKinney, O'Reilly.

Laboratory Outcomes [After undergoing the course, students will be able to:]

1. Use various data structures available in Python.
2. Apply the concepts of Data Analysis.
3. Apply the use of Numpy Library for performing various data processing activities.
4. Apply the use of Pandas library for data handling activities.
5. Apply the use of Matplotlib for data visualization activities.

Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.)

Program / Semester: B.Tech (VI Sem)	Branch: Data Sciences
Subject: Data Security and Privacy (Lab)	Course Code: C109634(022)
Total / Minimum-Pass Marks (End Semester Exam): 40/20	L: 0 T: 0 P: 2 Credits: 1

List of Experiments:-

1. Write a C / C++ program for encryption Program for Caesar Cipher.
2. Write a C / C++ program for encryption Program for Shift Cipher.
3. Write a C / C++ program to generate pseudo random numbers.
4. Write a C / C++ program for RSA algorithm taking P and Q randomly.
5. Write a C / C++ program for Diffie Hallman Key exchange algorithm.
6. Case study of software like CrypTool, HashCalc.
7. Working with some important window based commands used for investigating and configuring computer network : ipconfig, Ping, nbtstat, telnet, netstat etc.
8. Write a C / C++ program for encryption Program for Blowfish cipher.
9. Write a C / C++ program for encryption Program for Fiestal cipher.

Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.)

Program / Semester: B.Tech (VI Sem)	Branch: Data Sciences
Subject: Technical Communication & Soft Skills	Course Code: C000601(046)

UNIT-I:

Communication Skills-Basics: Understanding the communicative environment, Verbal Communication; Non Verbal Communication & Cross Cultural Communication, Body Language & Listening Skills; Employment Communication & writing CVs, Cover Letters for correspondence. Common errors during communication, Humour in Communication.

UNIT-II:

Interpersonal communication: Presentation, Interaction and Feedbacks, Stage Manners, Group Discussions (GDs) and facing Personal Interviews, Building Relationships, Understanding Group Dynamics- I, Emotional and Social Skills, Groups, Conflicts and their Resolution, Social Network, Media and Extending Our Identities.

UNIT-III:

Vocational skills: Managing time: Planning and Goal setting, managing stress: Types of Stress; Making best out of Stress, Resilience, Work-life balance, Applying soft-skills to workplace.

UNIT-IV:

Mindsets and Handling People: Definitions and types of Mindset, Learning Mindset, Developing Growth Mindset, Types of People, How to Lead a Meeting, How to Speak Effectively in Meetings, Behavior & Roles in Meetings, Role Play: Meeting. On Saying “Please”, How to say “NO”.

UNIT-V:

Positive Psychology: Motivating oneself, Persuasion, Survival Strategies, Negotiation, Leadership and motivating others, controlling anger, Gaining Power from Positive Thinking.

Text Books:

1. Petes S. J., Francis. Soft Skills and Professional Communication. New Delhi: Tata McGraw-Hill Education, 2011.
2. Stein, Steven J. & Howard E. Book. The EQ Edge: Emotional Intelligence and Your Success. Canada: Wiley & Sons, 2006.
3. Dorch, Patricia. What Are Soft Skills? New York: Execu Dress Publisher, 2013.

Reference Books:

1. Kamin, Maxine. Soft Skills Revolution: A Guide for Connecting with Compassion for Trainers, Teams, and Leaders. Washington, DC: Pfeiffer & Company, 2013.
2. Peale Norman Vincent. The Power of Positive Thinking: 10 Traits for Maximum Result. Paperback Publication. 2011.
3. Klaus, Peggy, Jane Rohman & Molly Hamaker. The Hard Truth about Soft Skills. London: Harper Collins E-books, 2007.

Course Outcomes:

- Learn to listen actively to analyse audience and tailor the delivery accordingly.
- Increase their awareness of communication behaviour by using propriety-profiling tool.
- Master three “As” of stressful situation: Avoid, Alter, Accept; to cope with stressors and create a plan to reduce or eliminate them.
- Develop growth mind-set and able to handle difficult person and situations successfully.
- Develop technique of turning negativity into positivity and generate self-motivation skills.