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

Program / Semester: **B.Tech (VI)**	Branch: **Computer Science &Engineering**
Subject: **Compiler Design**	Course Code: **C022611(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**

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

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

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

UNIT IV: Run-time Environment : Storage organization, activation trees, activation records, allocation strategies, Parameter passing symbol table, dynamic storage allocation.

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

Text Books:

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

Reference Books:

1. Compiler Design in C, A.C. Holub, PHI.
2. Compiler construction (Theory and Practice), A. Barret William and R.M., Bates, Galgotia Publication.
3. Compiler Design, O.G. Kakde, 4th edition, Laxmi Publication.

Course Outcomes [After undergoing the course, students will be able to:]
1. Explain the concepts of Compilers and roles of the lexical analyzer.
2. Apply the concepts of different Parsing techniques and implement the knowledge to Yacc tool.
3. Develop syntax directed translation schemes.
4. Implement the principles of scoping, parameter passing and runtime memory management.
5. Use the new code optimization techniques to improve the performance of a program in terms of speed & space and develop algorithms to generate code for a target machine.

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

Program / Semester: **B.Tech (VI)**	Branch: **Computer Science &Engineering**
Subject: **Software Engineering & Project Management**	Course Code: **C022612(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**

UNIT I: Introduction to software engineering and project management -Introduction to Software Engineering: Software, Evolving role of software, Three "R"-Reuse, Reengineering and Retooling, An Overview of IT Project Management: Define project, project management framework, The role of project Manager, Systems View of Project Management, Stakeholder management, Project phases and the project life cycle. Software Process Models-Waterfall Model, Evolutionary Process Model: Prototype and Spiral Model, Incremental Process model: Iterative approach, RAD, JAD model, Concurrent Development Model, Agile Development: Extreme programming, Scrum.

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

UNIT III: Software Project Planning : Business Case, Project selection and Approval, Project charter, Project Scope management: Scope definition and Project Scope management, Creating the Work Breakdown Structures, Scope Verification, Scope Control, Project Scheduling and Procurement management- Relationship between people and Effort: Staffing Level Estimation, Effect of schedule Change on Cost, Degree of Rigor & Task set selector, Project Schedule, Schedule Control, CPM (Numericals), Basic Planning Purchases and Acquisitions, Planning Contracting, Requesting Seller Responses, Selecting Sellers, Out Sourcing: The Beginning of the outsourcing phenomenon, Types of outsourcing relationship, The realities of outsourcing, Managing the outsourcing relationship.

UNIT IV :Software Quality : Software and System Quality Management: Overview of ISO 9001, SEI Capability Maturity Model, McCalls Quality Model, Six Sigma, Formal Technical Reviews, Tools and Techniques for Quality Control, Pareto Analysis, Statistical Sampling, Quality Control Charts and the seven Run Rule. Modern Quality Management, Juran and the importance of Top management, Commitment to Quality, Crosby and Striving for Zero defects, Ishikawa and the Fishbone Diagram.

UNIT V : Human Resource Management: Human Resource Planning, Acquiring the Project Team: Resource Assignment, Loading, Leveling, Developing the Project Team: Team Structures, Managing the Project Team, Change management: Dealing with Conflict & Resistance Leadership & Ethics. Software Risk Management and Reliability issues- Risk Management: Identify IT Project Risk, Risk Analysis and Assessment, Risk Strategies, Risk Monitoring and Control, Risk Response and Evaluation. Software Reliability: Reliability Metrics, Reliability Growth Modelling

Text Books:

1. Software Engineering, 5th and 7th edititon, by Roger S Pressman, McGraw Hill publication.
2. Managing Information Technology Project, 6edition, by Kathy Schwalbe, Cengage Learning publication.
3. Information Technology Project Management by Jack T Marchewka Wiley India publication.

Reference Books:

1. Software Engineering 3rd edition by KK Agrawal, Yogesh Singh, New Age International publication.
2. Software Engineering Project Managament by Richard H. Thayer Wiley India Publication
3. Software Engineering for students: A Programming Approach by Douglas Bell, Pearson publication.

Course Outcomes [After undergoing the course, students will be able to:]
1. To understand and conceptualize the process of Software Development Life Cycle (SDLC) models.
2. Apply use of knowledge of Software Life Cycle to implement the projects successfully in the corporate world.

3. Identify the Inputs, Tools and techniques to get the required Project deliverables and Product deliverables using 10 Knowledge areas of Project Management.
4. To familiarize with Project Management framework and To
5. Implement Project Management Processes to successfully complete project in IT industry.

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

Program / Semester: **B.Tech (VI)**	Branch: **Computer Science &Engineering**
Subject: **Artificial Intelligence & Expert Systems**	Course Code: **C022613(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**

UNIT I: Introduction: Overview of AI problems, examples of successful recent AI applications. The Turing test, Rational versus non-rational reasoning. Search Strategies: Problem spaces (states, goals and operators), problem solving by search. Uninformed search (breadth-first, depth-first, depth-first with iterative deepening). Heuristics and informed search (hill-climbing, generic best-first, A*). Minimax Search, Alpha-beta pruning. Space and time efficiency of search. Two-player games (introduction to minimax search). Constraint satisfaction (backtracking and local search methods).

UNIT II: Knowledge representation and reasoning: Review of propositional and predicate logic, First order logic, Resolution and theorem proving, Forward chaining, Backward chaining,Temporal and spatial reasoning. Review of probabilistic reasoning, Bayes theorem. Totally-ordered and partially-ordered Planning

UNIY III: Planning : The blocks world, Components of Planning Systems, Goal stack planning, Non-linear planning, Hierarchical planning. Learning-Learning from example, Learning by advice, Explanation based learning, Learning in problem solving, Definition and examples of broad variety of machine learning tasks, Classification, Inductive learning, Simple statistical-based learning such as Naive Bayesian Classifier, decision trees.

UNIT IV: Natural Language Processing: Language models, n-grams, Vector space models, Bag of words, Text classification, Information retrieval, Page rank, Information extraction, Question-answering

UNIT V: Agents: Definition of agents, Agent architectures (e.g., reactive, layered, cognitive), Multi-agent systems- Collaborating agents, Competitive agents, Swarm systems and biologically inspired models. Expert Systems: Representing and Using Domain Knowledge, Expert System Shells, Explanation, Knowledge Acquisition.

Text Books:

1. Title Artificial Intelligence Author Elaine Rich, Kevin Knight and Shivashankar B Nair Publisher Tata McGraw Hill Edition 3rd Edition 2009

Reference Book:

1 Title Introduction to Artificial Intelligence and Expert Systems Author Dan W. Patterson Publisher Pearson Education Edition 1st Edition, 2015

2. Title Artificial Intelligence: A Modern Approach Author S. Russell and P. Norvig. Publisher Prentice Hall Edition 3rd Edition 2009

Course Outcomes [After undergoing the course, students will be able to:]
1. Understand the basic principles of AI towards problem solving and perception.
2. Understand the basic principles of Knowledge representation and inference.
3. Acquire basic proficiency in a traditional AI language including an ability to write simple to intermediate programs and an ability to understand code written in that language.
4. Experiment with a machine-learning model for simulation of intelligent systems in NLP systems and Planning Problems.
5. Investigate applications of AI techniques in intelligent agents, expert systems, artificial neural Networks and other machine learning models.

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

Program / Semester: **B.Tech (VI)**	Branch: **Computer Science &Engineering**
Subject: **Web Technologies (Professional Elective-II)**	Course Code: **C022631(022)**
T**otal / 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**

UNIT- I
Introduction to WWW: Protocols and programs, Internet Protocol -TCP/IP, UDP, HTTP, Secure Http(http), secure connections, application and development tools, the web browser, what is server, choices, setting up UNIX and Linux web servers, Domain Name Server and IP Addresses, dynamic IP
Web Design: Web site design principles, planning the site and navigation

UNIT-II
HTML: Planning for designing Web pages, Model and structure for a Website, Developing Websites, Basic HTML using images links, Lists, Tables and Forms, Frames for designing a good interactive website
CSS: Introduction Cascading Style Sheets: Syntax, Class Selector, Id Selector, External Style Sheets, Internal Style Sheets, Inline Style, the class selector, div & span tag, introduction to AJAX, ajax based web application

UNIT- III

JAVA SCRIPT: Programming Fundamentals, Statements, Expressions, Operators, Popup Boxes, Control Statements, Try…. Catch Statement, Throw Statement, and Objects of JavaScript: Date object, array object, Boolean object, math object

Advance Script:HTML DOM, inner HTML, Dynamic HTML (DHTML), DHTML form, forms and validations

UNIT-IV
XML & JSON: Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Well formed, using XML with application.XML, XSL and XSLT. Introduction to JSON, JSON syntax, Datatypes, objects and JSON parse
Ajax: Introduction, AJAX request, AJAX Response, AJAX XML File

UNIT-V
PHP: Starting to script on server side, Arrays, function and forms, advance PHP
Databases: Basic command with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables, PHP myadmin and database bugs.

Text Books:

1. Jeffrey C.Jackson, "Web Technologies--A Computer Science Perspective", Pearson Education
2. Web Warrior Guide to Web Design Technologies, Don Gosselin, Joel Sklar& others, Cengage Learning
3. Web Technologies, Black Book, DreamTech Press

Reference Books:

1. Web Technology and Design by Xavier, C, New Age International
2. HTML, DHTML, Java Script, Perl & CGI by Ivan Bayross, BPB Publication.
3. Internet and Web Design by Ramesh Bangia, New Age International
4. Web Technology: A developer perspective, Gopalan&Akilandeswari, PHI

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

1. To design web sites utilizing multiple tools and techniques
2. To demonstrate the ability to create dynamic pages that are easy to navigate and easy to update
3. To utilize entry - level system analysis and design principles to solve business problems.
4. To demonstrate the ability to apply testing, debugging, and troubleshooting skills.

To exhibit the ability to design and implement an internet database.

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

Program / Semester: **B.Tech (VI)**	Branch: **Computer Science &Engineering**
Subject: **Internet Of Things (Professional Elective – II)**	Course Code: **C022632(022)**
Total / Minimum-Pass Marks (End Semester Exam): **100 / 35**	L: 2 T: 01 P: 0 Credits: 2
Class Tests & Assignments to be conducted: 2 each	Duration (End Semester Exam): **03 Hours**

Course Objectives
- To understand Concepts, design and characteristics of IoT.
- To understand Architecture of IoT.
- To understand basic protocols of IoTs.
- To understand challenges and applications of IoTs.
- To develop IoT applications using Tools.

Course Outcomes
- Students will familiar with the concepts of Internet of Things.
- Students will familiar with IoT Architecture
- Students will ready to Analyze basic protocols in wireless sensor network
- Students will be capable to design IoT applications in different domain and be able to analyze their performance
- Capable to implement basic IoT applications on embedded platform

Unit-I	**Introduction to Internet of Things:** Origin of Terminology IoT, Applications, Characteristics, Components of IoT, Associated technologies with IoT (M2M, Big Data, Cloud, Smart Grid, IoV, CPS, SDN, 3G/4G/5G), Challenges in IoT.
Unit-II	**Connectivity:** IoT Network Configurations, Gateway Prefix Allotment, IPv4, IPv6, IPv4 versus IPv6, RPL **Data Protocol:** MQTT, CoAP, AMQP, **Communication Protocols:** IEEE 802.15.4, ZWave, Bluetooth, ZigBee, 6LowPAN, HART and Wireless HART, NFC, RFID.
Unit-III	**Actuation:** Actuator, Actuator Types: Hydraulic Pneumatic, Electrical, Thermal/ Magnetic Mechanical, Soft Actuators, Shape memory polymer (SMP) **Types of Motor Actuators**: Servo motor, Stepper motor, Hydraulic motor, Solenoid Relay, AC motor **Sensing:** Definition, Types of sensors, Transducers, Sensors Classes
Unit-IV	**Introduction to Arduino Programming:** Operators in Arduino, Control Statement, Loops, Integration of Sensors and Actuators with Arduino. **Implementation of IoT**: Interoperability in IoT, Introduction to NodeMCU (ESP8266), Connectivity of Sensors and Actuators with NodeMCU, Introduction to Python programming, Introduction to Raspberry PI.
Unit-V	**Cloud Computing Fundamentals:** Recent Trends in Computing, Evolution of Cloud Computing, Evolution of Cloud Computing, Business Advantages, Components **Service Models:** Software-as-a-Service (SaaS), Platform-as-a-Service (PaaS) Infrastructure-as-a-Service (IaaS), Multi-cloud, Inter-cloud, Cloud Computing Service Management and Security, **Case studies:** Amazon Elastic Compute Cloud (EC2), Microsoft Azure.

Text Books:

1. Vijay Madisetti, Arshdeep Bahga, "Internet of Things: A Hands-On Approach"
2. Waltenegus Dargie,Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice"

Reference Book:

1. Internet of Things with Arduino Cookbook by Macro Schwart Published by Packt Publishing Ltd.

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

Program / Semester: **B.Tech (VI)**	Branch: **Computer Science &Engineering**
Subject: **Soft Computing (Professional Elective – II)**	Course Code: **C022633(022)**
Total / Minimum-Pass Marks (End Semester Exam): **100 / 35**	L: 2 T: 01 P: 0 Credits: 2
Class Tests & Assignments to be conducted: 2 each	Duration (End Semester Exam): **03 Hours**

UNIT- I Introduction: Concept of computing systems. "Soft" computing versus "Hard" computing, Characteristics of Soft computing, Some applications of Soft computing techniques.

UNIT-II Fuzzy logic : Introduction to Fuzzy logic. Fuzzy sets and membership functions. Operations on Fuzzy sets. Fuzzy relations, rules, propositions, implications and inferences. Defuzzification techniques. Fuzzy logic controller design. Some applications of Fuzzy logic.

Fuzzy rule base system : Fuzzy propositions, formation, decomposition & aggregation of fuzzy Rules, fuzzy reasoning, fuzzy inference systems, fuzzy decision making & Applications of fuzzy logic.

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

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

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

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

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

Course Outcomes [After undergoing the course, students will be able to:]
1. Fuzzy logic and its applications.
2. Artificial neural networks and its applications.
3. Solving single-objective optimization problems using GAs.
4. Solving multi-objective optimization problems using Evolutionary algorithms (MOEAs).
5. Applications of Soft computing to solve problems in varieties of application domains.

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

Program / Semester: **B.Tech (VI)**	Branch: **Computer Science &Engineering**
Subject: **Network Programming (Professional Elective – II)**	Course Code: **C022634(022)**
Total / Minimum-Pass Marks (End Semester Exam): **100 / 35**	L: 2 T: 01 P: 0 Credits: 2
Class Tests & Assignments to be conducted: 2 each	Duration (End Semester Exam): **03 Hours**

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

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

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

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

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

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

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

Course Outcome: After successful completion of the course, students will be
1. Familiar with protocols, network interfaces, and Design/performance issues in local area networks and wide area networks,
2. Familiar with basics of Socket and Socket programming.
3. Familiar with contemporary issues in networking technologies,
4. Familiar with network tools and network programming.
5. Familiar with client server programming.

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

Program / Semester: **B.Tech (VI)**	Branch: **Computer Science &Engineering**
Subject: **Software Engineering & Project Management (Laboratory)**	Course Code: **C022621(022)**
Total / Minimum-Pass Marks (End Semester Exam): **40 / 20**	L: 0 T: 0 P: 2 Credit(s): 1

Note: The course pre-requisite for pursuing Software Development and Project Management Laboratory PHP/MySQL; which if not covered beforehand; students should be encouraged to undertake SPOKEN TUTORIAL COURSE on PHP (duration: 4 – 6 Weeks before pursuing this laboratory.

Course Objectives: The goal of this course is to teach and provide experience building software projects in service to real-time end-user beneficiaries. The laboratory is pursued in the following sequence of stages with due coordination with co-projectees in teams (of 3–4 students) and supervision of laboratory instructor upon which the project is graded accordingly:

1. Writing the complete problem statement.

2. Writing the Software Requirement Specification document.

3. Drawing the entity relationship diagram.

4. Drawing the data flow diagrams at level 0 and level 1.

5. Drawing use case diagram.

6. Drawing activity diagram of all use cases.

7. Drawing state chart diagram of all use cases.

8. Drawing sequence diagram of all use cases.

9. Drawing collaboration diagram of all use cases.

10. Assigning objects in sequence diagram to classes and make class diagram.

11. Performing system analysis on any of the selected modules designed above.

Each team can choose any one-project theme (around and similar to below stated List of Sample Project Themes, also not repeating with any other group and are expected to provide the above mentioned project deliverables.)

[Student Result Management System, Library management system, Inventory control system, Accounting system, Fast food billing system, Bank loan system, Blood bank system, Railway reservation system, Automatic teller machine, Video library management system, Hotel management system, Hostel management system, E-ticking, Share online trading, Hostel management system, Resource management system, Court case management system]

Once project deliverable sequence is decided, each team meets with its client to understand the requirements and priorities of the client, which starts the software development process, a process that continues until the end of the semester.

Guidelines for Perusal / Assessment of Software Development and Project Management Laboratory:
1. The students are free to choose any Technology or Tool like (C/C++/VB/Gambas/PhP/Core Java/Servlet/ JSP/ Python and alike) for developing their case study on selected Project Theme.
2. This course is a CI (communications intensive) course. The meetings with end-user client, project supervisor involve extensive communication and involves frequent coordination with team members in order to assign tasks and communicate questions, issues, and completions. Hence, 20% of total grade shall be evaluated on the meeting-conduction patterns by the project team.
3. Also, the project team is expected to submit duly filled and signed (phase-wise) project progress reports by the authorised signatories (as provided in Annexure I) with reference to their progress in ongoing project work till its completion within scheduled semester deadline.

4. The documentation of the project should begin after exhibiting targeted project deliverables only, duly checked by project supervisor.
5. The final documentation should be made with due guidance from project mentor or supervisor and should be submitted (in both soft and hard copy formats).
6. Before the Final Practical examinations, every individual student should submit his own hardcopy of the documentation in a PunchedCardboard File Only, with a CD containing the softcopy of the same.
7. During Final Submissions, every copy of the documentation should be accompanied by a Submission Certificate duly signed by signatory authorities (Project Supervisor &Head of Department)

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

1. Define various software application domains and remember different process model used in software development.
2. Explain needs for software specifications also they can classify different types of software requirements and their gathering techniques.
3. Convert the requirements model into the design model and demonstrate use of software and user-interface design principles.
4. Justify the role of SDLC in Software Project Development and evaluate importance of Software Engineering in PLC.
5. Generate project schedules, deliverables and construct, design and develop network diagram for different type of projects; also practising the activities of each phase.

Recommended Books:

6. Fundamentals of Software engineering - Rajib Mall.
7. Software design – From programming to architecture - Eric Braude

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

Program / Semester: **B.Tech (VI)**	Branch: **Computer Science &Engineering**
Subject: **Artificial Intelligence & Expert Systems Laboratory**	Course Code: **C022622(022)**
Total / Minimum-Pass Marks (End Semester Exam): **40 / 20**	L: 0 T: 0 P: 2 Credit(s): 1

List of Experiments: (Each student should perform, at least, 10 experiments.)

1. Write a prolog program to find the rules for parent, child, male, female, son, daughter, brother, sister, uncle, aunt, ancestor given the facts about father and wife only.
2. Write a program to find the length of a given list
3. Write a program to find the last element of a given list
4. Write a program to delete the first occurrence and also all occurrences of a particular element in a given list.
5. Write a program to find union and intersection of two given sets represented as lists.
6. Write a program to read a list at a time and write a list at a time using the well defined read & write functions.
7. Write a program given the knowledge base,

    If x is on the top of y, y supports x.

    If x is above y and they are touching each other, x is on top of y.

    A cup is above a book. The cup is touching that book. Convert the following into wff's, clausal form; Is it possible to deduce that `The book supports the cup'.
8. Write a program given the knowledge base,

    If Town x is connected to Town y by highway z and bikes are allowed on z, you can get to y from x by bike.

    If Town x is connected to y by z then y is also connected to x by z.

    If you can get to town q from p and also to town r from town q, you can get to town r from town p.

    Town A is connected to Town B by Road 1. Town B is connected to Town C by Road 2.

    Town A is connected to Town C by Road 3. Town D is connected to Town E by Road 4.

    Town D is connected to Town B by Road 5. Bikes are allowed on roads 3, 4, 5.

    Bikes are only either allowed on Road 1 or on Road 2 every day. Convert the following into wff's, clausal form

    and deduce that `One can get to town B from town D'.
9. Solve the classical problems for demonstrating AI search heuristics: (Water Jug problem, Monkey Banana problem, Missionary Cannibals problem, Travelling Salesman Problem and alike).
10. Solve the classical Crypt arithmetic problems in AI: (DONALD + GERALD = ROBERT, CROSS + ROADS = DANGER, SEND + MORE = MONEY and alike).
11. Solve the classical Blocks World Problem demonstrating Planning Problem-solving simulation in AI.
12. Write a program to search any goal given an input graph using AO* algorithm.

List of Equipments/Machine required: PC with Wndows XP Operating System, Visual prolog compiler

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

1. Acquire an overview of logic constructs for performing inferencing techniques. (First Order Predicate Calculus) in toy problems /classical problems using PROLOG / LISP syntax.
2. Gain confidence in drafting production rules (iterative / recursive) for an AI simulating code, given a story domain.
3. Understand, on how to use different data structures (lists, trees, stacks and queues) for solving routing problems and implementing heuristic searches.
4. Gain exposure to deal with situations that crop up syntax / compile-time / run-time errors.
5. Simulate game playing / puzzle problemsusing general solution in PROLOG / LISP syntax.

Recommended Books :

1. Ivan Bratko : Logic & prolog programming.
2. Carl Townsend : Introduction to Turbo Prolog, BPB, Publication.
3. W.F. Clocksin & Mellish : Programming in PRLOG, Narosa Publication House

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

Program / Semester: **B.Tech (VI)**	Branch: **Computer Science &Engineering**
Subject:**Web** **Technologies** **Laboratory**(Professional Elective –**II**)	Course Code: **C022623(022)**
Total / Minimum-Pass Marks (End Semester Exam): **40 / 20**	L: 0 T: 0 P: 2 Credit(s): 1

List of Experiments: (Each student should perform, at least, 10 experiments.)

1. To Develop and demonstrate a XHTML document that illustrates the use external style sheet, ordered list, table, borders, padding, color, and the tag.
2. To Develop and demonstrate a XHTML file that includes JavaScript script for the following problems: a) Input: A number n obtained using prompt, Output: The first n Fibonacci numbers b) Input: A number n obtained using prompt, Output: A table of numbers from 1 to n and their squares using alert
3. To Develop and demonstrate a XHTML file that includes Javascript script that uses functions for the following problems: a) Parameter: A string, Output: The position in the string of the left-most vowel b) Parameter: A number, Output: The number with its digits in the reverse order
4. To Develop and demonstrate, using Javascript script, a XHTML document that collects the RollNo (the valid format is: A digit from 1 to 4 followed by two upper-case characters followed by two digits followed by two upper-case characters followed by three digits; no embedded spaces allowed- e.g. 1AB23CD356, 1GC13CS345) of the user. Event handler must be included for the form element that collects this information to validate the input. Messages in the alert windows must be produced when errors are detected.
5. To Modify the above program to get the current semester also (restricted to be a number from 1 to 8)
6. To Develop and demonstrate, using JavaScript script, a XHTML document that contains three short paragraphs of text, stacked on top of each other, with only enough of each showing so that the mouse cursor can be placed over some part of them. When the cursor is placed over the exposed part of any paragraph, it should rise to the top to become completely visible.
7. To Modify the above document so that when a paragraph is moved from the top stacking position, it returns to its original position rather than to the bottom
8. To Design an XML document to store information about a student in an engineering college affiliated to CSVTU. The information must include RollNo, Name, Name of the College, Branch, Year of Joining, and e-mail id. Make up sample data for 5 students. Create a CSS style sheet and use it to display the document.
9. To Create an XSLT style sheet for one student element of the above document and use it to create a display of that element.
10. Write an application in php that contains a textbox in which the user has to enter a name and a textarea in which the user has to enter his comments. When the Submit is clicked, the output should display the name entered in the textbox and the user-selection from the listbox. All the above should be displayed with the tracing for the page being enabled
11. Create a simple Web Service that converts the temperature from Fahrenheit to Celsius, and vice versa create a simple Web Service that converts the temperature from Fahrenheit to Celsius, and vice versa. Also write anphp program to consume this web service.
12.
    a) Write a Program in php that has a form taking the user s name as input. Store this name in a permanent cookie & whenever the page is opened again, then value of the name field should be attached with the cookie s content
    b) Write a Program to delete all cookies of your web site that has created on the clients computer
13. (Form Validation)
    a) Write a HTML file to create a simple form with 5 input fieldsviz. Name, Password, Email, Pincode, Phone No. and a Submit button
    b) Write a PHP program to demonstrate required field validations to validate that all input fields are required
    c) Write a PHP program to validate Name, Email and Password
    d) Write a PHP program to display error messages if the above validations do not hold.

14. (File Handling)
    a) Create a PHP program to demonstrate opening and closing a file
    b) Create a PHP program to demonstrate reading a file
    c) Create a PHP program to demonstrate writing in a file.
15. Create a PHP program to read the following text from a file csvtu.txt "Chhattisgarh Swami   Vivekanand Technical University, Bhilai " And write to another file learningphp.txt.

Recommended Books:

1. HTML Complete Reference- Tata McGraw hill 2. HTML and XML: An Introduction NIIT, Prentice-Hall of Indi
2. Head first PHP & My SQL – Lynn Beighley, Michael Morrison
3. PHP Cook Book0 David Sklar, Shroff Publish

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

1. Build and learn web development technologies.
2. Analyze a web page and identify its elements and attributes.
3. Build career in professional web site designing with good aesthetic sense of designing.
4. Have a Good grounding of back-end scripting.
5. Pursue their research-oriented career in the relevant and allied domains.

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

Program / Semester: B.Tech (VI)	Branch: Computer Science &Engineering
Subject: Internet of Things Laboratory (Professional Elective –II)	Course Code: C022624(022)
Total / Minimum-Pass Marks (End Semester Exam): 40 / 20	L: 0 T: 0 P: 2 Credit(s): 1

List of Experiments: (Each student should perform, at least, 10 experiments.)

Note: Students need to perform at least 10 experiments. Use of sensors and actuators are not restricted as provided. Student may use any other components also.

1. Introduction to various sensors and actuators.

   a) PIR Motion Sensor.
   b) Rain Drop Sensor.
   c) Moisture Sensor.
   d) Temperature Sensor.
   e) Touch Sensor.
   f) Infrared Sensor.
   g) RFID Sensor.
   h) Ultrasonic Sensor.
   i) Bluetooth Module.
   j) Wi-Fi Module.
   k) LED/OLED
   l) Servo Motor.

2. Acquaintance with Arduino /Raspberry Pi/Node MCU and perform essential programming establishment.

3. Perform Experiment using Arduino Uno to measure the distance of any object using Ultrasonic Sensor.

4. Connect LED/Buzzer with Arduino/Raspberry Pi and compose a program to turn ON LED for 1 sec later at regular intervals.

5. Connect Push button/Digital sensor (IR/LDR) with Arduino/Raspberry Pi and compose a program to turn ON LED when press button is squeezed or sensor activates.

6. Interact with DHT11 sensor with Arduino/Raspberry Pi and compose a program to print temperature and humidity readings on screen.

7. Connect engine utilizing hand-off with Arduino/Raspberry Pi and compose a program to turn ON engine when push button is squeezed.

8. Communicate OLED with Arduino/Raspberry Pi and compose a program to print temperature and moistness readings on it.

9. Communicate Bluetooth with Arduino/Raspberry Pi and compose a program to send sensor information to cell phone utilizing Bluetooth.

10. Connect Bluetooth with Arduino/Raspberry Pi and compose a program to turn LEDON/OFF when '1'/'0' issent from cell phone utilizing Bluetooth.

11. Compose a program on Arduino/Raspberry Pi to transfer temperature and stickiness information to thing speak cloud.

12. Compose a program on Arduino/Raspberry Pi to recover temperature and moistness information from thing speak cloud.

13. Getting Started and working with ESP8266 Wi-Fi to control devices from mobile.

14. Creating a webpage and display the values received from sensors through Arduino.

15. Study of other IoT Boards and components available.(Student Activity).

Recommended Books:

1. Vijay Madisetti, ArshdeepBahga, Ïnternet of Things, "A Hands on Approach", University Press

2. Dr. SRN Reddy, RachitThukral and Manasi Mishra, "Introduction to Internet of Things: A practical Approach", ETI Labs

3. Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press Laboratory Outcomes

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

1. Describe what IoT is and how it works today

2. Recognize the factors that contributed to the emergence of IoT, Design and program IoT devices

3. Use real IoT protocols for communication, secure the elements of an IoT device

4. Design an IoT device to work with a Cloud Computing infrastructure

5. Transfer IoT data to the cloud and in between cloud providers

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

Program / Semester: B.Tech (VI)   Branch: Computer Science &Engineering

Subject: **Soft Computing Laboratory**(Professional Elective –**II**)	Course Code: **C022625(022)**
Total / Minimum-Pass Marks (End Semester Exam): **40 / 20**	L: 0 T: 0 P: 2 Credit(s): 1

List of Experiments: (Each student should perform, at least, 10 experiments.)

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

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

Recommended Books:
1.   Python Data Analytics– Fabio Nelli, APress.
2.   Python for Data Analysis, Wes McKinney, O'Reilly.

Laboratory Outcomes [After undergoing the course, students will be able to:]
1. Use various data structures available in Python.
2. Apply the concepts of Data Analysis.
3. Apply the use of Numpy Library for performing various data processing activities.
4. Apply the use of Pandas library for data handling activities.
5. Apply the use of Matplotlib for data visualization activities.

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

Program / Semester: **B.Tech (VI)**	Branch: **Computer Science &Engineering**
Subject: **Network Programming Laboratory**(Professional Elective –II)	Course Code: **C022626(022)**
Total / Minimum-Pass Marks (End Semester Exam): **40 / 20**	L: 0 T: 0 P: 2 Credit(s): 1

List of Experiments: (Each student should perform, at least, 10 experiments.)

1. Implementation of Fork and EXEC in Unix environment.
2. Implementation of signal handling in Unix environment.
3. Implementation of pthread in Unix environment
4. Write an echo program with client and iterative server using TCP.
5. Write an echo program with client and concurrent server using TCP.
6. Write an echo program with client and concurrent server using UDP.
7. Write a program to retrieve date and time using TCP.
8. Write a program to retrieve date and time using UDP.
9. Write a client and server routines showing I/O multiplexing.
10. Write an echo client and server program using Unix domain stream socket.
11. Write an echo client and server program using Unix domain Datagram socket.
12. Write a client and server program to implement file transfer.
13. Write a client and server program to implement the remote command execution.
14. Write a client program that gets a number from the user and sends the number to server for conversion into hexadecimal and gets the result from the server.
15. Write a program for extracting information from URL.

List of Equipment / Machine Required:
1. Unix/Ubuntu/Linux
2. JDK

Recommended Books:
 1. Steven.W.R: UNIX Network Programming, (Vol. I & II), PHI.
 2. Reference Book 2: Java: The Complete Reference by SCHILDT and HERBERT, McGraw Hill.

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

1. Create multiple processes and implement inter-process communication methods in Unix environment.
2. Develop Client Server Based application using TCP/UDP.
3. Implement I/O Multiplexing mechanism to handle multiple i/o operation.
4. Analyze URL Data and Information.
5. Design protocol for data communication

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

Program / Semester: **B.Tech (VI)**	Branch: **Computer Science &Engineering**
Subject: **Android Application Laboratory**	Course Code: **C022611(022)**
Total / Minimum-Pass Marks (End Semester Exam): **40 / 20**	L: 0 T: 0 P: 2 Credit(s): 1

List of Experiments: (Each student should perform, at least, 10 experiments.)

1. Download and setup Android Environment
2. Using the Development environment
   a) Create a new Project using wizard
   b) Add source and resource files.
   c) Import existing projects into workspace
   d) Create testing Emulator
   e) Compile and run the project
   f) Debug the project
   g) Debug on android device.
3. XML Files
   a. AndroidManifest.xml
      i. Edit the manifest and change min sdk and target sdk of application.
      ii. Add main activity entries in manifest.
      iii. Add second activity entries in manifest.
      iv. Add Entries for Service, Broadcast receivers.
      v. Add uses permissions for reading files, internet, camera.
   b. Layouts
      i. Create Linear Layout in xml
      ii. Create Relative Layout in xml
      iii. Create frame layout in xml
      iv. Create a complex mixed layout using all above layouts
   c. Drawables
      i. Create xml drawable for rectangular, oval and other basic shapes
      ii. Create xml drawable with Layer list for complex shapes.
   d. Values
      i. Create strings.xml to store all your application strings.
      ii. Create color.xml to store all your color values
      iii. Create styles.xml to store all your custom themes and style objects
   e. Alternate resources based on qualifiers
      i. Create separate draw tables folders and xml files based on screen density (LDPI, MDPI, HDPI, XHDPI, XXHDPI)
      ii. Create separate styles.xml based on different android versions.
      iii. Create separate layout folders based on device screen sizes and orientations.
4. Creating User Interface
   a. Create application with Basic Views (Textview, Button, ListView)
   b. Create application with different Layouts (Linear, Relative, Frame)
   c. Create application to handle and respond on click using Click Listeners
5. Assets and Images
   a. Create application which will access files from Assets folder (Images, sounds, Custom Fonts)
6. Application Fundamentals
   a. Activities
      i. Create application with one activity and display a layout created in xml.
      ii. Create application which will log all activity lifecycle events using Android log api.
      iii. Create application which should be Saving and restoring app state (eg textview text, checkbox checked state)
   b. Intents
      i. Create application which will start another activity using intent.
      ii. Create an activity which will pass data to second activity using intent.
      iii. Create activity which will start second activity and get response back from second activity.
   c. Services

7. Content Providers
   a. System provided content providers
      i. Create application which can access/modify Contacts of device.
      ii. Create application which can access & display Images available on device.
      iii. Create application which can access and play Media files (Audio & Video)
   b. Custom Contact providers
      i. Create application which will provide some data to other applications using ContentProvider system.
8. Broadcast Receivers
   a. Create application to Listen to following system events using Receivers
      i. Incoming SMS
      ii. In and outgoing Phone Call
      iii. Low Battery & Storage state changed
   b. Create application which will broadcast Custom event to custom Receivers.
9. Create application which will display following Notifications
   a. Toast notification
   b. Status bar notification
   c. Dialog notification
10. Preference & Data Storage
   a. Create application which will save and read back data using Shared Preference
   b. SQLite database
      i. Create app to create database using Open helper
      ii. Create app to read, write and delete database entries
11. Networking & Web API
   a. HTTP connectivity
      i. Create app to connect and fetch data from a Http server/ website using URLConnection
      ii. Create app to connect and fetch data from a Http server/ website using HTTPClient library
      iii. Create app to connect and post data to Http server/ website using URLConnection
      iv. Create app to connect and post data to Http server/ website using HTTPClient library
   b. TCP Sockets or Sockets
      i. Create a server app using tcp socket, it will send "Welcome" to client when its connected.
      ii. Create a client app using tcp socket, it will send "Hello" to server once connected.
12. Google API
   a. Create application using Maps api, it should display marker on current location of user
   b. Create application which will display ads using Admob api
13. Accessing android hardware
   a. Create Application to take picture and save it to file storage using camera api
   b. Create application to display current direction using sensor api
   c. Create application to show a toast if phone is waved in air.
   d. Create application to show list of paired and nearby bluetooth devices.
14. Facebook SDK
   a. Create application which can share link on facebook using Facebook sdk.
   b. Create application which can share photo on facebook using Facebook sdk.
15. Publish to playstore
   a. Enable Obfuscation for your application using Proguard
   b. Export Signed application package
   c. Prepare Store listing
   d. Upload and publish apk

Recommended Books:

1. Head First Android- By Jonathan Simon

Laboratory Outcomes [After undergoing the course, students will be able to:]
1. Understand basic concepts and technique of developing applications for the Android phone.
2. Able to use the SDK and other development tools.
3. Acquire to know, how to publish Android applications to the Android Market.

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

Program / Semester: **B.Tech (VI)**	Branch: **Humanities**
Subject: **Technical Communication & Soft Skills**	Course Code: **C000601(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**

UNIT-1 Communication Skills-Basics: Understanding the communicative environment, Verbal Communication; Non Verbal Communication & Cross Cultural Communication, Body Language & Listening Skills; Employment Communication&writing CVs, Cover Letters for correspondence.Common errors during communication, Humour in Communication.

UNIT-2 Interpersonal communication: Presentation, Interaction and Feedbacks, Stage Manners, Group Discussions (GDs) and facing Personal Interviews, Building Relationships, Understanding Group Dynamics- I, Emotional and Social Skills, Groups, Conflicts and their Resolution, Social Network, Media and Extending Our Identities.

UNIT- 3 Vocational skills: Managing time: Planning and Goalsetting, managing stress: Types of Stress; Making best out of Stress, Resilience, Work-life balance, Applying soft-skills to workplace.

UNIT-4 Mindsets and Handling People: Definitions and types of Mindset, Learning Mindset, Developing Growth Mindset, Types of People, How to Lead a Meeting, How to Speak Effectively in Meetings, Behavior & Roles in Meetings, Role Play: Meeting.On Saying "Please", How to say "NO".

UNIT-5Positive Pschycology: Motivating oneself, Persuasion, Survival Strategies, Negotiation, Leadership and motivating others**,** controlling anger**,** Gaining Power from Positive Thinking.

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

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

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

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject: Food packaging Technology   Code: **C000601(094)**
Total Theory Periods: **40**   Total Tutorial : **Ten(Minimum)**
Class Tests: **Two(Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

Course Objectives:
1. To understand basic concepts of life of food material & packaging of foods
2. To understand the concepts of packaging system.
3. 3 To understand the concepts forms of packaging
4. To understand the concepts their selection for the raw and other system of lamination
5. To understand the concepts of Economics of packaging

UNIT I:	Factors affecting shelf life of food material during storage; spoilage mechanism during storage; definition, requirement, importance and scope of packaging of foods.
UNIT II	Types and classification of packaging system; advantage of modern packaging system. Different types of packaging materials used.
UNIT III	Different forms of packaging, metal container, glass container, plastic container, flexible films, shrink packaging, vacuum & gas packaging.
UNIT IV	Packaging requirement & their selection for the raw & processed foods. Advantages & disadvantages of these packaging materials; effect of these materials on packed commodities, Package testing, Printing, labeling and lamination.
UNIT V	Economics of packaging; performance evaluation of different methods of packaging food products; their merits and demerits; scope for improvements; disposal and recycle of packaging waste.

Text books:
1. Crosby. (2000). Food Packaging Material. Applied Science Publishers.
2. Gopakumar, K. (1998). Fish Packaging Technology- materials and Methods. Concept Pub.C, New Delhi.
3. Gordon and Roberston. (2000). Food Packaging. AVI Pub.Co.

Reference books:
1. Mathlonthi, M. (1997). Food Packaging and Preservation- Theory and Practice. ElsevierApplied Science.
2. Paine. (1998). Food Packaging. AVI Publishing Co.
3. Saccron & Graffin. (1998). Food Packaging. AVI Pub.Co.

Course Outcomes:
1. Students are able to understand the concepts of storage system
2. Students should be able to classification of packaging system
3. Students can able to understand concepts of forms of packaging and Packaging requirement
4. Students should be able to learn economic of packaging

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject: Energy Management & Audit   Code: **C000602(094)**
Total Theory Periods: **40**   Total Tutorial : **Ten(Minimum)**
Class Tests: **Two(Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

Course Objectives: Familiarizing with management especially with management in energy sector engineering. Fundamentals of product strategy management.Studying methods of energy accounting and energy auditing in energy sector, industry and final consumption.Finding opportunities to increase the rational use of energy.

Course Outcomes: Understanding basics of demand side management and mechanisms (technical, legal or financial) thatinfluence energy consumption. Recognizing opportunities for increasing rational use of energy.Learning thebasics of energy auditing with application on different sectors.

UNIT I: Overview
History of Energy Management: Energy forecasting, Limitations of energy resources. Renewable energy recourses. Load management. Energy management. Demand side management (DSM) Energy conservation in realistic distribution system. Short term load forecasting for de-centralized load management.

UNIT II: Energy Situation and Global Energy Sources
World energy consumption. Energy in developing countries. Firewood crises. Indian energy sources. Non-conventional renewable energy sources.Potential of renewable energy sources.Solar energy types. Wind energy. Wave, tidal andOTEC.Super-conductors in power system. Wind power generation for large scale generation of electricity. Winddriven induction generators.

UNIT III: Energy Auditing as Applicable to an Industry
Classification of energy audit System optimization.Power factor improvement.Preventive maintenance.Processmodification.Non-conventional energy sources.Electricity tariffs.Types of off-peak tariffs.

UNIT IV: Elements of Energy Auditing and Metering Methodologies (Case Studies):
Capacity utilization.Technology up-gradation.Fine tuning, Energy conservation.Concept and methods of energyconservation.

UNIT V: Demand Side Management
Introduction to DSM. Concept of DSM.Benefits from DSM.DSM techniques. Time of day pricing, Multi-utility exchange model. Time of day pricing models for planning, load management. Load priority technique. Peak clipping.Peak shifting.Valley filling.Strategic conservation. Energy efficient equipment, Socioeconomic awareness programs.

Text Books:
1. Energy Demand: Analysis, Management and Conservatioin, Ashok.V.Desai(ED), Wiley Eastern Ltd., New Delhi.
2. Energy technology, S. Rao, Parulekar, KhannaPbs.

Reference Books:
1. Demand Side Management ,Jyothi Prakash, Tata McGraw-Hill Publishers.
2. Renewable Energy Sources and Conservation Technology, N.K.Bansal, Kleeman Millin, Tata McGraw-HillPublishers.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject: Energy Conservation and Management   Code: **C000603(094)**
Total Theory Periods: **40**   Total Tutorial : **Ten(Minimum)**
Class Tests: **Two(Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   **Minimum Marks:35**

Course Objectives:
- To carryout energy accounting and balancing
- To understand and analyze the energy data of industries
- To conduct energy audit and suggest methodologies for energy savings and
- To 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 economic 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

Textbooks:
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 Utilization" Hemisphere Publ, Washington, 1988.
4. Dryden. I.G.C., "The Efficient Use of Energy" Butterworth's, London, 1982

Course Outcomes:
1. Can carry out energy accounting and balancing
2. Upon completion of this course, the students can able to analyse the energy data of industries.
3. Can suggest methodologies for energy savings.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject: Disaster Management   Code: **C000604(094)**
Total Theory Periods: **40**   Total Tutorial : **Ten(Minimum)**
Class Tests: **Two(Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

Objectives of the Subject:
1. To introduce disaster, its nature and types.
2. To understand disaster zoning and hazard assessment.
3. To know about the disaster mitigation and preparedness.
4. To understand management during disaster and construction technology for its mitigation.
5. To identify relief measures.

Outcomes of the Subject:
1. Students are expected to understand disaster and its nature.
2. Students are expected to understand impact and hazard assessment.
3. Students are expected to understand disaster preparedness and mitigation.
4. Students are expected to understand use of construction technology for disaster management.
5. Students are expected to identify short term and long term relief measures.

Unit-1: Nature of disasters – natural and other disasters, Earthquakes, floods, draught, cyclones, fire and other environmental disasters.

Unit-2: Behavior of structures in disaster prone areas, Disaster zoning, Hazard assessment, Environmental Impact Assessment

Unit-3: Methods of mitigating damage during disasters, disaster preparedness.

Unit-4: Management systems during disasters, Construction Technology for mitigation of damage of structures.

Unit-5: Short-term and long-term relief measures.

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)

Reference Books:
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: **VI**
Subject: Ecology and Sustainable Development   Code: **C000605(094)**
Total Theory Periods: **40**   Total Tutorial : **Ten(Minimum)**
Class Tests: **Two(Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:**100**   Minimum Marks:**35**

Course Objectives:
   1. To learn about the nature of ecology and sustainable development and various
      obstacles in sustainable development.
   2. To understand and analyze the sustainable development.

UNIT I:	Nature of ecology and sustainable development Definition, scope of ecology and sustainable development, geomorphology, oceanography, climatology and biogeography.
UNIT II	Energy and environment Introduction of energy environment, use of solar cells for heating and operated drills, methane gas digesters, environmentally friendly method of energy conservation, difference between conventional and non-conventional energy sources, future trends of energy systems.
UNIT III	Theory of isostasy Concept of isostasy for sustainable development, discovery of the concept, concept of Hayford and Bowie, Joly, and Holmes, Global isostatic adjustment.
UNIT IV	Physical geography and man human impact on the natural environment Modification of land forms, direct alternation of land forms, wind deflation, coastal erosion and deposition, modification of the atmosphere, ultration process in eco and energy systems.
UNIT V	Obstacles in sustainable development Pollution growth, species extinction, restriction of bat lands, desertification, soil erosion, soil pollution, characterization of contaminated soil, global warming and ozone depletion etc.

Text Books:
   1. Energy and environment – Fowler (McGraw Hill, New Delhi)
   2. Restoration Ecology and sustainable development – Krystyna M. Urbanska et.al.
      (Cambridge University Press, U.K.)

Reference Books:
   1. Reuniting Economy and Ecology in Sustainable Development – Russ Beaton et.al.
   2. Theory and implementation of economic models for sustainable development –
      Jeroen C.J.M. Van Den Bergh
   3. Economy and Ecology: Towards sustainable development – F. Archibugi et.al.
   4. Evaluating Sustainable Development: Giving People a voice in their destiny –
      Okechukwu Ukaga et.al.

Course Outcomes:
   1. To be able to plan and handle issues related to sustainable development.
   2. To be able to understand ecology and ecological balance.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject: Non Conventional Energy Sources   Code: **C000606(094)**
Total Theory Periods: **40**   Total Tutorial : **Ten(Minimum)**
Class Tests: **Two(Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

Course Objectives:
1. To study the non-conventional energy sources.
2. To analyze the sources of non-conventional energy
3. To use non-conventional energy sources more efficiently.

UNIT I:	Introduction: Various non-conventional energy sources, Need, availability, classification, Relative merits & 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 / Non electrical 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. 2. S.P. Sukhatme – Solar Energy – TMH.

Reference:
1. Bansal, Kleemann & Meliss – Renewable Energy Sources & Conversion Technology – TMH

Course Outcomes:
1. To be able to understand the non-conventional energy sources
2. To be able to use non-conventional energy sources more efficiently.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject: **Safety Engineering**   Code: **C000607(037)**
Total Theory Periods: **40**   Total Tutorial : **Ten(Minimum)**
Class Tests: **Two(Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

Course Objectives:
- To Know safety philosophy and principles of accident prevention
- To know the safety rules, regulations, standards and codes
- To achieve an understanding of principles of safety management.
- To learn about various functions and activities of safety department.
- To study various mechanical machines and their safety importance

UNIT – I Safety philosophy and principles of accident prevention

Introduction, accident, injury, unsafe act, unsafe condition, reportable accidents, need for safety, break down of accidents, hazardous industries. Theories & principle of accidents casualty, cost of accident, computation ofcost, utility of cost data.

Accident reporting & Investigation, Identification of the key facts, corrective actions, classification of facts.Regulation- American (OSHA) and Indian Regulation.

UNIT – II Safety Management

Division of responsibility, location of Safety function, size of safety department, qualification, for safetyspecialist, safety committee – structure and functions.

UNIT – III Safe working condition and their development

Standard Operating Procedure (SOP) for various mechanical equipments, incidental safety devices and methods, statutory of provisions related to safeguarding of Machinery and working condition.

UNIT – IV Safety in Operation and Maintenance

Operational activities and hazards, starting and shut down procedures, safe operation of pumps,compressor, heaters, reactors, work permit system, entry into continued spaces.

UNIT – V Safety in Storage and Emergency Planning

Safety in storage, handling of chemicals and gases, storage layout, ventilation, safety in chemical laboratories, emergency preparedness on site plan, off site plan, toxic hazard control.

TEXT BOOKS
1. Safety Management : Strategy And Practice -   Pybus R - Butterworth Heinmann, Oxford
2. Safety and Accident Prevention in Chemical Operation – H.H. Faweett and Wood

REFERENCE BOOKS
1.   Industrial Safety Management- Trafdar N K, Tarafdar K J – Dhapat Rai, New Delhi
2.   Safety Management In Industry- Krishna, N V- Jaico Publication House; New Delhi
3.   Industrial Safety And Pollution Control Hand Book - Nagraj, J N &
     Rameshchandar, R V - Associate Publisher, Securndabad
4.   Fire and Safety Manual Refineries and Petrochemical Panel - National Safety Counsil, Bombay
5. Safety in Use of Compressed Gas Cylinders - National Safety Counsil, Bombay

6. Encyclopaedia of Occupational Health and Safety -Stallman I M, Mccann M, Warshaw L, Brabant C -International Labour Office,Geneva

7. Industrial Safety Environmental Pollution Health Hazard And Nuclear Accidents - A Chand - MittalPublication, New Delhi

8. Personal Protective Equipment – National Safety Counsil, Bombay

9. Accident Prevention Manual for Business and Industrial Administration and Programs - Krieger, G RMontgomerji - National Safety Council, Ittenois.

10. Major Hazard Control A Practical Manual – ILO - National Safety Counsil, Bombay.

Course Outcomes:
- Ability to understand the functions and activities of safety engineering department.
- Apply knowledge of safety engineering specialization for hazard identification, risk assessment and controlof occupational hazards.
- Communicate effectively on health and safety matters among the employees and with society at large.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject: Value Engineering   Code: **C000608(037)**
Total Theory Periods: **40**   Total Tutorial : **Ten(Minimum)**
Class Tests: **Two(Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:**100**   Minimum Marks:**35**

Course Objectives:
- The objective of this course is to introduce students with the methodology of Value Engineering and its   decision-making process.
- To familiarize students with procedures that provides standards for Value Engineering applications.
- To teach value engineering in a practical, project-based manner.
- During the course student will be engaged in decision-making using Value Engineering tools to ensure quality and value while reducing the cost of projects.
- Student will know about a number of case study applications of the Value Engineering to gain practical   experience.

UNIT – I : Basic Concepts
Meaning of the term value, basic kind, and reasons for poor value, value addition, origin and history.
Benefits, relevance in Indian scenario.

UNIT – II : Techniques
Different techniques, organizing value engineering study, value engineering and quality.

UNIT – III : Job Plan
Different phases, General phase, Information phase, Functional Phase, Creation Phase, Evaluation Phase,
Investigation Phase, Implementation Phase, Audit.

UNIT – IV : Selection of evaluation of VE Projects
Project selection, method selection, value standard, application of methodology.

UNIT – V : Value Engineering Program
VE operations in maintenance and repair activities, VE Cost, life cycle, cost model, training for VE,
general value engineering, case studies.

Course Outcomes:
- Understand the basics of Value Engineering (VE) to ensure that a standardized method is used for VE applications to projects
- Learn to perform function analysis for projects
- Understand the appropriate time to apply VE for projects

TEXT BOOKS
1. Value Engineering a How to Manul– S.S. Iyer – New Age International Publishers, New Delhi
2. Industrial Engineering & Management – O.P. Khanna – DhanpatRai& Sons

REFERENCES

1. Techniques of Value Analysis and Engineering – L.D. Miles – McGraw Hill, New York
2. Value Engineering: A Systematic Approach – A.E. Mudge – McGraw Hill, New York
3. Getting More at Less Cost: The Value Engineering Way - Jagannathan G - TMH,New Delhi
4. Value Engineering a Practical Approach for Owners Designers & Constructions – Zimmerman LW &
Gilen HD – CBS, New Delhi.
5. Compendium on Value Engineering – H.G. Tufty – Indo-American Society.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject: : **Managing Innovation & Entrepreneurship**   Code: **C000609(037)**
Total Theory Periods: **40**   Total Tutorial : **Ten(Minimum)**
Class Tests: **Two(Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

Course Objective

1. The course will provide a thorough coverage of conceptual framework on Entrepreneurship development.

2. Enhances student's innovation skill.

3. Helps to provide a quick understanding of essential concepts and issues.

4. Enhance the students to have an understanding about international entrepreneurship.

5. Understand the problems and prospects related to setting up of any type of business.

UNIT – I

Introduction to Entrepreneurship

Evolution of entrepreneurship from economic theory Managerial and entrepreneurial growth and development.

UNIT – II

Creativity and Innovation

Creativity and Innovation: Concepts shifting composition of the Economy purposeful innovation and the seven Sources of innovative opportunity the innovation process. Innovative strategies: Strategies that aim at introducing an innovation. Innovation and entrepreneurship: Can they together? Planning – innovation and entrepreneurship.

UNIT – III

Entrepreneurial Motivation

Need for continuous learning & relearning Acquiring technological Innovation Entrepreneurial motivation (nAch story) Achievement Motivation in Real life.Case Study.

UNIT – IV

International Entrepreneurship

Concepts and nature of international entrepreneurship. The changing international environment. Ethics and international entrepreneurship. Strategic issues in international entrepreneurship.

UNIT – V

Problem identification and problem solving

Problem identification. Problem solving. Innovation and diversification.

TEXT BOOK

1. Managing innovation and entrepreneurship in technology based firm-Martin M J-John Willey

2. Managing technology innovation- Ettlite I E - John Willey & Sons.

REFERENCE BOOKS

1. discipline of innovation - Drucker P F -The Harvard business school press , May-June1985.

2. The innovator's solution: Creating and sustaining successful growth - Christensen, C. M. and Raynor, M.E. (2003) - Boston, M. A.: Harvard Business School Press.

3. Innovation(Collection of articles) - Drucker, P. F. (1985) - Harvard Business School Press(2001).

4. Harvard Business Review on entrepreneurship(Collection of articles) - Harvard Business School Press

5) Diffusion of innovations, 5th edition - Rogers, E. M. (2003) - New York: Simon and Schuster.

Course Outcomes

Work effectively with engineering and science teams.

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CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**　　　　　　　　Semester: **VI**
Subject: : **Environmental Pollution & Control**　　Code: **C000610(037)**
Total Theory Periods: **40**　　　　　　　　　　　　Total Tutorial : **Ten(Minimum)**
Class Tests: **Two(Minimum)**　　　　　　　　　　Assignments: **2(Minimum)**
ESE Duration: **Three Hours**　　　Maximum Marks:100　Minimum Marks:35

Course Objectives:
• To provide an introduction to Environmental Pollution.
• To develop an understanding of the causes, chemistry and effects of pollution.
• To build awareness of the strategies used to control and manage pollution.
• To make aware of Environmental Laws & Acts

UNIT-I Environmental Pollution – Introduction & Classification
Sources and classification of air pollutants, aerosols, primary and secondary air pollutants, effect of air pollution on human health, effect of SO_2, CO_2, NO_2 H_2S and lead, economic effect of air pollution, mechanism of deterioration in polluted atmosphere. Factors influencing atmospheric deterioration,

UNIT – II Environmental Pollution - Sources
Air pollution due to automobiles, exhaust, Crankcase and evaporative emissions and their control, effect of various parameters of I.C. engines on air pollution, photochemical air pollution, air pollution from ferrous metallurgical operations and thermal power plants.

UNIT – III Chemistry of Pollution
Definition of pollutant concentrations, mass concentration, volume concentration, mass-volume concentration and relationship between these concentrations, smoke and its control.Ningalmam smoke chart, smoke prevention and control of air pollution by process change, elementary ideas of control of gaseous contaminants for combustion and absorption.

UNIT – IV Pollution Control
Control of air pollution by equipment, objectives of using control equipment, settling chambers, inertial separators, cyclones, principle of electroscopic precipitators, descriptive study of the above equipment only, merits and demerits of the equipment, choice of equipment.

UNIT – V Environmental Laws & Acts
Air pollution indices, definition of air pollution index, type and use of air pollution indices, criteria for a standardized index, acid rain, causes of acid rain and its remedy, green house and its effect, air pollution legislation and regulations, constitution of the Board, functions of the central board and state boards, classification of pollution sources under Air Act 1981 and 1986.

TEXT BOOKS
1. Environmental Chemistry and Pollution Control - S SDara – S Chand , New Delhi
2. Air Pollution - M.N. Rao and H.V.N. Rao – TMH, New Delhi.

REFERENCE BOOKS
1. Air Pollution Control Theory - Martin Crawford.- TMH, New Delhi
2. Encyclopaedia of Environment Control Technology & Air Pollution Control – Cheremisinott
P N – Gulf Publication,
London

3. Pollution Control Hand Book - Utility Publication,Securndarabad

4. Environmental Pollution Conservation And Planning - Pashupatinath&SiddhNath - Chugh Publications, Allahabad

5. Environmental Air Pollution and Its Control - Chhatwal, Mehra&Katyal - Anmol Publications, New Delhi

6. Environmental Pollution Control Engineering – Rao C S –Wiley, New Delhi

7. Environmental Pollution Analysis – Khopkar S M- Wiley, New Delhi

8. Air Pollution Control Technology - R.W. Bethewaven - Van Nostrans.

9. Air Pollution & Control – KVSG Murali Krishnan – Kaushal& Company

10. Air Pollution & Control Technologies – Y. Anjaneyulu – Allied Publishers

11. Water & Air Pollution & Environmental Protection Laws, Vol. - II – M C Mehta – Delhi Law House

Course Outcomes
• Understand contemporary pollution issues.
• Have insight into specific examples of environmental pollution.
• Understand the causes and effects of key types of environmental pollution.
• Appreciate different pollution control strategies.
• Awareness of Environmental Laws & Acts

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject: : **Enterprise Resource Planning**(Except
CSE & IT Branch)   Code: **C000611(076)**
Total Theory Periods: **40**   Total Tutorial : **Ten(Minimum)**
Class Tests: **Two(Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

Course Objectives:

1. Identify the important business functions provided by typical business software such as enterprise resource planning and customer relationship management.
2. Describe basic concepts of erp systems for manufacturing or service companies.
3. Analyze the technical aspect of telecommunication systems, internet and their roles in business environment.
4. Develop skills necessary for building and managing relationships with customers, and stakeholders.

UNIT-I

A Foundation for Understanding Enterprise Resource Planning systems – Reengineering and Enterprise Resource Planning Systems – Planning ,Design ,and Implementation of Enterprise Resource Planning Systems – ERP Systems: Sales and Marketing – ERP Systems: Accounting and finance ERP Systems Production and Materials Management ERP Systems: Human Resources

UNIT-II

Managing an ERP Project – Supply chain Management and the marketplace – Rules of the game – Winning as a team. ERP Implementation Lifecycle, Implementation Methodology, Hidden Costs, Organizing the Implementation, Vendors, Consultants and Users, Contracts with Vendors, Consultants and Employees, Project Management and Monitoring

UNIT-III

Planning Evaluation and selection of ERP systems ERP Implementation life cycle Pre-evaluation Screening Package Evaluation Project Planning Phase ERP Implementation , Team Training Testing.
 Call Centers Mean Customer Interaction The functionality, Technological implementation, what is ACD (automatic call distribution), IVR (interactive voice response), CTI (computer telephony integration), Web enabling the call center, Automated intelligent call routing, Logging & Monitoring

UNIT-IV

Planning – Forecasting Demand – Scheduling Supply – Improving performance – Mastering Demand – Designing the Chain – Maximizing Performance Introduction to CRM & Automation Definition of CRM technology, CRM technology components, Customer life style, customer interaction, Introduction to eCRM: difference between CRM & eCRM, features of eCRM.

UNIT-V

THE BUSINESS MODULES : Business modeling for ERP Overview, Concept, Significance and principles of business engineering, BRP, ERP and IT business engineering with IT, ERP and management concerns, Building an MIS, Business as a system, Core process in a manufacturing company, Entities for data model in a manufacturing company, Extended ERP.
Business modules in an ERP Package, Finance, Manufacturing, Human Resources, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution

Text Books:
1. ERP concept and Practice- V.K Garg and N.K Venkatkrishnan.PHI
2. MIS – S. Sadagopan,PHI.

Reference Books:
1. Analysis and Design of Information Systems – V. Rajaraman.PHI
2. Information System, Analysis, Design and Implementaion- K.M. Hussain and D. Hussain, TMH
3. Concepts of ERP-Monak and Brady, Vikas Pub.
4. Managing with Information – Thomas J Kanter,PHI

Course Outcomes:

- To know the basics of ERP
- To understand the key implementation issues of ERP
- To know the business modules of ERP
- To be aware of some popular products in the area of ERP
- To appreciate the current and future trends in ERP

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject: : **Artificial Intelligence**   Code: **C000612(022)**
Total Theory Periods: **40**   Total Tutorial : **Ten(Minimum)**
Class Tests: **Two(Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

Course Objective(s):
- This course will allow gaining expertise in one of the most fascinating and fastest-growing areas of Computer Science.
- To learn about human intelligence and its applications in industry, defense, healthcare, agriculture, and many other areas.
- This course will give arigorous, advanced and professional graduate-level foundation in Artificial Intelligence.
- To learn optimization and inference algorithms for model learning.
- The industrial revolution, the computer age, and the smart phone revolution.

UNIT-I Introduction
- Concept of AI, history, current status, scope, agents, environments, Problem Formulations.
- Review of tree and graph structures, State space representation, Search graph and Search tree.

UNIT-II Search Algorithms
- Random search, Search with closed and open list, Depth and Breadth first search.
- Heuristic search, Best first search, A* algorithm, Game Search.

UNIT-III Probabilistic Reasoning
- Probability, conditional probability, Bayes Rule, Bayesian Networks- representation.
- Construction and inference, temporal model, hidden Markov model.

UNIT-IV Markov Decision process
- MDP formulation, utility theory, utility functions, value iteration.
- Policy iteration and partially observable MDPs.

UNIT-V Reinforcement Learning
- Passive reinforcement learning, direct utility estimation, adaptive dynamic programming.
- Temporal difference learning, active reinforcement learning- Q learning.

Text Books:
1. Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", 3rd Edition, Prentice Hall.
2. Elaine Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw Hill.

Reference Books:
1. Trivedi, M.C., "A Classical Approach to Artificial Intelligence", Khanna Publishing House, Delhi.
2. SarojKaushik, "Artificial Intelligence", Cengage Learning India, 2011

Course Outcome:
After completion of course, student should be able to
- Build intelligent agents for search and games.
- Solve AI problems through programming with Python

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject: : **Quantum Computing**   Code: **C000613(022)**
Total Theory Periods: **40**   Total Tutorial : **Ten(Minimum)**
Class Tests: **Two(Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

Course Objective(s):
- An introduction to quantum computation.
- To impart the necessary knowledge to develop and implement algorithms and write programs using these algorithms.
- Develop quantum algorithm.
- Program quantum algorithm on major toolkits.
- The algebra of complex vector spaces and quantum mechanics is covered within the course

UNIT-I 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-II 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, Eigenvalues andEigenvectors.

UNIT-III Elements of IoT
- Building 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 perspective e.g. Bell State
- Operation on qubits: Measuring and transforming using gates.
- Quantum Logic gates and Circuit: Pauli, Hadamard, phase shift, controlledgates, Ising, Deutsch, swap etc.

UNIT-IV Programming Model
- Programming model for a Quantum Computing Program
- Steps performed on classical computer
- Steps performed on Quantum Computer
- Moving data between bits and qubits.
- Basic techniques exploited by quantum algorithms.
- Amplitude amplification
- Quantum Fourier Transform
- Phase Kick-back
- Quantum Phase estimation
- Quantum Walks

UNIT-V Quantum Algorithms
- 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)

Text Books:
1. Michael A. Nielsen, "Quantum Computation and Quantum Information", Cambridge University Press.
2. David McMahon, "Quantum Computing Explained", Wiley.

Reference Books:
1. IBM Experience: https://quantumexperience,ng,bluemix.net

2. Microsoft Quantum Development Kit https://www.microsoft.com/enus/quantum/development-kit.

. **Course Outcome:**

After completion of course, student should be able to
- Explain the working of a Quantum Computing program, its architecture and program model.
- Develop quantum logic gate circuits.

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CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject: : **Cyber Security**   Code: **C000614(022)**
Total Theory Periods: **40**   Total Tutorial : **Ten(Minimum)**
Class Tests: **Two(Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

Course Objective(s):

- An extensive overview of cyber security issues, tools, and techniques that are critical in solving problems in cyber security domains.
- Providing students with concepts of computer security, cryptography, digital money, secure protocols, detection, and other security techniques.
- To understand essential techniques in protecting Information Systems, IT infrastructure, analyzing and monitoring potential threats and attacks, devising security architecture and implementing security solutions.
- A wider perspective on information security from a national security perspective from both technology and legal perspective.
- Demonstrate the use of standards and cyber laws to enhance information security in the development process and infrastructure protection.

UNIT-I Cyber Security Concepts

- Essential Terminologies: CIA, Risks, Breaches, Threats, Attacks, Exploits.
- Information Gathering (Social Engineering, Foot Printing & Scanning).
- Open Source/ Free/ Trial Tools: nmap, zenmap, Port Scanners, Network scanners.

UNIT-II Cryptography and Cryptanalysis

- Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography.
- Overview of Firewalls- Types of Firewalls, User Management, VPN Security.
- Security Protocols: - security at the Application Layer- PGP and S/MIME, Security at the Transport Layer- SSL and TLS, Security at the Network Layer-IPSec.
- Open Source/ Free/ Trial Tools: Implementation of Cryptographic techniques, Open SSL, Hash Values Calculations MD5, SHA1, SHA256, SHA 512, Steganography (Stools).

UNIT-III Infrastructure and Network Security

- Introduction to System Security, Server Security, OS Security, Physical Security, Introduction to Networks, Network packet Sniffing, Network Design Simulation.
- DOS/DDOS attacks. Asset Management and Audits, Vulnerabilities and Attacks. Intrusion detection and Prevention Techniques.
- Host based Intrusion Prevention Systems, Security Information Management, Network Session Analysis, System Integrity Validation.
- Open Source/ Free/ Trial Tools: DOS Attacks, DDOS attacks, Wireshark, Cain &abel ,iptables/ Windows Firewall, snort, suricata, fail2ban.

UNIT-IV Cyber Security Vulnerabilities & Safe Guards

- Internet Security, Cloud Computing & Security, Social Network sites security, Cyber Security Vulnerabilities-Overview, vulnerabilities in software.
- System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Authorization, Unprotected Broadband communications, Poor Cyber Security Awareness.
- Cyber Security Safeguards- Overview, Access control, IT Audit, Authentication.

- Open Web Application Security Project (OWASP), Web Site Audit and Vulnerabilities assessment.
- Open Source/ Free/ Trial Tools: Win Audit, Zap proxy (OWASP), burp suite, DVWA kit.

UNIT-V Malware
- Explanation of Malware, Types of Malware: Virus, Worms, Trojans, Root kits, Robots, Adware's, Spywares, Ransom wares, Zombies etc.
- OS Hardening (Process Management, Memory Management, Task Management, Windows Registry/ services another configuration), Malware Analysis.
- Open Source/ Free/ Trial Tools: Antivirus Protection, Anti Spywares, System tuning tools, Anti Phishing.

Text Books:
1. William Stallings, "Cryptography and Network Security", Pearson Education/PHI, 2006.
2. V.K. Jain, "Cryptography and Network Security", Khanna Publishing House.

Reference Books:
1. Gupta Sarika, "Information and Cyber Security", Khanna Publishing House, Delhi.
2. AtulKahate, "Cryptography and Network Security", McGraw Hill.

Course Outcome:
After completion of course, student should be able to
- Understand, appreciate, employ, design and implement appropriate securitytechnologies and policies to protect computers and digital information.
- Identify & Evaluate Information Security threats and vulnerabilities in Information Systems and apply security measures to real time scenarios.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject: : **Construction engineering and management**   Code: **C000615(020)**
Total Theory Periods: **40**   Total Tutorial : **Ten(Minimum)**
Class Tests: **Two(Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

UNIT 1 :Basics of Construction: Unique features of construction, construction projects- types and features, phases of a project, agencies involved and their methods of execution;

Planning and organizing construction site and resources- Site: site layout including enabling structures, developing site organization, Documentation at site; Manpower: planning, organizing, staffing, motivation; Materials: concepts of planning, procurement and inventory control; Equipment: basic concepts of planning and organizing; Funds: cash flow, sources of funds; Histograms and S-Curves. Earned Value; Resource Scheduling- Bar chart, line of balance technique, resource constraints and conflicts; resource aggregation, allocation, smoothening and leveling.

UNIT 2 :Construction project planning : Stages of project planning: pre-tender planning, preconstruction planning, detailed construction planning, role of client and contractor, Process of development of plans and schedules, work break-down structure, activity lists, assessment of work content, concept of productivities, estimating durations, sequence of activities, activity utility data; Techniques of planning- Bar charts, Gantt Charts. Networks: basic terminology, types of precedence relationships, preparation of CPM networks: activity on link and activity on node representation, computation of float values, critical and semi critical paths. PERT- Assumptions underlying PERT analysis, determining three time estimates, analysis, slack computations, calculation of probability of completion.

UNIT 3 :Construction Methods basics : Types of foundations and construction methods; Basics of Formwork and Staging; Common building construction methods (conventional walls and slabs; conventional framed structure with block work walls; Modular construction methods for repetitive works; Precast concrete construction methods; Basics of Slip forming for tall structures; Basic construction methods for steel structures; Basics of construction methods for Bridges. Construction Equipment basics: Conventional construction methods Vs Mechanized methods, Equipment for Earthmoving, Dewatering; Concrete mixing, transporting & placing; Cranes, Hoists and other equipment for lifting; Equipment for transportation of materials, Equipment Productivities.

UNIT 4 :Project Monitoring & Control : Supervision, record keeping, periodic progress reports, periodical progress meetings. Updating of plans: purpose, frequency and methods of updating. Common causes of time and cost overruns and corrective measures. Basics of Modern Project management systems such as Lean Construction; Use of Building Information Modelling (BIM) in project management; Quality control: concept of quality, quality of constructed structure, use of manuals and checklists for quality control, role of inspection, basics of statistical quality control. Safety, Health and Environment on project sites: accidents; their causes, effects and preventive measures, costs of accidents, occupational health problems in construction, organizing for safety and health.

UNIT 5 :Contracts Management basics: Importance of contracts; Types of Contracts, parties to a contract; Common contract clauses (Notice to proceed, rights and duties of various parties, notices to be given, Contract Duration and Price. Performance parameters; Delays, penalties and liquidated damages; Force Majeure, Suspension and Termination. Changes & variations, Dispute Resolution methods. Construction Costs: Make-up of construction costs; Classification of costs, time-cost trade-off in construction projects, compression and decompression.

Text/Reference Books :

1. Varghese, P.C., "Building Construction", Prentice Hall India, 2007

2. Peurifoy, R.L. Construction Planning, Methods and Equipment, McGraw Hill, 2011

3. Construction ,Engineering and Management, Dr. S .Seetharaman

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject: : **Metro system and engineering**   Code: **C000616(020)**
Total Theory Periods: **40**   Total Tutorial : **Ten(Minimum)**
Class Tests: **Two(Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

Unit 1

GENERAL: Overview of Metro Systems; Need for Metros; Routing studies; Basic Planning and Financials

Unit 2

CIVIL ENGINEERING-Overview and construction methods for: Elevated and underground Stations; Viaduct spans and bridges; Underground tunnels; Depots; Commercial and Service buildings. Initial Surveys & Investigations; Basics of Construction Planning & Management, Construction Quality & Safety Systems. Traffic integration, multimodal transfers and pedestrian facilities; Environmental and social safeguards; Track systems-permanent way. Facilities Management

Unit 3

ELECTRONICS AND COMMUNICATION ENGINEERING- Signaling systems; Automatic fare collection; Operation Control Centre (OCC and BCC); SCADA and other control systems; Platform Screen Doors.

Unit 4

MECHANICAL & TV + AC: Rolling stock, vehicle dynamics and structure; Tunnel Ventilation systems; Air conditioning for stations and buildings; Fire control systems; Lifts and Escalators

Unit 5

ELECTRICAL: OHE, Traction Power; Substations- TSS and ASS; Power SCADA; Standby and Back-up systems; Green buildings, Carbon credits and clear air mechanics.

Text Books:

World Metro Systems Paperback – Import, 1 April 1997 – Paul E. Garbutt

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject: : **Infrastructure Planning and Management**   Code: **C000617(020)**
Total Theory Periods: **40**   Total Tutorial : **Ten(Minimum)**
Class Tests: **Two(Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

Outcomes of the Subject:

After the completion of this course the learner would be able to:

1. Leaner is able to understand the basic terms and concepts used across the various stages of Infrastructure projects
2. Learner is able to analyze the strategies for Infrastructure Planning.
3. Learner is able to develop problem solving skills by identify the various challenges in Infrastructure Planning and Implementation.
4. Learner is able to understand the various aspects of Infrastructure Management
   and apply them in case studies.
   Learner is able to appraise any infrastructure project.

UNIT I Introduction to Infrastructure:

Types of infrastructure, measurement of infrastructure capacity, Role of infrastructure in economic development, Indian scenario in respect of adequacy and quality in Transportation (Road, Rail, Air and Port) Power and Telecom sectors.

An overview of the Rural and Urban Infrastructure Sectors, Organizations and Players in the field of Infrastructure, Project Lifecycle - Stages of an Infrastructure, Infrastructure Project Finance. Infrastructure Modeling.

UNIT 2 Infrastructure Planning: Typical infrastructure planning steps, Goals and objectives of infrastructure planning; Scheduling and management of planning activities, Identification and quantification of the casual factors influencing the demand for infrastructure; infrastructure planning to identify and prioritize preferred areas for development; Integration of strategic planning for infrastructure at urban, regional and national levels.

Case studies in infrastructure planning: The Case study for Political Risks, Socio-Environmental Risks, Cultural Risks in International Infrastructure Projects, Legal and Contractual Issues in Infrastructure.

UNIT 3 Challenges to Successful Infrastructure Planning and Implementation:

Mapping and Facing the Landscape of Risks in Infrastructure Projects, Economic and Demand Risks. Review and application of techniques to estimate supply and demand for infrastructure; use of econometric, social and land use indicators and models to forecast the demand and level of service of infrastructure and its impact on land use; critical review of the relevant forecasting techniques; Challenges in Construction and Maintenance of Infrastructure.

UNIT 4 Infrastructure Management: Concepts, Common aspects of urban and rural infrastructure management systems; pavement and bridge management systems, Integrated infrastructure management,: Socio-Economic Analysis and Good Governance for Infrastructure, Capacity Building and Improving the Governments Role in Infrastructure Implementation Stakeholder Management, Design Thinking and Negotiations, An Integrated Framework for Successful Infrastructure Planning and Management - Infrastructure Management Systems and Future Directions. Case studies.

UNIT 5 Emerging trends in infrastructure: Overview of Public-Private Sector Participation in infrastructure projects, Understanding stakeholders' concerns, regulatory framework, risk management in infrastructure projects, public policy for infrastructure Sector, Introduction to Special Economic Zones, Appraisal of major infrastructure projects

Overview: Highways, railways, waterways, airports, urban and rural infrastructure: roads, housing, water supply,

sanitation – case study examples.

Texts:

1. A. S. Goodman and M. Hastak, Infrastructure planning handbook: Planning, engineering, and economics, McGraw-Hill, New York, 2006.
2. J. Parkin and D. Sharma, Infrastructure planning, Thomas Telford, London, 1999.

References:

1. P. Chandra, Projects: Planning, analysis, selection, financing, implementation, and review, Tata McGraw-Hill, New Delhi, 2009.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: **Parallel Processing & Computing**   Code: **C000618(022)**
Total Theory Periods: **40**   Total Tutorial : **Ten(Minimum)**
Class Tests: **Two(Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:**100**   **Minimum Marks:35**

UNIT-I: Introduction & Technique of Parallelism: Trends towards parallel computing, parallelism in Uni processor systems, Architectural classification schemes, Amdahl's law, Moore's law, Principles of Scalable Performance, Parallel Processing in Memory, Parallel Algorithms, Parallel Algorithm Complexity, Models of Parallel Processing, Cache coherence, Cache coherence Protocols.

UNIT-II: Pipeline & Vector Processing: Conditions of Parallelism: Data & Resource dependencies, Program flow mechanisms: Control-flow .vs. Data flow computers Principle of pipelining and vector processing: principles of linear pipelining, classification of pipeline processors. General pipelines and reservation tables. Instruction and arithmetic pipelines, vector processing, architecture of Cray –1, Pipeline hazards, VLIW computers, Array Processing.

UNIT-III: Parallel Models and Mesh-based Architectures: Data Broadcasting, Parallel Prefix Computation, Shared Memory Algorithms, Sorting and Selection Networks, sorting on a 2D Mesh or Torus, Types of Data Routing, Meshes of Trees, Hypercube and their Algorithms, Cube Connected cycles network , Shuffle and Shuffle-Exchange Networks , Star and Pancake Networks , Ring based networks.

UNIT-IV: Multiprocessor architecture and Programming: Emulation and Scheduling, Emulations among Architectures, Distributed Shared Memory, Data Storage, Input, and Output, Multithreading and Latency Hiding, Parallel I/O Technology, Defect-Level Methods, Fault-Level Methods, Error-Level Methods, Parallel Programming Parallel Operating Systems, Parallel File Systems.

UNIT-V: Parallel System Implementations: Shared-Memory MIMD Machines, Variations in Shared Memory, MIN-Based BBN Butterfly, Vector-Parallel Cray Y-MP, CC-NUMA Stanford DASH, Message-Passing MIMD Machines, Data-Parallel SIMD Machines, Processor and Memory Technologies

Text Books:
1. Computer Architecture & Parallel processing - Kai Hwang 7 Briggs.(MGH).
2. Parallel Computers: Arch.& Prog., Rajaraman & Siva Ram Murthy, PHI.

Reference Books :
1. Parallel Computer 2 –Arch..& Algo., Adam Hilger, R.W. Hockney, C.R. Jesshope,.
2. Advanced Computer Architecture with Parallel Programming", K. Hwang, MGH.
3. Parallel computing- Theory and practice - Michael J Quinn- Mc Graw Hill.

Course Outcomes [After undergoing the course, students will be able to:**]**
1. Develop structural intuition of how the hardware and the software work, starting from simple systems to complex shared resource architectures.
2. Get a broad understanding of parallel computer architecture and different models for parallel computing.
3. Understand concepts related to memory consistency models, cache coherence, interconnection networks and latency tolerating techniques.
4. To know about current practical implementations of parallel architectures.
5. To learn how to design parallel programs and how to evaluate their execution.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: **Cryptography & Network Security**   Code: **C000619(022)**
Total Theory Periods: **40**   Total Tutorial : **Ten(Minimum)**
Class Tests: **Two(Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:**100**   Minimum Marks:**35**

UNIT I: Overview: Introduction to security attacks, services and mechanism, introduction to cryptography. A Model for Network Security. Symmetric (Private Key) Ciphers: Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Steganography. Block Ciphers and the Data Encryption Standard: Block Cipher Principles, The Data Encryption Standard (DES), The Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles.

UNIT II: Symmetric Ciphers: Basic Concepts in Number Theory and Finite Fields: Groups, Rings, and Fields, Modular Arithmetic, the Euclidian algorithm, Finite Fields of the Form GF(p), Polynomial Arithmetic, Finite Fields of the Form GF(2n). Advanced Encryption Standard: The Origins AES, Evaluation criteria for AES, the AES Cipher. Stream cipher: Stream ciphers and RC4. Confidentiality using symmetric encryption: Placement of encryption function, traffic confidentiality, key distribution.

UNIT III: Asymmetric (Public Key) Ciphers: Introduction to Number Theory: Prime Numbers, Fermat's and Euler's Theorems, Testing for Primality, The Chinese Remainder Theorem, Discrete Logarithms. Public-Key Cryptography and RSA: Principles of Public-Key Cryptosystems. Key Management-Other Public-Key Cryptosystems: Key management, Diffie-Hellman Key Exchange, Elliptic Curve Arithmetic, Elliptic Curve Cryptography.

UNIT IV: Message Authentication and Hash functions: Message authentication requirements, authentication functions, Message authentication codes, Hash functions, Security of Hash functions and MAC, SHA, HMAC, CMAC. Digital Signatures and Authentication protocols: Digital signature, Authentication protocols, Digital signature standards,

UNIT V: Network Security applications: Authentication applications: Kerberos, X.509 Authentication services, public key infrastructure. Electronic mail security: PGP, S/MIME. Overview of IP Security. Web Security: Web security considerations, SSL and TLS, Secure electronic transaction. System Security: Intruders, Intrusion detection, password management, viruses and related threats, virus counter measures, Firewall design principles, and trusted systems.

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

Reference Books:
1. Applied Cryptography: Protocols & Algorithms, Schneier & Bruce, MGH International.
2. Cryptography and Security – by Dr T R Padmanabhan N Harini, Wiley India Pvt Ltd, 2011.

Course Outcomes [After undergoing the course, students will be able to:]
1. Understand Conventional encryption algorithms for confidentiality and their design principles.
2. Understand Public key encryption algorithms and their design principles.
3. Apply message authentication codes, hash functions, digital signature and public key certificates to provide security in the network.
4. Apply Network Security Tools and applications for designing and its development.
5. Understand System-level security issues like threat of and countermeasures for intruders and viruses, and the use of firewalls and trusted systems.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: Cloud Computing   Code: **C000620(022)**
Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**
Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

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 (I Phone, Windows Mobile), Google(Android) Blackberry, Ubuntu Mobile Internet.

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

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

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

Subject:: **Computer Networks**   Code: **C000621(022)**

Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**

Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**

ESE Duration: **Three Hours**   Maximum Marks:**100**   Minimum Marks:**35**

COURSE OUTCOMES: After successful completion of this course, the student will be able to,

Course Code	CO Statement	Blooms Level
1	Illustrate the protocol layering and physical level communication.	2
2	Categorize and explain different networks.	4
3	Explain the functions of network layer and routing protocols.	5
4	Classify protocols of the Transport layer.	4
5	Explain various application layer protocols.	5

COURSE DETAILS:

UNIT I: INTRODUCTION AND PHYSICAL LAYER

Networks, OSI Model, TCP/IP Protocol suite, Addressing, Physical Layer: Performance, Transmission Modes, Transmission Media, Multiplexing, Spread Spectrum, Switching, Packet Switching.

UNIT II: DATA LINK LAYER

Error - Detection and Correction, Channels, Point to Point protocol, Data-Link Layer Protocols, Wired LANs: Ethernet, Wireless LANs: IEEE 802.11, Bluetooth, Connecting Devices, Wireless WANs: Cellular Telephone and Satellite Networks

UNIT III: NETWORK LAYER

Internetworks, Packet Switching and Datagram approach, IPv4 Addresses, IPv6 Addresses, Internet Protocol, ICMP, IGMP, Unicast Routing Protocols, Multicast Routing Protocols

UNIT IV: TRANSPORT LAYER

Introduction, Transport Layer Protocols, Services, Multiplexing, Demultiplexing, User Datagram Protocol, Transmission Control Protocol, SCTP.

UNIT V: APPLICATION LAYER

WWW and HTTP, FTP, Email, Telnet, SSH, DNS, SNMP

TEXT BOOKS:
 1. Data Communications and Networking by Behrouz A. Forouzan, Fifth Edition TMH.
 2. Computer Networksby Andrew S. Tanenbaum &David J. Wetherall, Fifth Edition, Pearson Education.

REFERENCE BOOKS:
 1. Computer Networks: A Systems Approach by Larry L. Peterson& Bruce S. Davie, Fifth Edition, Morgan Kaufmann Publishers Inc.
 2. Data and Computer Communications by William Stallings, Tenth Edition, Pearson Education.
 3. Computer and Communication Networks by Nader F. Mir, Second Edition, Prentice Hall.
 4. Computer Networks: An Open Source Approach by Ying-Dar Lin, Ren-Hung Hwang and Fred Baker, McGraw Hill Publisher.
 5. Computer Networking, A Top-Down Approach Featuring the Internet by James F. Kurose & Keith W. Ross, Sixth Edition, Pearson Education.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: **Internet of Things**   Code: **C000622(022)**
Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**
Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:**100**   Minimum Marks:**35**

Course Outcomes: After successful completion of this course, the student will able to:

Course Code	CO Statement	Knowledge Level
1	Explain the architecture and communication technologies of IoT.	2
2	Develop and Execute Big Data in IoT applications.	3
3	Design IoT for Smart Cities.	3
4	Design IoT for Energy Harvesting	3
5	IoT based Electrical Vehicles	2

UNIT-1: Introduction to IoT System: Overview of IoT Application, System Architectures and Design Approaches, IoT standards, Communication Technologies and Protocols for IoT (Non-Cellular, Cellular), Recent Protocols for IoT.   **[6 hours]**

UNIT-2: Big Data in IoT systems: Introduction, Theoretical Approaches to Ubiquitous computing Systems (UCS), Bigdata and its sources, Bigdata in IOT applications, Communication Network (Architecture, Protocols, Wireless Networking).   **[8 hours]**

UNIT-3: IOT for Smart cities: overview and key challenges: Introduction, Characteristics of Smart cities (Economy, People, Governance, Mobility, Environment), IoT based solution for Smart Cities (Grid, Home, Transport and traffic, Healthcare) Challenges (planning, cost and quality, Security and privacy)
                    [8 hours]

UNIT-4: Energy Harvesting and its IOT solutions: Review of Energy harvesting Techniques (Solar, Thermal, Vibration, and RF), Solar Energy (PV Effect, I-V characteristics, MPPT, Power conditioning topologies, Boost convertor with MPPT, Self-starting converter, Sensor Nodes with Solar energy harvesting, Vibration based harvesting, RF energy harvesting.   **[8 hours]**

UNIT-5: Electrical Vehicles in Smart cities: Introduction, EV charge scheduling and charging Techniques, Renewable energy for EV charging, Smart Distribution System.   **[6 hours]**

Text Book:
1.Internet of Things (IoT) Systems and Applications, Jamil Y. Khan, Mehmet R. Yuce, 2019, Jenny Stanford Publishing

2. Internet of Things for Smart Cities Technologies, Big Data and Security, WaleedEjaz, Alagan Anpalagan, 2018, Springer International Publishing.

References Book:

1. Smart Cities of Today and Tomorrow: Better Technology, Infrastructure and Security, Joseph N. Pelton, Indu B. Singh, 1st edition, 2019, Springer International Publishing;Copernicus

2. Intelligent Transport System in Smart Cities: Aspects and Challenges of Vehicular Networks and Cloud, Rodolfo I. Meneguette, Robson E. De Grande, Antonio A. F. Loureiro, 1st ed. 2018, Springer International Publishing

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**

Branch: **Common to all Branches**   Semester: **VI**

Subject:: **Data Structures and Algorithms**   Code: **C000623(022)**

Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**

Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**

ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

Course Outcomes:

Course Code	CO Statement	Knowledge Level
1	Explain the Elementary data organization, arrays, row column.	2
2	Execute stake and Queues operations	3
3	Design and adapt complete binary trees.	6
4	Apply various algorithms on graphs	3
5	Evaluate various searching algorithms and trees.	5

UNIT- I

Introduction: Basic Terminology, Elementary Data Organization, Algorithm, Efficiency of an Algorithm, Time and Space Complexity, Asymptotic notations, Abstract Data Types (ADT) Arrays, Row Major & Column Major Order Representation of Arrays, Linked lists.   [08 hours]

UNIT-II Stacks and Queues: Abstract Data Type ,Primitive Stack operations: Push &Pop,Array and Linked Implementation of Stack,Application of stack: Prefix and Post fix Expressions, Evaluation of post fix expression,Operations on Queue, linked implementation of queues, De-queue and Priority Queue.   [08 hours]

UNIT-III Trees: Basic terminology, Binary Trees, Binary Tree Representation: Array Representation and Dynamic Representation, Complete Binary Tree, Algebraic Expressions, Extended Binary Trees, Array and Linked Representation of Binary trees, Search Trees.

[06 hours]

UNIT-IV Graphs: Terminology, Sequential and linked Representations of Graphs, Graph Traversal: Depth First Search and Breadth First Search, Spanning Trees. Traversal algorithms.

[06 hours]

UNIT-V Searching: Sequential search, Binary Search, Comparison and Analysis Internal Sorting, Tree (BST) Sort; Complexity of Search Algorithm, AVL trees, Introduction to m-way Search Trees, B Trees, B+ Trees, Hashing, Storage Management: Garbage Collection and Compaction.

[06 hours]

Text books:
1. AaronM.Tenenbaum,YedidyahLangsamandMosheJ.Augenstein"DataStructures Using Cand C/C++", PHI
2. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publication.
3. Lipschutz, "Data Structures" Schaum's Outline Series, TMH

References books:
1. Jean Paul Trembley and Paul G. Sorenson, "An Introduction to Data Structures with applications", GrawHill
2. R. Kruse etal, "Data Structures and Program Design in C", PearsonEducation
3. G A V Pai, "Data Structures and Algorithms",TMH

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: **Big Data Analytics**   Code: **C000624(022)**
Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**
Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   **Minimum Marks:35**

COURSE OUTCOMES: After successful completion of this course, the student will able to:

Course Code	CO Statement	Knowledge Level
1	Analyze techniques to work with big data.	IV
2	Analyze data by using clustering.	IV
3	Apply various mining algorithms on large set of data	III
4	Examine analytics on large volume of data.	IV
5	Discover the tools for working with big data	IV

COURSE DETAILS:
UNIT 1: INTRODUCTION TO BIG DATA
Big Data Characteristics, Best Practices for data analytics, Promotion of value of Big Data, Big Data storage, Map Reduce –Algorithms, Extensions and Complexity Theory, Case Study: Matrix Multiplication

UNIT 2: CLUSTERING AND ADVERTISING ON THE WEB
Overview of Clustering, K-means Algorithm, Clustering for Streams and Parallelism. On-Line and Off-Line Algorithm, Issues, Matching Problem, Ad-words Problem and Implementation

UNIT 3: RECOMMENDATION AND ASSOCIATION SYSTEM
Model for Recommendation System, Content-Based Recommendations, Collaborative Filtering, Dimensionality Reduction, The Netflix Challenge.Association Rule- Market Basket Model, Handling larger datasets in Main Memory

UNIT 4: MINING DATA STREAMS
The Stream Data Model, Sampling Data in a Stream, Filtering Streams, Counting Distinct Elements in a Stream, Counting Distinct Elements in a Stream, Estimating Moments Counting Ones in a Window, Decaying Windows

UNIT 5: CASE STUDY
Sensitivity Analysis, Engineering and visualization-Feature, Understanding of business scenarios, Parallel computing with Map-Reduce,

TEXT BOOKS:
1 "Mining of Massive Datasets" by Jure Leskovec, Anand Rajaraman, Jeffrey D. Ullman,Cambridge University Press.
REFERENCE BOOKS:
   1 "Big Data Analytics: A Practice Guide for Managers", by Kim H. Pries and Robert Dunnigan, CRC Press.
   2. "Analytics in a Big Data World: The Essential Guide to Data Science and its Applications" by Bart Baesens, Wiley Publishers.
   3. "Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data" by EMC Education Services, Wiley publishers.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: Electrical Estimation and Costing   Code: **C000625(025)**
Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**
Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

COURSE OBJECTIVES:
- ➢ To give exposure to basic concepts estimating and costing.
- ➢ To impart knowledge about material requirements for various Electrical installations.
- ➢ To provide guidelines for preparation of Electrical drawings for residential and commercial buildings, distribution substation, grid substation, overhead Lines.

COURSE OUTCOMES:
At the end of the course the student should be able to:
- ✓ Explain general principles of estimation & residential building electrification
- ✓ Preparation of detailed estimates and costing of residential and commercial installation.
- ✓ Design and estimate of overhead transmission & distribution lines, Substations

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UNIT I Principles of Estimation and Residential Building Electrification: Introduction to estimation and costing, Electrical Schedule. Determination of cost material and labor Contingencies. Overhead charges. General Rules guidelines for wiring of residential installation and positioning of equipments, Principles of circuit design in lighting and power circuits. Procedures for designing the circuits and deciding the number of circuits, Method of drawing single line diagram. Selection of type of wiring and rating of wires and cables Load calculations and selection of size of conductor, Selection of rating of main switch Distribution board, protective switchgear and wiring accessories, Preparation of detailed estimates and costing of residential installation.   **Total Period 04**.

UNIT II Electrification of Commercial Installation: Design considerations of electrical installation system for commercial building, Load calculation and selection of size of service connection and nature of supply, Deciding the size of the cables, bus bar and bus bar chambers, Mounting arrangements and positioning of switchboards, distribution boards main switch etc, Earthing of the electrical installation, Selection of type wire, wiring system and layout, Preparation of detailed estimate and costing of commercial installation.   **Total Period 05**.

UNIT III Service Connection, Power Circuits, Inspection and Testing of Installation: Concept of service connection, Types of service connection and their features, Method of installation of service connection, Estimates of underground and overhead service connections, Inspection of internal wiring installations, Inspection of new installations, testing of installations, testing of wiring installations, Important considerations regarding motor installation wiring, Determination of rating of cables Determination of rating of fuse, Determination of size of Conduit, distribution Board main switch and starter.   **Total Period 05**

UNIT IV Design of Overhead Transmission and Distribution Lines: Introduction, Typical AC electrical LT system, Main components of overhead lines, Line supports. Factors governing height of pole, Conductor materials, Cross arms, Pole brackets and clamps, Guys and Stays, Conductors configuration spacing and clearances, Conductors configuration spacing and clearances, Span lengths, Overhead line insulators, insulator materials, Types of insulators, Lightning Arrestors, accessories, Erection of supports, setting of stays, Fixing of cross arms, Fixing of insulators, Conductor erection, Repairing and jointing of conductor, Dead end clamps, Positioning of conductors and attachment to insulators Jumpers, Tee-offs, Earthing of transmission lines. Guarding of overhead lines, Clearances of conductor from ground Spacing between conductors.   **Total Period 05**

UNIT V Design and Estimation of Substation: Introduction, Classification of substation, Indoor substations, Outdoor substations, Selection and location of site for substation, Main Electrical Connections, Graphical symbols for various types of apparatus and circuit elements on substation main connection diagram. Key diagram of typical substations. Equipment for substation and switchgear installations,   Substation   auxiliaries   supply,   Substation   Earthing.
Total Period 05
Textbooks:
1. Electrical Installation Estimating & Costing, J.B.Gupta,VIII Edition S.K.Katria & Sons New Delhi
2. Electrical Design Estimating and Costing, K.B.Raina S.K.Bhattacharya, New Age
Reference Books:
1. Electrical Wiring Estimating and Costing, S.L.Uppal, G.C Garg, Khanna Publishers

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: **Energy Auditing and Management**   Code: **C000626(025)**
Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**
Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

COURSE OBJECTIVES:
  ➤ To enable the students to understand the concept of energy management and energy managementopportunities.
  ➤ To understand the different methods used to control peakdemand.
  ➤ To know energy auditingprocedure.
  ➤ To understand the different methods used for the economic analysis of energyprojects.

UNIT I - Energy management and energy planning:

Definition and significance of energy management, objectives and principle of energy management, Two sides of energy management, energy planning flow for supply side, per capita energy consumption, organization for energy management.
                                                                    Total Period 10

UNIT II - Global energy sources:

Overview of India's energy and power sector, world energy consumption, Energy in developing countries, firewood crisis, India's non conventional renewable and alternate energy planning, Economic reforms in energy and power sector, Energy conservation measures, per capita availability of commercial energy resources.
Total Period 10

UNIT III - Energy audit:

Introduction, types of energy audit, Procedure of energy auditing, case study, power factor improvement, Electricity Tariff: Types of tariff.   **Total Period 08**

UNIT IV - Energy conservation:

Introduction, concept and methods of energy conservation, Electrical energyconservation opportunities, ECOs in medium and small industries, ECOs in residential building and shopping complex, Waste management and energy recycling.   **Total Period 12**

UNIT V - Demand side management:

Introduction to DSM, concept of DSM, DSM Technique, Time of day pricing models for planning, load management, load priority technique, Peak clipping, peak shifting, valley filling, energy efficient equipment, strategic conservation, socioeconomic awareness program.   **Total Period 10**

Text Books:

1. Energy Demand: Analysis, Management and Conservatioin, Ashok.V.Desai(ED), Wiley Eastern Ltd., NewDelhi.
2. Energy technology, S. Rao, Parulekar,KhannaPbs.
3. Handbook of Energy Audits, Albert Thumann, William J. Younger,CRC Press,2003
4. Energy management principles,Craig B. Smith,PergamonPress.
5. Energy Management and Conservation Handbook,D. Yogi Goswami, Frank Kreith,CRC Press,2007

Reference Books:

1. Demand Side Management ,Jyothi Prakash, Tata McGraw-HillPublishers.
2. Renewable Energy Sources and Conservation Technology, N.K.Bansal, Kleeman Millin, Tata McGraw-Hill Publishers.
3. Energy management, Paul O'Callaghan, McGraw Hill Book Co.

COURSE OUTCOME:
- ➢ Ability to understand the basics of Energy auditprocess.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: Finance Management   Code: **C000627(076)**
Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**
Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

Course Objectives
1. The objective of this course is to understand various concepts related to financial management.
2. To study in detail various tools and techniques in the area of finance.
3. To develop the analytical skills that would facilitate financial decision making.

Course Outcomes:
➢ Classify funding sources and demonstrate knowledge of value of money overtime.
➢ Understand and analyze complexities associated with financing decision.
➢ Understand the concept of budgeting and evaluate proposals.
➢ Select and apply techniques in management of working capital.
➢ Interpret the profit distribution decisions.

UNIT I Introduction to Financial Management:
Financial Management: Nature and Objectives, Profit maximization v/s Wealth maximization, Finance Function, Time value of money - Discounting and Compounding Techniques, Long term and Short-term sources of Finance, Introduction to Capital Market.   [8 HRS]

UNIT II Financing Decision
Cost of Capital: Weighted Average Cost of Capital, Capital Structure: Factors, Approaches and Theories, Leverage: Operating and Financial, Leverage: Impact, Trading on Equity.   [7 HRS]

UNIT III Investment Decision:
Budget Concept and Types, Budgetary Control, Capital Budgeting, Zero based Budgeting.

[7 HRS]

UNIT IV Working Capital Decision:
Management of Working Capital: Concept, Need, Factors and Estimation of Working Capital, Inventory and Receivables Management, Management of Cash.   [7 HRS]

UNIT V Dividend Decision
Dividend Policy: Types, Factors Influencing Dividend Policy and Dividend Models.

[7 HRS]

Text Book:
1) Financial Management Eugene F Brigham 15th Edition, 2017 Cengage Learning.
2) Financial Management M Y Khan, P K Jain 8 th Edition, 2019 Mc Graw Hill.

Reference Books:
1) Financial Decision Making: Concepts, Problems and Cases John J. Hampton 4 th Edition, 1989 PHI.
2) Financial Management and Policy V. K. Bhalla 2 nd Edition, 1998 Anmol Publications
3) Financial Management Tulsian&Tulsian 5 th Edition 2017 S Chand.
4) Essentials of Financial Management I M Pandey 11th Edition 2018 Vikas Publishing House .
5) Financial Management P. Chandra 9 th Edition, 2015 Mc Graw Hill.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: Safety Engineering   Code: **C000628(037)**
Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**
Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

Course Objectives:
- To Know safety philosophy and principles of accident prevention
- To know the safety rules, regulations, standards and codes
- To achieve an understanding of principles of safety management.
- To learn about various functions and activities of safety department.
- To study various mechanical machines and their safety importance.

UNIT – I Safety philosophy and principles of accident prevention

Introduction, accident, injury, unsafe act, unsafe condition, reportable accidents, need for safety, break down of accidents, hazardous industries. Theories & principle of accidents casualty, cost of accident, computation of cost, utility of cost data. Accident reporting & Investigation, Identification of the key facts, corrective actions, classification of facts. Regulation- American (OSHA) and Indian Regulation.

UNIT – II Safety Management

Division of responsibility, location of Safety function, size of safety department, qualification, for safetyspecialist, safety committee – structure and functions.

UNIT – III Safe working condition and their development

Standard Operating Procedure (SOP) for various mechanical equipments, incidental safety devices and methods, statutory of provisions related to safeguarding of Machinery and working condition.

UNIT – IV Safety in Operation and Maintenance

Operational activities and hazards, starting and shut down procedures, safe operation of   pumps, compressor, heaters, reactors, work permit system, entry into continued spaces.

UNIT – V Safety in Storage and Emergency Planning

Safety in storage, handling of chemicals and gases, storage layout, ventilation, safety in chemical laboratories,emergency preparedness on site plan, off site plan, toxic hazard control.

TEXT BOOKS
1. Safety Management : Strategy And Practice -   Pybus R - Butterworth Heinmann, Oxford
2. Safety and Accident Prevention in Chemical Operation – H.H. Faweett and Wood

REFERENCE BOOKS
1. Industrial Safety Management- Trafdar N K, Tarafdar K J – Dhapat Rai, New Delhi
2.Safety Management In Industry- Krishna, N V- Jaico Publication House; New Delhi
3 Industrial Safety And Pollution Control Hand Book - Nagraj, J N & Rameshchandar, R V - Associate Publisher, Securndabad
4. Fire and Safety Manual Refineries and Petrochemical Panel - National Safety Counsil, Bombay
5. Safety in Use of Compressed Gas Cylinders - National Safety Counsil, Bombay

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: AI and Machine learning   Code: **C000629(028)**
Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**
Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

Course Objectives

- To learn the concepts of searching for AI problems
- To learn about agents and knowledge representation
- To understand the various factors involved in inferences
- To get introduced to fundamentals of machine learning
- To learn about the possibilities of Supervised and Unsupervised learning

UNIT I AI - History of AI - Agents - Structure of Intelligent agents - Environments - Problem solving methods - Problem solving agents - Formulating problems - search strategies - Breadth-first - Uniform cost - Depth-first - Depth limited - Bidirectional - Informed Search - Best-first Heuristic Functions - Memory bounded search - A* - SMA* - Iterative Improvement algorithms - Hill Climbing - Simulated annealing - Measure of performance and analysis of search algorithms.

UNIT II Game playing - Perfect Decisions - Imperfect Decisions - Alpha-beta pruning - Knowledge based agent - Wumpus World Environment - Propositional logic - agent for wumpus world - First order logic - syntax - semantics - extensions - Using First order logic - Representation change in the world - Goal based agents.

UNIT III Knowledge Base - Knowledge representation - Production based system - Frame based system - Inference - Backward chaining - Forward chaining.

UNIT IV Learning from agents - inductive learning - Types of Machine learning - Supervised learning - learning decision trees - support vector machines - Neural and Belief networks - Perceptron - Multi-layer feed forward networks - Bayesian belief networks.

UNIT V Unsupervised learning - K-means clustering - hierarchical clustering - Agglomerative and Divisive clustering - Fuzzy clustering.

Text Books :

1. Stuart Russel, Peter Norvig, "AI – A Modern Approach", Second Edition, Pearson Education, 2007.
2. Kevin Night, Elaine Rich, Nair B., "Artificial Intelligence (SIE)", McGraw Hill, 2008.

Reference Books :

1. Vinod Chandra SS, Anand Hareendran S, "Artificial and Machine Learning", First Edition, PHI Learning, 2014.
2. Dan W. Patterson, "Introduction to AI and ES", Pearson Education, 2007
3. G. Luger, W. A. Sttubblefield, "Artificial Intelligence", Third Edition, Addison-Wesley Longman, 1998.

4. N. J. Nilson, "Principles of Artificial Intelligence", Narosa Publishing House, 1980.

5. Tom Mitchell, "Machine Learning", First Edition, Tata McGraw Hill India, 2017.

Course Outcomes

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

- Suggest appropriate search strategies for any AI problem
- Design agents for any given problem
- Represent real world knowledge using first order or propositional logic
- Solve problems by appropriated using the supervised or unsupervised machine learning algorithms
- Suggest appropriate clustering algorithm for solving real-world problems

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**

Branch: **Common to all Branches**   Semester: **VI**

Subject:: Operating Systems   Code: **C000630(028)**

Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**

Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**

ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

Course objective:

1. To provide an understanding of the functions of operating systems.
2. To provide an insight into internals and functional modules of operating systems.
3. To study the concepts underlying the design and implementation of memory management of operating systems.
4. To make student able to understand deadlocks and to recover them.
5. To make student understand the core structure, functions and design principles of distributed operating system will be introduced with this subject.

UNIT I Introduction to operating system: Functions provided by operating system, Introduction to multi programming, Time sharing and real time systems, Introduction to file systems, Access and allocation methods of file systems, Directory structure of a file system on a disk and tape, File protection.

UNIT II Introduction to scheduling: Process concept, states of process, Process control block, CPU scheduling, various types of CPU scheduling algorithms and their evaluation. Meaning of disk and drum scheduling, Various types of disk and drum scheduling algorithms like FCFS, SCAN etc., CPU protection.

UNIT III Introduction to memory management: Various types of memory management schemes like paging, Segmentation etc. Concept of virtual memory, demand paging, Various page replacement algorithms, thrashing and methods to tackle it, Memory protection.

UNIT IV Concurrency and Deadlock: Meaning of deadlocks, Resource allocation graphs, Deadlock Characterization, Various methods to avoid deadlocks like deadlock avoidance, Deadlock detection, Deadlock prevention, Banker's algorithm for deadlock avoidance. Introduction to concurrent processing, Precedence graphs, Critical section problem, Semaphore concept, Study of classical process co-ordination problem.

UNIT V Introduction to distributed systems: I/O Subsystem Principles of I/O Hardware: I/O devices, device controllers, direct memory access. Principles of I/O Software: Goals, interrupt handlers, device drivers, device independent I/O Software. User space I/O software, I/O protection. Distributed file systems: Design, Implementation, and trends. Performance Measurement: Important trends affecting performance issues, performance measures, evaluation techniques, bottlenecks and saturation feedback loops. Case study of UNIX and DOS operating systems.

Text Books:
1. Operating System Concepts, James L. Peterson and Abraham Silberschatz (Addison-Wesley)
2. Modern Operating System, Andrew .S. Tanenbaum, PHI

Reference Books:
1. Operating System Concepts & Design, Milan Milenkovic (MGH)
2. An Introduction to Operating Systems, Harvey M. Dietel (Addison Wesley)

Course Outcome:
1. The student will be able to learn the various functionalities of OS.
2. The student will be able to use the various algorithms and techniques to perform the various jobs performed by operating systems
3. The student will be able to get the overview of how operating system is designed.
4. The student will be able to demonstrate how various resources are managed by operating system

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: Internet & Web Technology   Code: **C000631(028)**
Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**
Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:**100**   Minimum Marks:**35**

Course objective:
1. To provide the fundamental concepts of Internet and to make students recognize the difference between various Internet protocols.
2. To introduce the concept of e-mail, list server & file transfer protocols.
3. To introduce the concept of HTML, JavaScript & XML.
4. To introduce the concept of Internet security, Firewalls, E-commerce & EDI

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 V sat. Web Technologies: Three Tier Web Based Architecture; Jsp, Asp, J2ee, Net Systems.

UNIT II HTML CSS AND SCRIPTING: HTML - Introduction, S gml, Dtd (Document Type Definition, Basic Html Elements, Tags and usages, HTML Standards , Issues in HTML D html: Introduction Cascading Style Sheets: Syntax ,Class Selector, Id Selector Dom (Document Object Model) & 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 – Flow Control – 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 ,Defining Attributes & Entities in the DTD ,Defining Parameter Entities & conditional Sections, Resolving a naming conflict, Using Namespaces, 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 ,Authorization and 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 Outcome:

1. Students will be familiar with various Internet protocols and the concepts of Internet.

2. Students will able to differentiate between various e-mail protocols and their working.

3. Students will be familiar with the concept of remote login with the understandability of hosting and maintaining of website.

4. Students will also get knowledge about Internet security and Firewalls.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: Database Management Systems (DBMS)   Code: **C000632(028)**
Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**
Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:**100**   Minimum Marks:**35**

Course Objectives:
- Understand the basic concepts and the application of database system.
- Understand the database development processes.
- Understand the relational database design principles.
- To be familiar with database storage structure.

UNIT I Database Management System Concepts: Introduction; Significance of database, Database System Application; Data Independence; Data Abstraction, Entities and their attributes, view of data, Advantage and Disadvantage of Database Management System, OODBMS.

UNIT II Database System Architecture : Three Level Architecture of DBMS(external level, conceptual level, internal level), DBMS Languages (DDL, DML, DCL, TCL), MYSQL,SQL Server, Oracle Architecture.

UNIT III Database Models and Implementation : Data Model and Types of Data Model, Relational Data Model, Hierarchical Data Model, Network Data Model, Object / Relational Model, E-R Model, Notation used in E-R Model, Relationship and types.

UNIT IV File Organization for Conventional DBMS: Sequential File Organization, Heap File Organization, Hash File Organization, B+ Tree File Organization, **Relational Algebra:** Basic Operations, **Relational Calculus:** Tuple relational calculus, Domain relational calculus, calculus vs algebra.

UNIT V An Introduction to RDBMS: Relational Database Management System, RDBMS Properties, E-R Model , Features of RDBMS, DBMS vs RDBMS, **SQL:** SQL Commands, Triggers, null values, index, constraint, keys.

Text books:
1. "Database System Concepts", 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill.
2. "Fundamentals of Database Systems", 5th Edition by R. Elmasri and S. Navathe, Pearson Education

Reference books:
1. "Data base Systems design, Implementation, and Management", Peter Rob & Carlos Coronel 7th Edition.
2. "Data base Management Systems", Raghurama Krishnan, Johannes Gehrke, TATA McGraw Hill 3rd Edition
3. "Introduction to Database Systems", C.J. Date, Pearson Education

Course Outcomes:
At the conclusion of the course, the student will be able to:
- Understand terms related to database design and management.
- Understand the relational database management system.
- Identify the data models for relevant problem.
- Extend normalization for the development of application software.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: Device Modelling   Code: **C000633(028)**
Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**
Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

Course Objectives
Students will
1. Have an introduction to numerical modeling of semiconductor devices
2. Understand the physical, electrical, and optical properties of semiconductor materials and their use in microelectronic circuits.
3. Be able to analyze the relation of atomic and physical properties of semiconductor materials to device and circuit performance issues.
4. Understand the connection between device-level and circuit-level performance of microelectronic systems.
5. Perform analysis of device structures and behaviors using modeling software.

Unit-I: Introduction to SPICE Simulation: Analysis of complex electronic circuits, simulation and analysis using SPICE, AC/DC operation, DC sweep transfer function, frequency response, feedback control analysis, transient response, device models, simulation and analysis of electronic circuits and systems.

Unit-II: Review of semiconductor physics: The p-n junction, , The built-in voltage, Depletion width and junction capacitance, Diode current/voltage characteristic, Minority carrier charge storage.

Unit-III: MOS transistors, Threshold voltage and the body effect, Current/voltage characteristics, Sub-threshold current, Short channel effect and narrow width effect, Drain induced barrier lowering Channel length modulation, Hot carrier effects, Effective mobility and velocity saturation SPICE models, MOS inverter circuits

Unit-IV: Bipolar transistors, Current gain, Gummel plots and output characteristics, Recombination in the emitter/base depletion region, Charge storage and forward transit time, Cut-off frequency, TTL gates.

Unit-V: Basic SPICE Models, Ebers-Moll and basic Gummel-Poon model, Small-signal model, Parameter extraction

References :
1. "Solid State Electronic Devices", "B. G. Streetman and S. Banerjee", Prentice Hall India
2. "Analysis and Design of Digital Integrated circuits", "D. A. Hodges, and H. G. Jackson" , McGrraw-Hill International
3. "Introduction to VLSI circuit and systems", "J. P. Uyemura", John Wiley and Sons
4. "Fundamentals of Modern VLSI devices", "Y. Taur, T. H.Ning", Cambridge University Press
5. "Principles of CMOS VLSI design , A systems perspective", "Eshraghian K", Addison Wesley.

Course Outcome:

At the end of the course Student will be able to
- design and model of semiconductor devices
- Understand modeling of semiconductor devices and deal with the advanced concepts in semiconductor electronic devices.
- Understand the physical and electrical properties of semiconductor devices and their use in microelectronic circuits through simulations.
- Understand the device/circuit co-design issues for the implementation of microelectronic systems.
- Perform analysis of device structures and behaviors using modeling software.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: Introduction to MEMS   Code: **C000634(028)**
Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**
Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   **Maximum Marks:100**   **Minimum Marks:35**

Course Objectives:

1. To enable the students to acquire knowledge about the principles of MEMS & MOEMS.
2. To understand the designing of MEMS.
3. To get an idea about what all materials are used in MEMS.
4. To give an insight to the working of RF MEMS Technology.
5. To understand the concepts of Optical MEMS & its application in communication

UNIT- I Introduction to MEMS Technology : Basic Concepts of MEMS, Scaling in Micro domain: Scaling Laws in Electrostatic, Electromagnetic, Structures etc. MEMS working Principles and Design: Transduction Principles in Micro domain. MEMS Modeling and Simulation: Modeling Elements in Electrical, Mechanical, Thermal and Fluid Systems. Modeling Elastic, Electrostatic, Electromagnetic Systems.

UNIT-II Micro fabrication /Micromachining: Overview of Micro Fabrication, Review of Microelectronics Fabrication Processes like Photolithography, Deposition, Doping, Etching, Structural and Sacrificial Materials, and other Lithography Methods, MEMS Fabrication Methods like Surface, Bulk, LIGA and wafer bonding methods.

UNIT-III Radio Frequency (RF) MEMS: Introduction, Review of RF-based communication systems, RF-MEMS like switches and relay, MEMS inductors and Capacitors, RF filters, resonators, phase shifters, transmission lines, micro machined antenna (Qualitative treatment only)

UNIT-IV Optical MEMS: Preview, passive optical components like lenses and mirrors, actuators for active optical MEMS, Basic optical communication network using MOEMS devices.

UNIT-V Case Studies: Case studies of Microsystems including micro-cantilever based sensors and actuators with appropriate selection of material properties: thermal, mechanical properties, Static and dynamic mechanical response with different force mechanisms: electrostatic, electromagnetic and thermal.

Text Books:

1. MEMS Nitaigour Mahalik, Tata McGraw Hill.
2. MEMS and MOEMS Technology and Applications, Rai Choudhary, PHI Learning.
3. MEMS, Vijay Vardan, Wiley Publication.
4. MEMS and Microsystems Design and Manufacture, Tai-Ran Hsu, Tata McGraw Hill

Reference Books:

1. Stephen D. Senturia. Microsystem Design, Kluwer Academic Publishers.
2. Marc Madou. Fundamentals of Micro fabrication, CRC Press.
3. Kovaes. Micromachined Transducers Sourcebook. WCB McGraw-Hill, Boston
4. M-H Bao, Elsevier, Micromechanical Transducers: Pressure sensors, accelerometers and gyroscopes. New York, 2000

Course Outcomes:

After completing the course students will –
1. Have knowledge of the operation of MEMS & MOEMS.
2. Have knowledge of design and analyze MEMS devices using suitable mechanical/electrical engineering principles.
3. Able to apply knowledge of MEMS & Optical MEMS in Communication area.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**　　　　　　　　　　　　Semester: **VI**
Subject:: Principles of Management　　　　　　　　　　　Code: **C000635(037)**
Total Theory Periods: **40**　　　　　　　　　　　　　　　Total Tutorial: **Ten (Minimum)**
Class Tests: **Two (Minimum)**　　　　　　　　　　　　　　Assignments: **2(Minimum)**
ESE Duration: **Three Hours**　　　　Maximum Marks:100　　　Minimum Marks:35

Course Objectives:

The objective of this course is to impart an understanding of the functions and responsibilities of managers and to provide tools and techniques to be used in the performance of the managerial job.

UNIT-I	**Basic concepts and functions of management:** Nature, Purpose and Objectives of basic functions of management, Authority and Responsibility ,social responsibility of manager, management ethics. **Production Planning and Control:** Functions, Organization, Aggregate planning and strategies, Materials Requirement Planning, Routing, Loading, Scheduling Dispatching-priority rules, Sequencing, Johnson's algorithm form jobs; 2machines, 3machines, and machines, Break even analysis, Gantt's chart, Flow process chart.
UNIT-II	**Marketing and Financial Management:** Marketing Environment, Advertising and Sales Promotion, Sales forecasting; Purposes, methods -linear regression, time-series analysis, moving average, exponential smoothing. **Inventory Management:** Objectives, scope and functions of inventory control, types of inventories, inventory control techniques, Economic ordering quantity Procurement cost, carrying charges, lead-time, reorder point, simple problems, ABC analysis.
UNIT-III	**Work Study:** Definition, advantages and procedure of work-study, Difference between production and productivity, Factors to improve productivity. **Method Study:** Definition, objectives and procedure of method study. Symbols, flow process chart (man-machine and material), flow diagram, machine chart, two hand process chart. Principles of motion economy. Ther blig symbols, SIMO chart and simple problems. **Work Measurement:** Time study, definition, principle and method of time study stop watch study - Calculation of basic time, rating techniques, normal time, allowances and standard time simple numerical problems. Work Sampling - Definition, method, advantages and disadvantage of work sampling Applications.
UNIT-IV	**Job Evaluation:** Objective, Methods of job evaluation, job evaluation procedure, merit rating (Performance appraisal). **Wages and incentive plans;** Rowan plan, Taylor's differential piece rate system, Emerson's Efficiency plan, Halsey's 50-50plan, Bed auxplan.
UNIT-V	**Human resource management:** Nature and Scope of Human Resource Planning ,Recruitment and Selection, Training and Development, Career Growth, Grievances, Motivation – needs and types , Maslow hierarchy of needs theory, Herzberg two factor theory ,job enrichment and job enlargement. **Statistical quality control:** Difference between inspection and quality control, acceptance sampling, procedure's risk and consumer's risk, operating characteristic curve for single sampling plan, AOQL quality of design, quality of performance, quality of conformance, SQC charts for variables and attributes; Introduction to JIT manufacturing, Kanban system.

TextBooks:
1. Industrial Engineering and Production Management–Mart and Telsang- S.Chand.
2. Statistical Quality Control–M. Mahajan–Dhanpat Rai & Co.(P)Ltd.

Reference Books:
1. Production and operations Management-Panneers elvam.R–PHI
2. Introduction of work study-ILO,Geneva-Universal Publishing Corporation, Bombay
3. Production & Operation Management–S.N.Chary–TMH,Delhi
4. Industrial Engineering & Management, A new perspective-Philip EHicks- Mc GrawHil
5. Industrial Engineering & Management-S.Dalela & MansoorAli- Standard Publishers.
6. Production and operation Management- By R.Mayer-TMH, NewDelhi
7. Production and operations Management by–Adamand Ebert–PHI, New Delhi
8. Marketing Management-Kotler Philip- Prentice Hall of India
9. Human Resource Management-Luthans Fred- McGraw Hill, Inc.
10. Statistical Quality Control– R.C.Gupta– Khanna Publishers, Delhi

Course Outcomes:.
On successful completion of the course, the student will be able to:
1. Describe the primary functions of management and the roles of managers and apply the concepts of PPC.
2. Apply concepts of marketing management and financial management Inventory control.
3. Apply the concept of work study and method study
4. Describe job evaluation and Wages and incentive plans.
5. Describe Human resource management and apply statistical tool inquality control.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**

Branch: **Common to all Branches**   Semester: **VI**

Subject:: Advanced I.C. Engines   Code: **C000636(037)**

Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**

Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**

ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

Course Objectives:

To understand the underlying principles of operation of different IC Engines and components. Also provide knowledge on pollutant formation, control, alternate fuel etc.

UNIT-I	**SPARK IGNITION ENGINES** Air-fuel ratio requirements, Design of carburetor –fuel jet size and venture size, Stagesof combustion-normal and abnormal combustion, Factors affecting knock, Combustion chambers, Introduction to thermodynamic analysis of SI Engine combustion process.
UNIT-II	**COMPRESSION IGNITION ENGINES** Stages of combustion-normal and abnormal combustion – Factors affecting knock, Direct and Indirect injection systems, Combustion chambers, Turbo charging, Introduction to Thermodynamic Analysis of CI Engine Combustion process.
UNIT-III	**ENGINE EXHAUST EMISSION CONTROL** Formation of NOX, HC/CO mechanism, Smoke and Particulate emissions, Green House Effect, Methods of controlling emissions, Three-way catalytic converter and Particulate Trap, Emission (HC, CO, NO and NOX) measuring equipments, Smoke and Particulate measurement, Indian Driving Cycles and emission norms.
UNIT-IV	**ALTERNATE FUELS** Alcohols, Vegetable oils and bio-diesel, Bio-gas, Natural Gas, Liquefied Petroleum, Gas, Hydrogen, Properties, Suitability, Engine Modifications, Performance,Combustion and Emission Characteristics of SI and CI Engines using these alternatefuels.
UNIT-V	**RECENT TRENDS** Homogeneous Charge Compression Ignition Engine, Lean Burn Engine, Stratified, Charge Engine, Surface Ignition Engine, Four Valve and Overhead cam Engines,Electronic Engine Management, Common Rail Direct Injection Diesel Engine, Gasoline, Direct Injection Engine, Data Acquisition System –pressure pick up, charge amplifier PC, for Combustion and Heat release analysis in Engines.

Text Books:	
1.	Heinz Heisler, 'Advanced Engine Technology', SAE International Publications, USA, 1998.
2.	Ganesan V." Internal Combustion Engines", Third Edition, Tata McGraw-Hill,2007.

Reference Books:
1. John B Heywood," Internal Combustion Engine Fundamentals", Tata McGraw-Hill, 1988
2. Patterson D.J. and Henein N.A,"Emissions from combustion engines and theircontrol," Ann Arbor Science Publishers Inc, USA, 1978
3. Gupta H.N, "Fundamentals of Internal Combustion Engines",Prentice Hall of India,2006
4. Ultrich Adler," Automotive Electric / Electronic Systems, Published by Robert BoshGmbH,1995

Course Outcomes:	
On successful completion of the course, the student will be able to:	
1.	Compare the operations of different IC Engine and components
2.	Apply the concept of compression ignition engine system
3.	Apply concepts to evaluate the pollutant formation and control
4.	Describe the concept of alternative fuel and apply concepts to evaluate the alternate fuel
5.	Describe recent trends in I. C. engine and apply the concept of concepts of modern trends in IC engines.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**

Branch: **Common to all Branches**　　　　　　　　　　　　Semester: **VI**

Subject:: Mechanical Vibrations & Condition Monitoring　　　Code: **C000637(037)**

Total Theory Periods: **40**　　　　　　　　　　　　Total Tutorial: **Ten (Minimum)**

Class Tests: **Two (Minimum)**　　　　　　　　　　　Assignments: **2(Minimum)**

ESE Duration: **Three Hours**　　　**Maximum Marks:100**　　　**Minimum Marks:35**

Course Objectives:

The objective of this course is to provide the importance of the study of vibration with enhancing the vibration analysis procedure for the physical systems.

UNIT-I	**Harmonically Excited Vibration** Introduction, equation of motion, response of an undamped system under harmonic force, response of a damped system under the harmonic motion of the base, response of a damped system under rotating unbalance, forced vibration with coulomb and hysteresis damping. **Two Degrees of Freedom Systems** Introduction, equations of motion for forced vibration, free vibration analysis of an undamped system, torsional system, coordinate coupling and principal coordinates, forced vibration analysis.
UNIT-II	**Multi Degree of Freedom Systems** Introduction, modeling of continuous systems as multi degree of freedom systems, influence coefficients, potential and kinetic energy expressions in matrix form, generalized coordinates and generalized forces, using Lagrange's equation to derive equations of motion ,equations of motion of undamped systems in matrix form, eigenvalue problem, solution of the eigen value problem, free vibration of undamped systems, forced vibrations of undamped systems using modal analysis, forced vibration of viscously damped system.
UNIT-III	**Nonlinear Vibrations** Introduction, examples of nonlinear vibration problems, exact methods, approximate analytical methods, sub harmonic and super harmonic oscillations, systems with time dependent coefficients, graphical methods, stability of equilibrium states, limit cycles, chaos.
UNIT-IV	**Vibration Control** Introduction, vibration nomograph and vibration criteria, reduction of vibration at the source, balancing of rotating machines, whirling of rotating shafts, balancing of reciprocating engines, control of vibration, control of natural frequencies, introduction of damping, vibration isolation, vibration absorbers.
UNIT-V	**Fault Diagnosis** Dynamic testing of machines and structures, experimental modalanalysis, machine condition monitoring and diagnostics. Condition monitoring and signature analysis applications: Introduction, noise monitoring, temperature monitoring, wear behaviour monitoring, corrosion monitoring, performance trend monitoring, selection of condition monitoring techniques, diagnosis.

Text Books:	
1.	Rao S.S., "Mechanical Vibrations", 4'h Edition, Pearson Education, Inc., 2004.
2.	B.C. Nakra and K.K. Chowdary, "Mechanical Measurements", 2nd Edition, TMH, New Delhi, 2004.

Reference Books:	
1.	William T Thomson & Marie Dillon Dahleh, "Theory of Vibrations with application", 5th Edition, Pearson Education Publication, 2007.
2.	Tse, Morse and Hinkel, "Mechanical Vibrations", Chapman and Hall, 1991.
3.	Den Hartong J.P., "Mechanical Vibrations", McGraw Hill, 1986.
4.	V.P.Singh, "Mechanical vibrations", 3rd Edition, Dhanpat Rai & Co., 2006.
5.	G.K. Grover, "Mechanical Vibrations", Nemchand & Bros, Roorke, 8th Edition, 2009.

Course Outcomes:	
On successful completion of the course, the student will be able to:	
1.	Analyze free and forced vibrations of single-degree of freedom systems
2.	Analyze multi degree freedom system for forced vibrations with and without damping
3.	Solve the nonlinear vibration problems using different analytical and graphical methods
4.	Calculate unbalanced forces in rotating machinery and reciprocating engines, explain concept of vibration absorber
5.	Describe various condition monitoring techniques to diagnose the machine condition.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: Entrepreneurship Developments   Code: **C000638(067)**
Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**
Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

Course Objectives:
- To understand Entrepreneurship and Economic Development.
- To understand the forms of entrepreneurship.
- To know about the generation of business ideas and plans.
- To know about Financial organizations and NGO`s

UNIT I Entrepreneurship – Entrepreneurship and its Relationship with the Economic Development, Barriers to Entrepreneurship (Factors affecting Growth of Entrepreneurship), Theory of Achievement Motivation, McClelland's Experiments, Women Entrepreneur's. Entrepreneurship Development in India: Issues and Opportunities, Small-Scale Sector in India.

UNIT II Entrepreneurship Trends - Forms of Ownerships, Franchising, Types of Entrepreneurship, Career Planning, Choice of Entrepreneurship as a Career, Cases from Indian Industry. The ED Cycle, Identifying & Developing Entrepreneurial Potential, Techno-economics innovation and entrepreneurship, Socio-psychological factors influencing entrepreneurship development.

UNIT III Business Idea and Business Plan -, Creativity and Innovation, Business Ideas Generation Process, Evaluation of Business Idea. Building the Business Plan, Venturing an Enterprise, Financial Considerations (Cash Flow Management, Financial Plan, Business Plan). Role of chamber of commerce, industries associations and other bodies like FICCI, CII .

UNIT IV Registration of new venture and Support Systems - Steps and processes involved in setting up a manufacturing unit and a service unit. Process of registration and formalities; Activities of SIDBI, EDI, NIESBUD, DIC, NABARD, Government policy, Agency supporting entrepreneurial development Industrial estates. Role of MSME, NSIC.

UNIT V The Industry and Ancillarization: Role of Intrapreneurship in Indian industry; Success cases, Ancillarization - Ancillarization in India, Ancillaries & Industrial Development, Ancillary Opportunities in different Economic Sectors: Agro Industries, Logistics, BPO, Banking and Finance, Sub-contracting System, Supplier Organization Network Global Aspect of Entrepreneurship. NGOs and entrepreneurship.

TEXT BOOK:
1. Entrepreneurial Development- S.S. Khanka- S. Chand & Co.

REFERENCE BOOKS:
1. Entrepreneurship 6th Edition. Robert D Hisrich , Tata McGraw-Hill.
2 - Entrepreneurship - A Contemporary Approach, Kuratko -Thomson Learning Books
3. Small-Scale Industries and Entrepreneurship. Desai, Vasant (2003). Himalaya Publishing House, Delhi.
4. Business Gurus speaks - Chary – Macmillan
5. Exploring Entrepreneurship - Blundel & Lockett, Oxford University Press
6. Entrepreneurship, Roy, Oxford University Press
7. Entrepreneurship - Barringer & Ireland, Pearson Publication
8. Entrepreneurship Small Business Enterprises, Charantimath, Pearson Publication

Course Outcomes:
- The student will understand Entrepreneurship and Economic Development.
- The student will understand the forms of entrepreneurship.
- The student will know about the generation of business ideas and plans.
The student will know about Financial organizations and NGO`s.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: Heat Transfer Operation   Code: **C000639(095)**
Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**
Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   **Maximum Marks:100**   **Minimum Marks:35**

Course Objectives
- The course is designed to provide an overview of various modes of heat transfer, its mechanism, and the industrial aspects of conduction, convection and radiation.
- To understand the concepts of Condensation and evaporation phenomena, design and construction of equipment.

UNIT I
Classification of heat flow processes, concept of driving force and resistance, conductive heat transfer, Fourier's law, steady-state conduction, compound resistances in series, critical insulation thickness, heat flow through a cylinder and sphere, introduction to unsteady state heat conduction, numerical problems based on the above.

UNIT II
Principles of heat flow in fluids, natural and forced convection, concept of films and two film theory. individual and overall heat transfer coefficients, dirt factor, controlling resistance, logarithmic mean temperature difference, dimensional analysis and dimensionless groups in heat transfer, dittus- boelter equation and other correlations, numerical problems based on the above.

UNIT III
Heat transfer from condensing vapors, drop wise and film wise condensation, condensation of superheated vapors, heat transfer to boiling liquids, critical, heat flux, nucleate film boiling. radiation heat transfer, kirchoff's law, black body radiation, numerical problems based on the above. solidification time calculation of plastic melt.

UNIT IV
Heat transfer types of equipment, operation and preliminary design concepts in plastics processing such as heat transfer in sprue bush, heat transfer to core and cavity of the mould, runner length on the base of heat transfer, inlet and outlet temperature of cooling channels, cooling tower or chilling plant calculation on the base of heat transfer in the mould, quantity of water required for the cooling of polymer melt, calculation of cooling time required mould processing cycle time, heat transfer through a solid wall in mould, polymer composite wall and polymer composite cylinder.
Heat exchangers, condensers, double pipe, multipass shell and tube type heat exchangers, transfer units in heat exchangers, NTU and HTU, numerical problems based on the above.

UNIT V
Evaporation, types of evaporators performance of tubular evaporators, duhring's rule, elevation in boiling point and effect of hydrostatic head, steam economy, enthalpy balance, multiple effect evaporators, methods of feeding, numerical problems based on the above.

Text Books:
1. Heat Transfer Technology by Y.V.C. Rao.
2. Unit Operations In Chemical Engineering by W.L. McCabe and J.C. smith,4thEdn., McGraw Hill Publishing Co., 1985.
3. Introduction to Chemical Engg by Badger and Bancharo, McGraw Hill.

Reference Books:
1. Process Heat Transfer by D. Q. Kern, McGraw Hill Publishing Co., New York 1950.
2. Principles of Unit Operations by A. S. Foust, L. A. Wenzel, C.W. Clump, Louis Maus and L.B. Anderson, John Wiley, New York, 1959.
3. Heat Transmission by W. H. Mc Adams, McGraw Hill Publishing Co., New York

Course outcomes:
Students would be able to know the various heat transfer operations and they will be able to design various types of equipment based on the requirement.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: Process Economics and Management   Code: **C000640(095)**
Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**
Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

Course Objectives
1. To know about the organization, its types structure and process.
2. To understand the ownership like private, public and joint.
3. To study the concept of management.
4. To understand the depreciation.
5. To understand cost accounting and control

UNIT-I
Organization: introduction, system approach applied to the organization, necessity of organization, the process of organization, formal and informal organization, organization structure and types.

UNIT-II
Forms of Business Organization: Concept and Types of Ownership, Industrial Ownership, Partnership Organization, Joint Stock Company, Co-Operative Organization, Public Sector Organization, and State Ownership.

UNIT-III
Management: Concept Of Management, Function Of Management, Financial Management. Industrial Acts and Legislations: Factories Act, Workmen's Compensation Act, Wages Act Employee's Provident Fund and Family Pension Act.

UNIT-IV
Finance: Breakeven Analysis, Breakeven Point, Breakeven Calculation and Applications. Depreciation: Introduction, Types, Methods for Calculating Depreciation Fund.

UNIT-V
Cost Accounting and Control: Cost Estimation, Elements of Cost, Computation of Actual Cost, Nature and Types of Cost, Cost Control.
Replacement Studies: Methods (Rate of Return, Payback Period and Discounted Cash Flow).

Text Books:
1. Industrial Engineering and Management Science by Banga T. R., Sharma S. C., Agarwal N.K. Khanna Publication, 10th Edition 2007
2. Industrial Engineering & Production Management by Mahajan M. S., Dhanpat Rai Publication, 1st Edition 2000-01
3. Process Economics and Indurstrial Management by Sivasubramanian V, Galgotia Publicaiton

Reference Books:
1. Industrial Engineering & Management by Khanna O.P. Dhanapat Rai Publication Revised & Enlarged Edition 2007.
2. Plant Design & Economics for Chemical Engineers by Peter S. Max, Timmerhaus D. Klaus, West E. Ronald, Tata McGraw-Hill,5th Edition 2004.

Course outcomes:
- The Student will be able to understand the necessity of organization.
- The Student will be able to understand the forms of business organization.
- The Student will be able to understand the management Act & Laws.
- The Student will be able to understand cost control.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: Adhesive and Surface Coating   Code: **C000641(095)**
Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**
Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

Course Objectives
- Understand various adhesives and their specific applications
- Understand various concepts of specialty and their applications
- Acquire knowledge of surface coatings and their uses
- Acquire knowledge about various types of paints
- Acquire knowledge of various aspects of paint properties and their evaluation

UNIT I
Adhesives, concepts and terminology, functions of adhesives, advantages and disadvantages of adhesive bonding, criteria for selection of adhesives.
Types of adhesives, structural adhesives, Urethane structured adhesives, Modified acrylic structural adhesives, phenolic adhesives and modifiers, anaerobic adhesives, cyanoacrylate adhesives, Hot melt adhesives, pressure-sensitive adhesives, RTV Silicone adhesives, sealants, water-based adhesives.

UNIT II
Specialty adhesives, adhesives in aerospace, adhesive in the automobile industry, conductive adhesives, adhesives in building construction, adhesive in the electrical industry.
Joint design, stress, types of joints, selection of joint detail, joint criteria, surface preparation of adhered metals, plastics and rubbers. Adhesive bonding process methods for adhesives application and bonding equipment, testing and quality control.

UNIT III
Introduction to surface coatings Components of paints, Pigments, pigment properties, different types, extenders, solvents, oils, driers, diluents, lacquers, varnishes, paint preparation, formulation, factors affecting pigment dispersion, preparation of pigment dispersion.

UNIT IV
Different types of paints classification based on polymeric resin, emulsion, oil and alkyd paints, acrylic paints, epoxy coatings, polyurethane, silicones, chlorinated rubber.
Classification based on application, fluro polymers, vinyl resins, appliance furnishes, automotive finishes, coil coatings, can coatings, marine coatings, aircraft coatings. Surface preparation and paint application.

UNIT V
Paint properties and their evaluation, mechanism of film formation, factors affecting coating properties, methods used for film preparation, barrier properties, optical properties, ageing properties, rheological properties and adhesion properties of coatings.

Text Books:
1. Handbook of Adhesives – Skeist, Irvine, Van Nostrand, New York, 1990, 3rd Edition
   Gerald L. Schreberger, Adhesive in manufacturing, Marcel Dekker Inc., New York, 1983
2. Surface Coatings by Swaraj Paul, John Wiley & Sons, NY, 1985.
3. Adhesives and Coatings Technology by Premamoy Ghosh, McGraw Hill Education, 2007

Reference Books:

1. Adhesion and the formulation of adhesives by W.C. Wake. Applied Science Publishers, London, 1976
2. Polymer Mixing Technology by George Mathews, Applied Science Publishers. Sheilds, Handbook of adhesives, Butterworths, 1984.

Course outcomes:

- The Student will be able to understand the type of different adhesive.
- The Student will be able to understand the coating.
- The Student will be able to understand the paint
- The Student will be able to select the suitable adhesive as per application

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CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: E-Commerce   Code: **C000642(033)**
Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**
Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

COURSE OBJECTIVES:
- This course provides an introduction to information systems for business and management.
- It is designed to familiarize students with organizational and managerial foundations of systems
- The technical foundation for understanding information systems.

COURSE OUTCOMES

After successful completion of this course, the students will be able to-

1. Apply the knowledge and skills of heuristic search and game playing for solving real time problems
2. Make decisions based on which knowledge representation to use
3. Ability to work with Natural Languages and implement linear and nonlinear planning
4. Apply suitable Bayesian decision theory for various types of learning problems
5. Develop learning models and required solutions for Multivariate datasets

Unit- I Electronic Commerce Environment and Opportunities:
Background, the Electronic Commerce Environment, Electronic Marketplace Technologies. Modes of Electronic Commerce: Electronic Data Interchange, Migration to Open EDI, Electronic Commerce with www/Internet, Commerce Net Advocacy, web Commerce Going Forward.

Unit-II: Approaches to Safe Electronic Commerce:
Secure Transport Protocols, Secure Transactions, Secure Electronic Payment Protocol (SEPP), Secure Electronic Transaction (SET), Certificates for authentication Security on web Servers and Enterprise Networks. Electronic Cash and Electronic Payment Schemes: Internet Monetary Payment & Security Requirements. Payment and Purchase Order Process, On-line
Electronic cash.

Unit- III: Internet/Intranet Security Issues and Solutions:
The need for Computer Security, Specific Intruder Approaches, Security Strategies, Security Tools, Encryption, Enterprise Networking and Access to the Internet, Antivirus Programs, Security Teams.

Unit-IV: Master Card/Visa Secure Electronic Transaction:
Introduction, Business Requirements, Concepts, payment Processing. E-Mail and Secure Email Technologies for Electronic Commerce: Introduction, The Means of Distribution, A model for Message Handling, E-mail working, Multipurpose Internet Mail Extensions, Message Object Security Services, Comparisons of Security Methods, MIME and Related Facilities for EDI over the Internet

Unit-V: Internet Resources for Commerce:
Introduction, Technologies for web Servers, Internet Tools Relevant to Commerce, Internet Applications for Commerce, Internet Charges, Internet Access and Architecture, Searching the

Internet. Advertising on Internet: Issues and Technologies. Introduction, Advertising on the Web, Marketing creating web site, Electronic Publishing Issues, Approaches and Technologies: EP and web based EP.

TEXT BOOKS:

1. Web Commerce Technology Handbook, by Daniel Minoli, Emma Minoli, McGraw-Hill

2. Frontiers of electronicommerece by Galgotia.

REFERENCE BOOKS:

1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: Industrial Economics and Management   Code: **C000643(033)**
Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**
Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

COURSE OBJECTIVES:

- To provide basics of demand and demand forecasting
- To explain cost functions, cost control, cost reduction and pricing techniques.
- To provide fundamental knowledge about industrial economy
- To provide basic understanding of Industrial Management.
- To give introductory concepts of Macroeconomics

COURSE OUTCOMES:

On completion of the course, student will be able to–

1. Apply the concept of demand.
2. Estimate production and cost function.
3. Formulate appropriate pricing strategies.
4. Understand Market Structure and trends.
5. Understand and Measure Gross Domestic Product (GDP).

Unit-1 Introduction

Nature, significance and role of management in organizations. The Scope and Method of Managerial economics, Fundamental Economics concepts, Managerial Economics with other subjects, Objectives of the Firm

Unit-2 Demand and Supply Analysis

Meaning, Types and Determinants – Demand estimation- Demand elasticities for decision making – Business and Economic forecasting: Qualitative and Quantitative methods, Supply analysis: Meaning, elasticities and determinants, Market equilibrium and price determination

Unit-3 Production Economics

Productivity and its role in the economy; Techniques for improving productivity; Production and Production function: Types, Estimation, Returns to Scale, Economies and Diseconomies of Scale and Economies of Scope. Factor Inputs – Input-Output Analysis

Unit-4 Marketing Management

Marketing management process; 4P's of marketing mix; Target marketing; Product life cycle and marketing strategies. Market Structure: Perfect Competition, Imperfect Competition: Monopoly, Monopolistic, Oligopolistic Strategy, Cartels, Cournot, Kinked Demand and Price Leadership. Oligopolistic , Measurement of economic concentration, Policy against monopoly and restrictive trade practices, Competition Law, Pricing Practices: Objectives, Determinants, Pricing Methods, Government Policies and Pricing.

Unit-5 Introduction to Macroeconomics

Circular Flow of Income and Expenditures, Components of National Income and its significance, Measuring Gross Domestic Product (GDP), Inflation and Business Cycles, Government   Fiscal and Monetary Policy, Balance of payments, Foreign exchange markets

TEXT BOOKS:

1. P.L. Mehta – Managerial Economics Analysis, Problems and cases, Sultan Chand & Co. Ltd., 2001

REFERENCE BOOKS:

1. Peterson and Lewis, Managerial Economics, 4th Ed., Prentice Hall , 2004
2. Dholakia and Oza, Microeconomics for Management Students, 2nd Edition, Oxford University Press
3. Gregory Mankiw, Principles of Microeconomics, Havcourt Asia Publishers, 2001
4. Mote, Paul, Managerial Economics, Tata McGraw Hill, 2001

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: Project Planning & Management   Code: **C000644(033)**
Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**
Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum 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 Projects 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, 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: CPM 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

1. Khatua, Project Management and Appraisal, ISBN: 9780198066903, Oxford University Press

2. SUGGESTED READINGS

3. Bhavesh, M. Patel (2000): Project Management-Strategic Financial Planning Evaluation and Control, Vikas Publishing House Pvt. Ltd.

4. Chandra, P. (6th ed., 2007): Projects. Tata McGraw Hill.

5. Wysocki, Robert K., Bick Robert and Crane David B. (2000): Effective ProjectManagement. John Wiley and Sons, USA

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: Bio-Informatics   Code: **C000645(033)**
Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**
Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

COURSE OBJECTIVES:
- To provide basic understanding of bioinformatics and bioinformatics algorithms.
- To solve bio industrial problems using modern bioinformatics tools for gene annotation, functional proteomics, molecular phylogeny etc.
- To train on the development and use of bioinformatics softwares.
- To train on the basic theory and application of programs used for database searching, protein and DNA sequence analysis, prediction of protein function.
- To provide logistics to the development of modern bioinformatics tools for bio-molecular simulations, 3-D protein modelling, computer-aided drug design and molecular docking.

COURSE OUTCOMES:

On completion of the course, student will be able to–
1. Understand the scope of bioinformatics
2. Understand common bioinformatics tools and databases.
3. Design and implement computer science algorithms to solve biological problems
4. Use bioinformatics softwares and provide logistics to the development of modern bioinformatics tools for bio-molecular simulations, 3-D protein modelling, computer-aided drug design and molecular docking.
5. Analyze and provide solution to bio industrial problems using modern bioinformatics tools for gene annotation, functional proteomics, molecular phylogeny etc.

Unit-1 Basics Basics of Biology, Bioinformatics-introduction, Application, Scope of bioinformatics and computational biology, Major Bioinformatics resources (NCBI, EBI, ExPASy)

Unit-2 Sequences Problem statement, Understanding large scale DNA and protein sequencing and arrays, Sequence analysis, bio molecular sequence file formats, scoring matrices (PAM and BLOSUM), Sequence alignment, Edit distance and substitution matrices, Hidden Marcov Models (HMMs) and pairwise HMMs, Global and local alignments, Spliced alignment, Space-efficient sequence alignment, Multiple alignment, Database searching tools, Sequence by hybridization, Profile HMMs

Unit-3 Structures   Protein structure alignment, Protein Structure Prediction: Methods for predicting the secondary and tertiary structure of proteins. Techniques: Data Mining, gene prediction, neural networks, SVMs, genetic algorithms and stochastic global optimization.

Unit-4 Trans criptomics Methods for analyzing gene expression and microarray data. Techniques: clustering, SVMs. Agent-based Genome Analysis: Automation of genome analysis using intelligent software agents. Drug Discovery Informatics: Approaches to drug discovery using bioinformatics techniques

Unit-5 Phylogenetic trees   Large parsimony and small parsimony problems, Probabilistic approaches, Grammar-based approaches. Miscellaneous topics: Pathways and networks, Microarrays, Biomedical images

TEXT BOOK:

1. N.C. Jones, P.A. Pevzner, An Introduction to Bioinformatics Algorithms, MIT Press, 2004.
2. M. Lesk, *Introduction to Bioinformatics*, Oxford University Press.

REFERENCE BOOKS:

1. Bergeron B, Bioinformatics computing, Prentice Hall, USA , ISBN: 0-13-100825-0
2. Xiong J, Essential bioinformatics, Cambridge University Press, USA , ISBN: 978-0521600828.
3. T. Attwood, D. Parry-Smith, Introduction to Bioinformatics, Prentice Hall, 1999.
4. R. Durbin, S. Eddy, A. Krogh, G. Mitchison, Biological Sequence Analysis, Cambridge University Press, 1998
5. D. Gusfield, Trees and Sequences Author Algorithms on Strings, Cambridge University Press, 1997
6. C.A. Orengo, D.T. Jones, J.M. Thornton, Bioinformatics- Genes, Proteins and Computers , BIOS Scientific, 2003.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: Management Information System   Code: **C000646(033)**
Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**
Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:100   Minimum Marks:35

COURSE OBJECTIVES:

- The objective of this course is to make the student aware about the MIS and role, impact of MIS.
- To explain the student decision making concept method and tool.
- Explain to students the concept of system and planning control
- The course also includes DSS and Expert system concepts.
- Identify the major management challenges to building and using information systems and learn
- how to find appropriate solutions to those challenges

COURSE OUTCOMES:

1. Understand the basic concepts and technologies used in the field of management information systems.
2. Will able to make decision using DSS tool.
3. Have the knowledge of the different types of system and the concept of planning.
4. Develop an understanding of how DSS and Expert system work.
5. Understand the processes of developing and implementing information systems.

Unit- I: INTRODUCTION

Introduction to MIS, definition, Role, impact, subsystems of MIS, structure of MIS, MIS and computer, Executive information system, Transaction processing, Office Automation and Information processingcontrol functions.

Unit-II: Conceptual Foundations:

Decision making concept, method, tools, procedures, MIS and Decision making, Concept of information- mathematical definition, classification, methods of collection, value, age of information, Human as an information processor.

Unit- III: Systems, Planning and Control:

System concept – definition, General model of system, types, subsystems, preventing system entropy, system stress and system change, system concept applied to MIS. Concept of planning and computational support for planning, characteristics of control.

Unit-IV : DSS and Expert Systems:

Concept and philosophy, characteristics, structure of decision making, classes of DSS, users of DSS, support for decision making process, AI systems, Knowledge based Expert systems, semantic networks, MIS and role of DSS

Unit-V : Development and Implementation:

Development of long range plans, ascertaining the class of information, determining the information requirement, Development and implementation of MIS, management of quality in MIS, organization for development of MIS, factors of success and failure of MIS

TEXT BOOKS:
1. Godon B. Davis & Margrethe H. Olson, "Management Information Systems", TMH (2nded) .

2. W.S. Jawadekar 'Management Information Systems' TMH.

Reference Books:
1. S. Sadagopan 'Management Information Systems' PHI.

2. Jerome Kanter 'Managing with Information' PHI(4th edition).

3. James A. Senn 'Analysis and Design of Information systems ' MC Graw-Hill, International Edition.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**
Branch: **Common to all Branches**   Semester: **VI**
Subject:: **Plant Utility & Safety Engineering**   Code: **C000647(019)**
Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**
Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**
ESE Duration: **Three Hours**   Maximum Marks:**100**   Minimum Marks:**35**

PREREQUISITITES: Students should have knowledge of Chemical Technology, Chemical Process Industries.

COURSE OBJECTIVE:
1. To impart the basic concepts of Process Safety and plant Utility in chemical plants
2. Learn about various safety methods and instruments used for suchpurposes.
3. learn the advanced risk assessmentanalysis
4. Inherent Safer Concept in designing a chemicalplant

UNIT 1 Introduction: Different utilities. Role of utilities in process plant operations and criteria for selection and estimation of suitable utilities. Water: Water resources. Process water, Cooling water, drinking water and boiler feed water ,Water quality Standards,Water treatment processes Storage and handling of water .Types and selection of pumps, piping and accessories. Air :Compressed air ,blower air, fanair .Types of compressor and vacuum pumps and selection. Power requirements, performance and related calculations. Quality of compressed air for instruments and processes. Compressed air distribution system- piping and accessories.   **(10 hrs)**

UNIT 2 Steam and Power: Steam generation in chemical plants. Types of boilers and waste heat boilers. Fuels- types, Calorific value. Proximate and ultimate analysis. and related calculations. Cogeneration power plants. Boiler performance. Related Calculations. Economy of steam generation with different fuels, Steam storage and handling- piping and accessories.   **(08 hrs)**

UNIT3 Safety: Elements of safety, safety and site selection; Plant layout and unit plot planning Introduction to Process Safety- Intrinsic & Extrinsic Safety. The Hazards- Toxicity, Flammability, Fire, Explosions. Sources of ignition, Pressure. Safety devices: Pressure relief valves. Ruptures discs. Blow down systems. Flare systems. Flame arrestors. Deflagration arrestors and explosion suppression. Personal safety devices Process safety analysis: HAZAN and HAZOP comparison. Sequence of operability study. Risk analysis and estimation. Safety checklist.   **(08 hrs)**

UNIT 4 Industrial Safety: Safety Rules and Disciplines, Emergency Action Plan, Indian Factories Act, Fire training, Protections and Fire Drills, Case Study.   **(06 hrs)**

UNIT 5 Control of process, Prevention of losses, Pressure relief, Provision of firefighting equipment, Technology selection and transfer, choosing the right process Prevention of hazardous deviation in process variables :e.g., pressure, temperature flow by provision of automatic control systems-interlocks, alarms, trips together with good operating practices and management. Regulations and legislation.   **(08 hrs)**

COURSE OUTCOME:
> **CO 1.**Identify the common utilities required for Chemical Plant.
> **CO 2.**Express various types of boilers and their selection.
> **CO 3.** Analyse the importance of insulation and air pressure in process.
> **CO 4.**Identify and analyse the hazards.
> **CO 5.**Integrate the theoretical and practice knowledge to understand hazards activities.
> **CO 6.**Implement the safety designs and procedures.

TEXT BOOKS:
> 1. Perry, Chemical Engineers Handbook, 8th Edition, McGraw Hill.
> 2. Sinnot, R.K., Coulson and Richardson's Chemical Engineering- Vol 6, Pergamon,1996.
> 3. G. L. Wells, Safety in Chemical Process Industries, McGrawHill
> 4. Crowl, D.A. & Louvar, J.F.. "Chemical Process Safety: Fundamentals with Applications". New Jersey: PrenticeHall.(1989).

REFERENCE BOOKS:

1. Goodall, P. M., "The Efficient Use Of Steam" IPC Science and Technology (1980). Reference Books

2. Lees, F. P., "Loss Prevention in Process Industries 3 volume set" Butterwort - Heinemann, Oxford

3. Daniel A. Crow, Joseph F Louvar, "Chemical Process Safety, Fundamentals with Application", 2nd Edition, Prentice Hall, 2002.

OPENSOURCELEARNING:

http://nptel.ac.in/http://ocw.
mit.edu/courses/chemicalen
gineering/

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Name of Program: **Bachelor of Technology**

Branch: **Common to all Branches**   Semester: **VI**

Subject:: **Environment Pollution & Control**   Code: **C000648(019)**

Total Theory Periods: **40**   Total Tutorial: **Ten (Minimum)**

Class Tests: **Two (Minimum)**   Assignments: **2(Minimum)**

ESE Duration: **Three Hours**   Maximum Marks:**100**   Minimum Marks:**35**

PREREQUISITES: Knowledge of Ecology, Physics, Biology and Chemistry.

COURSE OBJECTIVES:
1. Understand various aspects of air pollution and its control method.
2. Procured knowledge of wastewater sources and their treatment methods.
3. Comprehensive understanding on noise pollution and its control techniques.
4. Illustrative knowledge on solid waste management system.
5. Understand the basic knowledge of radioactivity and their discharge methods.

COURSEDETAILS:

Unit 1: Air Pollution   **(05 hrs)**

Introduction, Source and classification of air pollutants, Meteorology and air pollution, Effect of air pollution on human health, animals & plants, Sampling procedures, Analytical methods, Control of air pollution by equipment.

Unit 2: Water Pollution & Control   **(05 hrs)**

Water resources, Origin of waste water, Types of water pollutants and their effects, Wastewater sampling and analysis, Basic process of water treatment, Recovery of materials from process effluents.

Unit3: Noise Pollution and Control   **(03 hrs)**

Definition of noise, Noise Characterization, Sources of noise, Health effect of noise, Measuring instruments and techniques, Noise standards and limits, Noise control techniques.

Unit 4: Solid Waste Management   **(03 hrs)**

Sources and classification, Public health aspects, Methods of collection, Disposal methods, Potential methods of disposal.

Unit 5: Radioactivity in the Environment   **(04 hrs)**

Introduction, Basic types of radiation, Radioactive decay, Discharge of radioactive materials into the sea, Personal monitoring, Maximum permissible doses.

On completion of each unit, students have to submit one assignment from every unit.

COURSE OUTCOMES:

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

   CO1. Acquire in-depth knowledge of sampling, analytical and control methods of air pollution.

   CO2. Demonstrate knowledge and understanding of types of wastewater, sampling methods and treatment processes.

   CO3. Detail acquaintance about sources of noise pollution and their measurement techniques.

   CO4. Minimize the solid waste discharge and understand the collection and disposal methods.

   CO5. Acquire a basic knowledge about radioactive material, waste and their monitoring systems.

   CO6. Complete knowledge of environmental problems in all areas with understanding of minimizing methods.

TEXT BOOKS:
1. G.N.Pandey and G.C.Carney, Environmental Engineering, Tata McGraw-Hill Publication.
2. G.S.Rao, Environmental Pollution Control Engineering, New Age International (P) Limited, Publishers.
3. S.P.Singal, Noise Pollution and Control Strategy, Narosa Publication House.
4. M.N.Rao and H.V.Rao, Air Pollution, Tata McGraw-Hill Publication.

REFERENCEBOOKS:
1. Gill LMc.,Haldan F.R., Air Pollution Handbook, Tata McGrawHill.

OPENSOURCELEAENING:

http://nptel.ac.in/http://ocw.mit.edu/courses/chemicalengineering/