MEWAR UNIVERSITY

Syllabus of

Value Added Courses

Session 2021-2022

Name of Course: Flexible Manufacturing system
Type of Course: Value Added Course
Course Code: ME-12022
Academic Year: 2021-22
Duration of course: 30 Hours

Introduction: FMS definition and classification of manufacturing systems, Automated production cycle, Need of flexibility, Concept of flexibility, Types of flexibilities and its measurement.

FMS Equipment: Why FMS, Factors responsible for the growth of FMS, FMS types and applications, Economic justification for FMS, Functional requirements for FMS equipments, FMS processing and QA equipment, e.g., turning and machining centers, Co-ordinate measuring machines, Cleaning and deburring machines, FMS system support equipment, Automated material handling and storage equipment, cutting tool and tool management, Work holding considerations, Fixture considerations in FMS environment.

Group Technology: GT concepts, Advantages of GT, Part family formation-coding and classification systems; Partmachine group analysis, Methods for cell formation, Use of different algorithms, mathematical programming and graph theoretic model approach for part grouping, Cellular vs FMS production. FMS related problem and Solution Methodology: · FMS design problems: Part assignment, Machine selection, Storage system selection, Selection of pallets and fixtures, Selection of computer hardware and software, designing for layout integration of machine storage, Material handling System and computer system, Communication networks.

Books:

1. Automation, Production System & Computer Integrated Manufacturing Groover Englewood

2. Design and Operation of SMS Rankey IFS

3. Flexible Manufacturing System Wernecks Spring-Verlag

4. FMS in Practice Bonctto Northox Ford

5. Flexible Manufacturing Cells and systems W.W. Luggen Prentice Hall India

Name of Course: Machine Vision
Type of Course: Value Added Course
Course Code: ME-22022
Academic Year: 2021-22
Duration of course: 30 Hours

Image capture and digitization; Image transforms; Digital Fourier transform; Fast Fourier transform; Other transforms; Convolution; Image enhancement; Spatial methods; Frequency domain methods; Image restoration.

Geometric transformation; Image compression; error free and lossy compression; Edge detection; Hough transform; Region based segmentation; image feature / region representation and descriptors; Morphological operators.

Feature based matching; Baye's classification; Low level vision; Introduction to stereopsis, Shape from shading; Optical flow; Rule based picture segmentation; tutorial exercise will emphasize development and evaluation of image algorithms.

Books:

1. Image Processing, Analysis and Machine Vision Milan Sanka, Vaclav Hlavac and Roger Boyle Vikas Publishing

2. Digital Image Processing Kenneth & Castleman Prentice Hall India

3. Digital Image Processing Conzalez RC & P Wint Addision Wesley

4. Digital Image Processing & Analysis Chandra and Mazumdar Prentice Hall India

Name of Course: Additive Manufacturing & Tooling
Type of Course: Value Added Course
Course Code: ME-32022
Academic Year: 2021-22
Duration of course: 30 Hours

Introduction: Historical developments, Fundamentals of RP Systems and its Classification, Rapid prototyping process chains, 3D modeling and mesh generation, Data conversion and transmission.

RP Systems: Liquid polymer based rapid prototyping systems, Teijin Seikis' solid form and other similar commercial RP systems, Solid input materials based rapid prototyping systems, laminated object manufacturing (LOM) and fused deposition modelling systems etc., Power based rapid prototyping systems, selective Laser sintering, Soligen Diren's shell production casting (DSPC), Fraunhofer's multiphase jet solidification (MJS) and MIT's 3D printing (3DP) etc.

RP Database: Rapid prototyping data formats, STL format, STL file problems, STL file repair, Network based operations, Digital inspection, Data warehousing and learning from process data.

RP Applications: Development of dies for moulding, RP applications in developing prototypes of products, application in medical fields, Development of bone replacements and tissues, etc., RP materials and their biological acceptability.

Books:

1. Rapid Prototyping Of Digital Systems: A Tutorial Approach Hamblen James O Kluwer Aca

2. Rapid Prototyping: Principles And Applications Kai Chua Chee World Science

3. Rapid System Prototyping With Fpgas: Accelerating The Design Process R C Cofer Newnes

4. Rapid Prototyping of Digital Systems James O Hamblen Springer

Name of Course: Advanced Power Plant
Type of Course: Value Added Course
Course Code: ME-42022
Academic Year: 2021-22
Duration of course: 30 Hours

Introduction to Power Plants and Boilers : Layout of Steam, Hydel, Diesel, MHD, Nuclear and Gas turbine Power Plants Combined Power cycles – comparison and selection, Load duration Curves Steam boilers and cycles – High pressure and Super Critical Boilers – Fluidised Bed Boilers.

Steam Power Plant: Fuel and ash handling, Combustion Equipment for burning coal, Mechanical Stokers. Pulveriser, Electrostatic Precipitator, Draught- Different Types, Surface condenser types, cooling Towers.

Nuclear and Hydel Power Plants: Nuclear Energy-Fission , Fusion Reaction, Types of Reactors, Pressurized water reactor, Boiling water reactor, Waste disposal and safety Hydel Power plant- Essential elements, Selection of turbines, governing of Turbines- Micro hydel developments.

Diesel And Gas Turbine Power Plant: Types of diesel plants, components , Selection of Engine type, applications-Gas turbine power plant- Fuels- Gas turbine material – open and closed cyclesreheating – Regeneration and intercooling – combines cycle.

Other Power Plants and Economics Of Power Plants: Geo thermal- OTEC- tidel- Pumped storage – Solar central receiver system Cost of electric Energy- Fixed and operating costs- Energy rates- Types tariffs- Economics of load sharing, comparison of various power plants.

BOOKS:
1. Arora S.C and Domkundwar S, "A Course in Power Plant Engineering", Dhanpat Rai, 2001
2. Nag P.K ,"Power Plant Engineering". Third edition Tata McGraw- Hill ,2007

INTRODUCTION TO DATA MINING

Data Mining: Introduction to Data Mining, How Data Mining Works, Data Mining Tasks, Data Mining Elements, Data Mining Architecture, Advantages, Disadvantages, **Data Pre Processing:** Introduction, Task of Data Pre-processing, Data Cleaning, Data Integration, Transformation. Data Reduction.

Data Mining Techniques: Introduction, Decision Tree, Clustering, Genetic Algorithms, Artificial Neural Networks

Data Warehouse: Introduction, Definition, Characteristics, Difference between Data Warehouse and Database System, Advantage and Disadvantages, Relationship between Data Mining and Data Warehousing.

Data Mining Techniques: Introduction, Decision Tree, Clustering, Genetic Algorithms, Artificial Neural Networks

Data Warehouse: Introduction, Definition, Characteristics, Difference between Data Warehouse and Database System, Advantage and Disadvantages, Relationship between Data Mining and Data Warehousing.

Data Warehouse Architecture : Data Warehouse Architectures, Overall and Typical Architecture, Three-Tier architecture, Problem in Three-Tier architecture, Goal of Data Warehouse Architecture, Frameworks of Data Warehouse, Data Warehouse back-end Tools and Utilities.

Data Mining Techniques: Introduction, Decision Tree, Clustering, Genetic Algorithms, Artificial Neural Networks,

Data Warehouse: Introduction, Definition, Characteristics, Difference between Data Warehouse and Database System, Advantage and Disadvantages, Relationship between Data Mining and Data Warehousing.

Components of Data Warehouse : Components of Data Warehouse, Meta Data, Introduction, Definition, Types of Meta data, Use of Meta Data, Data Marts, Access Tools, Data Warehouse Database

OBJECT ORIENED PROGRAMMING USING JAVA

Overview of fundamentals of object oriented programming, Introduction to Java: java history, Evolution of java, Java and internet, Java and world wide web, Java environment, Importance and Features of Java, Keywords, Constants, Variables and Data Types, Operators and Expressions, Decision Making, Branching and Looping, If-else, Switch, Operator, While, Do, For Statements, Labeled Loops, Jump Statements, Break, Continue, Return, Introducing Classes, Objects and Methods, Defining a Class, Adding Variables and Methods, Creating Objects, Constructors, Class Inheritance, Arrays and Strings: Creating an Array, One and Two Dimensional Arrays, String Array and Methods, String and String Buffer, Classes, Wrapper classes.

Inheritance, Basics Types, Using Super, Multilevel Hierarchy Abstract and Final classes, Object class, Packages and interfaces, Access protection, Extending Interfaces, Packages, Exception Handling, Fundamentals Exception Types, Uncaught Exceptions, Throw, Throw, Final, Built in Exception, Creating your own Exceptions, Multithreaded Programming: Fundamentals, Java Thread Model, Priorities, Synchronization, Messaging, Thread Class, Runnable Interface, Inter thread Communication, Suspending, Resuming and Stopping Threads, Hibernate, Principles of Object Relational Mapping, Hibernate configuration, Session Management, Flushing, Concurrency and Hibernate, Optimistic and Pessimistic Locking.

Input/ Output, Basics, Streams, Byte and Character Stream, Predefined Streams, Reading and Writing From Console and Files, Using Standard Java Packages (Lang, Util, Jo, Net), Networking, Basics, Networking Classes and Interfaces, Using java.net Package, Doing

TCP/IP and Datagram Programming, Programming with Java, J2ME architecture, Bluetooth Package Interface, Classes, Exceptions, Event Handling: Different mechanism, Event Classes, Event Listener Interfaces, Adapter and Inner Classes, Working with windows, Graphics and text, Using AWT controls, Layout managers and menus, Handling Image, Animation, Sound and video, Java Applet, Spring, Introduction of Spring Framework, Spring Architecture, Spring Framework Definition, Spring & MVC, Factory Pattern, Bean Factory,

J2EE: Introduction to J2EE, Building J2EE Applications, JDBC, Servlets and Web Applications, Java Server Pages and Model/View/Controller, J2EE Web Services Overview, Introduction to EJB, Session EJBs, Entity EJBs, JMS and message driven Beans, Transactions and Security, Application Servers, Web Services.

FULL STACK WEB DEVELOPMENT

HTML:- Introduction to HTML, Browsers and HTML, Editor's Offline and Online, Tags, Attribute and Elements, Doctype Element, Comments, Headings, Paragraphs, and Formatting Text, Lists and Links, Images and Tables.

CSS:- Introduction CSS, Applying CSS to HTML, Selectors, Properties and Values, CSS Colors and Backgrounds, CSS Box Model, CSS Margins, Padding, and Borders, CSS Text and Font Properties, CSS General Topics.

JavaScript:- Introduction to JavaScript, Applying JavaScript (internal and external), Understanding JS Syntax, Introduction to Document and Window Object, Variables and Operators, Data Types and Num Type Conversion, Math and String Manipulation, Objects and Arrays, Date and Time, Conditional Statements, Switch Case, Looping in JS, Functions.

ReactJS:-Introduction, Templating using JSX, Components, State and Props, Lifecycle of Components, Rendering List and Portals, Error Handling, Routers, Redux and Redux Saga, Immutable.js, Service Side Rendering Unit Testing, Webpack.

Node JS:- Node js Overview, Node js - Basics and Setup, Node js Console, Node js Command Utilities

Node js Modules

Node js Concepts

Node js Events

Node js with Express js

Node js Database Access

MongoDB:- SQL and NoSql Concepts, Create and Manage MongoDB, Migration of Data into MongoDB, MongoDB with PHP, MongoDB with NodeJS, Services Offered by MongoDB

Python:-

Learn the basics of python and use it to develop applications. Also learn to work with mongodb in python. This additional language is a value-added skill as python is increasingly in demand for full stack projects. In this module, you will learn:

Python Installation & Configuration, Developing a Python Application, Connect MongoDB with Python

CRYPTOGRAPHY

Computer Security: Introduction, Need of Security, Security approaches, Principle of Security,

Attacks on Computer : Attacks: A general and technical view, Active and passive attacks, Program that attacks: Virus, Worm, Trojan horse Applets, ActiveX controls, Cookies, Scripts, Preventing Virus, Specific attacks, Sniffing and Spoofing, Phishing, Pharming or DNS spoofing.

Cryptographic : Concepts and Techniques, Plain and Cipher Text, Substitution techniques, Caesar Cipher, Mono-alphabetic Cipher, Polyalphabetic substitution Cipher, Playfair Cipher, Transposition Techniques, Rail Fence Technique, Simple Columnar Transposition Technique, Vernam Cipher (One time pad),Encryption and Decryption **Symmetric and Asymmetric Key Cryptography,** Block and stream cipher, Overview of Symmetric Key Cryptography, Overview of Asymmetric Key Cryptography, Digital signature, Concept of message digests.

Internet Security Protocols, Basic concept, Introduction of TCP/IP, Brief Overview of, Secure socket layer (SSL),Secure Hyper Text Transfer Protocol (SHTTP),Time stamping Protocol (TSP),Secure Electronic Transaction (SET),**E-mail Security:** Introduction, SMTP, Brief Overview of Privacy Enhanced Mail (PEM),Pretty good privacy (PGP),Secure multipurpose secure Internet mail Extensions (SMIME)

Firewall, Introduction, Types of firewall, Packet filter, Application gateways, Concepts of DMZ, Limitation of firewall, Virtual Private Network (VPN),Intrusion

INTRODUCTION TO ROBOTICS

Introduction to robotics, classification of robots, workspace analysis, Manipulator

Kinematics: Convention for affixing frames to links – DH Representation, Derivation of Direct kinematic equations for various types of robots. Inverse Manipulator Kinematics: Solvability, algebraic vs. geometric, Pipers solution when three axes intersect, Examples of inverse manipulator kinematics, repeatability and accuracy.

Jacobians: Velocities and static forces: Linear and rotational velocity of rigid bodies, velocity propagation from link to link, jacobians, singularities, static forces in manipulators, jacobians in force domain, Cartesian transformation of velocities and static forces
Trajectory Generation: General consideration in path description and generation, joint space schemes, collision free path planning, Robot programming.

Sensing and vision – range sensors, proximity sensors, touch sensors, force and torque sensors – Low level and high-level vision. Robot intelligence and task planning

FRONT END WEB TECHOLOGY

Hyper Text Mark-up Language (HTML5):- Introduction HTML HTML Basics , HTML Elements , HTML5 Semantic , HTML Attributes , HTML Headings , HTML Paragraph , HTML Styles , HTML Formatting , HTML Quotations , HTML Computer Code , HTML Comments & Colours , HTML CSS, Links and Images , HTML Lists , HTML Blocks , HTML Classes , HTML Layout , HTML Responsive , HTML iframes , HTML JavaScript , HTML Head , HTML Entities and URI Code , HTML Symbols and XHTML , HTML Charset and Forms.

Cascading Style Sheets (CSS3):- Introduction CSS3 , CSS3 Syntax , CSS3 How To , CSS3 Colours , CSS3 Backgrounds , CSS3 Boarders , CSS Padding , CSS Height/Width ,CSS3 Gradients ,CSS3 Shadows , CSS3 Text , CSS3 Fonts , CSS3 2D Transforms , CSS3 3D Transforms ,CSS Links ,CSS Lists ,CSS Tables

, CSS Box Model ,CSS Outline , CSS Display ,CSS Max-width ,CSS Position CSS Float ,CSS Inline-block , CSS Align ,CSS Combinators , CSS Pseudo-class , CSS Pseudo-element ,CSS Navigation Bar ,CSS Dropdowns , CSS Tooltips , CSS3 Images , CSS Attr Selectors , CSS Forms , CSS Counters , CSS3 Animations , CSS3 Buttons , CSS3 Pagination , CSS3 Multiple Columns , CSS3 User Interface , CSS3 Box Sizing , CSS3 Filters , CSS3 Media Queries •,CSS3 Responsive.

JavaScript for Front-end:- Introduction to JavaScript , Java Script Language Basics , JavaScript Objects , JavaScript Scope , JavaScript Events , JavaScript Strings , JavaScript Numbers , JavaScript Math , JavaScript Arrays , JavaScript Boolean , JavaScript Comparisons , JavaScript Conditions, JavaScript Switch , JavaScript Loops , JavaScript Type Conversion , JavaScript RegExp , JavaScript Errors , JavaScript Debugging , JavaScript Hoisting , JavaScript Strict Mode , JavaScript Functions , JavaScript Objects , JavaScript Forms JavaScript HTML DOM , JavaScript BOM

Front-end Frameworks:-

Bootstrap:- Introduction to Bootstrap ,Bootstrap Basics , Bootstrap Grids , Bootstrap Themes , Bootstrap CSS , Bootstrap JS. **Angular JS:-** Introduction to AngularJS , AngularJS Expressions , AngularJS Modules , AngularJS Data Binding , AngularJS Scopes , AngularJS Directives & Events , AngularJS Controllers , AngularJS Filters , AngularJS Services , AngularJS HTTP , AngularJS Tables , AngularJS Select , Fetching Data from MySQL , AngularJS Validation , AngularJS API , AngularJS Animations , AngularJS i18n and i10n

Cloud Computing

Introduction: Cloud-definition, benefits, usage scenarios, History of Cloud Computing - Cloud Architecture Types of Clouds - Business models around Clouds – Major Players in Cloud Computing - issues in Clouds - Eucalyptus - Nimbus – Open Nebula, Cloud Sim.

Cloud Services: Types of Cloud services: Software as a Service - Platform as a Service – Infrastructure as a Service - Database as a Service - Monitoring as a Service – Communication as services. Service providers- Google, Amazon, Microsoft Azure, IBM, Sales force Collaborating Using Cloud Services: Email Communication over the Cloud – CRM Management - Project Management-Event Management - Task Management – Calendar - Schedules - Word Processing – Presentation Spreadsheet - Databases – Desktop – Social Networks and Groupware

Virtualization For Cloud: Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization –System Vm, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and Binary translation, HLL VM - Hypervisors – Xen, KVM, VMWare, Virtual Box, Hyper-V.

Virtualization For Cloud: Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization –System Vm, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and Binary translation, HLL VM - Hypervisors – Xen, KVM, VMWare, Virtual Box, Hyper-V.

Security, Standards And Applications: Security in Clouds: Cloud security challenges – Software as a Service Security, Common Standards: The Open C loud Consortium – The Distributed management Task Force – Standards for application Developers – Standards for Messaging – Standards for Security End user access to cloud computing, Mobile Internet devices and the cloud.

MACHINE LEARNING

INTRODUCTION: Two simple approaches to prediction-statistical decision theory-local methods in high dimensions-statistical models, supervised learning and function approximation-structured regression models- classes of restricted estimators- model selection and the bias–variance trade off.

LINEAR MODELS: Linear classification – univariate linear regression – multivariate linear regression – logistic regression – perceptron – multilayer neural networks – learning neural networks structures – support vector machines – soft margin SVM – going beyond linearity

DISTANCE BASED MODELS: Nearest neighbor models – K-means – clustering around medoids – silhouttes – hierarchical clustering – ensemble learning: bagging and random forests – boosting – meta learning.

TREE AND RULE MODELS: Decision trees – learning decision trees – ranking and probability estimation trees – regression trees – clustering trees – learning ordered rule lists – learning unordered rule lists. mage fusion-object recognition-text document clustering-handwritten digit recognition-image segmentation-spam email classification

INTERNET OF THINGS

INTRODUCTION TO IOT: Definitions and functional requirements – Vision and concept – identification – Open research issues – security and privacy – Components of Internet of Things: Control units – Sensors – Communication modules – Power sources. Communication technologies: RFID – Bluetooth – ZigBee – WiFi – RF Links –Wired Communication. Basics of sensors and actuators – Sensor technology – Actuators.

IOT ECOSYSTEM USING WIRELESS TECHNOLOGIES: Sensor data communication protocols – Radio frequency identification (RFID) technology – Wireless sensor networks technology – Architecture for IoT using mobile devices - Mobile technologies for supporting IoT ecosystem - Energy harvesting for power conservation in the IoT system - Data analytics – Knowledge acquiring, managing and storing processes

IOT REFERENCE ARCHITECTURE FOR ECOSYSTEM: Infrastructure and Service discovery protocols for the IoT Ecosystem: Introduction - Layered architecture for IoT - Protocol architecture of IoT - Infrastructure Protocols - Device or service discovery for IoT - Protocols for IoT service discovery. Device integration protocols and Middleware. Internet-based connection: 6LoWPAN, TCP / IP suite. Web communication protocols for connected devices – Message communication protocols for connected devices – Web connectivity for connected devices network using gateway, SOAP, REST, HTTP RESTful and web sockets.

PROGRAMMING THE MICROCONTROLLER FOR IOT: Arduino / equivalent Microcontroller platform: Microcontrollers – Development environment – Writing Arduino / equivalent software – Programming microcontroller for IoT. Reading from sensors – Connecting microcontroller with mobile devices: Communicating using Bluetooth and USB. Connecting microcontroller using Ethernet and WiFi. **FROM THE INTERNET OF THINGS TO THE WEB OF THINGS** : Designing RESTful smart things – Web-enabling constrained devices – The future Web of Things – Cloud computing: Basic services and architectures – Open cloud computing services for sensor management: COSM – Nimbits – Sensor Cloud. IoT cloud-based services using the Xively, Nimbits. Send data from microcontroller to cloud application –Case study: Big sensor data systems for smart cities– Other recent projects.

Introduction to Python Programming

Introduction to Python, use IDE to develop programs, Basic coding skills, working with data types and variables, working with numeric data, working with string data, Python functions, Boolean expressions, selection structure, iteration structure, Illustrative Programs, Exercises

Define and use functions and modules, working with recursion, Basic skills for working with lists, work with a list of lists, work with tuples, work with dates and times, get started with dictionaries, Illustrative programs, Exercises.

An introduction to file I/O, use text files, use CSV files, use binary files, Handle a single exception, handle multiple exceptions, Illustrative programs, Exercises, Object Oriented Programming, An introduction to classes and objects, define a class, work with object composition, work with encapsulation, work with inheritance, override object methods, Illustrative programs, Exercises

An introduction to relational databases, SQL statements for data manipulation, Using SQLite Manager to work with a database, Using Python to work with a database, Creating a GUI that handles an event, working with components, Illustrative programs, Exercises

INSTALLATION AND REPAIR OF CONSUMER ELECTRONICS PRODUCTS

UNIT I
LCD-LED TV and Monitor
Basic Principle, Working and Operation of LCDLED TV and Monitor, Installation, Repair Maintenance and Serving and Practice, Fault Diagnosis and Error Remover Techniques and Practices

Cable TV and DTH Services
Basic Principle, Working and Operation of Cable TV and DTH Services, Installation and Checking, Repair Maintenance, Serving and Practice, Fault Diagnosis and Error Remover Techniques and Practices

UNIT II
DVD Player and Home Theatre System
Basic Principle, Working and Operation of DVD Player and Home Theatre System, Installation, Repair, Maintenance, Serving and Practice, Fault Diagnosis and Error Remover Techniques and Practices.

FM Radio-Cordless Phone-Hair Dryer
Basic Principle, Working and Operation of FM Radio- Cordless Phone-Hair Dryer, Installation, Repair, Maintenance, Serving and Practice, Fault Diagnosis and Error Remover Techniques and Practices.

UNIT III
Induction Stove and Microwave Oven
Basic Principle, Working and Operation of Induction Stove and Microwave Oven, Installation, Repair, Maintenance, Serving and Practice, Fault Diagnosis and Error Remover Techniques and Practices.

Air-Conditioner
Basic Principle, Working and Operation of Air Conditioner, Installation, Repair, Maintenance, Serving and Practice, Fault Diagnosis and Error Remover Techniques and Practices.

UNIT IV
Soft Skills and Communication
Communication, verbal and non-verbal communication, Building professional relationship, Relationship at work , Making the most of personal and professional relationships, Competency Description, Managing Difficult Business Relationships,

Interview Techniques: Planning For the Interview, Preparing for an Interview, Interview Formats, Stages Of The Interview, Types Of Interview Questions

Best Bet for Interview Preparation: Mock Interviews, Benefits of Mock Interviews Experience & Skills,

Curriculum Vitae: Overview, types of CV, Covering letter, Writing a Resume, Acceptance Letter, Thank You Letter.

QUANTITY SURVEY AND VALUATION

Estimate– Basic terms, Types of estimate, Revised estimate– supplementary estimate, Maintenance estimate, Approximate estimate, Plinth area method– cubic rate method, Unit rate method, Bay method, Approximate quantity from bill method, Comparison method, Cost from materials and labour etc., Preparation of detailed estimate for buildings, Centre line method and long wall, Short wall method.

Methods of measurements of different items of work, Preparation detailed estimate for sanitary and water supply works, Roads, Irrigation works, Steel structures– doors and windows, R C C Structures, Preparation of bar bending schedule.

Detailed specifications for common building materials and items of work as per I.S specifications, Preparation of conveyance statement, Calculation of quantities of materials for items of work, Analysis of rate for items of works required for civil engineering works, Preparation of abstract of estimate of civil engineering works.

Valuation, Explanation of items, Types of values, Sinking fund, Years purchase, Depreciation, Straight line method, Constant percentage method, S.F method, Obsolescence, Valuation of real property, Rental method, Profit based method, Depreciation method, Valuation of land, Belting method, Development method, Hypothecated building scheme method, Rent calculation, Lease and lease hold property

Infrastructure Planning & Contract Management

Definitions of infrastructure; Typical infrastructure planning steps; Planning and appraisal of major infrastructure projects; Screening of project ideas; Life cycle analysis; Multi-criteria analysis for comparison of infrastructure alternatives; Procurement strategies; Scheduling and management of planning activities

Economic Analysis – Concepts and Applications, Principles of methodologies for economic analysis of public works, Social welfare function, indifference curves and tradeoffs, Demand curves and price elasticity's; Benefit-cost ratio and internal rate of return; Shadow pricing; Accounting for risk and uncertainty

Financial Evaluation - Time value of money, Investment criteria, Project cash flows – elements and basic principles of estimation, Financial estimates and projections, Cost of capital, Rate of return; Project risk analysis; Political and social perspectives of infrastructure planning; Case studies.

Construction Law - public law; Government Departments and Local Authorities; Private Law, Contracts, property law and building law. Unit –V Construction Contracts - Contract Specifications, types of contract documents used for construction, Contract Procurement - selecting a contractor, Introduction to BOT and BOOT projects, EPC contracts Price Adjustment: need for the formulae, comparison with previous system, Civil Engineering and building formulae, practical implications.

FOOD FERMENTATION TECHNIQUES

Fermented Foods Definition, types, advantages and health benefits

Milk Based Fermented Foods Dahi, Yogurt, Buttermilk (Chach) and cheese: Preparation of inoculums, types of microorganisms and production process

Grain Based Fermented Foods Soy sauce, Bread, Idli and Dosa: Microorganisms and production process

Vegetable Based Fermented Foods Pickels, Saeurkraut: Microorganisms and production process

Fermented Meat and Fish Types, microorganisms involved, fermentation process Probiotic Foods Definition, types, microorganisms and health benefits

QUALITY & SAFETY MANAGEMENT IN CONSTRUCTION

Introduction to quality; Importance of quality; Quality transition - quality control and inspection, quality assurance, total quality management; Evolution of quality management

Planning and control of quality during design of structures; Tools and techniques for quality management; Inspection of materials and machinery

Quality assurance in construction; Systems quality management; Quality standards/codes in design and construction; (ISO:9000)

Total quality management (TQM) - principles, tools and techniques. Introduction to safety; Safety and health programs in construction industry; Planning for safety provisions; Analysis of construction hazards and accidents; Unit – V Construction hazards and safety guidelines; Prevention techniques for construction accidents; Site management with regard to safety recommendations; Training for safety awareness and implementation; Construction safety and health manual.

MICROBIAL DIAGNOSIS IN HEALTH CLINICS

Importance of Diagnosis of Diseases Bacterial, Viral, Fungal and Protozoan Diseases of various human body systems, Disease associated clinical samples for diagnosis.

Collection of Clinical Samples How to collect clinical samples (oral cavity, throat, skin, Blood, CSF, urine and faeces) and precautions required. Method of transport of clinical samples to laboratory and storage.

Direct Microscopic Examination and Culture Examination of sample by staining - Gram stain, Ziehl-Neelson staining for tuberculosis, Giemsastained thin blood film for malaria Preparation and use of culture media - Blood agar, Chocolate agar, Lowenstein-Jensen medium, Mac Conkey agar, Distinct colony properties of various bacterial pathogens.

Serological and Molecular Methods Serological Methods - Agglutination, ELISA, immunofluorescence, Nucleic acid based methods - PCR, Nucleic acid probes

Kits for Rapid Detection of Pathogens Typhoid, Dengue and HIV, Swine flu Testing for Antibiotic Sensitivity in Bacteria Importance, Determination of resistance/sensitivity of bacteria using disc diffusion method, Determination of minimal inhibitory concentration (MIC) of an antibiotic by serial double dilution method

FOOD FERMENTATION TECHNIQUES

Fermented Foods Definition, types, advantages and health benefits

Milk Based Fermented Foods Dahi, Yogurt, Buttermilk (Chach) and cheese: Preparation of inoculums, types of microorganisms and production process

Grain Based Fermented Foods Soy sauce, Bread, Idli and Dosa: Microorganisms and production process

Vegetable Based Fermented Foods Pickels, Saeurkraut: Microorganisms and production process

Fermented Meat and Fish Types, microorganisms involved, fermentation process Probiotic Foods Definition, types, microorganisms and health benefits

BASICS OF EVENT MANAGEMENT

UNIT – I Why Event Management, Requirement of Event Manager, Analyzing the events, Scope of the Event, Decision-makers, Technical Staff, Developing Record-Keeping Systems, Establishing Policies & Procedures

UNIT – II Preparing a Planning Schedule, Organizing Tasks, Assigning Responsibility, and Communicating, Using the Schedule Properly, The Budget, Overall Planning tips, Checklists, Expert Resources, Computer Software Required.

UNIT – III Who are the people on the Event, Locating People, Clarifying Roles, Developing content Guidelines, Participant Tips, Reference Checks, Requirement Forms, Introduction, Fees & Honorariums, Expense Reimbursement, Travel Arrangements, Worksheets.

UNIT – IV Types of Events, Roles & Responsibilities of Event Management in Different Events, Scope of the Work, Approach towards Events

UNIT – V Introduction to PR – Concept, Nature, Importance, Steps, Limitations, Objectives Media – Types of Media, Media relations, Media Management PR strategy and planning – identifying right PR strategy, Brain Storming sessions, Event organization, writing for PR

Recommended Text:
1. Event Management: A Blooming Industry and an Eventful Careerby Devesh Kishore, Ganga Sagar Singh - Har-anand Publications Pvt. Ltd. -
2. Event Management by Swarup K. Goyal - Adhyayan Publisher - 2009
3. Event Management & Public Relations by Savita Mohan - Enkay Publishing House.

INTRODUCTION TO RETAIL MANAGEMENT

Course Objective: The objective of this paper is to familiarize the participants with concept and tools a d techniques of retail management and their application to solution of managerial problems

UNIT1: Introduction to Retail:

Retail Industry in India, Characteristic of Retailing, Function of Retailing, Categorizing retailers, Retail Channels, Retail Formats, Retail model & Theories, Ethical Issue in Retailing

UNIT2: Retail Market Segmentation:

Introduction to Market Segment, benefits of Market Segmentation, Criteria for Effective Segmentations, Dimensions of Segmentation, Targeting & Positioning, Market Targeting – Choosing Segment to Focus Customer Profile

UNIT3: Retailing Channels:

Products and Merchandise Management, the process of Retail Merchandising, Structure & Channels, Methods of Merchandise Procurement, Retail pricing & Evaluating Merchandise performance, Retail Franchising

UNIT4: Customer Relationship Management:

CRM Concept, CRM Relationship Management in Retailing, Customer Life cycle-B to B CRM functions – Market, Sales, Customer, Support Channel, Developing CRM Strategy, CRM Components

UNIT5: Retail Store Management:

Store Space Management, Color Planning, Physical Material in Store Designing, Servicing the Retail Customers, Retail Human Resource Management, Financial Aspect of Retail Management, Retail Information System, Supply Chain Management in Retailing

EMERGING INNOVATION, MODELS AND CHALLENGES IN SCM

Course Objective: A supply chain management plays an important role to know about the system of organizations, people, technology, activities, information and resources involved in moving a product or service from supplier to customer. It is beneficial to students to understand the concept of Supply chain activities of transforming natural resources, raw materials and components into a finished product that is delivered to the end customer

UNIT1: Introduction to Supply Chain Management:
Supply Chain-Objectives, Importance, Conceptual Model of SCM, SCM Division Phases & process, Elements of SCM, Logistic as a part of SCM, inbound & Outbound Logistic

UNIT2: Designing the Supply Chain Network:
Designing Supply Chain Network, Role of Distribution, Factor influencing Distribution, Design Option, Factors Affecting the Network Design Divisions

UNIT3: Designing & Planning Transportation Network:
Role of Transportation, modes & their Performance, Transportation Infrastructure & Policies, Design Options & their Trade off, Tailored Transportation, Inventory; Transportation & Information.

UNIT4: Inventory Management in Supply Chain:
Traditional Inventory Management, Inventory Models, EOQ Models, FOIS, FOQS, ORS, MRP, Just in Time Elements & benefits.

UNIT5: IT in Supply Chain Management:
Role of IT in a SCM, Needs, E-Business & its Impact on Supply Chain, Transaction Management

Introduction to GST

Course Objective: The objective of this subject is to expose the student to the various provision & fundamental understanding of GST relating to business product and processing.

UNIT-1

Introduction: concept of GST, its significance & limitation, Need for Tax Reforms, GST rate structure, type of GST, GSTIN.

Registration: Introduction, Registration Procedures, Special Person, Migration of Person, Amendments of Registration/Cancellation of Registration, impact of GST on Job work and electronic commerce.

UNIT-2

An overview of the integrated Goods & Services tax Act, 2017, inter-state supply, Intra-state supply, supply in territorial water, places of supply of goods, Zero rated supply, appointment of tax and settlement of fund, transfer of input Tax Credit, Authority and Power-Officer under the Act , Power of officers, Levy and collection of tax, offences penalties and prosecution.

UNIT-3

Valuation of GST: Transaction Value, Valuation Rules, Input Tax Credit: Introduction, concept of input service distribution, legal formalities for ISD, distribution of credit and claiming, Input Tax Credit for Capital Goods.

UNIT-4

Tax Invoice, Credit and Debit Note: Tax Invoice, Important Documents, Credit Note and Debit Note, Tax Invoice in Special Cases.

E-way Bill: Introduction, preparation of e-way Bill, important point for Transporter.

UNIT-5

Inter- State Goods & Services tax: Major advantage of IGST Model, salient features of Integrated GST.

Payment of Tax: Introduction, computation of tax, Liability, Tax Liability Register, Electronic credit Ledger, Electronic cash Ledger, Time of GST Payment, How to make payment, Challan Generation & CPIN, TDS, TCS

GST Portal: Introduction, GST council, GST Eco-System, GST Suvidha Provider (GSP), uploading Invoice.

Project Management: The Basics For Success

Course Objective
The objective of this paper is to familiarize the participants with concepts, techniques and skills of project management and control and their applications in business

UNIT 1:
Concept of Project; categories of projects; project development cycle; the concept of project management; tools and techniques of project management; forms of project organizations

UNIT 2:
Project identification, project formulation and preparation; market and demand estimation; market survey; demand forecasting; technical factors – material inputs, technology, production, plant capacity, location and site; civil works, charts, layouts, work schedule;

UNIT 3:
Cost of project, means of financing, estimates of cost, financial projections, technical, economic, financial, legal and social appraisal of industrial projects;

UNIT 4:
Problems arising due to rate of discount, wage rate; treatment of taxes; social cost benefits; treatment of risk and uncertainty; sensitivity analysis and probability approach – single as well as multiple projects

UNIT 5:
Project scheduling; network techniques for resource; cost budgeting and scheduling; project management teams and coordination; monitoring and post implementation; evaluation of the project; project financing

Basics of Digital Media

Course objectives:
1. Understand the history of computing, digital media, and the internet, along with the implications of that history and how it is told;
2. Understand and summarize major theories of digital media, including technological determinism, social determinism, and technological affordances;
3. Analyze digital communication, using key concepts like affordance, rhetorical choice, and audience;
4. Interrogate the implications digital media offers for communication today.

Unit 1:
What is the history of computing, digital media, and the internet? What are the implications of that history? What are the implications of how that history is told? What implications does that history have for digital communication today?

Unit 2:
How can we critically analyze communication messages made with digital media? How can we conceptualize the audience within a context of digital media? How can we account for the technological aspects of communication made with digital media?

Unit 3:
What affects who can speak and who can be heard online? How does a networked, many-to-many system affect communication with digital media? How do race, gender, and class affect who can speak and be heard through digital media?

Introduction to Financial Market

Course Objective: The objective of this paper is to familiarize the participants with the concepts of financial services and system prevailing in India.

UNIT 1- Financial System
An overview of Financial System, Financial Markets, Structure of Financial Market (Organised and unorganised market), Components of Financial System, Major Financial Intermediaries, Financial products, Functions of Financial System, Regulatory framework of Indian financial system, (Overview of SEBI and RBI-Role and importance as regulators).

UNIT 2- Commercial Banks, RBI and Development Banks
Concept of Commercial Banks- Functions, Investment Policy of Commercial Banks, Liquidity in Banks, Asset structure of commercial banks, Non-Performing Assets, Interest Rate Reforms, Capital Adequacy Norms, Reserve Bank of India- Organisation and Management, Role and Functions, Development Banks- Characteristics of Development Banks, Need and emergence of Development Financial Institutions in India, Functions of Development Banks.

UNIT 3- Insurance
Concept, Basic Characteristics of Insurance, Insurance Company Operations, Principles of Insurance, Reinsurance, Purpose and need of Insurance, Different kinds of Life Insurance Products, Basic Idea about Fire and Marine Insurance and Banc assurance

UNIT 4- Mutual Funds
Concept of Mutual Funds, Growth of Mutual Funds in India, Features and Importance Mutual Fund, Mutual Fund Schemes, Money Market Mutual Funds, Private School Mutual Funds, Evaluation of the Performance of Mutual Funds, Functioning of Mutual Funds in India.

UNIT 5- Lease Finance and Venture Capital Finance
Lease Finance- Meaning, definition and types of lease agreements; advantages and disadvantages from the point of view of lessor and lessee; purchase v/s leasing, borrowing v/s leasing; lease finance in India Venture Capital Financing – meaning, importance/need, scope of venture capital finance; venture capital v/s investors; Venture Capital in India

Financial Accounting: Fundamentals

Course Objective: The objective of this paper is to familiarize the participants with concepts, conventions and principles of accounting and financial analysis and their application in business firms

UNIT1: Introduction:
Accounting Meaning, Nature, Function, Usefulness of Accounting, Scope, Objectives, Accounting Vs Book Keeping

UNIT2: Conceptual Framework:
Accounting concept, Principle & Conventions, Accounting Standard-Concept, Objectives, Benefits, Brief Review of Accounting Standard in India, Accounting Policies, Accounting as a Measurement Discipline

UNIT3: Recording Transactions & Final Account:
Voucher System, Accounting Process, Journals, Subsidiary Books, Ledger, Cash Book, Trial Balance, Rectification of error, Bank reconciliation Statement, preparation of Trading and Profit & Loss Account and Balance Sheet

UNIT4: Depreciation:
Meaning, Need & Importance of Depreciations, Methods for Charging, Depreciation-Straight line method, reducing balance method, Depreciation Fund method, Annuity method

UNIT5: Analysis of Balance Sheet and Ratios:
Analysis of Financial Statement, Ratio Analysis, Solvency Ratio, Profitability Ratio, Activity Ratio, Liquidity Ratio, Market Capitalization Ratio, Comparative Balance Sheet & Trend Analysis of Manufacturing, Service & Banking organization

Foundation of Business Strategy

Course Objective: The objective of this paper is to familiarize the participants with concepts and techniques of strategy formulation and implementation and their applications in business

Unit 1
An Overview: Meaning, Concept, Need for Strategic Management, Levels at which Strategy Operate , Strategic Decision Making, School of Thought on Strategy Formation, Strategic Management Process, Role of Strategic Management in Business & Non Business Organization

Unit 2
Organization Appraisal & Strategy Formulation: Organization Dynamics and Structuring Organization Appraisals, Environmental Appraisal, Organization Capability Factor, Considerations in Organization Appraisal, Methods & Techniques in Organization Appraisal, SWOT Analysis Formulation-Generic Strategic Corporate Level Strategies & Business Strategies, BCG Matrix, GE Matrix, SPACE Approach, QSP Matrix & Strategic Planning

Unit 3
Strategy Implementation: Aspects, Structures for Strategies, Organization Design & Change, Organization System, Behavioral Implementation – leadership, Culture, Value & Ethics

Unit 4
Functional Implementation: Functional Strategies, Plans & Policies, Marketing, Financial, Personal Operations, Plans a Policies, Strategic Evaluation & Control

Unit 5
Evaluation & Control: An Overview of Strategic Evaluation & Control, Operational Control, Techniques of Strategic Evaluation & Control, Role of Organization System in Evaluation

Marketing in A Digital World

Unit-1

Digital Marketing Fundamentals , Marketing v/s Sales , Marketing Mix and 4 Ps, What is Digital Marketing, Inbound vs Outbound Marketing, Content Marketing, Understanding Traffic, Understanding Leads, Strategic Flow for Marketing Activities. Remarketing Strategies Remarketing Rules, Remarketing Tracking Code Linking Google Analytics, Designing Remarketing Budget Software.

Unit-2

YouTube Marketing, Advance Channel Navigation Video, Mobile Redirect Traffic to Website Post Upload Enhancements, Live Broadcasting Managing Playlists Managing Comments, Managing Messages, Monetization with Adsense Paid Youtube Channel, Channel Analytics Real Time Analytics.

Unit-3

Email Marketing , Content Writing Email Machine , The Strategy Email Frequency, Value Triggers in Email using 4Ps Sequence of Email Triggers Email Example, Topic Email Example, Intro Email Example ,Product Email Example, Secondary Value Email Example, Fear Email Example – Regret Email Example – Ask for Sales Email Example – Reinforcement Email Example – Offers Announcements Email Example – Urgency Email Example – Cross Sales Email Example, Re-Engagement Email Example – Buyer vs Consumer.

Unit-4

Marketing Automation, Marketing Automation Tools, Email, Campaigns, Email Auto responder, SMS Auto responder, Creating Landing Page, Lead Generation Strategy Capturing, Leads from Sources Website and List Management CRM Integration, Sales Integration Products, Integration Business Reporting Lead, Source Link Building Lead, Tracking Features, Web Hooks and Connectors Complete Automation Strategy.

Unit-5

Ecommerce and Payment Gateway, e-Commerce Business, Planning, e-Commerce, Remarketing Products, Understanding Coupon System Appointing Affiliates for Products Cross/Up/Down Selling Payment Gateway in India Application and Documentation Collecting Online Payment, Web Store using Payment Gateway, Web Fronts using Payment Gateway Invoice Payments through Emails, SMS Invoice Payments. Re-Marketing Strategies Re-Marketing Flow Email Re-Marketing Strategy Segmentation, Re-Marketing Strategy Facebook, Re-Marketing Google Ad words Re-Marketing Marketing Machine Bucket Filling Dynamic Re-Marketing for e-Commerce

Basic Concepts: Entrepreneurship

Course Objective: The objective of this paper is to familiarize the participants with concepts, techniques and skills of entrepreneurship and enable them to become successful entrepreneurs

Unit 1
Introduction: Definition of Entrepreneur, Internal & External Factors, Function of an Entrepreneur, Theories of entrepreneurship, Stages in Entrepreneurial Process

Unit 2
Promotion of a Venture: Opportunity Analysis, External Environmental Analysis Economic, Social & Technological, Legal Requirements of Establishment of a new Unit, Raising of Funds, Venture Capital Sources & Documentation Required

Unit 3
Entrepreneurial Behavior: Innovation & Entrepreneur, Entrepreneurial Behavior & Psycho Theories, Social Responsibility

Unit 4
Entrepreneurial Development Programme: Entrepreneurial Development Programme, their Role, Relevance & Achievements, Role of Government in Organizing Entrepreneurial Development Programme, Critical Evaluation

Unit 5
Role of Entrepreneur: Role of Entrepreneur in Economic Growth as an Innovator, Generation of Employment Opportunity, Bringing about social stability, Role in Export Promotion & Import substitution, International Entrepreneurial Opportunities, Forex Earnings.

Market Research and Consumer Behavior

Course Objectives
1. To give the students a perspective to understand the application of market research in framing effective marketing strategies.
2. To understand consumer behaviour in an informed and systematic way.
3. To analyse personal, socio-cultural, and environmental dimensions that influence consumer decisions making.
4. To enable students in designing and evaluating the marketing strategies based on fundamentals of consumer buying behaviour.

Unit I: Market Research: Concept and significance; Types of Research; Research approach and Process; Consumer research paradigms; Combining qualitative and quantitative research; Sampling, Data – Types and Collection; Questionnaire and Schedule; Scaling Techniques; Data analysis & reporting research findings; Barriers to market research.

Unit II: Consumer behavior: Concept and Implications; Integration of consumer behavior in the marketing concept; Consumer Decision Making Process; Levels of consumer decision making; Types of Consumer Decision Making.

Unit III: Key Determinants of Consumer Behaviour and Marketing Strategy; Providing Customer Value and Retention; Market segmentation: Concept, Bases and Significance; How market segmentation operates; Criteria for effective targeting of market segments; Target Marketing strategies.

Unit IV: Consumer Motivation; Dynamics of Motivation, type and systems of needs; Personality and theories of personality (relevant to marketing); Consumer diversity; Self and self-image; Consumer Perception; Dynamics of perception and consumer imagery; Consumer Learning; Behavioral and cognitive learning theories; Consumer Attitude; Attitude formation and behavior; Communication and consumer behavior.

Unit V: Consumer Influence and the Diffusion of Innovations; Opinion Leadership, WOM, e-WOM. New times, new consumers; Managing Consumer Dynamics; Consumer decision making and beyond; Consumer Satisfaction and Dissatisfaction: Mechanism; Managing Post-purchase behavior.

Basics of Accounting

UNIT – I Purpose of Accounting and its. Place in Business, Limitations, Relationship with other Financial Areas. Advantages & Importance.
Basic Accounting Concepts and convensions : Money Measurement Concept, Entity Concept, Going Concern Concept, Cost Concept, Dual Aspect Concept, Accrual Concept, Conservatism, Materiality Concept, Consistency concept, and accounting convensions

UNIT – II Accounting Structure : Process of Accounting Journal, Ledger and Trial Balance Errors & their rectification based on Double Entry Book-Keeping System.
Bank Reconciliation statement.

UNIT – III Preparation of Financial Statements : Form and Preparation of Income Statement and Statement of Financial Position, Adjustments.

UNIT – IV Accounting for Deprecation and its importance in decision making.-Fixed Installment Methods & Reducing Balance Methods.

UNIT- V Preparation of final accounts of Joint stock companies and overview of Indian and International accounting standards.

Fundamentals of Marketing Management

Course Objective: The objective of this paper is to familiarize the participants with concepts, Techniques and skills of marketing and their applications in business

UNIT1: Intro to marketing
Nature, Scope & importance of Marketing, basic concepts, function of marketing, marketing Vs Selling, role & functions of Marketing Manager, Marketing Environment

UNIT2: Market Segmentation, Targeting & Positioning:
Meaning, Definition, Different ways to Segment Market, Bases for Market Segmentation, Targeting- Meaning & Procedure, Positioning- Meaning, Usefulness, Product Positioning Strategy

UNIT3: Product, Pricing & Marketing Mix:
Marketing Mix, Product – Concept, Product Decision, New Product Development, New Product Planning & Development, Product Mix, Product Life Cycle, Pricing – Objective, Decision, Method of Setting Pricing, Pricing Strategies

UNIT4: Promotion Mix & Physical Distribution Decision:
Meaning, Element of Promotion Mix – Advertising, Publicity, Sales Promotion, Personal Selling, Direct Marketing & Public Relation, Physical Distribution (Place) – Meaning, Type of Channels

UNIT5: Management Information System & Marketing Research:
Concept & components of MIS, Marketing Research – Meaning & Scope, Marketing Research Procedure, Need for Marketing Research, Green Marketing

Industrial Relation

Objective: to enlighten the students with the Concepts and Practical applications of Industrial Relations.

Unit – I: Industrial Relations: Scope and Significance – Causes and Consequences of Industrial Disputes – Recent Trends in Industrial Relations

Unit—II: Trade Unions: Trade Union Structure and Movement in India – Changing Role in the Context of Liberalisation

Unit – III: Promotion of Harmonious Relations – Machinery for Prevention and Settlement of Industrial Disputes – Conciliation – Arbitration and Adjudication – Code of Discipline.

Unit-IV: Grievances and Discipline: Grievances Redressal Machinery – Discipline in Industry _ Measures for dealing with Indiscipline.

Unit – V: Collective Bargaining (CB) – CB Practices in India – Participative Management Forms and Levels – Schemes of Workers' Participation in Management in India.

SUBSTATION DESIGN

UNIT-I: INTRODUCTION

Background, Need Determination, Budgeting, Financing, Traditional and innovative Substation Design, Site Selection and Acquisition, Design, Construction and Commissioning Process

UNIT-II: HIGH VOLTAGE SWITCHING EQUIPMENT

Ambient conditions, Disconnect switches, Load Break switches, high speed grounding switches, power fuses, circuit switches, circuit breakers.

UNIT-III: TYPES OF SUBSTATIONS & BUS/SWITCHING CONFIGURATIONS

Transmission substation, distribution substation, collector substation, switching substations, gas insulated substations, air insulated substations, bus configurations: single bus, double bus, double break, main and transfer bus, double bus, single breaker, ring bus, break-and-a-half, Comparison of configurations.

UNIT-IV: DESIGN OF SUBSTATION GROUNDING AND PROTECTION

Reasons for substation grounding system, accidental ground circuit, Design criteria-Actual Touch and step voltage, soil resistivity, grid resistance, grid current, use of the design equations, selection of conductors, grounding fence, other design considerations. Lightning stroke protection-lightning parameters, empirical design methods. Substation fire protection-Fire hazards, fire protection measures, fire protection selection criterion.

PCB DESIGN

Introduction to Printed circuit board: fundamental of electronic components, basic electronic circuits, Basics of printed circuit board designing: Layout planning, general rules and parameters, ground conductor considerations, thermal issues, check and inspection of artwork.

Design rules for PCB: Design rules for Digital circuit PCBs, Analog circuit PCBs, high frequency and fast pulse applications, Power electronic applications, Microwave applications,

Introduction to Electronic design automation(EDA) tools for PCB designing: Brief Introduction of various simulators, SPICE and PSPICE Environment, Selecting the Components Footprints as per design, Making New Footprints, Assigning Footprint to components, Net listing, PCB Layout Designing, Auto routing and manual routing. Assigning specific text (silkscreen) to design, Creating report of design, creating manufacturing data (GERBER) for design.

Introduction printed circuit board production techniques: **Module IV: (6 hrs.):** Photo printing, film- master production, reprographic camera, basic process for double sided PCBs photo resists, Screen printing process, plating, relative performance and quality control, Etching machines, Solders alloys, fluxes, soldering techniques, Mechanical operations.

PCB Technology Trends: Multilayer PCBs. Multiwire PCB, Flexible PCBs, Surface mount PCBs, Reflow soldering, Introduction to High-Density Interconnection (HDI) Technology.

PCB design for EMI/EMC: Subsystem/PCB Placement in an enclosure, Filtering circuit placement, decoupling and bypassing, Electronic discharge protection, Electronic waste; Printed circuit boards Recycling techniques, Introduction to Integrated Circuit Packaging and footprints, NEMA and IPC standards,.

Repairing of Mobile & Mobile Charger

Unit I

Introduction to mobile phones, Generations of mobile phones, FHSS networks, GSM, Spread spectrum, CDMA, TDMA & Basic electronics components.

Unit II

Handset Specific operating systems, Handset features & applications, working principle of mobile handset & Components used in mobile handsets.

Unit III

Tools & equipment used for repairing & maintenance of mobile handsets, types of power supply & batteries, boosting a battery, Troubleshooting basics.

Unit IV

Network problems, Power failure (dead), Mobile phone hardware troubleshooting (water damage, hanging, charging & keypad problems), Handsets assembly & disassembly, Soldering & desoldering & SMD rework station.

Unit V

BGA IC's, Basics of Computer, Installation of software, Flashing, PC based diagnostic tools, mobile sets formatting, used of secret codes.

Unit VI

Mobile softwares, Data cable, Card reader, Mobile display, Remove/replace Component & Mobile phone hardware troubleshooting (Troubleshooting through circuit diagram, transmission, transmitter filter, microphone, reception, Antenna, RF power amplifier, local oscillator, Audio IC, speaker, charger etc.).

Unit VII

Reading & writing skills, Communication skills, Time management skills, Team skills, Safety &Security.

Repairing, Maintainece & Connections of Industrial Appliances

UNIT-1

Demonstrate Rewinding's, Repairing, Maintainece and Testing of various DC motor & DC Generator: - Study about the cut-section of DC motor & Generator and its internal Parts. Install, test and run of an electric DC motors. Install & test a DC Generator and M.G. set. Demonstrate Magnetism and classification of magnets, care and maintenance, methods of magnetizing & magnetic materials. Demonstrate electromagnetism, cork screw rule, right hand rules. Faradays laws, Lenz's law and Principle and Application of D.C. motor and generators.

UNIT-2

Demonstrate Rewinding's, Repairing, Maintainece and Testing of single phase & Three Phase transformer: - Study about the cut-section of 1-Phase & 3-Phase Transformer and its internal Parts. Perform the various tests on 1-Phase & 3-Phase and study of various three phase connection of 3-Phase Transformer.

UNIT-3

Demonstrate Rewinding's, Repairing, Maintainece and Testing of Induction Motor & Synchronous Motor: - Study about the cut-section of Induction Motor & Synchronous and its internal Parts. Demonstrate Principle of Single phase and three phase motor and its application. Install and test an electric single phase AC motors and An electric 3 phase motor by a D.O.L. starter.

Agricultural Waste Management

Theory

UNIT-1

Introduction to agricultural waste management, Nature and characteristics of agricultural waste and their impact on the environment, Kinds of wastes, Classification, role of soil and plants in waste management,

UNIT-2

sources of waste, impact of waste on soil and plant quality, Biological processes of waste management, Utilization and Recycling of Agricultural waste, Potential of Recyclable Crop Residues and its management,

UNIT-3

In-situ management of agriculture waste, Composting and Vermicomposting for bio conservation of biodegradable waste, Biogas Technology, Agricultural waste and water, air and animal resources,

UNIT-4

Impacts of waste on human, animal health and environment. Management of bedding & litter, wasted feed, run-off from feed lots and holding areas and waste water form dairy parlors, agro-waste recycling through farming system, waste management machineries, environmental benefit of waste management.

Practical

1. Collection and preparation agricultural waste sample.
2. Determination of pH, EC, CECe, heavy metals, BOD, COD, TSS, TDS, NH_4, Total P, and dissolved reactive P. Nutrient status (N, P, K, secondary and micronutrients) analysis of agricultural waste.
3. Waste management equipment operation, Maintenance and safety hazards, computer software and models.
4. Survey of different agri waste from live stock, dairy, poultry, food processing, fruit & vegetable and agri-chemicals,
5. Preparation of compost, Vermicomposting, biogas and analysis of compost.

Mushroom Culture

UNIT-1

Introduction to mushrooms fungi - nutritional value, edible and poisonous types, edible mushrooms, Pleurotus, Volvariella and Agaricus, medicinal value of mushrooms,

UNIT-2

Construction cultivation room/structure and Disinfection. Compost preparation & pasteurization. Procurement of mother culture and spawn preparation.

UNIT-3

Procurement of casing soil and preparation for production. Mushroom seeding, Casing with soil and maintenance,

UNIT-4

Harvesting, processing, Grading, packing, marketing and Cost economics of mushroom culture.

Nursery Management

UNIT – I

Introduction, Importance, Development. **Establishment of Nursery** -: Selection of site- Location, Soil and climate for Nursery, Topography, Wind, Elevation of Nursery place, Irrigation and Drainage facilities, Transportation and Marketing facilities, Labour facilities, Situation of Nursery , Free from all types of insects and diseases, Soil and preparation of Nursery.

UNIT II

Lay out of Nursery-: Bed Department, Construction Department, Water management Department, Residential Department, Mother plants Department, Roads and Paths Department. **Types of Nursery** -: Multipurpose or mixed Nurseries, Monopurpose or General Nursery, Specialized Nursery, Attached or auxiliary or subsidiary nursery.

UNIT III-

Location of Nursery -: Scientific layout of Nursery, Collection of mother plant and their management, Source of available root stocks and their proper utilization , Testing and processing of seeds viability or seeds survival, Use of standard methods of plant propagation , Proper management of seed or storage , Arrangement of good selling, Proper testing facilities , Arrangement of Training and Demonstration, Arrangement of nursery exhibitions .

UNIT IV -

 Present location of Nursery in India, Suggestions for maximization of Nursery. **Nursery Management** -: Plant propagation, Sexual propagation (seed), Asexual propagation – Introduction ,Division- suckers, runners, crown, rhizome, corm, tubers, bulb, bulbil, stolen, offset. Rootage- cutting, layering. Graftage- approach grafting, whip, tongue, cleft, saddle, side, veneer, bark, buttressing, epicotyle, bridge, double, Top working, Double working, Frame working.

UNIT V -

Plant growth regulators -: Introduction, Types- Auxins, Gibberellins, Cytokinins, Abscisic acid, Ethylene. Methods.**Green house** – Definition, Origin, Preparation, Structure, Types, Advantage.**Polly House** – Introduction, Structure, Size, Method, Advantage.

Post-harvest Management and Value Addition of Fruits and Vegetables

Theory

UNIT-1.

Importance of fruits and vegetables, extent and possible causes of post harvest losses; Pre-harvest factors affecting postharvest quality, maturity, ripening and changes occurring during ripening; Respiration and factors affecting respiration rate;

UNIT-2.

Role of ethylene; Post harvest disease and disorders; Heat, chilling and freezing injury; Harvesting and field handling; Storage (ZECC, cold storage, CA, MA, and hypobaric); Value addition concept;

UNIT-3.

Principles and methods of preservation; Intermediate moisture food- Jam, jelly, marmalade, preserve, candy – Concepts and Standards; Fermented and non-fermented beverages. Tomato products- Concepts and Standards;

UNIT-3.

Drying/ Dehydration of fruits and vegetables – Concept and methods, osmotic drying. Canning -– Concepts and Standards, packaging of products.

Practical

1. Applications of different types of packaging containers for shelf life extension.
2. Effect of temperature on shelf life and quality of produce.
3. Demonstration of chilling and freezing injury in vegetables and fruits.
4. Extraction and preservation of pulps and juices.
5. Preparation of jam, jelly, RTS, nectar, squash, osmotically dried products, fruit bar and candy and tomato products, canned products.
6. Quality evaluation of products -- physico-chemical and sensory.
7. Visit to processing unit/ industry.

VERMICULTURE

UNIT 1

1. Introduction to vermiculture, definition, classification, history, economic important, their value in maintenance of soil structure.

2. Its role in bio transformation of the residues generated by human activity and production of organic fertilizers.

3. Choosing the right worm. Useful species of earthworms. Local species of earthworms. Exotic species of earthworms.

4. Biology of *Eisenia fetida*.

   a) Taxonomy Anatomy, physiology and reproduction.

   b) Vital cycle of *Eisenia fetida*: alimentation, fecundity, annual reproducer potential.

UNIT 2

5. Limit factors (gases, diet, humidity, temperature, PH, light, and climatic factors).

6. Physio- chemical parameters of vermicompost

7. Different Methods of Vermicomposting: Small- and large-scale Bed method, Pit method Small Scale Earthworm farming for home gardens - Earthworm compost for home gardens

8. Conventional commercial composting - Earthworm Composting larger scale

9. Pest and diseases of earthworms. Frequent problems. How to prevent and fix them. Complementary activities of auto evaluation.

10. Nutritional Composition of Vermicompost for plants, comparison with other fertilizer.

UNIT 3

11. Earthworm Farming (Vermiculture), Extraction (harvest), vermicomposting harvest and processing. Earthworm Farming (Vermiculture), Extraction (harvest), vermicomposting harvest and processing.

12. Vermiwash

13. Small Scale Earthworm farming for home gardens

14. Conventional commercial composting

15. Earthworm Farming (Vermiculture), Extraction (harvest), vermicomposting harvest and processing.

16. Harvesting, packaging, transport and storage of Vermicompost and separation

PRACTICAL

Scientific classification of Earthworm

Study of external morphology of Earhworm

Study of habit and habitat of Earhworm

Study of Digestive system of earthworm

Study of Reproduction of earthworm

Vermicomposting unit Pit method

Establishment of vermicomposting unit Bed method

Establishment of vermiwash unit

Vermicompost production, harvesting and packaging.

Study of cocoon and vermicast

Study of Pests and diseases of Earthworms