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

Program / Semester: **B.Tech (VII)**	Branch: **Computer Science &Engineering**
Subject: **Machine Learning**	Course Code: **D022711(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

1. To introduce the basic concepts of Machine Learning.
2. To introduce the concepts of Data Analysis in Machine Learning.
3. To introduce the concepts of Machine Learning algorithms.
4. To introduce the concepts related to Machine Learning model diagnosis and tuning.
5. To introduce the concepts related to Artificial Neural Networks.

UNIT- I Introduction: History and Evolution, Machine Learning Categories: Supervised Learning, Unsupervised Learning, Reinforcement Learning. Knowledge Discovery in Databases, SEMMA (Sample, Explore, Modify, Model, Assess).

UNIT-II Machine Learning Perspective of Data: Scales of Measurement, Dealing with Missing Data, Handling Categorical Data, Normalizing Data, Feature Construction or Generation. Correlation and Causation, Polynomial Regression, Logistic Regression, ROC Curve.

UNIT- III Introduction to Machine Learning Algorithms: Decision Trees, Support Vector Machine, k-Nearest Neighbors, Time-Series Forecasting, Clustering, Principal Component Analysis (PCA).

UNIT-IV Model Diagnosis and Tuning: Bias and Variance, K-Fold Cross Validation, Bagging, RandomForest, Gradient Boosting, Stacking.

UNIT-V Artificial Neural Network (ANN): Perceptron—Single Artificial Neuron, Multilayer Perceptrons (Feedforward Neural Network), Restricted Boltzman Machines (RBMs).

Text Books:

1. Mastering Machine Learning with Python in Six Steps– Manohar Swamynathan, APress.
2. Python Machine Learning for Beginners, M. Usman Malik, AI Publishing.

Reference Books:

1. Introduction to Machine Learning with Python, Daniel Nedal& Peters Morgan, AI Sciences
2. Data Structures and Algorithms Using Python, Rance D. Necaise, WILEY

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

1. Remember the basic concepts of Machine Learning.
2. Able to perform Data Analysis in Machine Learning.
3. Remember the Machine Learning algorithms.
4. Able to perform Machine Learning model diagnosis and tuning.
5. Apply the concept of Artificial Neural Networks.

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

Program / Semester: **B.Tech (VII)**	Branch: **Computer Science &Engineering**
Subject: **Data mining and Warehousing**	Course Code: **D022712(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

1. To understand the overall architecture of a data warehouse.
2. The different data mining models and techniques will be discussed in this course.
3. Evaluate different models used for OLAP and data pre-processing;
4. Design and implement systems for data mining and evaluate the performance of different data mining algorithms;
5. Propose data mining solutions for different applications.
6. Differentiate Online Transaction Processing and Online Analytical processing

UNIT-I Overview and Concepts: Need for data warehousing, basic elements of data warehousing, Trends in data ware housing. Planning and Requirements: Project planning and management, Collecting the requirements. Architecture And Infrastructure: Architectural components, Infrastructure and metadata.

UNIT-II Data Design and Data Representation: Principles of dimensional modelling, Dimensional modelling advanced topics, data extraction, transformation and loading, data quality

UNIT-III Information Access and Delivery: Matching information to classes of users, OLAP in data warehouse, Data warehousing and the web. Implementation And Maintenance: Physical design process, data warehouse deployment, growth and maintenance.

UNIT-IV Data Mining: Introduction: Basics of data mining, related concepts, Data mining techniques Data Mining Algorithms: Classification, Clustering, Association rules. Knowledge Discovery: KDD Process.

UNIT-V Web Mining: Web Content Mining, Web Structure Mining, Web Usage mining. Advanced Topics: Spatial mining, Temporal mining. Visualization : Data generalization and summarization-based characterization, Analytical characterization: analysis of attribute relevance, Mining class comparisons: Discriminating between different classes, Mining descriptive statistical measures in large databases Data Mining Primitives, Languages, and System Architectures: Data mining Primitives, Query language, Designing GUI based on a data mining query language, Architectures of data mining systems Application and Trends in Data Mining: Applications, Systems products and research prototypes, Additional themes in data mining, Trends in data mining.

Text Books:

1. Data warehousing- concepts, Techniques, Products and Applications by Prabhu, Prentice hall of India
2. Insight into Data Mining: Theory & Practice by Soman K P, Prentice hall of India.
3. Data Mining Introductory and Advanced Topics by M.H. Dunham, Pearson Education.

Reference Books:

1. Data Warehousing Fundamentals by PaulrajPonniah, John Wiley.
2. Introduction to Data mining with Case Studies by Gupta, PHI.
3. The Data Warehouse Lifecycle toolkit by Ralph Kimball, John Wiley.
4. Introduction to Building the Data warehouse, IBM, PHI.

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

1. Design a data warehouse for an organization
2. Develop skills to write queries using DMQL
3. Extract knowledge using data mining techniques
4. Adapt to new data mining tools.
5. Explore recent trends in data mining such as web mining, spatial-temporal mining.

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

Program / Semester: **B.Tech (VII)**	Branch: **Computer Science &Engineering**
Subject: **Internet and Web Technology**	Course Code: **D022713(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

1. Describe the important features of the Web and Web browser software
2. Evaluate e-mail software and Web-based e-mail services
3. Use FTP and other services to transfer and store data
4. Demonstrate the use of real-time chat and briefly describe the history of the wireless Internet
5. Create HTML documents and enhance them with browser extensions

UNIT-I INTRODUCTION TO INTERNET: Introduction, Evolution of Internet, Internet Applications, Internet Protocol -TCP/IP, UDP, HTTP, Secure Http(Shttp) Internet Addressing – Addressing Scheme – Ipv4 & IPv6, Network Byte Order, Domain Name Server and IP Addresses, Mapping . Internet Service Providers, Types Of Connectivity Such As Dial-Up Leaded Vsat Etc. Web Technologies: ThreeTier Web Based Architecture; Jsp, Asp, J2ee, .Net Systems

UNIT-II HTML CSS AND SCRIPTING: HTML - Introduction, Sgml, Dtd(Document Type Definition, Basic Html Elements, Tags and usages, HTML Standards , Issues in HTML Dhtml: Introduction Cascading Style Sheets: Syntax ,Class Selector, Id Selector Dom (Document ObjectModel) &Dso (Data Source Object) Approaches To Dynamic Pages: Cgi, Java Applets, Plug Ins, Active X, Java Script –Java Script Object Model, Variables-Constant – Expressions, Conditions-Relational Operators- Data Types – FlowControl – Functions & Objects-events and event handlers – Data type Conversion & Equality – Accessing HTML form elements

UNIT-III XML: What is XML – Basic Standards, Schema Standards, Linking & Presentation Standards, Standards that build on XML, Generating XML data, Writing a simple XML File, Creating a Document type definition, Documents &Data ,DefiningAttributes & Entities in the DTD ,Defining Parameter Entities & conditional Sections, Resolving a naming conflict, UsingNamespaces, Designing an XML data structure, Normalizing Data, Normalizing
DTDS

UNIT-IV INTERNET SECURITY & FIREWALLS: Security Threats From Mobile Codes, Types Of Viruses, Client Server Security Threats, Data & Message Security, Various electronic payment systems, Introduction to EDI, Challenges–Response System, Encrypted Documents And Emails,Firewalls: Hardened Firewall Hosts, Ip- Packet Screening, Proxy Application Gateways, Aaa (Authentication, AuthorizationAnd Accounting).

UNIT-V WEBSITE PLANNING & HOSTING: Introduction, Web Page Lay-Outing, Where To Host Site, Maintenance Of Site, Registration Of Site On Search Engines And Indexes, Introduction To File Transfer Protocol, Public Domain Software, Types Of Ftp Servers (Including Anonymous),Ftp Clients Common Command. Telnet Protocol, Server Domain, Telnet Client, Terminal Emulation. Usenet And Internet Relay Chat

Text Books:

1. Internet & Intranet Engineering,- Daniel Minoli, TMH.
2. Alexis Leon and Mathews Leon – Internet for Every One, Tech World.

Reference Books:

1. Eric Ladd, Jim O'Donnel–"Using HTML 4, XML and JAVA"-Prentice Hall of India -1999.
2. "Beginning Java Script "– Paul Wilton – SPD Publications –2001.
3. Frontiers of Electronics of Commerce, Ravi kalakota& Andrew B. Whinston Addison Wesley

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

1. Understand, analyze and apply the role of languages like HTML, DHTML, CSS, XML, Javascript, and web applications
2. Analyze a web page and identify its elements and attributes.
3. Create XML documents and XML Schema

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

Program / Semester: **B.Tech (VII)**	Branch: **Computer Science &Engineering**
Subject: **Parallel and Distributed Algorithms** (Professional Elective III)	Course Code: **D022731(022)**
Total / Minimum-Pass Marks(End Semester Exam):**100 / 35**	L: 1 T: 1 P: 0 Credits: 2
Class Tests & Assignments to be conducted: 2 each	Duration (End Semester Exam): **03 Hours**

Parallel Algorithms

Unit-I: Introduction Parallel Programming Models: Shared-memory model (PRAM, MIMD, SIMD), network model (line, ring, mesh, hypercube), performance measurement of parallel algorithms.

Unit-II Algorithm Design Techniques for PRAM Models: Balancing, divide and conquer, parallel prefix computation, pointer jumping, symmetry breaking, pipelining, accelerated cascading. Algorithms for PRAM Models: Parallel Reduction, Prefix Sums, List ranking, sorting and searching, tree algorithms, graph algorithms, string algorithms.

Unit-III Algorithms for Network Models: Matrix algorithms, sorting, graph algorithms, routing, Relationship with PRAM models. Parallel Complexity: Lower bounds for PRAM models, the complexity class NC, P-completeness.

Distributed Algorithms

Unit-IV Basic concepts. Models of computation: shared memory and message passing systems, synchronous and asynchronous systems. Logical time and event ordering. Global state and snapshot algorithms, clock synchronization. Distributed Operating Systems: Mutual exclusion, deadlock detection

Unit-V Classical Algorithms: Leader election, termination detection, distributed graph algorithms. Fault tolerance and recovery: basic concepts, fault models, agreement problems and its applications, commit protocols, voting protocols, check-pointing and recovery, reliable communication. Security and Authentication: basic concepts, Kerberos. Resource sharing and load balancing.

Text Books:

1. Joseph F Jájá, An Introduction to Parallel Algorithms, Addison-Wesley, 1992.
2. Joseph Jaja, An Introduction to Parallel Algorithms, Addison Wesley
3. Mukesh Singhal and Niranjan Shivaratri, Advanced Concepts in Operating Systems, McGraw-Hill.

Reference Books:

1. Michael J Quinn, Parallel Computing: Theory and Practice, second edition, McGraw Hill, 1994/2002.
2. Michael J Quinn, Parallel Programming in C with MPI and OpenMP, first edition, McGraw Hill, 2004/2003.
3. AnanthGrama, Anshul Gupta, George Karypis and Vipin Kumar, Introduction to Parallel Computing, second edition, Addison-Wesley/Pearson, 1994/2003.
4. Nancy Lynch, Distributed Algorithms, Morgan Kaufmann.
5. Andrew S. Tanenbaum, Distributed Operating Systems, ACM Press.
6. Jie Wu, Distributed Systems, CRC Press.
7. HagitAttiya, Jennifer Welch, Distributed Computing: Fundamentals, Simulations and Advanced Topics, McGraw-Hill.

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

Program / Semester: **B.Tech (VII)**	Branch: **Computer Science &Engineering**
Subject: **Cyber Security**	Course Code:
Total / Minimum-Pass Marks(End Semester Exam):**100 / 35**	L: 1 T: 1 P: 0 Credits: 2
Class Tests & Assignments to be conducted: 2 each	Duration (End Semester Exam): **03 Hours**

Course Objectives

1. To Create cyber security awareness and to understand principles of web security
2. To understand key terms and concepts in cyber law, intellectual property and cyber crimes, trademarks and domain theft.
3. To make attentive to students about possible hacking and threats in this communication era.
4. Discuss Issues for creating Security Policy for a Large Organization.

Unit – 1 Cyber Security Fundamentals: Security Concepts: Authentication, Authorization, Non-repudiation, Confidentiality, Integrity, availability. CyberCrimes and Criminals: Definition of cyber-crime, types of cyber-crimes and types of cyber-criminals.

Unit – 2Cyber attacker Techniques and Motivations: Anti-forensics: Use of proxies, use of tunneling techniques. Fraud techniques: Phishing and malicious mobile code, Rogue antivirus, Click fraud. Threat Infrastructure: Botnets, Fast Flux and advanced fast flux.

Unit – 3 Exploitation: Techniques to gain foothold: Shellcode, Buffer overflows, SQL Injection, Race Conditions, DoS Conditions, Brute force and dictionary attacks. Misdirection, Reconnaissance, and DisruptionMethods: Cross-Site Scripting (XSS), Social Engineering, WarXing, DNS Amplification Attacks.

Unit – 4 Information Technology Act 2000: Overview of IT Act 2000, Amendments and Limitations of IT Act, Electronic Governance, Legal Recognition of Electronic Records, Legal Recognition of Digital Signature, Certifying Authorities, Cyber Crime and Offenses, Network Service Providers Liability, Cyber Regulations Appellate Tribunal, Penalties and Adjudication.

Unit – 5 Cyber Law and Related Legislation: Patent Law, Trademark Law, Copyright, Software Copyright or Patented, Domain Names and Copyright disputes, Electronic Data Base and its Protection, IT Act and Civil Procedure Code, IT Act and Criminal Procedural Code,Relevant Sections of Indian Evidence Act, Relevant Sections of Bankers Book Evidence Act, Relevant Sections of Indian Penal Code, Relevant Sections of Reserve Bank of India Act, Law Relating To Employees And Internet, Alternative Dispute Resolution, Online Dispute Resolution (ODR).

Text Books:

1. Cyber Security Essentials, James Graham et al. CRC Press
2. Cyber Laws: Intellectual property & E Commerce Security, Kumar K. Dominant Publisher

Reference Books:

1. Cyber Law Text & Cases, Gerald R. Ferrera, Margo E. K. Reder, CENGAGE LEARNING Publication.
2. Ethics in Information Technology, George W. Reynolds, CENGAGE LEARNING Publication.
3. Cyber Laws & IT Protection, Harish Chander, PHI Publication.
4. Ross J. Anderson. Security Engineering: A Guide to Building Dependable Distributed Systems. John Wiley, New York, NY, 2001.
5. Matt Bishop. Computer Security: Art and Science. Addison Wesley, Boston, MA, 2003.
6. Frank Stajano. Security for Ubiquitous Computing. John Wiley, 2002.

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

1. Students will be able to acknowledge about the cybercrime, cyber criminal, and intellectual property rights.
2. Encouraging Open Standards.
3. Protection and resilience of Critical Information Infrastructure.
4. To enable effective prevention, investigation and prosecution of cybercrime and enhancement of law enforcement capabilities through appropriate legislative intervention.

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

Program / Semester: **B.Tech (VII)**	Branch: **Computer Science &Engineering**
Subject: **Quantum Computing**	Course Code: **D022733(022)**
Total / Minimum-Pass Marks(End Semester Exam):**100 / 35**	L: 1 T: 1 P: 0 Credits: 2
Class Tests & Assignments to be conducted: 2 each	Duration (End Semester Exam): **03 Hours**

Course Objectives

The objective of this course is to impart necessary knowledge to the learner so that he/she can develop and implement algorithm and write programs using these algorithms.

UNIT-1 Introduction to Quantum Computing: Motivation for studying Quantum Computing, Major players in the industry (IBM, Microsoft, Rigetti, D-Wave etc.),Origin of Quantum Computing. Overview of major concepts in Quantum Computing:Qubits and multi-qubits states, Bra-ket notation,Bloch Sphere representation,Quantum Superposition,Quantum Entanglement

UNIT-2 Math Foundation for Quantum Computing Matrix Algebra: basis vectors and orthogonality, inner product and Hilbert spaces, matrices and tensors, unitary operators and projectors, Dirac notation, Eigen values and Eigen vectors.

UNIT-3Building Blocks for Quantum Program Architecture of a Quantum Computing platform. Details of q-bit system of information representation: Block Sphere,Multi-qubits States,Quantum superposition of qubits (valid and invalid superposition),Quantum Entanglement,Useful states from quantum algorithmic perceptive
e.g. Bell State , Operation on qubits: Measuring and transforming using gates,Quantum Logic gates and Circuit: Pauli, Hadamard, phase shift, controlled gates, Ising, Deutsch, swap etc.

UNIT-4Programming model for a Quantum Computing Program: Steps performed on classical computer,Steps performed on Quantum Computer,Moving data between bits and qubits.

UNIT-5Quantum Algorithms: Basic techniques exploited by quantum algorithms.: Amplitude amplification,Quantum Fourier Transform,Phase Kick-back,Quantum Phase estimation,Quantum Walks,Major Algorithms:Shor's Algorithm,Grover's Algorithm,Deutsch's Algorithm,Deutsch -Jozsa Algorithm. OSS Toolkits for implementing Quantum program:IBM quantum experience Microsoft Q ,RigettiPyQuil (QPU/QVM)

List of Suggested Books:

1. Michael A. Nielsen, "Quantum Computation and Quantum Information", CambridgeUniversity Press.
2. David McMahon, "Quantum Computing Explained", Wiley

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

1. Explain the working of a Quantum Computing program, its architecture and program model
2. Develop quantum logic gate circuits
3. Develop quantum algorithm
4. Program quantum algorithm on major toolkits

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

Program / Semester: **B.Tech (VII)**	Branch: **Computer Science &Engineering**
Subject: **Distributed Systems**	Course Code: **D022734(022)**
Total / Minimum-Pass Marks(End Semester Exam):**100 / 35**	L: 1 T: 1 P: 0 Credits: 2
Class Tests & Assignments to be conducted: 2 each	Duration (End Semester Exam): **03 Hours**

Course Objectives

1. Familiarize the students with the basics of distributed computing systems.
2. To introduce the concepts of distributed file systems, shared memory and message passing systems, synchronization and resource management.

Unit I: INTRODUCTION

Definition – Evolution- Goals of distributed systems, system models- Issues in the design of distributed systems- Distributed com-puting environment.

Unit II: COMMUNICATION

Message Passing – Features and Issues -Synchronization-Buffering – Process Addressing – Failure Handling – Remote procedure call (RPC): Model – Implementation – Stub generation – RPC messages – Marshaling – server Management – Call semantics – communication protocols for RPC-Client server binding – RMI.

Unit III: DISTRIBUTED SHARED MEMORY

Distributed shared memory- Design and implementation issues- Sequential consistency – Release consistency, Process migration Features & Mechanism

Unit IV: SYNCHRONIZATION

Synchronizing physical clocks – Logical clocks – Distributed coordination – Event Ordering – Mutual Exclusion – Deadlock – Elec-tion algorithms.

Unit V: DISTRIBUTED FILE SYSTEMS

Introduction – File Models – File accessing, sharing and caching – File Replication – Atomic transactions Case Study HADOOP. : Resource and process management – Task assignment approach – Load balancing approach – Load sharing approach

Text Books:

1. George Colouris, Jean Dollimore and Tim Kindberg, “Distributed Systems – Concepts and Design”, Pearson Education Private Limited, New Delhi, 2001
2. Pradeep K Sinha, “Distributed Operating Systems: Concepts and Design”, Prentice Hall of India, New Delhi, 2003.

Reference Books:

1. Gerard Tel, “Introduction to Distributed algorithms”, Cambridge University Press, USA, 2000.
2. Andrzej Goscinski, “Distributed Operating Systems, the logical Design”, Addison Wesley Publishing Company, USA, 1991.
3. Tanenbaum, “Modern Operating Systems”, Prentice Hall of India, New Delhi, 1999.
4. Patrick Naughton and Herbert Schildt, “Java 2- The Complete Reference”, Tata McGraw Hill, New Delhi, 2007.

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

1. Verify and analyze the time complexity of the algorithms related to distributed computing.
2. Design and develop various algorithms for problems in distributed computing
3. Compare various resource allocation stratagies.

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

Program / Semester: **B.Tech (VII)**	Branch: **Computer Science &Engineering**
Subject: **Distributing System**	Course Code: **D022734(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

3. Familiarize the students with the basics of distributed computing systems.
4. To introduce the concepts of distributed file systems, shared memory and message passing systems, synchronization and resource management.

Unit I: INTRODUCTION

Definition – Evolution- Goals of distributed systems, system models- Issues in the design of distributed systems- Distributed com-puting environment.

Unit II: COMMUNICATION

Message Passing – Features and Issues -Synchronization-Buffering – Process Addressing – Failure Handling – Remote procedure call (RPC): Model – Implementation – Stub generation – RPC messages – Marshaling – server Management – Call semantics – communication protocols for RPC-Client server binding – RMI.

Unit III: DISTRIBUTED SHARED MEMORY

Distributed shared memory- Design and implementation issues- Sequential consistency – Release consistency, Process migration Features & Mechanism

Unit IV: SYNCHRONIZATION

Synchronizing physical clocks – Logical clocks – Distributed coordination – Event Ordering – Mutual Exclusion – Deadlock – Elec-tion algorithms.

Unit V: DISTRIBUTED FILE SYSTEMS

Introduction – File Models – File accessing, sharing and caching – File Replication – Atomic transactions Case Study HADOOP. : Resource and process management – Task assignment approach – Load balancing approach – Load sharing approach

Text Books:

3. George Colouris, Jean Dollimore and Tim Kindberg, “Distributed Systems – Concepts and Design”, Pearson Education Private Limited, New Delhi, 2001
4. Pradeep K Sinha, “Distributed Operating Systems: Concepts and Design”, Prentice Hall of India, New Delhi, 2003.

Reference Books:

5. Gerard Tel, “Introduction to Distributed algorithms”, Cambridge University Press, USA, 2000.
6. Andrzej Goscinski, “Distributed Operating Systems, the logical Design”, Addison Wesley Publishing Company, USA, 1991.
7. Tanenbaum, “Modern Operating Systems”, Prentice Hall of India, New Delhi, 1999.
8. Patrick Naughton and Herbert Schildt, “Java 2- The Complete Reference”, Tata McGraw Hill, New Delhi, 2007.

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

1. Verify and analyze the time complexity of the algorithms related to distributed computing.
2. Design and develop various algorithms for problems in distributed computing
3. Compare various resource allocation stratagies.

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

Program / Semester: **B.Tech (VII)**	Branch: **Computer Science &Engineering**
Subject: **Machine Learning Lab**	Course Code: **D022721(022)**
Total / Minimum-Pass Marks(End Semester Exam):**40 / 20**	L: 0 T: 0 P: 2 Credits: 1

Course Objectives

1. To be able to use Numpy along with Matplotlib for visual representation of data.
2. To be able to create a Supervised Learning models in Python.
3. To be able to create an Un-Supervised Learning models in Python.
4. To be able to implement Artificial Neural Network in Python.

1. Write programs to understand the use of Matplotlib for Simple Interactive Chart, Set the Properties of the Plot, matplotlib and NumPy.
2. Write programs to understand the use of Matplotlib for Working with Multiple Figures and Axes, Adding Text, Adding a Grid and Adding a Legend.
3. Write programs to understand the use of Matplotlib for Working with Line Chart, Histogram, Bar Chart, Pie Charts.
4. Write a program in Python to implement Linear Regression for house price prediction. (Data Source: https://forge.scilab.org/index.php/p/rdataset/source/file/master/csv/MASS/Boston).
5. Write a program in Python to implement K Nearest Neighbor classifier for diabetes classification. (Data Source: https://www.kaggle.com/uciml/pima-indians-diabetes-database/data).
6. Build a Naive Bayes model in Python totackle a spam classification problem. (Data Source: (https://www.kaggle.com/uciml/sms-spam-collectiondataset/downloads/spam.csv/1).
7. Write a Python code to tackle a multi-class classification problem where the challenge is to classify wine into three types using Decision Tree.(DataSource: https://gist.github.com/tijptjik/9408623/archive/b237fa5848349a14a14e5d4107dc7897c21951f5.zip).
8. Write a program in Python to implement Support Vector Machine for diabetes classification. (Data Source: https://www.kaggle.com/uciml/pima-indians-diabetes-database/data).
9. Demonstrate the application of Artificial Neural Network using Python.

Recommended Books:

1. Hands On MachineLearning With Python– John Anderson, AI Sciences LLC.
2. Python for Data Analysis, Wes McKinney, O'Reilly.

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

1. ApplyNumpy along with Matplotlib for visual analysis of data.
2. Apply Supervised Learning models for problem solving.
3. Apply Un-Supervised Learning models for problem solving.
4. Apply Artificial Neural Network for problem solving.

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

Program / Semester: **B.Tech (VII)**	Branch: **Computer Science &Engineering**
Subject: **Internet and Web Technology Lab**	Course Code: **D022722(022)**
Total / Minimum-Pass Marks(End Semester Exam):**40 / 20**	L: 0 T: 0 P: 2 Credits: 1

CourseObjectives:

- Theobjectiveofthislabistodevelopanability todesignandimplementstaticanddynamicwebsite
- Tolearnhowtocreateasimple&advancedwebpageusinghtmlalongwiththeusageofstylesheets,lists,creatio nor tables with borders, paddingand colors.
- TogetacquaintedwithJavaScriptproceduresandusageofregularexpressionsinJavaScript.

Expt-1: Develop and demonstrate a XHTML document that illustrates the use external style sheet, ordered list, table,borders,padding, color, and the tag.

Expt-2: DevelopanddemonstrateaXHTMLfilethatincludesJavascriptforthefollowingproblems:

a) Input:Anumber*n*obtainedusingprompt
Output:Thefirst*n*Fibonacci numbers
b) Input:Anumber*n*obtainedusingprompt
Output:A tableofnumbers from1to*n*andtheir squaresusing alert

Expt-3: DevelopanddemonstrateaXHTMLfilethatincludesJavaScriptscriptthatusesfunctionsforthefollowingproblems:

a) Parameter:A string
Output:Thepositioninthestringoftheleft-mostvowel
b) Parameter:Anumber
Output:Thenumberwith itsdigitsinthereverseorder

Guideline:

1. Declarethescripttagastext/javascript inthebeginningofthe<body> ofhtmlprogram
2. Getthenumbertobereversedfromtheuserusingprompt()
3. Validate input number (should be a positive number between 0 to 9) using the regular expression "/^[0-9]+$/"and alert the user for invalid inputusing alert()
4. Reversethenumberusingmodulusoperation.
5. Usemath.floor(number/10)togetthefloorofnumberafterdivision(usedforreversing)
6. Displaythereversedstringusingalert()

Expt-4(a): Develop and demonstrate, using Java script, a XHTML document that collects the USN (the valid formatis: A digit from 1 to 4 followed by two upper-case characters followed by two digits followed by two upper-casecharacters followed by three digits; no embedded spaces allowed) of the user. Event handler must be included for theform element that collects this information to validate the input. Messages in the alert windows must be producedwhenerrors are detected.

(b) : Modify theabove programtogetthecurrentsemesteralso(restrictedtobeanumberfrom1to8)

Expt-5: Develop and demonstrate, using JavaScript script, a XHTML document that contains three short paragraphsof text, stacked on top of each other, with only enough of each showing so that the mouse cursor can be placed oversome part of them. When the cursor is placed over the exposed part of any paragraph, it should rise to the top tobecomecompletelyvisible.

Expt-6: Design an XML document to store information about a student in an engineering college affiliated toCSVTU.

- The information must include Enrolment, Univ_Roll, Name, Name of the College, Brach, Year of Joining,ande-mail id.
- Create sampledatafor10students.Createa CSSstylesheetanduseittodisplay thedocument.

Expt-7:(a) Write a Perl program to display various Server Information like Server Name, ServerSoftware, Serverprotocol,CGIRevision etc.
(b)WriteaPerlprogramtoacceptUNIXcommandfromaHTMLformandtodisplaytheoutputofthecommandexecuted.

Expt-8: Write a Perl program to accept the User Name and display a greeting message randomly chosen from a list of4greeting messages.

Expt-9: WriteaPerlprogramtodisplayadigitalclockwhichdisplaysthecurrenttimeoftheserver

Expt-10: Write a Perl program to insert name and age information entered by the user into a table created usingMySQLandto displaythe current contents of this table.

EXPT-11: Write a PHP/.Net program to store current date-time in a COOKIE and display the "Last visited ondate-timeon the web page uponreopening ofthe samepage.

EXPT-12: Write a PHP/.Net program to store page views count in SESSION, to increment the count on each refresh,andto show the count onweb page.

EXPT-13: Create a XHTML form with Name, Address Line 1, Address Line 2, and E-mail text fields. On submitting,storethe values in MySQL table. Retrieveand display the data based onName.

EXPT-14: Using PHP/.Net develop a program to accept book information viz. Accession number, title, authors,edition and publisher from a web page and store the information in a database and to search for a book with the titlespecifiedbythe user and todisplaythe search resultswithproper headings.

EXPT-15: UsingPHP/.NetTechnologydevelopanonlineportalofanonlineBookstore.Thepagesshouldresemblewww.amazon.comthe website should consist the followingpages.

- Homepage
- RegistrationanduserLogin
- UserProfile Page
- Bookscatalog
- ShoppingCart
- PaymentBycreditcard
- OrderConformation

Validatethe Registration,userlogin,userprofileandpaymentbycreditcardpagesusingJavaScript.

Courseoutcome:

Attheendofthecourse,students shouldbeableto:

- Designandimplementdynamicwebsiteswithgoodaestheticsenseofdesigningandlatesttechnicalknow-how's.
- HaveaGoodgroundingofWebApplicationTerminologies,InternetTools,E–Commerceandotherwebservices

Program / Semester: **B.Tech (VII)**	Branch: **Computer Science &Engineering**
Subject: **Project (Phase I)**	Course Code: **D022723(022)**
Total / Minimum-Pass Marks(End Semester Exam):**60/40**	L: 0 T: 0 P: 6 Credits: 3

Guideline for Allocation of project:

1. Information regarding broad area must be made available to the students well in advance (may be during previoussemester).
2. Information must cover following parameters.
   I. Broad area: Subject or expertise/application area.
   II. Required skills: Knowledge of subject(s), software, tools & other characteristics.
   III. Type of project: Hardware, software, design, survey, study based etc.
   IV. Guide available: Name of Guide (S) from Department & Institute.
   V. Other related information depending upon specific branch & institute.
3. It is also recommended to give proper counseling to pick up suitable project.
4. Students must get chance to select projects as per their choice or decided mutually between students anddepartment faculty (HoD) concern.
5. One project group must contain maximum four students, however students can do project individually but it shouldbe approved by department.
6. Compiled list of projects must be submitted to the University within 25 days of start of semester.
7. Compiled list may contain following parameters.

Monitoring of project:

1. It is recommended to give projects as per the specializations of existing faculty of the department instead of outsideperson/agency.
2. Project must be allocated, developed and monitored by department / institution itself, but not by outside agencies.
3. Regular review by guide is recommended to ensure development & contribution of students.

Internal Evaluation & Submission of project:

1. Evaluation of project would be as per the examination scheme of the University, which is based on internal as well as external evaluation.
2. Internal assessment requires submission of project report for getting approved by the concern authority.
   However printing and binding would be as per the conventional format.
3. Evaluation will be based on live demonstration / presentation and Viva.
4. Final submission of project is expected as,
   - Submission of a copy to the University,
   - One copy to the Institution central library,
   - One copy to the department.

External Evaluation:

External assessment of project would be like conduction of practical exams of University, and must be executed asper the norms of practical exams.

NOTE: Completion of Project outside the department/Institution should not be encouraged.

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

Program / Semester: **B.Tech (VII)**	Branch: **Computer Science & Engineering**
Subject: **Industrial Training**	Course Code: **D022724(022)**
Total Marks (Internal Assessment):**20**	L: 0 T:0 P: 2 Credit(s): 1
Internal Assessments to be conducted: 02	Duration (End Semester Exam): **NA**

COURSE OBJECTIVES:

1. To gain experience of working as an engineering professional, including the technical application of engineering knowledge.
2. To experience the discipline of working in a professional organisation and multidisciplinary team.
3. To develop technical, interpersonal and communication skills.

Course Outcomes

On completion of this component of curriculum, the students will be able to

1. Apply engineering knowledge in solving real-life problems.
2. Attain new skills and be aware of the state-of-art in engineering disciplines of their own interest.
3. Get exposure to real-life-working environment & practices, and to attain the professionalisms.
4. Work with multi-tasking professionals and multidisciplinary team.
5. Prepare a technical report, to improve presentation and other soft skills.

Course Content

Exposure to real life problems at various reputed industries engaged in areas of Computer Science and Engineering

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

Program / Semester: **B.Tech (VII)**	Branch: **Computer Science &Engineering**
Subject: **Universal Human Values 2**	Course Code: **D000701(046)**
Total Marks (Internal Assessment):10	L: 0 T:0 P: 2 Credit(s): 0
Internal Assessments to be conducted: 02	Duration (End Semester Exam): **NA**

Course Objectives

1. To help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings
2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature Thus, this course is intended to provide a much needed orientational input in value education to the young enquiring minds.

UNIT 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education- Understanding the need, basic guidelines, content and process for Value Education, Self Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for selfexploration, Continuous Happiness and Prosperity- A look at basic Human Aspirations, Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority, Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario 6. Method to fulfill the above human aspirations: understanding and living in harmony at various levels

UNIT 2: Understanding Harmony in the Human Being –

Harmony in Myself!, Understanding human being as a co-existence of the sentient 'I' and the material 'Body', Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha, Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer), Understanding the characteristics and activities of 'I' and harmony in 'I', Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail, Programs to ensure Sanyam and Swasthya - Practice Exercises and Case Studies will be taken up in Practice Sessions.

UNIT 3: Understanding Harmony in the Family and Society-

Harmony in Human Human Relationship Understanding Harmony in the family – the basic unit of human interaction, Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship, Understanding the meaning of Vishwas; Difference between intention and competence, Recognition of Human-Human Relationship, Recognition of feelings in relationship, Established Values and Expressed Values in Relationship, interrelatedness of feelings and their ful fillment, Expression of feelings, Types of relationship and their purpose, mutual evaluation in relationship, meaning of justice in relationship, Justice leading to culture, civilization and Human Conduct.

UNIT 4: Understanding Harmony in the Nature and Existence –

A comprehensive understanding (knowledge) about the existence, Nature being included; the need and process of inner evolution (through self-exploration, self awareness and self-evaluation), Whole existence as Co-existence ,Understanding the harmony in the Nature, Interconnectedness and mutual fulfillment among the four orders of nature recyclability and self-regulation in nature, Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence - Practice Exercises and Case Studies will be taken up in Practice Sessions.

UNIT 5: Professional Ethics-

Value based Life and Profession, Professional Ethics and Right Understanding, Competence in Professional Ethics, Issues in Professional Ethics – The Current Scenario, Vision for Holistic Technologies, Production System and Management Models.

Text Books:

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. A.N Tripathy, New Age International Publishers, 2003..

Reference Books:

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and Harper Collins, USA
2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
3. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
4. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
5. Bajpai. B. L , , New Royal Book Co, Lucknow, Reprinted, 2004

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

1. Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society
2. Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body.
3. Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society
4. Understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature.
5. Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.

Name of the Program: Bachelor of Technology
Semester: B. Tech – 7th **Branch: Computer Science Engg.**
Subject: Universal Human values 2 **Course Code: D000701(046)**
Total Marks in End Semester Exam: **L: T: P: 2 Credits: 0**
Minimum number of Class Tests: 2

Course Objective(s):

- Development of a holistic perspective based on self- exploration about themselves (human being), family, society and nature/existence.
- Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
- Strengthening of self-reflection.
- Development of commitment and courage to act.

UNIT-I Introduction- Need, Basic Guidelines, Content and Process for Value Education

- Purpose and motivation for the course, recapitulation from Universal Human Values-I.
- Self-Exploration–what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration.
- Continuous Happiness and Prosperity- A look at basic Human Aspirations
- Right understanding, Relationship and Physical Facility- the basic requirements for fulfillment of aspirations of every human being with their correct priority.
- Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
- Method to fulfill the above human aspirations: understanding and living in harmony at various levels.
- Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking.

UNIT-II Understanding Harmony in the Human Being - Harmony in Myself!

- Understanding the needs of Self ('I') and 'Body' - happiness and physical facility.
- Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer).
- Understanding the characteristics and activities of 'I' and harmony in 'I'.
- Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail.
- Programs to ensure Sanyam and Health.
- Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life.
- Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease

UNIT-III Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

- Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship
- Understanding the meaning of Trust; Difference between intention and competence
- Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship
- Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals
- Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

- Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives.

UNIT-IV Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

- Understanding the harmony in the Nature
- Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self-regulation in nature.
- Understanding Existence as Co-existence of mutually interacting units in all-pervasive space.
- Holistic perception of harmony at all levels of existence.
- Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

UNIT-V Implications of the above Holistic Understanding of Harmony on Professional Ethics

- Natural acceptance of human values
- Definitiveness of Ethical Human Conduct
- Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
- Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems.
- Case studies of typical holistic technologies, management models and production systems
- Strategy for transition from the present state to Universal Human Order:
  - At the level of individual: as socially and ecologically responsible engineers, technologists and managers
  - At the level of society: as mutually enriching institutions and organizations
- Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions e.g. to discuss the conduct as an engineer or scientist etc.

Text Books:

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. Jeevan Vidya: EkParichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.

Reference Books:

1. The Story of Stuff (Book).
2. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi.
3. Small is Beautiful - E. F Schumacher.

Course Outcome:

After completion of course, student should be able to

- To become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
- They would have better critical ability. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society). It is hoped that they would be able to apply what they have learnt to their own self in different day-to- day settings in real life, at least a beginning would be made in this direction.

Open Elective for 7th Semester

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Biomass Management for Fodder & Energy**	Code:	**D000701(094)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Min Marks: 100	Min Marks: 35

Course Objectives:

- To Learn about the biomass management system.
- To understand the function of baler for collection of straw.
- To know about the mulching and composting methods.

UNIT I	Introduction to biomass management, Biomass resource assessment management techniques/supply chains, Processing of paddy straw, densification - extrusion process.
UNIT II	Briquettes and cubes, Baling-classification, uses, Residue management for surface mulch and soil incorporation.
UNIT III	Paddy Straw choppers and spreaders, Paddy Straw choppers and spreaders as an attachment to combine Harvester, Mulch seeder, Paddy Straw Chopper-cum-Loader.
UNIT IV	Baler for collection of straw, Processing of straw/ fodder for animal use, Agricultural and horticultural use of paddy straw
UNIT V	Paddy straw - Cushioning material for fruits and vegetables, Mulching and Composting, Paper and cardboard manufacturing from paddy straw, Straw as a fuel.

Text books:

1. Biomass Production and Efficient Utilization for Energy Generation, N.S. Rathore, N.L. Panwar, CRC Press.
2. Principles of Agricultural engineering vol 1 & 2 by Michael and Ojha

Course Outcome:

- Student shall be able to explain biomass management system.
- Student shall be able to explain baler performance.
- Student shall be able to explain mulching and composting process in detail.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Gully & Ravine Control Structure**	Code:	**D000702(094)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objectives:

- To explain the gully and ravine erosion.
- To explain erosion.
- To understood how to control erosion.

UNIT I	Introduction, Extent of Gully and Ravine Erosion Problem, Soil Erosion, Factors Influencing Soil Erosion.
UNIT II	Precipitation, Measurement of Precipitation, Analysis of Precipitation Data – I, Analysis of Precipitation Data – II, Runoff, Computation of Runoff
UNIT III	Runoff Estimation– SCS Curve Number Method, Runoff Hydrograph – I, Runoff Hydrograph – II, Unit Hydrograph – I, Unit Hydrograph – II
UNIT IV	Estimation of Soil Erosion, Modification of Universal Soil Loss Equation, Measurement of Runoff and Sediment, Models for Predicting Sediment Yield – I, Models for Predicting Sediment Yield – II
UNIT V	Soil Erosion Control Measures, Terracing, Bunds, Grassed Waterways, Retaining Wall, Culverts, Temporary Control Structures, Control by Semi-permanent Structures, Control by Permanent Structures, Permanent Structures – I, Permanent Structures – II

Text books:

1. Soil And Water Conservation Engineering, R Suresh, Standard Publisher Distributors
2. Principles of Agricultural engineering vol 1 & 2 by Michael and Ojha

Course Outcome:

- Student shall be able to explain gully and ravine erosion.
- Student shall be able to define soil erosion.
- Student shall be able to explain erosion control methods.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Design of structure**	Code:	**D000703(020)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objectives:

- To define relationship between stress and strain.
- To understand beam construction.
- To understand different types of bolt.
- To study different type of joints.

UNIT I	**Basis of working stress method:** Properties of Concrete and reinforcing steel, stress-strain curves, permissible stresses, modular ratio, loads on structure, Basis for design by working stress method. Analysis and design of singly reinforced and doubly reinforced sections by working stress method, shear in beams.
UNIT II	**Limit State Method – Rectangular Beams:** Introduction to limit state method, characteristic loads, partial safety factor, limit state of flexure – assumptions, stress block parameters, neutral axis, analysis and design of singly and doubly reinforced section, shear in beams, bond and development length, design of lintels.
UNIT III	**Limit State Method – T-Beams and Slabs:** Properties of T-section, moment of resistance and design of singly reinforced T-beam. Dead loads, imposed loads, thickness of slabs, modification factors, effective span, reinforcement in slab, design of one way slab and two way slabs.
UNIT IV	**Limit State Method – Columns:** Axially loaded short columns, minimum eccentricity, longitudinal and transverse reinforcement, effective length of column, safe load on columns, circular columns, Pu – Mu interaction curves, combined axial load and uni-axial bending, combined axial load and bi-axial bending
UNIT V	**Limit State Method – Fasteners:** Location details of fasteners, Bearing type bolts, Friction Grip type Bolting, Welds and Welding, Advantages and Disadvantages of Welded Connections, Lap and Butt Joints, Truss Joint Connections by bolts and welds.

Text books:

1. Limit State Design of Reinforced Concrete – B. C. Punmia, A. K. Jain and A. K. Jain (LaxmiPublications)
2. Limit State Theory and Design of Reinforced Concrete (IS:456-2000) – V. L. Shah and S. R. Karve (StructuresPublications,Pune)
3. Reinforced Concrete Design – S. U. Pillai and D. Menon (Tata McGrawHill)
4. Design of Steel Structures - N. Subramanian (Oxford UniversityPress)
5. Limit State Design of Steel Structures – S. K. Duggal (Tata McGrawHill)

Reference Books

1. Relevant IS codes IS: 456:2000, IS 875, Part 1,2
2. Reinforced Concrete Structures – Dayaratam P. (Oxford and IBH PublishingCo.)
3. Reinforced Concrete Limit State Design – Jain, A.K. (Nem Chand and Bros.Roorkee)

4. Indian Standard – General Construction in Steel –Code of Practice (3rd Revision) (IS:800 – 2007)
5. Design of Steel Structures – K. S. Sai Ram (PearsonEducation)
6. Structural Steel Design : LRFD Method – J. C. McCormac, J. K. Nelson (PearsonEducation)
7. Limit State design in Structural Steel – M. R. Shiyekar (PHILearning)
8. Limit State Design of Steel Structures (IS:800-2007) – V. L. Shah, V. Gore (StructuresPublications)

Course Outcome:

- Student shall able to explain relationship between stress and strain.
- Student shall be able to explain different type of joints.
- Student shall be able to identify type of bolt.
- Student shall be easily constructing beam.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Reservoir and farm pond design**	**Code:**	**D000704(094)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objectives:

- To understand rain harvesting.
- Explain the basic design concept of dam component.
- To know about the runoff inducement methods.

UNIT I	Introduction to Rainwater Harvesting, Hydrological Aspects of Water Harvesting, Identification of Areas Suitable for Water Harvesting, Reservoir/Dam and Farm Ponds, Earthen Embankments, Earthen Embankment Classification
UNIT II	Components of Embankment, Basic Design Concept I, Basic Design Concept II, Design of Dam Components
UNIT III	See through Dam, Estimation of See Flow, Determination of Location of See Line, Flow Net, See Analysis I, See Analysis II, Failure and Damages I, Failure and Damages II, Control of See Using Drainage System, Stability Analysis I, Stability Analysis II, Stability Analysis III, Stability Analysis IV, Slope Protection
UNIT IV	Construction of reservoir and pond, Operation and Maintenance of Water Harvesting System Introduction to Economic Analysis, Economic Indicators
UNIT V	Water Quality of Harvested Water and Environmental Considerations, Method to Reduce See and Evaporation Losses, Runoff Inducement Methods, Other Water Harvesting Structures

Text books:

1. Ponds: Building, maintaining, enjoying : the first complete book of farm pond management, Carolyn Garrick Stern
2. Reservoir and Farm Pond Design, Dr. S. N. Panda, Dr. B. C. Sahoo, Dr. K. P. Sudheer

Course Outcome:

- Student shall be able to understand rain harvesting.
- Student shall be able to design dam component.
- Student shall be able to construct dam.
- Student shall be able to explain runoff inducement methods.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**3 D Printing & Design**	**Code:**	**D000705(037)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objectives:

- The course is designed to impart knowledge and skills related to 3D printing technologies, selection of material and equipment and develop a product using this technique in Industry 4.0 environment

UNIT I	**3D Printing (Additive Manufacturing)** Introduction, Process, Classification, Advantages, Additive V/s Conventional Manufacturing processes, Applications. **CAD for Additive Manufacturing** CAD Data formats, Data translation, Data loss, STL format.
UNIT II	**Module : Additive Manufacturing Techniques** Stereo- Lithography, LOM, FDM, SLS, SLM, Binder Jet technology. Process, Process parameter, Process Selection for various applications. Additive Manufacturing Application Domains: Aerospace, Electronics, Health Care, Defence, Automotive, Construction, Food Processing, Machine Tools.
UNIT III	**Materials** Polymers, Metals, Non-Metals, Ceramics, Various forms of raw material- Liquid, Solid, Wire, Powder; Powder Preparation and their desired properties, Polymers and their properties. Support Materials.
UNIT IV	**Additive Manufacturing Equipment** Process Equipment- Design and process parameters, Governing Bonding Mechanism, Common faults and troubleshooting Process Design
UNIT V	**Post Processing: Requirement and Techniques** **Product Quality:** Inspection and testing, Defects and their causes

Text books:

1. 1. Lan Gibson, David W. Rosen and Brent Stucker, "Additive Manufacturing Technologies: Rapid Prototyping to Direct Digital Manufacturing", Springer, 2010.
2. Andreas Gebhardt, "Understanding Additive Manufacturing: Rapid Prototyping, Rap-id Tooling, Rapid Manufacturing", Hanser Publisher, 2011.

Refrerences:

1. Khanna Editorial, “3D Printing and Design”, Khanna Publishing House, Delhi.
2. CK Chua, Kah Fai Leong, “3D Printing and Rapid Prototyping- Principles and Applica-tions”, World Scientific, 2017.
3. J.D. Majumdar and I. Manna, “Laser-Assisted Fabrication of Materials”, Springer Se-ries in Material Science, 2013.
4. L. Lu, J. Fuh and Y.S. Wong, “Laser-Induced Materials and Processes for Rapid Proto-typing”, Kulwer Academic Press, 2001.
5. Zhiqiang Fan and Frank Liou, “Numerical Modelling of the Additive Manufacturing (AM) Processes of Titanium Alloy”, In Tech, 2012. .

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Technology Management**	**Code:**	**D000706(076)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

UNIT I	**Technology:** Definitions, Types and Characteristics, Management of Technology (MOT), Technological Environment, Paramters of technological Environment, Science & technology in India.
UNIT II	**Innovation Management:** Invention v /s innovation, Definition and components of innovation, Types of Innovations: Product, Process and System innovations, Understanding Innovation process.
UNIT III	**Technology life Cycle:** Technology evolution and S-curves of Technology Evolution, Technology Diffusion, Dynamics of Diffusion, Mechanism of Diffusion,.
UNIT IV	**Technology strategies & intelligence:** Technology, Strategy & types, Models for technology strategy formulation, Definition of technology, Definition of Technology Intelligence, Technology Audit, Process of technology Intelligence, Technology Scanning, Monitoring, forecasting and Assessment.
UNIT V	**Acquisition and technology transfer, over view of- GATT, Intellectual Property rights (IPR)**

Text books:

1. V.K. Narayanan, "Managing Technology and Innovation for Competitive advantage" Pearson education .
2. Tarek Khalil, "Management of technology:, McGraw Hill.

Refrerences:

1. Khanna Editorial, "3D Printing and Design", Khanna Publishing House, Delhi.
2. CK Chua, Kah Fai Leong, "3D Printing and Rapid Prototyping- Principles and Applica-tions", World Scientific, 2017.
3. J.D. Majumdar and I. Manna, "Laser-Assisted Fabrication of Materials", Springer Se-ries in Material Science, 2013.
4. L. Lu, J. Fuh and Y.S. Wong, "Laser-Induced Materials and Processes for Rapid Proto-typing", Kulwer Academic Press, 2001.
5. Zhiqiang Fan and Frank Liou, "Numerical Modelling of the Additive Manufacturing (AM) Processes of Titanium Alloy", In Tech, 2012. .

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Decision Support & Executive Information system**	**Code:**	**D000707(033)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objectives:

- 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 discuss and develop skills in the analysis, design and implementation of computerized Decision Support Systems

UNIT I	**Decision Support System:** What is a DSS, Decision Making Rational Decisions, Definitions of Rationality, Bounded Rationality and Muddling Through, The Nature of Managers, Appropriate Data Support, Information Processing Models, Group Decision Making?
UNIT II	**Component OF DSS**: Data Component : Information and its Usefulness, Characteristics of Information, Databases to Support Decision Making ,Database Management Systems, Data Warehouses, Data Mining and Intelligent Agents Model Component- Models Representation Methodology, Time Model Based Management Systems, Access to Models Understand ability of Integrating Models Sensitivity of a Decision, Brain storming and Alternative Generation ,Evaluating Alternatives, Running External Models .Mail Component :Integration of Mail Management Examples of Use implications for DSS.
UNIT III	**Intelligence and Decision Support Systems:** Programming Reasoning, Backward Chaining Reasoning, Forward Chaining Reasoning, Comparison, Certainty Factors,User-Interface Component: User Interface Components, The Action Language, Menus, Command Language, I/O Structured Formats ,Free Form Natural Language, The Display or Presentation Language, Windowing Representations, Perceived Ownership of Analyses, Graphs and Bias Support for All Phases of Decision Making,The Knowledge Base Modes of Communication.
UNIT IV	**Designing A DSS:** Planning for DSS, Designing a Specific DSS, Interviewing Techniques, Other Techniques, Situational Analysis Design Approaches, Systems Built from Scratch, Using Technology to Form the Basis of the DSS, Evaluating a DSS Generator ,Using a DSS Generator ,The Design Team, DSS Design and Re-engineering Discussion.

UNIT V	**Implementation and Evaluationof DSS:** Implementation Strategy ,Prototypes ,Interviewing, User Involvement , Commitment to Change, Managing Change, Institutionalize System, Implementation and System Evaluation, Technical Appropriateness, Measurement Challenges ,Organizational Appropriateness

Course outcomes:

On completion of this program student will:

- Recognize the relationship between business information needs and decision making
- Appraise the general nature and range of decision support systems
- Appraise issues related to the development of DSS

Text books:

1. Decision Support System By VickilSauter
2. Management Information system –GeraldV .Post & David L.Anderson

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**SoftwareTechnology**	**Code:**	**D000708(022)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objectives:

- The basic objective in offering this course is to be employed as a practicing engineer in fields such as design, research, development, testing, and manufacturing

UNIT I	**ASSEMBLYLANGUAGEPROGRAMMING** Pentium Assembly languages-Registers, Memory Model, Addressing mode, 1source Link, Installation, Assembler Directives. ASSEMBLER DESIGN Simple manual Assembler, Assembler Design Process, Load and Go Assembler, Object File Formats.
UNIT II	**LINKERS** Linking-Combining Object Modules, PassI , PassII ;Library Linking; Position Independent Code(PIC); Shared Library Linking. LOADERS-Binary Image; Types of Loaders
UNIT III	**MACROPROCESSORS** Macro in NASM-Local Labels in Macro Body ,Nested Macros.;Design of Macroprocessors–Major Data Structures, Macroprocessing Technique, Simple macroprocessors without nesting, Nested calls &definitions.
UNIT IV	**COMPILERS** Lexical Analysis; Syntax Analysis; Intermediate Code Generation; Target Code Generation; Optimizing Transformation.
UNIT V	**TEXT EDITORS** Design of a Text Editor ; Data Structures for Text Sequences; Text Document Design; Text view Design DEBUGGER Features; Breakpoint mechanism; Hardware support; context of Debugger; Check pointing &reverse Execution

Course outcomes: After successful completion of the course, student will be able to

- An ability to apply knowledge of mathematics ,science ,and engineering.
- An ability to design and conduct experiments, as well as to analyze and inter prêt data

Text books:

1. SYSTEM SOFTWARE by Santanu Chattopadhyay; Prentice Hall of India
2. Software Engineering By Roger SPressman; Mc-GrawHill

References

1. Foundations of Software Technology and Theoretical Computer Science ,By V.(Venkatesh) Raman: Springer
2. Software Visualization by John Stasko ;MIT press
3. Software Engineering By Rajib Mall:PHI

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Knowledge Entrepreneurship**	**Code:**	**D000709(076)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

UNIT I	Introduction: Entrepreneurship in Knowledge economy, abundant & accessible information, implication, impact & consequence, knowledge based opportunities, aims, scope, and objectives.
UNIT II	Managing knowledge & intellectual capital: Knowledge management, loss of knowledge, knowledge implementation, knowledge creation, property intellectual.
UNIT III	Contemporary information problems: Information overload, winning & losing barrier to entry, emerging issues, customers, investors, myth of inevitable program.
UNIT IV	Creating enterprise cultures:Working with employer, organizing for entrepreneurship, unity & diversity, ten essential freedoms, freedom of operation, effective issue monitoring establish search criteria.
UNIT V	Becoming a knowledge entrepreneur: Entrepreneur qualities, knowledge entrepreneur, challenge of launching new product, creating launch support tool, examples of best practice.

Text books:

1. Amrit Tiwana, The Knowledge Management tool kit, Person Education.

2. Lunlin Conlson, Knowledge Entrepreneur, Thomas Press.

3. Catheriue L Mann, Knowledge entrepreneurship, Oxpford

4. Heinke Robkern, Knowledge entrepreneurship

5. Bonnie Montano, Knowledge Management, IRM Press, Londan

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Intellectual Property Rights**	**Code:**	**D000710(076)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objective:

- To promote the dissemination of the knowledge in intellectual properties by affording protection to its creators and its applications relevant to various streams of Engineering and Technology.

UNIT I	**INTRODUCTION:** Nature of Intellectual Property: Patents, Designs, Trademarks and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development.
UNIT II	**INTERNATIONAL SCENARIO:** International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.
UNIT III	**PATENT RIGHTS:** Scope of Patent Rights. Licensing and transfer of technology.Patent information and data bases. Geographical Indications.
UNIT IV	**NEW DEVELOPMENTS IN IPR:** Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR –patent corporation treaty (PCT)- patent laboratory treaty
UNIT V	**LEGAL PROCEDURE:** Registered and unregistered trademarks, design, concept, idea patenting.

Text books:

1. **Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd, 2007.**
2. **Mayall, "Industrial Design" McGraw Hill, 2004.**

REFERENCES:

1. Niebel, " Product Design" McGraw Hill, 2002
2. Robert P. Merges, Menell, Mark A. Lemley, " Intellectual Property " New Technologi-cal Age , 2002
3. Ramappa T, "Intellectual Property Rights" Under WTO, T., S. Chand, 2003.
4. http://www.ipindia.nic.in/

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Phytochemistry**	**Code:**	**D000711(018)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objective(s):

- To make the students familiar and aware of constitution, classification, structure determination and isolation of compounds present in plants.
- To make them learn about synthesis of drugs and use of different plants and chemical compounds to cure various diseases.
- To make them learn about synthesis and application of important biomolecules like lipid, protein, vitamins etc.
- To learn about the drug development process.
- To understand the chemistry behind the plant metabolites.

UNIT I	**Introduction of plant constituents** • A study of plant constituents with reference to classification. • Isolation and nomenclature of terpenes. • Structure determination and identification general methods of structure elucidation of terpenes. • Volatile oils: classification of citral and citronellol, menthol and camphor, Farnesol, Zinziberene.
UNIT II	**Phytochemical Study** • Alkaloids: Classification, isolation and general methods for structure investigation, structure elucidation of ephedrine and atropine. • Nicotine, study of ephedra and cinchona. • Structure of uric acid and caffeine. Tannins: general chemistry of tannins
UNIT III	**Protein** • Proteins: structure of proteins, partial and complete hydrolysis of polypeptides, determination of amino acid sequences. • Study of gelatin, papain and hyaluronidase.
UNIT IV	**Lipid** • Lipids: General chemistry of lipids and classification, hydrolysis of fats. • Study of following drugs- castor, olive, coconut.
UNIT V	**Drugs and Vitamins** • Study of following drugs with reference to sources, preparation, constituents and uses: honey, Starches and dextrin. • Vitamins: chemistry and structure determination of thiamine, riboflavin, ascorbic acid, vitamin A.

Text books:

1. **1.** Chemistry of Natural Products, P. S. Kalsi, Kalyani Publishers.
2. Organic Chemistry of Natural Products (Vol I & Vol II), Chatwal, Himalayan Publishers.
3. Synthetic Drugs, Chatwal, Himalayan Publishers.

REFERENCES:

1. 1. Advance Practical Organic Chemistry, Jagmohan (Vol I & Vol II), Himalayan Publishers.
2. Text Book of Organic Chemistry, P. L. Soni, Sultan Chandra and Sons.
3. Text Book of Organic Chemistry, M. K. Jain, Sultan Chandra and Sons.

Course Outcome:

After completion of course, student should be able to

- To gain knowledge about application of plants and their related compounds in treatment of various diseases.
- Understand the importance of plants phytochmicals.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Clinical Research and Trial Management**	**Code:**	**D000712(018)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objective(s):

- To make the students familiar with the concept of clinical research and trials.
- To make them aware of the regulations and ethical issues concerned with trials.
- To learn the basic of Pharmacovigilence.
- To understand the process involved in trial management.
- To understand the ethical and legal side of clinical research.

UNIT I	**Introduction to Clinical Research** • Introduction, Basics of Clinical Research, good clinical practices. • Indian and global perspective and guidelines.
UNIT II	**Clinical Trial Process** • Clinical trial and its processes, Types and Phases of clinical trial. • Documentation and its management
UNIT III	**Drug Development** • Drug development and processes, Pharmacovigilence. • Pre- clinical toxicity: types of toxicities, Regulations in clinical research and trial
UNIT IV	**Product Marketing** • Marketing of product, Post marketing surveillance- methods. • Monitoring of treatment and outcome, Termination of trial.
UNIT V	**Ethics** • Ethical, legal and social issues for responsible clinical research

Text books:

1. Handbook of clinical research. Julia Lloyd and Ann Raven Ed. Churchill Livingstone c.

2. Principles of Clinical Research edited by Giovanna di Ignazio, Di Giovanna and Haynes

REFERENCES:

1. Ethical Guidelines for Biomedical Research on Human Subjects 2000. Indian Council of Medical Research, New Delhi.
2. Textbook of Clinical Trials edited by David Machin, Simon Day and Sylvan Green, March 2005, John Wiley and Sons.

Course Outcome:

After completion of course, student should be able to

- To apply a better research in the related field with the knowledge acquired in the above course.
- Marketing knowledge will help the students to develop and maintain a better enterprise Students will be able to develop an understanding of the scientific methods employed in forensic science.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Cellular and Molecular Diagnostics**	**Code:**	**D000713(018)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objective(s):

- To give the students a clear knowledge of the diseases and severity of several medical conditions so that they can apply this knowledge in diagnosis and therapy.
- To make the students aware of medico legal issues and other issues concerned with the diagnostics and the result confidentiality.
- To understand the test involves for cellular and molecular diagnosis.
- To understand the handling and preparation methods of chemicals.
- To learn the advantages of cellular and molecular diagnosis..

UNIT I	**Diseases** • Disease: classification, epidemiology, pathology, prognosis. • Molecular pathology, symptoms
UNIT II	**Laboratories Protocol** • Procedure and protocols of laboratories: chemical preparation, volumetric analysis, weighing and balancing, concept of solute and solvent. • Specimen collection preservation, transportation, specimen selection procedure
UNIT III	**Function Test** • General Function test: liver function test, renal function test, reproductive endocrine function test, thyroid function test. • Principle of diagnostic enzymology. • Biochemical tests for electrolytes, toxic chemicals biomolecules.
UNIT IV	**Diagnosis Techniques** • Diagnosis: Molecular techniques: PCR, RFLP, SSCP, Microarrays, FISH, In-situ hybridization, blotting techniques. • Cytogenetic diagnosis; Immunodiagnostics: Antigen-Antibody Reactions, Antibody Production, Enzymes and Signal Amplification Systems, electrophoresis. • Antibody markers, CD Markers, FACS, HLA typing, Bioassays, biosensors, biochips.
UNIT V	**Benefits** • Advantages and disadvantages; Medico-legal issues; Confidentiality. • Result display and counseling of the affected individual, documentation, Therapy.

Text books:

1. Essentials of Human Disease (2011) Leonard V. Crowley, Jones & Bartlett Publishers.
2. The Biology of Disease (2001) Jonathan Phillips, Paul Murray & Paul Kirk, Blackwell Scientific.
3. Tietz Textbook of Clinical Chemistry, Carl A. Burtis, Edward R. Ashwood, Harcourt Brace & Company Aisa Pvt. Ltd.

REFERENCES:

1. Commercial Biosensors (1987) Graham Ramsay, John Wiley & Son, INC.
2. Essentials of Diagnostic Microbiology, Lisa Anne Shimeld.
3. Diagnostic Microbiology, Balley & Scott's.

Course Outcome:

After completion of course, student should be able to

- To conduct a better research in the related field with the knowledge acquired in the above course.
- The diagnosis will help in development of advanced therapeutic methodologies..

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Environmental Legislation and Impact Assessment**	**Code:**	**D000714(019)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

PREREQUISITES: Knowledge of Environmental Science and Education

Course Objectives:

1. Fundamental and conceptual understandings of air, water, wastewater pollution and control methodologies.
2. Comprehensive understanding and elaborative capacity to impart the environmental legislations.
3. Illustrative knowledge to implement the environmental legislation for impact assessment and management practices.

UNIT I	**Introduction to fundamental concepts of environmental protocols** Introduction: Role of National, International and UN Agencies in dealing with the environmental aspects, International protocols: Kyoto protocol, Montreal protocol, Rio declaration, Concept of carbon trading , Carbon footprint and climate change, Biodiversity and its conservation.
UNIT II	**Environmental Legislations & Enforcement – I** Significant Legislations in developing and developed countries, Environmental laws in India: Water (Prevention and Control Pollution) Act, 1974, Air (Prevention and Control Pollution) Act 1981, Wild life Protection Act 1972
UNIT III	**Environmental Legislations & Enforcement – II** Indian Forest Act 1927 and Amendments, Environment (Protection) Act, 1986, Issues involved in enforcement of environmental legislations.
UNIT IV	**Environmental Impact Assessment (EIA)** EIA methodologies, EIA notification 2006, Screening and scoping criteria, Rapid and comprehensive EIA, EIA processes in India and other countries, Environmental pollution indices.
UNIT V	**Environmental Audit and Management Action Plan** Environmental auditing, Environmental management, Preparation of management action plan.

Text books:

1. **Environmental Engineering and Management by Dr.Suresh K. Dhameja Publisher -S.K. Kataria & Sons (2004-2005).**
2. **Environmental Studies by Dr.Suresh K. Dhameja Publisher-S.K. Kataria & Sons (2006-2007).**

REFERENCES:

1. Environmental Laws in India – S. K. Shastri.
2. G.J. Rau and C.D.Wooten, Environmental impact analysis handbook, McGraw- Hill.

OPEN SOURCE LEARNING: http://nptel.ac.in/
http://ocw.mit.edu/courses/chemical-engineering/

Course Outcome:

On completion of the course, students will be able to:

CO1. Discuss the fundamental concepts of environmental protocols.

CO2. Describe the environmental legislations and implementation for enforcement.

CO3. Explain environmental legislations towards the significant enforcement.

CO4. Illustrate significantly the various aspects of environmental impact assessment.

CO5. Exemplify the significance of environmental audit and management action plan.

CO6. Demonstrate and proficiently explicate the complexities of environmental issues based on the protocols, legislations, enforcement and impact assessment for successful implementation of environmental management action plan.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Environmental management and Legislations**	**Code:**	**D000715(020)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

UNIT I	**Methodology:** Methodology of environmental management – Review various national and international protocols.
UNIT II	**Fundamentals of Environmental Management:** Fundamentals of Environmental Management and ISO 14000 series: Environmental management Plans, principles and elements. The ISO 14001- Environmental management systems standard
UNIT III	**Life Cycle Analysis:** Life cycle analysis, LCA steps, Framework and Methodology, Limitations of LCA, Environmental auditing.
UNIT IV	**Environmental Management Programmes:** Environmental Management Programmes – Economic incentive and disincentives as instruments for environmental management – Tax, subsidies, fee, and tradable permits.
UNIT V	**Major legislations and Sustainable Development:** Major legislations: Clean Water and Air Act. Principles of sustainable development, Related Issues and implications of finite biosphere and complexities for engineering design and decision-making.

Text books:

1. Environmental Engg& Management, Dhameja. S. K, S.K Kataria& Sons, New Delhi
2. Environmental Law and policy in India – Cases, Material and Status, Rosencranz, S. Divan, M.L. Noble, Tripathi Pvt. Ltd. Bombay
3. Encyclopedia of Environmental Analysis and Remediation Vol. 1-8, Meyers A. Robert (Eds.) , John Wiley & Sons
4. Accident Prevention Manual for Administration & Programs (Occupational Safety and Health Series), Philip Hagan, Natl Safety Council

REFERENCES:

1. The theory of Environmental policy, W.J. Banmol and W.E. Dates, Cambridge University
2. Legal aspects of environmental pollution and its management, S. Musharraf, C.B.S. Publishers, Delhi
3. Introduction to Environmental Engineering & Science, G.M. Masters, Prentice Hall, New Delhi.

4. Environmental Science & Engineering, J.G. Henry and G. W. Heike, Prentice Hall International Inc
5. Environmental Quality Management, Lohani B. N. and North A. M., South Asian Publishers Pvt. Ltd., New Delhi

Course Outcome:

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

1. Develop an understanding about various International and National Protocols.
2. Apply the ISO procedures.
3. Apply the knowledge gained for green procurement.
4. Efficiently handle the environmental management instruments
5. Apply concept of sustainable development for engineering design and decision-making

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Hydraulics of water and wastewater**	**Code:**	**D000716(020)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

UNIT I	**General hydraulics and flow measurement:** Fluid properties; fluid flow – continuity principle, energy principle and momentum principle; frictional head loss in free and pressure flow, minor heads losses, Carrying Capacity–Flow measurement.
UNIT II	**Water transmission and distribution:** Need for Transport of water and wastewater-Planning of Water System –Selection of pipe materials, pipe thickness calculations. Water transmission main design- gravity and pumping main; Selection of Pumps-characteristics-economics; Specials, Jointing, laying and maintenance, water hammer analysis.
UNIT III	**Water distribution systems:** Water distribution pipe networks, Methods, Design, analysis and optimization – appurtenances – corrosion prevention – minimization of water losses – leak detection Storage reservoirs. Use of computer software in water transmission and water distribution..
UNIT IV	**Wastewater collection and conveyance:** Planning factors – Design of sanitary sewer; partial flow in sewers, economics of sewer design. Handling and transport of slurry. Wastewater pumps and pumping stations- sewer appurtenances; material, construction, inspection and maintenance of sewers; Design of sewer outfalls-mixing conditions; conveyance of corrosive wastewaters. Use of computer software in sewer design, handling and transport of slurries.
UNIT V	**Storm water drainage:** Necessity - combined and separate system; Estimation of storm water runoff Formulation of rainfall intensity duration and frequency relationships- Rational methods. Use of computer software in storm water design.

Text books:

1. Fluid Mechanics – Dr. P.N. Modi (Standard Book House)
2. Mechanics of Fluid – Irving H. Shames (McGraw Hill)
3. Introduction to Fluid Mechanics – James A. Fay (Prentice Hall India)
4. Fluid Machines – Dr. JagdishLal (Metropolitan Book Company Private Ltd.)
5. Fluid Machines – John P. Douglas (Pearson Publication)

REFERENCES:

1. Bajwa, G.S. Practical Handbook on Public Health Engineering, Deep Publishers, Simla, 2003.
2. "Manual on water supply and Treatment", CPHEEO, Ministry of Urban Development, Government of India, New Delhi, 1999.
3. "Manual on Sewerage and Sewage Treatment", CPHEEO, Ministry of Urban Development,

Government of India, New Delhi, 1993.

Course Outcome:

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

1. The student will analyse general hydraulics and flow measurement.
2. The student will design water transmission system.
3. The student will analyse and design water distribution system.
4. The student will design sanitary sewer and maintenance of sewer.
5. The student will Analyse storm water runoff

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Disaster Management**	**Code:**	**D000717(020)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

UNIT I	**Introduction:** Nature of disasters – natural and other disasters, Earthquakes, floods, draught, cyclones, fire and other environmental disasters.
UNIT II	**Disasters:** Disaster's classification; natural disasters (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.); manmade disasters; Behaviour of structures in disaster prone areas, Disaster zoning.
UNIT III	**Disaster Impacts:**Disaster impacts (environmental, physical, social, ecological, economic, political, etc.); health, psycho-social issues; demographic aspects (gender, age, special needs); hazard locations; global and national disaster trends; climate change and urban disasters.
UNIT IV	**Disaster Risk Reduction (DRR):** Disaster management cycle – its phases; prevention, mitigation, preparedness, relief and recovery; structural and non-structural measures; risk analysis, vulnerability and capacity assessment; early warning systems, Post disaster environmental response (water, sanitation, food safety, waste management, disease control, security, communications), DRR programmes in India and the activities of National Disaster Management Authority.
UNIT V	**Disasters, Environment and Development:** Factors affecting vulnerability such as impact of developmental projects and environmental modifications (including of dams, landuse changes, urbanization etc.), sustainable and environmental friendly recovery; reconstruction and development methods.

Text books:

1. Design of Earthquake Resistant Buildings – Minoru Wakabayashi (McGraw Hill Publication)
2. Dynamics of Structures: Theory and Application to Earthquake Engineering (2nd edition) – Anil K Chopra (Pearson Education Publication)

REFERENCES:

1. Fundamentals of Vibrations – Anderson, R.A. (Mc Millan)
2. IS – 1893 (Part I): 2002, IS – 13920: 1993, IS – 4326: 1993, IS-13828: 1993
3. Earth quake engineering damage assessment and structural design – S.F. Borg
4. Disasters and development – Cuny F (Oxford University Press Publication)

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Neural Network and Deep Learning**	**Code:**	**D000718(022)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objectives

1. To define Neural Network, model a Neuron and Express both Artificial Intelligence and Neural Network
2. To introduce deep learning (DL) algorithms including convolutional neural networks (CNN), recurrent neural networks (RNN)
3. To train on how to fine tune hyper parameters of DL algorithms.

UNIT I	**Introduction to Neural Networks:** Neural Network, Human Brain, Models of Neuron, Neural networks viewed as directed graphs, Biological Neural Network, Artificial neuron, Artificial Neural Network architecture, Artificial Intelligence and Neural Networks; Network Architectures, Single-layered Feed forward Networks, Multi-layered Feed forward Networks, Recurrent Networks, Topologies.
UNIT II	**Introduction - Machine Learning and Deep Learning:** Representation Learning, Width and Depth of Neural Networks, Activation Functions: RELU, LRELU, ERELU, Unsupervised Training of Neural Networks, Restricted Boltzmann Machines, Auto Encoders.
UNIT III	**Introduction to Convolutional Neural Networks and Recurrent Neural Networks:** Introduction to CNNs, Kernel filter, Principles behind CNNs, Multiple Filters, CNN applications, Introduction to RNNs, Unfolded RNNs, Seq2Seq RNNs, LSTM, RNN applications
UNIT IV	**Gradient Descent and Backpropagation**: Gradient Descent, Stochastic Gradient Descent, Backpropagation Optimization and Regularization: Overfitting and Capacity, Cross Validation, Feature Selection, Regularization, Hyperparameters
UNIT V	**Deep Learning applications**: Image Processing, Natural Language Processing, Speech Recognition, Video Analytics

Text books:

1. Neural Networks and Deep Learning, Charu C. Aggarwal, Springer International Publishing
2. Deep Learning, Ian Good fellow, Yoshua Bengio and Aaron Courville, MIT Press

REFERENCES:

1. Machine Intelligence: Demystifying Machine Learning, Neural Networks and Deep Learning, Suresh Samudrala, Notion Press
2. Fundamentals of Deep Learning: Designing Next Generation Machine Intelligence Algorithms, Nikhil

Buduma, Nicholas Locascio, O'Reilly Media

Course outcome After successful completion of this course students will be able to

1. Understand the context of neural networks and deep learning
2. Fine tune hyper parameters of DL algorithms.
3. Understand the fundamentals of CNN and RNN
4. Recognize the characteristics of deep learning models that are useful to solve real-world problems.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Big data and Hadoop**	**Code:**	**D000719(022)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objectives

This course introduces the fundamental concepts of cloud and lays a strong foundation of Apache Hadoop (Big data framework).

1. The HDFS file system, MapReduce frameworks are studied in detail.
2. Hadoop tools like Hive, and Hbase, which provide interface to relational databases, are also covered as part of this course work.
3. Analyzing data with unix tools
4. Sorting. Map side and Reduce side joins.
5. Implementation. Java and Mapreduce clients

UNIT I	**Introduction to Big Data.** What is Big Dat?. Why Big Data is Important. Meet Hadoop. Data. Data Storage and Analysis. Comparison with other systems. Grid Computing. A brief history of Hadoop. Apache Hadoop and the Hadoop Eco System. Linux refresher; VMWare Installation of Hadoop.
UNIT II	**The design of HDFS.** HDFS conceptsCommand-linene interface to Hadoop Distributed File System (HDFS). Hadoop File systems. Interfaces. Java Interface to Hadoop. Anatomy of a file read. Anatomy of a file writes. Replica placement and Coherency Model. Parallel copying with distcp, Keeping an HDFS cluster balanced.
UNIT III	**Introduction. Analyzing data with Unix tools.** Analyzing data with hadoop. Java MapReduce classes (new API). Data flow, combiner functions, Running a distributed Map Reduce Job. Configuration API. Setting up the development environment. Managing configuration. Writing a unit test with MRUnit. Running a job in local job runner. Running on a cluster. Launching a job. The Map Reduce Web UI.
UNIT IV	**Classic Map Reduce. Job submission.** Job Initialization. Task Assignment. Task execution .Progress and status updates. Job Completion. Shuffle and sort on Map and reducer side. Configuration tuning. Map Reduce Types. Input formats. Output formats, Sorting. Map side and Reduce side joins.
UNIT V	**The Hive Shell.** Hive services. Hive clients. The meta store. Comparison with traditional databases. HiveQl. Hbasics. Concepts. Implementation. Java and Mapreduce clients. Loading data, web queries.

Text books:

1. Tom White, Hadoop, "The Definitive Guide", 3rd Edition, O'Reilly Publications, 2012
2. Dirk deRoos, Chris Eaton, George Lapis, Paul Zikopoulos, Tom Deutsch , "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data", McGraw Hill Osborne Media; 1 edition, 2011

REFERENCES:

1. http://www.cloudera.com/content/cloudera-content/clouderadocs/HadoopTutorial/CDH4/Hadoop-Tutorial.html
2. https: //www.ibm.com / developerworks / community / blogs / Susan VisserEditionntry/flash book understanding big data analytics for enterprise class hadoop and streaming data? langen

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

1. Understand the fundamentals of Big cloud and data architectures.
2. Understand HDFS file structure and Mapreduce frameworks, and use them to solve complex problems, which require massive computation power.
3. Use relational data in a Hadoop environment, using Hive and Hbase tools of the Hadoop Ecosystem.
4. Understand The Hive Shell.
5. Understand the Comparison with traditional databases.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Bio Informatics**	**Code:**	**D000720(022)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objectives

1. To introduce the basic concepts of Bioinformatics.
2. To introduce the concepts of Protein information.
3. To introduce the concepts of Genome information.
4. To introduce the concepts related to algorithms used in bioinformatics.
5. To introduce the concepts related to Multiple sequence alignment.

UNIT I	**Introduction:** The biological sequence/structure deficit, Genome projects, Status of the human genome project, Why is bioinformatics important?, Pattern recognition and prediction, The folding problem, The role of chaperones, Sequence analysis, Homology and analogy. The European Molecular Biology network, The National Center for Biotechnology Information- NCBI.).
UNIT II	**Protein information resources:** Biological databases, Primary sequence databases, Composite protein sequence databases, Secondary databases, Composite protein pattern databases, Structure classification databases.
UNIT III	**Genome information resources:** DNA sequence databases, Specialised genomic resources. DNA sequence analysis: Gene structure and DNA sequences, Features of DNA sequence analysis, Issues in the interpretation of EST searches, Two approaches to gene hunting, The expression profile of a cell, cDNA libraries and ESTs, Different approaches to EST analysis, Effects of EST data on DNA databases.
UNIT IV	**Pairwise alignment techniques:** Database searching, Alphabets and complexity, Algorithms and programs, Comparing two sequences -Sub-sequences, Identity and similarity, The Dotplot, Local and global similarity, Global alignment: the Needleman and Wunsch algorithm, Local alignment: the Smith-Waterman algorithm, Dynamic programming, Pairwise database searching.
UNIT V	**Multiple sequence alignment:** The goal of multiple sequence alignment, The consensus, Computational complexity, Manual methods, Simultaneous methods, Progressive methods, Databases of multiple alignments, Searching databases with multiple alignments.

Text books:

1. 1 Introduction to Bioinformatics, Teresa K. Attwood &David J. Parry-Smith, Prentice Hall
2. Bioinformatics For Dummies, 2nd Edition, Jean-Michel Claverie& Cedric Notredame, WILEY

REFERENCES:

1. Fundamental Conceptsof Bioinformatics, Dan E. Krane Wright & Michael L. Raymer, Pearson Education.
2. Introduction to Bioinformatics, Arthur M. Lesk, Oxford University Press.

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

1. Remember the basic concepts of Bioinformatics.
2. Understand the concepts of Protein information.
3. Remember the concepts of Genome information.

4. Understand the applicability of the concepts related to algorithms used in bioinformatics.
5. Understand the applicability of Multiple sequence alignment.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Software Testing**	**Code:**	**D000721(022)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objectives

1. To introduce the basic concepts of Bioinformatics.
2. To learn the criteria for test cases.
3. To learn the design of test cases.
4. To understand test management and test automation techniques
5. To apply test metrics and measurements.

UNIT I	**INTRODUCTION:** Testing as an Engineering Activity – Testing as a Process – Testing Maturity Model- Testing axioms – Basic definitions – Software Testing Principles – The Tester‘s Role in a Software Development Organization – Origins of Defects – Cost of defects – Defect Classes – The Defect Repository and Test Design –Defect Examples- Developer/Tester Support of Developing a Defect Repository.
UNIT II	**TEST CASE DESIGN STRATEGIES:** Test case Design Strategies – Using Black Box Approach to Test Case Design – Boundary Value Analysis – Equivalence Class Partitioning – State based testing – Cause-effect graphing – Compatibility testing – user documentation testing – domain testing - Random Testing – Requirements based testing – Using White Box Approach to Test design – Test Adequacy Criteria – static testing vs. structural testing – code functional testing – Coverage and Control Flow Graphs – Covering Code Logic – Paths – code complexity testing – Additional White box testing approaches- Evaluating Test Adequacy Criteria.
UNIT III	**LEVELS OF TESTING:** The need for Levels of Testing – Unit Test – Unit Test Planning – Designing the Unit Tests – The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – Scenario testing – Defect bash elimination System Testing – Acceptance testing – Performance testing – Regression Testing – Internationalization testing – Ad-hoc testing – Alpha, Beta Tests – Testing OO systems – Usability and Accessibility testing – Configuration testing –Compatibility testing – Testing the documentation – Website testing.
UNIT IV	**TEST MANAGEMENT:** People and organizational issues in testing – Organization structures for testing teams – testing services – Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management – test process – Reporting Test Results – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group- The Structure of Testing Group- .The Technical Training Program.
UNIT V	**TEST AUTOMATION:** Software test automation – skills needed for automation – scope of automation –

	design and architecture for automation – requirements for a test tool – challenges in automation – Test metrics and measurements – project, progress and productivity metrics.

Text books:

1. Srinivasan Desikan and Gopalaswamy Ramesh, ―Software Testing – Principles and Practices‖, Pearson Education, 2006.
2. Ron Patton, ―Software Testing‖, Second Edition, Sams Publishing, Pearson Education, 2007. AU Library.com

REFERENCES:

1. Ilene Burnstein, ―Practical Software Testing, Springer International Edition, 2003
2. Edward Kit, Software Testing in the Real World – Improving the Process‖, Pearson Education, 1995.
3. Boris Beizer, Software Testing Techniques‖ – 2nd Edition, Van Nostrand Reinhold, New York, 1990.
4. Aditya P. Mathur, ―Foundations of Software Testing _ Fundamental Algorithms and Techniques‖, Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008.

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

1. Design test cases suitable for a software development for different domains.
2. Identify suitable tests to be carried out.
3. Prepare test planning based on the document.
4. Document test plans and test cases designed.
5. Use automatic testing tools.
6. Develop and validate a test plan.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Switched Mode Power Converter**	**Code:**	**D000722(025)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objectives:

- To understand various modes of operation of switched mode power converters
- To analyze control aspects of switched mode power converters
- To design various switched mode power converter and its components

UNIT I	**Switching devices and control of switched mode power converters:** Power semiconductor devices for SMPS- static and switching characteristics, power loss evaluation, turn-on and turn-off characteristics, PWM control, Modeling and control of SMPS, duty cycle and current model control.
UNIT II	**Non-Isolated switched mode power converters:** Non-isolated dc-dc converter- buck, boost, buck-boost, Cuk, Sepic; continuous conduction mode and discontinuous conduction mode analysis; non-idealities in the switched mode power converters.
UNIT III	**Isolated switched mode power converters:** Isolated dc-dc converters- fly back, forward, push-pull, half bridge and full bridge topologies; transformer design for high frequency isolation.
UNIT IV	**Resonant Converters:** Introduction, resonant switch ZCS converter, principle of operation and analysis, resonant switch ZVS converter, principle of operation and analysis, Series resonant inverter, series resonant DC-DC converter, parallel resonant DC-DC converter, series- parallel resonant DC-DC converter, resonant converters comparison.
UNIT V	**Design considerations:** Selection of output filter capacitor, Selection of energy storage inductor, Design of High Frequency Inductor and High frequency Transformer, Selection of switches, Snubber circuit design, Design of driver circuits.

Text books:

1. H. W. Whittington, B. W. Flynn and D. E. MacPherson, "Switched Mode Power Supplies, Design and Construction", Universities Press, 2009 Edition.
2. Mohan N. Undeland . T & Robbins W., "Power Electronics Converters, Application and Design" Wiley, Third edition, 2007.
3. Umanand L., Bhat S.R., "Design of magnetic components for switched Mode Power Converters", newage publishers, First edition, 1992.
4. Robert. W. Erickson, D. Maksimovic, "Fundamentals of Power Electronics", Springer, 3rd edition,2020.

REFERENCES:

1. Krein P.T., "Elements of Power Electronics", Oxford University Press, Second edition,2017.

2. M. H. Rashid, "Power Electronics", Pearson Education, Fourth edition,2017.

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

- Model and develop switching power converters topologies.
- Describe the role of switch mode power converters in various applications.
- Design magnetic components for DC-DC converters

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Internet of Things**	**Code:**	**D000723(025)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objectives:

- To prepare the students to understand the Internet of Things.
- To make students understand the applications of IoT.
- To make students understand the difference between IoT and WoT

UNIT I	**IOT** What is the IoT and why is it important? Elements of an IoT ecosystem, Technology drivers, Business drivers, Trends and implications, Overview of Governance, Privacy and Security Issues.
UNIT II	**IOT PROTOCOLS** Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFIDProtocols – Issues with IoT Standardization – Unified Data Standards – Protocols – IEEE802.15.4–BACNet Protocol– Modbus – KNX – Zigbee– Network layer – APS layer – Security.
UNIT III	**IOT ARCHITECTURE** IoT Open source architecture (OIC)- OIC Architecture & Design principles- IoT Devices and deployment models- IoTivity: An Open source IoT stack - Overview- IoTivity stack architecture- Resource model and Abstraction.
UNIT IV	**WEB OF THINGS** Web of Things versus Internet of Things – Two Pillars of the Web – Architecture Standardization for WoT– Platform Middleware for WoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence.
UNIT V	**IOT APPLICATIONS** IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications. Study of existing IoT platforms /middleware, IoT- A, Hydra etc.

Text books:

1. Honbo Zhou, "The Internet of Things in the Cloud: A Middleware Perspective", CRC Press,2012.
2. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), "Architecting the Internet of Things", Springer, 2011.
3. David Easley and Jon Kleinberg, "Networks, Crowds, and Markets: Reasoning About a Highly Connected World", Cambridge University Press, 2010.
4. Olivier Hersent, David Boswarthick, Omar Elloumi , "The Internet of Things – Key applications and Protocols", Wiley, 2012.

REFERENCES:

1. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-on-Approach)",1st Edition, VPT, 2014.
2. Francis da Costa, "Rethinking the Internet of Things: A Scalable Approach to ConnectingEverything", 1st Edition, Apress Publications, 2013.
3. CunoPfister, Getting Started with the Internet of Things, O"Reilly Media, 2011, ISBN: 978-1-4493-9357-1

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

- Understand the meaning of IOT.
- Apply IoT in various applications in day to day life.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Non Conventional Energy Sources**	**Code:**	**D000724(025)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objectives:

- To provide a survey of the most important renewable energy resources and the technologies for harnessing these resources within the framework of a broad range of simple to state- of -the-art energy systems.

UNIT I	**Introduction :** Various non-conventional energy sources, Need, availability, classification, Relativemerits & demerits. Energy storage, distribution and conservation.
UNIT II	**Solar Energy:** Solar Cells; Theory of Solar Cells, Materials, Solar Cell Power Plants, merits / demerits.Solar Thermal Energy : Solar energy collectors, Applications, storage, Solar Thermal Power Plants, merits/demerits.
UNIT III	**Wind Energy:** Basic Principles of Wind Energy conversion Site Selection criterion ,wind Data & Energy Estimation, Types of Rotors, Characteristics, performance & limitations of energy conversion systems.
UNIT IV	**Tidal Energy:** Basic Principles, Components of Tidal Plants, Operation methods & utilization**,** **Bio-Mass Energy** – Conversion Technology, Classification of Plants, Advantages & Disadvantages **Geo-Thermal Energy** – Sources of Geo- Thermal energy, Thermal energy conversion- electrical /Nonelectrical conversion. Advantage & Disadvantages.
UNIT V	**MHD Power Generation** – Principle of working open cycle / close cycle system. Advantages & Disadvantages **Thermo Electric Power –** Basic Principles, Thermo Electric Materials, Performance & Limitations**.** **Thermionic Conversion** – Principles of working. **Hydrogen Energy –** Principles of conversion ,production of H2

Text books:

1. G.D. Rai – Non Conventional Energy Sources –4th ed.Khanna Pub..
2. S.P. Sukhatme – Solar Energy – TMH
3. John A Duffie& William A Beckman, 'Solar Energy Thermal processes', Wiley Interscience publication.

REFERENCES:

1. Bansal, Kleemann&Meliss – Renewable Energy Sources & Conversion Technology–TMH
2. P Garg & J Prakash,' Solar Energy - Fundamentals and Applications', Wiley Interscience publication.
3. Jay Cheng, 'Biomass to Renewable Energy Processes', 1st Edition, CRC press, 2009

Course outcomes:

- Demonstrate the generation of electricity from various Non-Conventional sources of energy, have a working knowledge on types of fuel cells.
- Estimate the solar energy, Utilization of it, Principles involved in solar energy collection and conversion of it to electricity generation.

- Explore the concepts involved in wind energy conversion system by studying its components, types and performance.
- Illustrate ocean energy and explain the operational methods of their utilization.
- Acquire the knowledge on geothermal energy.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Sensors and Transducers**	**Code:**	**D000725(025)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objective:

- To understand the principle of operation of Transducers and Sensors.
- To understand the application of Transducers and Sensors.

UNIT I	**Introduction:** Definition, significance of measurement and instruments. Principle of sensing & transduction, transducer classification, Transducer characteristics, emerging fields of sensor technologies.
UNIT II	**Resistive Transducers:** Potentiometers: types, loading error, metal and semiconductor strain gauges, types, resistance measuring methods, strain gauge applications: Load and torque measurement.
UNIT III	**Transducers: Electrical Transducer:** Transformer type, synchros, eddy current transducers, LVDT: Construction, material, input-output characteristics. **Magnetic Transducer:** Hall effect sensors, Magnetostrictive transducers: principle, positive and negative magnetostriction.
UNIT IV	**Capacitive Transducers**: Variable distance-parallel plate type, variable area- parallel plate type, cylindrical type, differential type, variable dielectric constant type, calculation of sensitivity. Capacitive microphone, fluid level measurement. Piezoelectric transducers: piezoelectric effects, Materials, naturaland synthetic types – their comparison, Charge and voltage coefficient, Force and stress sensing, displacement measurement.
UNIT V	**Thermal Sensors:** Resistance temperature detector (RTD): principle, materials and types; Thermistor: principle, materials and types; Thermocouple, Thermoelectric effects, laws of thermocouple, thermocouple types, construction. IC temperature sensor, PTAT type sensor. **Radiation Sensors:** types, characteristics and comparison. Pyroelectric type. **Optical Sensors:** LDR, Photo Diode, Stroboscope, IR Sensor.

Text books:

1. Transducers and Instrumentation, D.V.S. Murthy, Prentice Hall, 2008
2. Sensors and Transducers, D. Patranabis, Prentice Hall India, 2003
3. Measurement Systems - Application and Design, E.O. Doebelin, McGraw-Hill, 2008

Reference books:

1. Instrument Transducers - An Introduction to their Performance and Design", H.K.P. Neubert, Oxford University Press, 1999.
2. Measurement Systems and Sensors, WaldemarNawrocki Artech House, 2016.
3. Semiconductor sensors", S.M. Sze, Wiley - Interscience, 1994

4. Instrumentation Measurement and Analysis", B. C. Nakara & Chaudhry TATA McGraw-Hill, 2009.
5. Smart Sensors and Sensing Technology, Daniel E. Suarez, Nova Science Publishers, 2011.

Course Outcome:

- explain the basic principle of operation of Transducers and Sensors.
- distinguish different sensors and transducers.
- identify suitable transducer by comparing different industrial standards and procedures formeasurement of physical parameters.
- estimate the performance of different transducers.
- design real life electronics and instrumentation measurement systems.
- apply smart sensors, bio-sensors, PLC and Internet of Things to different applications.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**E-Commerce & strategic IT**	**Code:**	**D000726(033)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objectives:

- **To understand the business impact and potential of e-commerce**
- **To learn about the technologies required to make e-Commerce viable**
- **To learn e-commerce from an enterprise point of view**
- **To learn about the working of various electronic payment systems**

UNIT I	**Introduction:** What is E-Commerce, Forces behind E-Commerce, E-Commerce Industry Framework, and Brief History of E-commerce. Inter Organizational E-Commerce, Intra Organizational E-Commerce, and Consumer toBusiness Electronic Commerce, Architectural framework
UNIT II	**Network Infrastructure:** LAN, Ethernet (IEEE standard 802.3) LAN , WAN , Internet, TCP/IP Reference Model, DomainNameServer , Internet Industry Structure
UNIT III	Electronic payment systems: Types of electronic payment systems, digital token-based electronic payment systems, smart cards &electronicpayment systems, credit card based electronic payment systems, risk and electronic payment systems, designingelectronic payment systems.
UNIT IV	**Information Distribution and Messaging**: FTP,E-Mail, www server, HTTP, Web service implementation, Information publishing , Web Browsers, HTML, Common Gateway Interface
UNIT V	**Mobile & wireless computing fundamentals:** Mobile computing framework, wireless delivery technology and switching methods, mobile information access devices, mobile data internetworking standards, cellular data communication protocols, mobile computing applications, personal communication service.

Text books:

1. Frontiers of E-commerce by Kalakota & Whinston, Addison Wesley.
2. E-business road map for success by Dr. Ravi Kalakota& Marcia Robinson, Addison Wesley.

REFERENCES:

1. Electronic Commerce by Bharat Bhasker, TMH

Course outcomes:

- Will be able to work on business applications of wireless and mobile technologies for e-commerce
- Will be able to work on information distribution and messaging services in e-commerce application.
- Will be able to apply the skills necessary for large-scale web based e-commerce project development..

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Software Technology**	**Code:**	**D000727(022)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objectives:

- **The basic objective in offering this course is to be employed as a practicing engineer in fields such as design, research, development, testing, and manufacturing**

UNIT I	**ASSEMBLY LANGUAGE PROGRAMMING** Pentium Assembly languages-Registers, Memory Model, Addressing mode, 1source Link, Installation, Assembler Directives. ASSEMBLER DESIGN Simple manual Assembler, Assembler Design Process, Loadand Go Assembler, Object File Formats.
UNIT II	**LINKERS Linking -**Combining Object Modules, Pass I, Pass II; Library Linking; Position Independent Code (PIC); Shared Library Linking. LOADERS- Binary Image; Types of Loaders.
UNIT III	**MACROPROCESSORS Macro in NASM-** Local Labels in Macro Body, Nested Macros.; Design of Macro processors –Major Data Structures, Macro processing Technique, Simple macro processors without nesting, Nested calls &definitions
UNIT IV	**COMPILERS** Lexical Analysis; Syntax Analysis; Intermediate Code Generation; Target Code Generation; Optimizing Transformation
UNIT V	**TEXT EDITORS Design of a Text Editor ;** Data Structures for Text Sequences; Text Document Design; Text view Design DEBUGGER Features; Breakpoint mechanism; Hardware support; context of Debugger; Check pointing & reverse Execution

Text books:

1. SYSTEM SOFTWARE by Santanu Chattopadhyay ; Prentice Hall of India
2. Software Engineering By Roger S Pressman ; Mc -Graw Hill

References

1. Foundations of Software Technology and Theoretical Computer Science, By V. (Venkatesh) Raman:Springer
2. Software Visualization by John Stasko; MIT press 3. Software Engineering By Rajib Mall : PHI

Course outcomes:

After successful completion of the course, student will be able to

1. an ability to apply knowledge of mathematics, science, and engineering.
2. an ability to design and conduct experiments, as well as to analyze and interpret data.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Solar PV Energy System**	**Code:**	**D000728(024)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

COURSE OBJECTIVES:

1. To facilitate the students to achieve a clear conceptual understanding of technical and commercial aspects of Solar Power plant Development.
2. To increase the awareness of PV power systems potential and its value.
3. To enable the students to develop the approaches and strategies regarding Solar Power Development.
4. To stimulate activities that will lead to a cost reduction of PV power systems applications.

CO Statement	Knowledge Level
Conceptual knowledge of the technology with Solar Photovoltaic power plant development.	2
Students will learn different types of solar PV module and batteries used in solar PV plant.	2
Describe the working principle of various types of conversion systems and identify the different types of inverter.	2
Demonstrate knowledge of how to Mount, ground, position, install, wire and connect a photovoltaic system.	3
Design of solar PV Plant, installation, trouble shooting based on estimated loads.	4

UNIT I	**BASIC OF ELECTRICITY AND SOLAR PHOTOVOLTAIC** DC Power, AC Power, Energy, Harmonics, Solar Radiation, Net Metering, Measurement of Electrical and Non Electrical Quantities, Solar Cell and its function, Solar Technologies, Solar Cell Parameters, Efficiency of Solar Cell, Solar PV Module, PV Module Parameters, Efficiency of PV Module, Measuring Module Parameters.
UNIT II	**SOLAR PHOTOVOLTAIC MODULE ARRAY AND BATTERIES** Connection of PV Module in Series and Parallel, Estimation and Measurement of PV Module Power, Selection of PV Module, Battery function, Types of Batteries, Battery parameters, Series and Parallel combination of Batteries, Batteries for Photo voltaic System, Battery Fault Detection and Test.
UNIT III	**CONTROLLER, MPPT and INVERTERS** Power MOSFET and IGBT, Opto coupler, Buck and Boost Converter, Fly back Converter, Full Bridge Inverter, Voltage and Current Feedback, DC to DC Power Converter, DC to AC and AC to DC

	Converter, Battery Charge controller, Specification of Inverter and charger.
UNIT IV	**ELECTRICAL WIRING** Types of Wire, Wire Sizing, Junction Box, DC cabling, AC cabling, Array Combiner Box, AC Distribution Box, Energy Metering, Electrical Grounding, Earth Resistance and Insulation Resistance Measurements.
UNIT V	**SOLAR PV SYSTEM DESIGN, INSTALLATION AND SAFTEY** Solar Radiation Energy Measurements, Estimating Energy requirement, Types of Solar PV System, Design methodology for SPV system, Design of Off Grid Solar Power Plant, Design and Development of Solar Street Light, Installation and Trouble shooting of Standalone Solar PV System, Maintenance of Solar PV System, Safety in installation of Solar PV System.

Text books:

1. Gilbert M. Masters, "Renewable and Efficient Electric Power Systems", John Wiley & Sons, 2004
2. Solanki, Chetan Singh, "Solar Photovoltaic: Fundamentals, Technologies and Application", PHI Learning, New Delhi 2009
3. G.D. Rai, "Non Conventional Energy Sources", Khanna Publishers, New Delhi.
4. S. Rao & Dr. B. B.Parulekar, "Energy Technology, Non Conventional, Renewable & Conventional", Khanna Publishers, New Delhi

References

1. Roger A. Messenger & Jerry Ventre,"Photovoltaic Systems Engineering", CRC Press, 2004.
2. S.P. Sukhatme, J.K.Nayak ,"Solar Energy", Tata McGraw, New Delhi, 2010.
3. John R. Balfour, Michael L. Shaw, Sharlave Jarosek, "Introduction to Photovoltaics", Jones & Bartlett Publishers, Burlington, 2011.
4. Partain L.D., Fraas L.M., "Solar Cells and Their Applications", Wiley, 2nd Ed., New Delhi, 2010.
5. Md. Rabiul Islam, Faz Rahman & Wei Xu," Advances in Solar Photovoltaic Power Plants",2016

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Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Energy Conservation & Management**	**Code:**	**D000729(037)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

COURSE OBJECTIVES:

- understand and analyze the energy data of industries
- carryout energy accounting and balancing
- conduct energy audit and suggest methodologies for energy savings and
- utilize the available resources in optimal ways

UNIT I	**Introduction** Energy – Power – Past & Present scenario of World; National Energy consumption Data– Environmental aspects associated with energy utilization –Energy Auditing: Need, Types , Methodology and Barriers. Role of Energy Managers. Instruments for energy auditing. Energy intensity, Energy production and imports
UNIT II	**Energy Conservation in Major utilities** Pumps, Fans, Blowers, Compressed Air Systems, Refrigeration and Air Conditioning Systems–Cooling Towers – D.G. sets, Energy management programmes, Energy conservation measures.
UNIT III	**Thermal Systems Utilization** Stoichiometry, Boilers, Furnaces and Thermic Fluid Heaters – Efficiency computation and enconomic measures. Steam: Distribution & Usage: Steam Traps, Condensate Recovery, Flash Steam Utilization, Insulators & Refractories.
UNIT IV	Energy Storage Technologies Overview of storage technologies, Principal forms of stored energies, Application of energy storage, Specifying energy storage devices, Specifying fuels, Direct electric storage ,Electrochemical energy storage, Mechanical energy storage, Direct thermal storage, Thermochemical energy storage
UNIT V	**Industrial Energy Efficiency and Energy Management** Introduction, Industrial energy management and efficiency improvement, Improving industrial energy audits, Industrial electricity end uses and electrical energy management, Thermal energy management in industry, The role of new equipment and technology in industrial energy efficiency

Text books:

1. Energy Management and Conservation Handbook - D. Yogi Goswami, and Frank Kreith
2. Energy Management – W.R. Murphy, G. Mckay

References

1. Energy Management – Paul O'Callaghan
2. Engineering Economics & Engineering Management – R. Raju – Anuradha Agencies
3. Witte. L.C., P.S. Schmidt, D.R. Brown, "Industrial Energy Management andUtilisation"Hemisphere Publ, Washington, 1988.

4. Dryden. I.G.C., “The Efficient Use of Energy” Butterworths, London, 1982

Course Outcomes: Upon completion of this course, the students can able to analyse the energy data of industries

- Can carryout energy accounting and balancing
- Can suggest methodologies for energy savings

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Information Theory & Coding**	**Code:**	**D000730(033)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

COURSE OBJECTIVES:

- To learn the basic concepts of information theory and coding, including information, source coding, channel model,channel capacity, channel coding and so on.

UNIT I	Uncertainty, Information and Entropy Information Measures: Characteristics on information measure; Shannon's concept of information; Shannon's measure of information; Model for source coding theorem; Communication system; Source coding and line/channel coding; channel mutual information capacity (Bandwidth);
UNIT II	Channel coding, Theorem for discrete memory less channel, Information capacity theorem: Error detecting and error correcting codes; Types of codes; Block codes; Tree codes; Hamming codes; Description of linear block codes by matrices; Description of linear tree code by matrices; Parity check codes; Parity check polynomials;
UNIT III	Compression: Lossless and lossy; Huffman codes; Binary Image compression schemes; Run–length Encoding; CCITT group-3 1D compression; CCITT group-3 2D compression; CCITTgroup-42Dcompression;
UNIT IV	Video Image Compression: Requirement of full motion video compression; CCITTH261videocodingalgorithm; MPEG compression methodology; MPEG-2 compression; Audio (Speech) compression;
UNIT V	Cryptography: Encryption; Decryption; Cryptogram (cipher text); Conceptofcipher; Cryptanalysis; Keys: Single key (Secret key); Cryptography; two-key (Publickey)cryptography; Single key cryptography; Ciphers; Block Cipher code; Streamciphers;Requirements for secrecy; The data Encryption Standard; Public Key Cryptography;Diffie-Hellmann public key distribution; The Rivest- Shamin Adelman(R-S-A) systemfor public keycryptography;Digital Signature.

Text books:

1.Digital Communication by Das, Mullick & Chatterjee, New Age Pub.

2.Digital Communication by Proakis, TMH

3.Digital Image Processing by Gonzales & Woods, Pearson (for Unit – III & IV)

4.Local Area Network by G. Keiser, TMH (for Unit – V)

Course Outcomes: Upon completion of this course, the students can able to analyse the energy data of industries

1. Understand and explain the basic concepts of information theory, source coding, channel and channel capacity, channel coding and relation among them.
2. Describe the real life applications based on the fundamental theory.

3. Calculate entropy, channel capacity, bit error rate, code rate, steady-state probability and soon

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Project Planning, Management & Evaluation**	**Code:**	**D000731(076)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

COURSE OBJECTIVES:

- Projects are non-recurring activities requiring a different set of skill for planning as compared to regular and operative activities. The course is aimed at developing the understanding of project activities and relevant skills.

UNIT I	Project Identification Analysis: Socio-economic Consideration in Project formulation; Social Infrastructure Projects for Sustainable Development; Investment Opportunities; Project Screening and Presentation of Project of Decision Making; Expansion of Capacity; Diversification.
UNIT II	Market and Technical Analysis: Market and Demand Analysis—Market Survey, Demand forecasting, Uncertainties in Demand forecasting; Technical Analysis-Product Mix, Plant Capacity, Materials and Inputs, Machinery and Equipment.
UNIT III	Project Costing and Finance: Cost of project; Cost of production; Break even Analysis; Means of Financing Project; Tax Aspects in Project Finance; Role of Financial Institution in Project Finance.
UNIT IV	Project Appraisal: Time Value of Money; Project Appraisal techniques—Playback Period, Accounting Rate of Return, Net Present Value, Internal Rate of Return, benefit Cost Ratio; Social Cost Benefit Analysis; Effective Rate of Protection. Risk analysis: measures of Risk; Sensitivity Analysis; Stimulation Analysis; Decision Tree Analysis.
UNIT V	Project Scheduling/Network techniques in Project management: CMP and PERT Analysis; Float times; Crashing of Activities; Contraction of Network for Cost Optimization, Updating; Cost Analysis of Resources Allocation. Basic knowledge of the leading softwares for Project Planning and Analysis.

Text books:

- Khatua, Project management and Appraisal, ISBN: 9780198066903, Oxford University Press.

Reference Books :

- Bhaves, M. Patel (2000): Project management-Strategic Financial Planning Evaluation and Control, Vikas Publishing House Pvt.Ltd.
- Chandra, P.(6^{th} ed., 2007): Projects. Tata McGraw Hill.
- Wysocki, Robert K., Bick Robert and Crane Davide B.(2000); Effective Project Management. John.
- Wiley and sons USA.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Java Programming**	**Code:**	**D000732(028)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course objective:
Make them learn about Java programming concepts, graphical user interfaces, basic data structures.

UNIT I	**Introduction:** Introduction to Java and Java programming Environment. Object Oriented Programming. Fundamental Programming Structure: Data Types, variable, Typecasting Arrays, Operators and their precedence. **Control Flow:** Java's Selection statements (if, switch, iteration, statement, while, do-while, for, Nested loop) Concept of Objects and Classes, Using Exiting Classes building your own classes, constructor overloading, static , final, this keyword
UNIT II	**Inheritance:** Using Super to Call Super class constructor, Method overriding, dynamic method Dispatch, Using Abstract Classes, Using final with inheritance. The Object Class**.** **Packages & Interfaces**: Packages, Access Protection, Importing package, Interface, Implementing Interfaces, variables in Interfaces, Interfaces can be extended. **Exception Handling:** Fundamentals, Types Checked , Unchecked exceptions, Using try & catch, Multiple catch, throw , throws, finally, Java's Built in exceptions, user defined exception.
UNIT III	**Multi-Threading:** Java Thread Model, Thread Priorities, Synchronization, Creating a thread, Creating Multiple threads, Using is Alive ( ) and join ( ), wait () & notify ( ). **String Handling:** String constructors, String length, Character Extraction, String Comparison, Modifying a string. **Java I/O:** Classes &Interfaces, Stream classes, Byte streams, Character streams, Serialization.
UNIT IV	**The MSP Model**: **Applets:** Basics, Architecture, Skeleton, The HTML APPLET Tag, Passing Parameters to Applets, Applet context and show documents (). **Event Handing:** Delegation Event model, Event Classes, Event Listener Interfaces, Adapter classes. **JDBC:** Fundamentals, Type I, Type II, Type III, Type IV drivers. **Networking:** Basics, Socket overview, Networking classes, & interfaces, TCP/IP client sockets, who is, URL format, URL connection, TCP/IP Server Sockets.
UNIT V	**AWT:** AWT Classes window fundamentals, component, container, panel, Window, Frame , Canvas, Creating a frame window in an Applet , working with Graphics , Control Fundamentals , Layout managers, Handling Events by Extending AWT components. Core java API package, reflection, Remote method Invocation(RMI) **Swing:** J applet, Icons & Labels, Text fields, Buttons, Combo boxes, Tabbed panes, Scroll panes, Trees, Tables. **Exploring Java-lang:** Simple type wrappers, Runtime memory management, object (using clone() and the cloneable Interface), Thread, Thread Group, Runnable.

Text books:

1. Introduction to Java Programming: Liang, Pearson Education, 7 th Edition.
2. Java The complete reference: Herbert Schildt, TMH, 5 th Edition.

Reference Books :

1. George 1. Balguruswamy, Programming with JAVA, TMH.
2. Programming with Java: Bhave &. Patekar, Pearson Education.
3. Big Java: Horstman, Willey India, 2 nd Edition.
4. Java Programming Advanced Topics: Wigglesworth, Cengage Learning.
5. Java How to Program: H.M. Deitel & Paul J. Deitel, PHI, 8 th Edition

Course Outcomes

1. Can develop solutions for a range of problems using object-oriented programming.
2. Be able to implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.
3. Demonstrate the ability to use simple data structures like arrays in a Java program.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Cloud computing**	**Code:**	**D000733(028)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course objective:

1. Cloud computing represents a latest in the long history computing mainframe, Personal computing networked computing and expected to revolutionize the business is done.
2. This course covers the theoretical and practical aspects of cloud computing. At the end of the course, student will be able to appreciate the cloud computing paradigm, recognize its various forms and able to implement some cloud computing features.

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, 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 (iPhone, 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, SubraKumaraswamy and ShahedLatif, "Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance", O'Reilly Media, 2005.

Course Outcomes

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

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Big data Mining**	**Code:**	**D000734(028)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course objective:

1. To understand the fundamental concepts of big data analytics
2. To analyze the big data using intelligent techniques.
3. To develop various search methods and visualization techniques.
4. To explore various techniques for mining data streams.
5. To understand the applications using Map Reduce Concepts.

UNIT I	**Concepts of Big data: Concept of Big Data Platform–** Evolution and Challenges of Conventional Systems - Intelligent data analysis – Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools- Applications of big data.
UNIT II	**Mining Data Streams :** Introduction To Streams Concepts – characteristics, StreamData Model and Architecture - Stream Computing - Sampling Data in a Stream–Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments–Counting Oneness in a Window – Decaying Window, Role of high speed mass storage.
UNIT III	**HADOOP:** History of Hadoop- The Hadoop Distributed File System–Components of Hadoop- Analyzing the Data with Hadoop- Scaling Out- Hadoop Streaming- Map Reduction Working - Anatomy of a Map Reduce Job run Failures-Job Scheduling-Shuffle and Sort–Task execution - Map Reduce Types and Formats- Map Reduce Features.
UNIT IV	**HADOOP Environment:** Setting up a Hadoop Cluster - Cluster specification-Cluster Setup and Installation - Hadoop Configuration-Security in Hadoop - Administering Hadoop–HDFS - Monitoring-Maintenance-Hadoop benchmarks Hadoop in the cloud.
UNIT V	**Frameworks:** Applications on Big Data Using Pig and Hive –Data processing operators in Pig – Hive services – Hive QL – Querying Data in Hive - fundamentals of H Base and Zoo Keeper. Visualizations - Visual data analysis techniques, interaction techniques.

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,

Course Outcomes

1. To able to know about intelligent applications.
2. To use knowledge about vast data.
3. To know different big data modelling techniques.
4. Ability to work in Hadoop environment.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Cryptography & Network security**	**Code:**	**D000735(028)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course objective:

1. Explain the objectives of information security
2. Explain the importance and application of each of confidentiality, integrity, authentication and availability
3. Understand various cryptographic algorithms.
4. Understand the basic categories of threats to computers and networks
5. Describe public-key cryptosystem.
6. Describe the enhancements made to IPv4 by IPSec
7. Understand Intrusions and intrusion detection
8. Discuss the fundamental ideas of public-key cryptography.
9. Generate and distribute a PGP key pair and use the PGP package to send an encrypted e-mail message.
10. Discuss Web security and Firewalls.

UNIT I	**Attacks on Computers and Computer Security**: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security. **Cryptography: Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques,** encryption and decryption, symmetric and asymmetric key cryptography, stenography, key range and key size, possible types of attacks.
UNIT II	**Symmetric key Ciphers:** Block Cipher principles & Algorithms(DES, AES, Blowfish), Differential and Linear Crypt analysis, Block cipher modes of operation, Stream ciphers, RC4, Location and placement of encryption function, Key distribution **Asymmetric key Ciphers:** Principles of public key cryp to systems, Algorithms(RSA, Diffie-Hellman, ECC), Key Distribution.
UNIT III	**Message Authentication Algorithms and Hash Functions**: Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, CMAC, Digital signatures, knapsack algorithm **Authentication Applications**: Kerberos, X.509 Authentication Service, Public – Key Infrastructure, Biometric Authentication.
UNIT IV	**E-Mail Security:** Pretty Good Privacy, S/MIME **IP Security**: IP security overview, IP Security architecture, Authentication Header, Encapsulating security payload, Combining security associations, key management.
UNIT V	**Web Security:** Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction **Intruders, virus and Firewalls: Intruders, Intrusion detection, password management, virus and related threats, Countermeasures, Firewall design principles, types of firewalls** **Case Studies on Cryptography and security: S**ecure Inter-branch Payment Transactions, Cross site Scripting Vulnerability, Virtual Elections

Text Books:

1. Cryptography and Network Security : William Stallings, Pearson Education,4″‘ Edition
2. Cryptography and Network Security : Atul Kahate, Mc Graw Hill Edition.

Reference Books:

1. Cryptography and Network Security: C K Shyamala, N Harin i, Dr T R Padmanabhan, Wiley India, **1”**
2. Cryptography and Network Security : Forouzan Mukhopadhyay, MC Graw Hill, 2″” Edition
3. Information Security, Principles and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM.Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

Course Outcome:

1. Student will be able to understand basic cryptographic a algorithms, message and web authentication and security issues.
2. Ability to identify information system requirements for both of them such as client and server.
3. Ability to understand the current legal issues towards information security.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Neural Network & Fuzzy Logic**	**Code:**	**D000736(028)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course objective:

1. To provide the student with the basic understanding of neural networks and fuzzy logic fundamentals, Program the related algorithms and Design the required and related systems.
2. To cater the knowledge of Neural Networks and Fuzzy Logic Control and use these for controlling real time systems.

UNIT I	**Introduction to Artificial Neural Networks:** Elementary Neurophysiology, Models of a Neuron, Neural Networks viewed as directed graphs, Feedback, from neurons to ANN, Artificial Intelligence and Neural Networks; Network Architectures, Single-layered Feed forward Networks, Multi-layered Feed forward Networks, Recurrent Networks, Topologies.
UNIT II	**Learning and Training**: Activation and Synaptic Dynamics, Hebbian, Memory based, Competitive, Error-Correction Learning, Credit Assignment Problem: Supervised and Unsupervised learning, Memory models, Stability and Convergence, Recall and Adaptation.
UNIT III	**A Survey of Neural Network Models:** Single-layered Perceptron – least mean square algorithm, Multi-layered Perceptrons – Back propagation Algorithm, XOR – Problem, The generalized Delta rule, BPN Applications, Adalines and Madalines – Algorithm and applications
UNIT IV	**Applications:** Talking Network and Phonetic typewriter: Speech Generation and Speech recognition, Neocognitron – Character Recognition and Handwritten Digit recognition, Pattern Recognition Applications.
UNIT V	**Neural Fuzzy Systems:** Introduction to Fuzzy sets, operations, relations, Examples of Fuzzy logic, Defuzzification, Fuzzy Associative memories, Fuzziness in neural networks and examples.

Text Books:

1. Artificial Neural Networks by B. Yagna Narayan, PHI
2. Neural Networks Fuzzy Logic & Genetic Alogrithms by Rajshekaran & Pai, Prentice Hall

Reference Books:

1. Neural Networks by James A. Freeman and David M. Strapetuns, Prentice Hall,.
2. Neural Network & Fuzzy System by Bart Kosko, PHI.
3. Neural Network Design by Hagan Demuth Deale Vikas Publication House

Course Outcome:

1. To provide adequate knowledge about concepts of feed forward neural networks and feedback neural networks.
2. To teach about the concept of fuzziness involved in various systems.
3. To provide adequate knowledge about fuzzy set theory.

4. To provide comprehensive knowledge of fuzzy logic control and adaptive fuzzy logic and to design the fuzzy control using genetic algorithm.
5. To provide adequate knowledge of application of fuzzy logic control to real time systems.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**RF IC Design**	**Code:**	**D000737(028)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course objective:

1. An ability to understand the different Passive IC Components Interconnects and skin effect, Resistors, capacitors Inductors.
2. An ability to define the Zeros to enhance bandwidth, Shunt-series amplifiers, tuned amplifiers, Cascaded amplifiers and to be able to build simple applications.
3. An ability to understand the LNA Design and the different design examples & Multiplier based mixers. Mixer Design, Sub sampling mixers.
4. An ability to derive RF Power amplifier design examples and to perform simple projects .

UNIT I	**Characteristics of passive IC components at RF frequencies:** Interconnects, resistors, capacitors, inductors and transformers – Transmission lines. **Noise** – classical two-port noise theory, noise models for active and passive component**s**
UNIT II	**High frequency amplifier design:** Zeros as bandwidth enhancers, shunt-series amplifier, f_T doublers, neutralization and unilateralization
UNIT III	**Low noise amplifier design:** LNA topologies, power constrained noise optimization, linearity and large signal performance. **Mixers:** Nonlinear systems as linear mixers, multiplier-based mixers, subsampling mixers, diode-ring mixers
UNIT IV	**RF power amplifiers:** Class A, AB, B, C, D, E and F amplifiers, modulation of power amplifiers, design and linearity considerations
UNIT V	**Oscillators & synthesizers:** Basic topologies, VCO, describing functions, resonators, negative resistance oscillators, synthesis with static moduli, synthesis with dithering moduli, combination synthesizers – phase noise considerations.

Text Books:

1. Thomas H. Lee, The Design of CMOS Radio-Frequency Integrated Circuits, 2nd ed., Cambridge, UK: Cambridge University Press, 2004.
2. Behzad Razavi, RF Microelectronics,2nd Ed., Prentice Hall, 1998.

Reference Books:

1. A.A. Abidi, P.R. Gray, and R.G. Meyer, eds., Integrated Circuits for Wireless Communications, New York: IEEE Press, 1999.
2. R. Ludwig and P. Bretchko, RF Circuit Design, Theory and Applications, Pearson, 2000

Course Outcome:

1. Understand the impact of engineering solutions in a societal context and to be able to respond effectively to the needs for sustainable development.
2. Apply and Analyze knowledge of mathematics, science and engineering to the solution of complex

engineering problems.

3. Design and conduct experiments, analyze, interpret data and synthesize valid conclusions.
4. Identify, formulate, research through relevant literature review, and solve engineering problems reaching substantiated conclusions.
5. Use the techniques, skills, and modern engineering tool of CADENCE necessary for engineering practice with appropriate considerations for public health and safety, cultural, societal, Slight and environmental constraints.
6. Recognize the project management and demonstrate a GSM, CDMA, UMTS radio architectures for lifelong learning in engineering.

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Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Graph Theory And Applications**	**Code:**	**D000738(033)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objective:

- **To understand fundamentals of graph theory.**
- **To study proof techniques related to various concepts in graphs.**
- **To explore modern applications of graph theory.**

UNIT I	**Introduction** - Graph Terminologies - Types of Graphs - Sub Graph- Multi Graph - Regular Graph - Isomorphism - Isomorphic Graphs - Sub-graph - Euler graph - Hamiltonian Graph - Related Theorems.
UNIT II	**Trees** -Properties- Distance and Centres - Types - Rooted Tree-- Tree Enumeration- Labeled Tree - Unlabeled Tree - Spanning Tree - Fundamental Circuits- Cut Sets - Properties - Fundamental Circuit and Cut-set- Connectivity- Separability -Related Theorems.
UNIT III	**Network Flows** - Planar Graph - Representation - Detection - Dual Graph - Geometric and Combinatorial Dual - Related Theorems - Digraph - Properties - Euler Digraph
UNIT IV	Matrix Representation - Adjacency matrix- Incidence matrix- Circuit matrix - Cut-set matrix - Path Matrix- Properties - Related Theorems - Correlations. Graph Coloring - Chromatic Polynomial - Chromatic Partitioning - Matching - Covering - Related Theorems.
UNIT V	**Graph Algorithms**- Connectedness and Components- Spanning Tree- Fundamental Circuits- Cut Vertices- Directed Circuits- Shortest Path - Applications overview.

Text Books:

1. Narsingh Deo, "Graph Theory with Application to Engineering and Computer Science", Prentice-Hall of India Pvt.Ltd, 2003.
2. L.R.Foulds , "Graph Theory Applications", Springer ,2016.

Reference Books:

1. Bondy, J. A. and Murty, U.S.R., "Graph Theory with Applications", North Holland Publication,2008.
2. West, D. B., ―Introduction to Graph Theory‖, Pearson Education, 2011.
3. John Clark, Derek Allan Holton, ―A First Look at Graph Theory‖, World Scientific Publishing Company, 1991.
4. Diestel, R, "Graph Theory", Springer,3rd Edition,2006.
3. Kenneth H.Rosen, "Discrete Mathematics and Its Applications", Mc Graw Hill , 2007

Course outcome: Upon completion of this course, the students should be able to

1. Understand the basic concepts of graphs, and different types of graphs
2. Understand the properties, theorems and be able to prove theorems.

3. Apply suitable graph model and algorithm for solving applications.
4. Apply matrix representation in real problems.
5. Understand Algorithms,

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Biometrics**	**Code:**	**D000739(033)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objective

- **The basic objective in offering this course is to study the state-of-the-art in biometrics technology can explore the way to improve the**
- **current technology. The students can learn and implement various biometrics technologies using advanced algorithm.**

UNIT I	**Introduction of Biometrics:** definition, history, basic working architecture, types; Performance measures of biometrics; applications and benefits of biometrics; design of biometrics; biometric identification versus verification.
UNIT II	**Face and Iris Biometrics:** Background of face and iris recognition; Face recognition methods: Eigen face methods, contractive transformation method; Challenges of face biometrics; Design of iris biometrics: image segmentation, image preprocessing, determination of iris region; Advantages and disadvantages of face and iris biometrics..
UNIT III	**Fingerprint and Sign Language Biometrics**: Fingerprint matching: image acquisition, image enhancement and segmentation, image binarization, minutiae extraction and matching; Sign language biometrics: Indian sign language (ISL) biometrics, SIFT algorithm, advantages and disadvantages of ISL and fingerprint biometrics.
UNIT IV	**Biometric Cryptography and Privacy Enhancement**: Introduction to biometric cryptography; general purpose cryptosystems; Cryptographic algorithms: DES and RSA; Privacy concerns and issues related to biometrics; biometrics with privacy enhancement; soft biometrics; comparison of various biometrics; Identity and privacy.
UNIT V	**Scope of Biometrics and Biometric Standards**: Multimodal biometrics: basic architecture and fusion scheme, application, example of AADHAAR; scope and future market of biometrics; role of biometrics in enterprise and border security; DNA biometrics; biometric standards; biometric APIs.

Text Books:

1. Biometrics: concepts and applications by Dr G R Sinha and Sandeep B. Patil, Wiley India Publications, 2013..

Reference Books:

1. Introduction to biometrics by Anil K Jain, Arun Ross and Karthik Nandakumar, Springer, 2011.
2. Biometrics Identity verification in a networked world by Samir nanawati, Michael Thieme and Raj Nanawati, US edition of Wiley India, 2012.

Course outcomes: On completion of this program student will:

1. Understand the basic definition of 'Biometric Recognition' and the distinctive of this form of biometrics.
2. Be able to state precisely what functions these systems perform.
3. Be able to draw a system-level diagram for any biometric system and discuss its components.
4. Be able to solve verification, identification, and synthesis problems for a variety of biometrics such as fingerprint, face, iris, hand gestures and cryptography.
5. Be able to use the biometrics ingredients of existing system to obtain a given security goal.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Quantum Computing**	**Code:**	**D000740(033)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objectives:

- The students will learn the fundamentals of quantum information science.
- Selected number of more advanced topics including few quantum versions of classical algorithms will be covered.

UNIT I	Quantum building blocks, Single qubit systems, Quantum Mechanics of Photon Polarization, Single qubit measurement, a quantum key distribution protocol, the state space of single qubit system. Multiple qubit systems, tensor products, state space of n-qubit system, Entangled States, Quantum Key Distribution Using Entangled States.
UNIT II	Measurement of Multiple-Qubit States, Dirac's Bra/Ket Notation, Projection Operators for Measurement, Hermitian Operator Formalism for Measurement, EPR Paradox and Bell's Theorem, Quantum State Transformations, The No-Cloning Principle, Some Simple Quantum Gates, The Pauli Transformations, The Hadamard Transformation,
UNIT III	Multiple-Qubit Transformations from Single-Qubit Transformations, the Controlled-NOT and Other Singly Controlled Gates. Applications of Simple Gates. Realizing Unitary Transformations as Quantum Circuits.
UNIT IV	Quantum Versions of Classical Computations, From Reversible Classical Computations to Quantum Computations, Reversible Implementations of Classical Circuits. A Language for Quantum Implementations. Example Programs for Arithmetic Operations. Introduction to Quantum Algorithms, Computing with Superpositions, Notions of Complexity, Deutsch's Problem, Quantum Subroutines, Few Simple Quantum Algorithms.
UNIT V	Shor's Factoring Algorithm, The Efficiency of Shor's Algorithm, The Discrete Logarithm Problem, Hidden Subgroup Problems, Framework for Quantum Error Correcting Codes, Fault Tolerance and Robust Quantum Computing.

Text Books:

1. 1. Rieffel & Polak, Quantum Computing-A Gentle Introduction-The MIT Press (2011).
2. David J Griffiths, Introduction to Quantum Mechanics, Cambridge India (2016).

Reference Books:

1. N. D. Mermin, Quantum Computer Science: An Introduction, Cambridge Univ. Press (2007.

Course Outcomes:

1. Understand the Quantum building blocks and fundamentals of Quantum Mechanics
2. Apply various transformation on quantum systems
3. Design and use Simple Gates and Qubit Transformations.
4. Apply Computing with Superpositions and simple quantum algorithms
5. Use Quantum Error Correcting Codes , Fault Tolerance and Robust Quantum Computing

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Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Entrepreneurship essentials**	**Code:**	**D000741(033)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

COURSE OBJECTIVES:

- To develop conceptual understanding of the topic among the students
- To comprehend the environment of making of an Entrepreneur.

UNIT I	**Entrepreneurship: Definition**, requirements to be an entrepreneur, entrepreneur and entrepreneur, entrepreneur and manager, growth of entrepreneurship in India, women entrepreneurship, rural and urban entrepreneurship.
UNIT II	**Entrepreneurial Motivation: Motivating** factors, motivation Theories-Maslow's Need Hierarchy Theory, McClelland's Acquired Need Theory, government's policy actions towards entrepreneurial motivation, entrepreneurship development programmes.
UNIT III	**Types of Enterprises and Ownership Structure**: Small scale, medium scale and large scale enterprises, role of small enterprises in economic development; proprietorship, partnership, Ltd. companies and co-operatives: their formation, capital structure and source of finance.
UNIT IV	**Projects:** Identification and selection of projects; project report: contents and formulation, concept of project evaluation, methods of project evaluation: internal rate of return method and net present value method.
UNIT V	**Management of Enterprises:** Objectives and functions of management, scientific management, general and strategic management; introduction to human resource management: planning, job analysis, training, recruitment and selection, etc.; marketing and organizational dimension of enterprises; enterprise financing: raising and managing capital, shares, debentures and bonds, cost of capital; break- even analysis, balance sheet its analysis. **Institutional Support and Policies**: institutional support towards the development of entrepreneurship in India, technical consultancy organizations, government policies for small scale enterprises.

Text Books:

1. Ram Chandran, 'Entrepreneurial Development', Tata McGraw Hill, New Delhi
2. Saini, J. S., 'Entrepreneurial Development Programmes and Practices', Deep & Deep Publications (P), Ltd.
3. Khanka, S S. 'Entrepreneurial Development', S Chand & Company Ltd. New Delhi

Reference Books:

1. Badhai, B 'Entrepreneurship for Engineers', Dhanpat Rai & co. (p) Ltd.
2. Desai, Vasant, 'Project Management and Entrepreneurship', Himalayan Publishing House, Mumbai, 2002.
3. Gupta and Srinivasan, 'Entrepreneurial Development', S Chand & Sons, New Delhi.

COURSE OUTCOMES

1. To inculcate entrepreneurship skills to students.
2. To aware about industry structure and how to start up a company
3. Understand ownership structure.
4. Evaluation of Projects conceptually.
5. Overall analysis and dimensions of a new enterprise

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Managerial Skills**	**Code:**	**D000742(033)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objective:

- **To help the student to attain the following industry identified competency through various teaching learning experiences:**
- **Use relevant managerial skills for ensuring efficient and effective management.**

UNIT I	**Introduction of management concepts and managerial skills:** definitions of managements, roll and importance of management. Management characteristics and principles levels of management and their functions; management, administration and organization, relation between management and administration. Functions of management: planning, organizing, leading/directing, staffing and controlling, Types of planning, Types of organization, Steps in organizing, Functional areas of management, Managerial skills.
UNIT II	**Planning and organizing at supervisory level: Planning at supervisor level** –Planning by supervisor, Planning activities, detailing and following of each step., Prescribing standard forms for various activities, Budgeting for materials and manpower. **Organizing at Supervisor Level –** Organizing the physical resources, matching human need with job needs, Allotment of tasks to individuals and establishing relationship among person working in a group.
UNIT III	**Directing and Controlling at supervisory level:** Directing at Supervisory level- Needs for directions and instructions to subordinates: Completeness and feasibilities of instructions, Personal counselling advanced predictions of possible mistakes, elaborating decision, laying disciplinary standards in overall working. **Controlling at supervisory level**- Managerial control; Understanding team and link between various departments in respect of process and quality standards: Steps in control process, controlling methods: Control over the performance in respect of quality, quantity of production, time and cost, measuring performance, comparing with standards, correcting unfavorable deviating.
UNIT IV	**Safety Management**: Need for safety management measures, General safety norms for an industrial unit: Preventive measures. Definition of accident, types of industrial accident: Causes of accidents; Fire hazards; Fire drill, Safety procedure, Work permits.
UNIT V	**Legislative Acts:** Necessity of acts, Important definition and Main provisions of acts, Industrial Acts Indian Factory Acts, Industrial Dispute Act, Workman compensation Act, Minimum Wages Act.

Text Books:

1. Management and entrepreneurship, by Veerabhadrappa, Havinal, New age international publishers, New Delhi, 2014.
2. Principal of Management by Chaudhary omvir Singh prakash, New age international publishers, New Delhi, 2012.

Reference Books:

1. Industrial Engineering and Management by Dr. O. P. Khanna, Dhanpath ray and sons, New Delhi.
2. Industrial Engineering and Management by Banga and Sharma, Khanna Publication, New Delhi.

Course outcomes: The student demonstrates the following Course outcomes associated with above mentioned competency:

1. Use basic management principles to execute daily activities.
2. Use principles of planning and organising for accomplishment of tasks.
3. Use principles of directing and controlling for implementing the plans
4. Apply principles of safety management in all activities.
5. Understand various provisions of industrial acts.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Mechatronics**	**Code:**	**D000743(037)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

- **Course Objectives:** The main objective of the course is to apply knowledge of mechatronics for understanding and solving engineering problems and to acquire knowledge and hands-on competence in applying the concepts of mechatronics in the design and development of mechanical systems.

UNIT I	**Introduction about Mechatronics:** Scope of Mechatronics, application, process control automation and N/c Machines.
UNIT II	**Sensors and Transducers:** Introduction, classification, specification, characteristics of transducers, type of transducers displacement, strain, vibration pressure, flow, temperature, force & torque, tactile**.**
UNIT III	**Hydraulic, Pneumatic & Electrical actuators:** Pumps & Compressors, control valves & accessories, actuators, fluid power symbols, fluid power systems, switching devices, solenoids, motors.
UNIT IV	**Data Acquisition and Control System:** Introduction, Quantizing theory, Analog to Digital Conversion, Digital to Analog (D/A) conversation, transfer function, transient response & frequency response & frequency response, stability criteria.
UNIT V	**Design of Mechatronics systems**: Introduction, Automatic front and book and cutting in steel rolling mill, lift control system, CNC lathe, temperature control of a heat treatment furnace, EOT crane control panel, Grey grain separators, electrode arm control in electric arc furnace..

Text Books:

1. Mechatronics – N. Shanmugam – Anuradha Agencies
2. Mechatronics – HMT Limited – Tata McGraw hill,New Delhi

Reference Books:

1. Mechatronics - Singh and Joshi – PHI New Delhi
2. Mechatronics :A Multi Disciplinary Approach– W. Bolton – Pearson Education – Singapore
3. Mechatronics System Design - Shetty D, Kolk Ra – PWS Publications, Boston
4. Mechatronics - Kamm, Lawrence J – Prentice Hall Of India
5. Mechatronics & Measurement Systems – Alciator David &Histand Michael – TMH Delhi
6. Mechatronics - Necsulescu D – Pearson, Singapore
7. Mechatronics Source Book – N.C.Braga – Cenegage Learning, Delhi
8. Mechatronics System Design – DevdasSetty&RichrdKolk - Cenegage Learning, Delhi
9. Analytical Robotics and Mechatronics - Stadler W – McgrawHill,New Delhi
10. Mechatronics: Electronics in Products & Processes- Bradley, D A; Dawson, D And Burd, N C

Loader, A J - Taylor AndFrancies - Boca Raton

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

1. Discuss the basics of mechatronics and their scope.
2. Describe sensors and transducers.
3. Describe Hydraulic, Pneumatic & Electrical actuators.
4. Demonstrate an understanding of data acquisition system and control system.
5. Demonstrate an understanding of design mechatronics systems.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Engineering Economics**	**Code:**	**D000744(037)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

- **Course Objectives:** The main objective of the course is to prepare engineering student to analyze cost/revenue data and carry out economic analyses in the decision making process to justify or reject alternatives/projects on an economic basis and acquire necessary skills to function in the business and management side of professional engineering practice

UNIT I	**Introduction & Scope**: Engineers and Economics, Utility of its study, Managerial Economics, Nature and scope, basic terms and concept of economics like goods, kinds of goods, utility, value and wealth. Theory of Demand and supply, Elasticity of demand. Meaning, Characteristics, Objectives of Firm, Managerial and behavioral theories of a firm
UNIT II	**Pricing and Market Competition:** Industrial Establishments, various types of industrial establishments, Sole traders, partnership, Joint Stock Company, types of shares, financial goals of organization. Pricing Perspective approach: Pricing policy and price influencing factors, Basic data for price fixation. Market forms & Competition – Pure and perfect competition, monopoly, monopolistic competition, price determination under perfect and monopolistic competition**.**
UNIT III	**Economy, Monetary & Fiscal Policy:** Balance of payments – money and monetary policy, fiscal policy, Inflation, measuring employment and unemployment. Credit policies Concept and measurement of national income. Working Capital, Factors deciding Working capital, Return on investment, Financial Planning
UNIT IV	**Cost and Costing Factors:** Cost Analysis – Types and Elements of cost, cost planning and control. Relationship between Average cost & Marginal cost, Short run and long run average cost curves.
UNIT V	**Depreciation & Capital Budgeting**: Depreciation and its methods of calculation, marginal costing, break – even analysis, profit planning and forecasting, Capital budgeting, cost of capital, Appraising projects profitability.

Text Books:

1. Managerial Economics – P.L. Mehta – S. Chand and sons
2. Economics Michael Parkin, Addison Wesley Longman Publication, International Edition.
3. Elementary Economics Theory – K.K. Dewett – S. Chand & Company

Reference Books:

1. Economics – Samuelson, Pauls& W.D. Nordhan – McGraw Hill
2 Advanced Cost Accounting – Nigam, Sharma – Himalaya Publishing House
3. Managerial Economics – Mote and Paul - TMH
4. Macro Economics for management Students – A. Nag - Macmillan India Ltd
5. Cost Accounting – Jain &Narang - Kalyan Publishers
6. Managerial Economics - G.S. Gupta – TMH
7. Engineering Economics – J.L. Riggs, D.D. Bedforth , Randhawa – TMH

8. Essentials of Managerial Economics – Reddy & Ganesh – Himalaya Publishing Hosue
9. Managerial Economics – Joel Dean - PHI

Course outcomes: The student demonstrates the following Course outcomes associated with above mentioned competency:

1. Discuss the basic terminologies and concepts of engineering economics..
2. Discuss various types of industrial establishments, aspects of pricing and market competition.
3. Discuss concepts related to Monetary & Fiscal Policy.
4. Discuss elements of cost & carry out cost analysis.
5. Demonstrate knowledge of depreciation& capital budgeting and its methods of calculations

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Computer Graphics**	**Code:**	**D000745(037)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

- **Course Objectives:** The main objective of the course is to get familiar with Computer input and Output devices, to introduce fundamental techniques and methods for two-dimensional and three-dimensional computer graphics, to recognize geometric and graphical elements of engineering design problems and to understand the algorithms and models for geometric projections, transformations, coordinate systems, parametric curves, hidden surface determination, colour theory, texture mapping, shading and lighting**.**

UNIT I	**Input and Output Devices**: Keyboard, Mouse, Z mouse Trackball, Joysticks, Data Glove, Digitizers, Light pen, Touch Panels, Image scanners, Printers and Plotters. **Video Display device**: Refresh Cathode ray Tubes, Random Scan and Raster Scan monitors, Colour CRT Monitors, Flat panel display: LED and LCD Monitors & plasma display, Direct view Storage Tubes, Continuous Refresh and Storage display.
UNIT II	**Output Characteristics**: Aspect ratio; Aliasing and Anti-aliasing**.** **Graphic Primitives:** Points & Lines, Line drawing Algorithm, DDA and Bresenham's Algorithm**.** **Circle Generation Algorithm:** Midpoint circle algorithm. Ellipse Generation Algorithm: Mid-point ellipse algorithm. **Attributes of Primitives:** Line style, Type, Width, Colour, Character Attributes, Area Filling: Inside-outside test; **Fill Algorithm:** Scan-Line Polygon Fill algorithm, Boundary Fill Algorithm - 4 and 8 connected area; Flood Fill Algorithm.
UNIT III	**Analytical & Synthetic Curve**: C0, C1 & C2 Continuity, Convex hull, Parametric & non parametric representation of curves. **Analytic Curves:** Parabola, Hyperbola, Splines: linear, quadratic, cubic, hermite, Bezier curves: single and multiple segments, parametric forms of cubic splines **Synthetic Curves:** Circle and ellipse drawing,
UNIT IV	**Geometric Transformation:** Window and View port, Window definitions, View port definitions, Window and View port relationship; World co-ordinates; Normalized device co-ordinates and Homogenous co-ordinates. **BasicTransformation:** Translation, Scaling, Rotation, Reflection, Twist, Matrix Representation, Composite Transformations. **3D Geometric Transformation:** Basic Transformations, 3D Display parallel & perspective projection
UNIT V	**Viewing:** Viewing, Device co-ordination system, Image co-ordination system, Viewing transformation. **Clipping:** Point clipping, Line clipping, Cohen- Sutherland clipping, Mid-point clipping method, Sutherland and Hodgeman Clipping.

Text Books:

1. Computer Graphics-Donald hearn and M.Pauline Baker-Prentice Hall of India Pvt Ltd.
2. Introduction to Computer Graphics – N. Krishnamurhy - TMH Publication.

Reference Books:

1. Computer Graphics –Harrington S. – TMH Publication.
2 CAD-CAM Theory and Practice-Ibrahim Zeid- TMH Publication
3. Xiang and Plastok - Schaum's Outlines Computer Graphics - TMH, 2nd Edition, 2002.
4. Rogers, "Procedural Elements for Computer Graphics – TMH

Course outcomes: The student demonstrates the following Course outcomes associated with above mentioned competency:

1. Describe computer input,output and video display devices.
2 Explain graphic primitives and attributes of primitives..
3. Demonstrate an understanding ofanalytical & synthetic curve.
4. Demonstrate an understanding of 2D & 3D transformation.
5. Demonstrate an understanding of Viewing and clipping.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Control Engineering**	**Code:**	**D000746(037)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

- **Course Objectives: The main objective of the course is to understand the fundamental and types of control system and to acquire the knowledge of basic control system like hydraulic, pneumatic and electrical control system in detail.**

UNIT I	**Basic Control System:** System differential equation of electrical, mechanical, thermal, hydraulic and electromechanical network, analogy
UNIT II	**Theory of Automatic Control:** Concept of feedback referred to linear control systems in general, e.g. displacement and speed control, process control, definition and terminology, open loop and closed loop systems and its advantages. Block diagrams and single flow graph representation of a physical system, block diagram algebra, transfer function from a block diagram. Basic control actions and controllers on off. Proportional, derivative and integral controllers, steady – state analysis**.**
UNIT III	**Hydraulic System:** Characteristic of hydraulic components control valves, sources of hydraulic power hydraulic meters, pistons and transmission, elements of circuit design, Accumulation control circuit such as position control and speed control circuit. **Hydraulic Systems:** Reciprocating Pump, pressure intensifier, cranes, ram, press, lift, coupling and hydraulic controls. Maintenance of hydraulic system: Fire Foam resistance oxidation and corrosion of hydraulic pipe sealing devices, Filters regulator, problems caused by gas in hydraulic circuit cooling of power pack
UNIT IV	**Pneumatic Systems:** Pneumatic power supply, Amplifiers with different controlling actions, Pneumatic valves and cylinders, theory of four way and pilot valves. **Electrical Systems:** Speed control of D.C. motors, Remote center positional serve mechanism (including effect of gearing between motor and load).
UNIT V	**Programmable Logic Controllers:** Introduction, Micro PLC, Programming a PLC, Logic Functions, input & output Modules, PLC Processors, PLC Instructors, Documenting a PLC System, Timer & counter Instructions. **Control Components:** Pneumatic relays, control mechanisms for liquid level, boiler feed control, pressure regulation, throttle valve, temperature regulations and industrial process regulation.

Text Books:

1. Modern Control Engineering, By Ogata K, Pearson Education
2. Control Systems Engineering By Nagrath&Gopal, New Age International Publishers
3. Process Control and Instrumentation / Technology – C.D. Johnson – Prentice Hall of India, New Delhi..

Reference Books:

1. Automatic Control System By Kuo, Benjamin.C, Prentice Hall

2 Control Systems Engineering By Nise, Norman S John wiley& Sons, New York

3. Control Systems Engineering By S K Bhattacharya , Pearson Education.
4. Control Engineering By D.GaneshRao, K. Chennavenkatesh ,Pearson Education

Course outcomes: The student demonstrates the following Course outcomes associated with above mentioned competency:

1. Explain the basic control systems.
2 Explain the basic theories of automatic control systems.
3. Describe various hydraulic systems.
4. Describe pneumatic and electrical control system
5. Demonstrate an understanding of Programmable Logic Controllers and control components.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Finance Management**	**Code:**	**D000747(076)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

UNIT I

Financial Management –an overview: Introduction, finance and other disciplines, objectives and scope of financial management, role and responsibility of finance manager.

[No of Periods: 8 + 2]

UNIT II

Working capital management-nature, need, importance and concept of working capital, trade off between profitability and risk, Determining finance mix.

[No of Periods: 8 + 2]

UNIT III

Inventory management-Introduction, objectives, ordering cost, carrying cost, lead time, economic order quantity and safety stock, deterministic model.

[No of Periods: 8 + 2]

UNIT IV

Management of cash-introduction motives for holding cash, objectives of cash management and technique/process of cash management.

[No of Periods: 8 + 2]

UNIT V

Receivables management-introduction, objectives, credit terms, credit policies and collection policies.

[No of Periods: 8 + 2]

Text books:

Basic financial management, M Y Khan and P K Jain, TMH
Financial Management, I M Pandey.

References books:

Financial management and policy, V K Bhalla,Anmol publications pvt. Ltd.
Financial management, Van Horne.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Energy Conservation & Management**	**Code:**	**D000748(037)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objectives:

- understand and analyze the energy data of industries
- carryout energy accounting and balancing
- conduct energy audit and suggest methodologies for energy savings and
- utilize the available resources in optimal ways

UNIT I	**Introduction** **Energy – Power – Past & Present scenario of World; National Energy consumption Data – Environmental aspects associated with energy utilization –Energy Auditing: Need, Types, Methodology and Barriers. Role of Energy Managers. Instruments for energy auditing. Energy intensity, Energy production and imports.**
UNIT II	**Energy Conservation in Major utilities** **Pumps, Fans, Blowers, Compressed Air Systems, Refrigeration and Air Conditioning Systems – Cooling Towers – D.G. sets, Energy management programmes, Energy conservation measures.**
UNIT III	**Thermal Systems Utilization** Stoichiometry, Boilers, Furnaces and Thermic Fluid Heaters – Efficiency computation and enconomic measures. Steam: Distribution & Usage: Steam Traps, Condensate Recovery, Flash Steam Utilization, Insulators & Refractories
UNIT IV	**Energy Storage Technologies** Overview of storage technologies, Principal forms of stored energies, Application of energy storage, Specifying energy storage devices, Specifying fuels, Direct electric storage, Electrochemical energy storage, Mechanical energy storage, Direct thermal storage, Thermochemical energy storage
UNIT V	**Industrial Energy Efficiency and Energy Management** Introduction, Industrial energy management and efficiency improvement, Improving industrial energy audits, Industrial electricity end uses and electrical energy management, Thermal energy management in industry, The role of new equipment and technology in industrial energy efficiency

Text Books:

1. Energy Management and Conservation Handbook - D. Yogi Goswami, and Frank Kreith
2. Energy Management – W.R. Murphy, G. Mckay

Reference Books:

1. Energy Management – Paul O'Callaghan
2. Engineering Economics & Engineering Management – R. Raju – Anuradha Agencies
3. Witte. L.C., P.S. Schmidt, D.R. Brown, "Industrial Energy Management and Utilisation" Hemisphere Publ, Washington, 1988.
4. Dryden. I.G.C., "The Efficient Use of Energy" Butterworths, London, 1982

Course outcomes:

Upon completion of this course, the students can able to analyse the energy data of industries.

- Can carryout energy accounting and balancing
- Can suggest methodologies for energy savings

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Renewable Energy**	**Code:**	**D000749(095)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objectives

1. To know about the different types of energy in eco system.
2. To understand the conversion system of energy.
3. To study the wind energy, electric energy, solar energy etc.
4. To know the power generation system.

UNIT I	**Introduction** Introduction to Energy Science and Energy Technology Energy Science and Energy Technology, world energy future, Energy sources and their availability. Renewable energy sources. Prospects of Renewable energy sources Solar energy fundamentals and application.
UNIT II	**Geothermal energy:** Introduction, Utilization of Geothermal energy, Geothermal energy resources, geothermal gradient Different types of Geothermal Electric power plant and their operations for Geothermal Energy systems in India Wind energy: Fundamentals and application, Basic principles of Wind Energy Conversion, Wind Energy conversion system, Performance of wind machines.
UNIT III	**Electric generation for wind Biomass Energy Resources:** Introduction, Biomass Conversion Process. Biogas from plant wastes, communities bio-gas plants. Biochemical conversion, Fermentation, liquid fuels for biomass. Urban Waste: A source of Energy. Urban solid waste, waste incineration process. Environmental consideration, Fluidized bed combustion boilers for burning solid waste and fossil fuels
UNIT IV	**Energy from the oceans**: Introduction Ocean Energy conversion Technologies. Types of Ocean Thermal Electric Power Generation system and their operation. Tidal power plant Hydro Energy: Introduction, types hydro-electric plants and energy conversion scheme, Impulse turbine and Reaction turbine. Classification of Hydro-Energy plants Energy Conservation: Principle of energy conservation and Energy Audit. Energy conservation Technologies.
UNIT V	**Co-generation, waste heat utilization, Heat recuperates, Heat regenerators, Heat pipes, Heat pumps, Energy storage.**

Text Books:

1. S P Sukhatme , Solar Energy, Mcgraw hill, New Delhi (2016)
2. D.S. Chauhan and S.K. Srivastava, Non- Conventional Energy Resources, New Age International Pvt Ltd
3. G.N. Tiwari, Fundamentals of Renewable Energy Sources, Narosa Publishing House

Reference Books:

1. Abbi, Y.P. & Jain, Shashank, Handbook on energy audit and environment management, Teri, New Delhi (2012)
2. Non Conventional Energy Sources: B.H. Khan, TMH Publications
3. Renewable Energy Sources and Emerging Technology: D.P.Kothari and etal., PHI

Course outcomes:

- The Student will be able to understand use of different energy and their sourse.
- The Student will be able to utilise the energy for new development.
- The Student will understand the importance of energy.
- The Student will be understand generation of energy from waste.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program:	Bachelor of Technology.		
Branch:	Common to all Branches	Semester:	VII
Subject:	**Plastics Waste Management and Recycling**	**Code:**	**D000750(095)**
Total Theory Periods:	40	Total Tutorial Periods:	Ten (Minimum)
Class Tests:	Two (Minimum)	Assignments:	2 (Minimum)
ESE Duration:	Three Hours	Max Marks:100	Min Marks: 35

Course Objectives

- To know various sources of plastics waste generation and the segregation methods.
- To know the various techniques for recycling of plastics
- To know the method for utilisation of plastics waste in to energy.
- To learn about primary and secondry recycling techniques of plastics with examples/case studies..

UNIT I	Plastic & environment value additions, global policy, regulations, waste energy management.Waste treatment of various plastic plants, estimations of power requirement & efficiency of sizereduction operation of plastics, environment pollution.
UNIT II	Need for recycling – Sorting and segregation of waste – Plastics identification - Plastics production and composition – Plastics waste – Composition, quantities and disposal alternatives.
UNIT III	Primary recycling – Equipments for primary recycling. Specific recycling techniques – PE films,PP battery case – Crushing and separation – PET films.
UNIT IV	Recycling of plastics from urban waste – Rheology, density, mechanical behavior. Secondaryrecycling Plastics wastes containing paper – hydrolytic treatment – processing methods –processing of mixed plastics waste – household waste – industrial sector.
UNIT V	Use of recyclable plastics in motor vehicles – recoverable materials – disposal of residuals – recyclable plastic components – virgin and recycled HDPE – Fluorinated and unfluorinated HDPE – fuel tanks. Tertiary recycling – Reactors used – Advantages – Dry method wet method -use of recyclable plastics in automobiles.

Text Books:

1. Dr. Murali Srinivasan Natamai Subramanian , Plastics Waste Management Processing & Disposal,Smithers U.K. (2016)
2. Nabil, Mustafa, Plastics waste management: Disposal,Recycling and Reuse, Marcel Decker, New York,1993.
3. EIRI, Plastics Waste Recycling Technology

Reference Books:

1. Rudolph, Natalie & Kiesel, Raphael & Aumnate, Chuanchom , Understanding Plastics Recycling: Economic, Ecological and Technical Aspects Of Plastic Waste Handling, Hanser, Munich (2017)
2. Allen, W.S. & Baker, P.N. , Handbook of plastic technology: Identification, Testing and recycling of Plastics, CBS, New Delhi (2009)

Course outcomes:

After completion of this course the students will be able to

- Understand the recycling of various commodity and engineering plastic.
- Understand the management of various plastics waste
- Understand the environmental impact of plastics waste and control.