



Government of Kerala
Department of Education

VOCATIONAL HIGHER SECONDARY EDUCATION (VHSE)

SYLLABUS

Second Year



**State Council of Educational
Research and Training (SCERT)**

Vidyabhavan, Poojappura, Thiruvananthapuram - 695 012

Courses

- 1 **Accounting and Taxation**
 - 2 **Agri -Business and Farm Services**
 - 3 **Agriculture - Crop Health Management**
 - 4 **Agriculture Science and Processing Technology**
 - 5 **Agro Machinery and Power Engineering**
 - 6 **Aquaculture**
 - 7 **Automobile Technology**
 - 8 **Banking and Insurance Services**
 - 9 **Basic Nursing and Palliative care**
 - 10 **Bio Medical Equipment Technology**
 - 11 **Civil Construction Technology**
 - 12 **Computer Science and Information Technology**
 - 13 **Computerised Office Management**
 - 14 **Cosmetology and Beauty Therapy**
 - 15 **Crèche and Pre-school Management**
 - 16 **Customer Relationship Management**
 - 17 **Dairy Technology**
 - 18 **Dental Technology**
 - 19 **ECG & Audiometric Technology**
 - 20 **Electrical and Electronics Technology**
 - 21 **Electronics and Communication Technology**
 - 22 **Fashion and Apparel Designing**
 - 23 **Food and Restaurant Management**
 - 24 **Graphic Design and Printing Technology**
 - 25 **Livestock Management**
 - 26 **Marine Fisheries & Seafood Processing**
 - 27 **Marine Technology**
 - 28 **Marketing and Financial services**
 - 29 **Medical Laboratory Technology**
 - 30 **Physical Education**
 - 31 **Physiotherapy**
 - 32 **Polymer Technology**
 - 33 **Refrigeration and Air-Conditioning**
 - 34 **Textile Technology**
 - 35 **Travel and Tourism**
 - 36 **Entrepreneurship Development (Non Vocational)**
 - 37 **Management (Non-vocational)**
-

ACCOUNTING AND TAXATION

MODULE 3 - COMPUTERISED ACCOUNTING

Unit 3.1 Introduction to Computerised Accounting (10 periods)

Accounting system-need and benefits of Computerized Accounting-transition from Manual Accounting to Computerized Accounting- list of Accounting softwares.

Unit 3.2 Fundamentals of tally ERP9 (20 periods)

Features of tally- Tally versions -Tally ERP9- requirements for installing tally- steps for installing tally-benefits of tally-tally licensing-gateway of tally/screen components of tally- company creation-select and shut -split company data-Alt company-F12 configuration.

Unit 3.3 Basic Accounting Information in Tally (30 periods)

Menu related to accounts - groups - predefined groups - managing groups - creating groups and sub group - display, alter and delete groups - multiple groups - ledgers - single ledger creation, display, alt and delete - multiple ledger creation, display and alt.

Unit 3.4 Accounting vouchers in Tally (60 periods)

Voucher types - configuring vouchers-creating vouchers-display, alt, duplicating and cancelling of vouchers-predefined vouchers.

Unit 3.5 tax Accounting in Tally (60 periods)

Enabling VAT (VAT must be replaced with GST when GST is implemented and incorporated in Tally)-Enabling TDS in tally-Enabling Service Tax in tally.

Unit 3.6 Cost centres and inventory information (60 periods)

Cost categories and cost centres-create, display, alter and delete cost category-cost centre-create, display, alt and delete cost centres-accounts with inventory- stock group- stock category-stock item- godown-units of measures.

Unit 3.7 Orders, invoices and reports (50 periods)

Purchase order- sales order-invoice-cheque printing-trial balance-balance sheet-profit and loss account-day books-bank reconciliation statement.

Unit 3.8 QuickBooks (50 periods)

Introduction to Quick Books-features of QB-uses of QB-set up company accounts- QB centre -setup taxes- -Set up customer -create new customer-utility button -reports related to customers-Set up suppliers -create a new supplier-utility button-report related to suppliers- chart of accounts-working with transaction-reports in QB-customizing reports.

SYLLABUS

MODULE 4 - TAXATION

Unit 4.1 Introduction to Taxation (20 periods)

Meaning of Tax - Need for tax - Classification of tax - Meaning of Cess and Surcharge

Unit 4.2 Income Tax (100 periods)

Meaning of Income Tax-Income Tax Act 1961-Income Tax Rule 1962-basic terms - General

charging section - Residential status and scope of Income Tax -Heads of income - exempted incomes under sec10(fully exempted only) - Computation of income under the head salary - Computation of GTI - PAN - Deductions - Computation of total income - Income tax rates-computation of tax.

Unit 4.3 Advance tax, TDS and Tax Returns (100 periods)

Advance tax -TDS - Income Tax assessment - Income Tax returns - E-filing.

Unit 4.4 Value Added Tax(vat must be replaced with gst when gst is implemented) (100 periods)**

VAT - Basic terms used in KVAT -Input VAT and output VAT - VAT schedules - VAT rates - Presumptive VAT - Compounding of tax - Input tax credit- Computation of VAT - Procedure for e_filing of VAT returns - Liability for registration - Procedure for registration - The CST

Unit 4.5 Other Indirect Taxes (this chapter must be replaced with GST when GST is implemented) (20 periods)**

Service Tax - Excise Duty - Customs Duty



AGRI BUSINESS AND FARM SERVICES

MODULE 3 AGRI-BUSINESS ENTERPRISES

UNIT-1 INTRODUCTION TO AGRI-BUSINESS (10 Periods)

Definition of agri-business, importance, basic concepts, scope of agri-business, entrepreneurial opportunities in agri-business, decision making in Agri-business ,steps in farm planning.

UNIT 2 MAJOR ENTERPRISES (210 Periods)

a) **Landscaping** (65 Periods)

Importance and scope, basic principles of landscaping, classification of ornamental plants, garden types, garden components, principles of garden design and layout.

b) **Commercial nursery** (35 Periods)

Basic concepts of commercial nursery, scope, types, establishment of nursery, layout, records, major activities.

c) **Protected cultivation practices** (70 Periods)

Definition of protected cultivation, importance, types-polyhouse, rain shelter, greenhouse, establishment of protected cultivation structures, agrotechniques, emerging trends-Good Agriculture Practices (GAP), organic certification.

d) **Post harvest handling and value addition** (40 Periods)

Post harvest handling of flowers, improvement of vase life, post harvest handling of fruits, postharvest handling of vegetable, value addition of flowers - flower arrangement, dry flower making, value addition of fruits- preparation of jam/jelly/squash, value addition of vegetables- preparation of pickles/sauce

UNIT 3 OTHER ENTERPRISES (120 Periods)

- a) Tissue culture- basic principles, media, equipment, steps, tissue culture techniques of banana
- b) Mushroom cultivation
- c) Vermicomposting
- d) Indoor gardening- suitable plants, care and maintenance
- e) Bonsai- basics of bonsai making, styles
- f) Apiculture
- g) Sericulture
- h) Vegetable seedling production
- i) Vertical gardening, Aquaponics

MODULE 4

FARM SERVICES

UNIT 1. AGRI CLINICS

(140 Periods)

Definition - concept and necessity of agri clinics - objectives of agri clinic - functioning of agri clinic - infrastructure required - procedure of pest and disease diagnosis - diagnosis and management of major pest and diseases of rice, coconut, rubber, pepper, ginger, cassava, banana, tomato, brinjal, chilli, cucurbitaceous vegetables, cowpea, amaranthus, bhindi, cabbage, rose, anthurium, orchid, jasmine - plant protection in polyhouse.

UNIT 2. AGRI INPUT CENTRES

(70 Periods)

Concept and scope of agri input centres - formalities for starting an agri input centre - types of inputs in agriculture - consumable inputs and capital inputs - supply chain management - marketing strategies.

UNIT 3. FARM MACHINERY AND PLANT PROTECTION EQUIPMENTS

(80 Periods)

Scope of farm mechanization - farm machineries used for cultivation, harvesting, intercultural operations, harvesting and post harvest operations, plant protection equipments, homestead farming – maintenance of plant protection equipments.

UNIT 4. FARMER SUPPORT SERVICES

(50 Periods)

Government agencies and major NGOs supporting farmers - important schemes - ICT - enabled support.

AGRICULTURAL SCIENCE & PROCESSING TECHNOLOGY

MODULE III

APPLIED AGRICULTURAL TECHNOLOGY

Unit 1 Hi-Tech Agriculture (69 periods)

Protected cultivation - definition - advantages – scope and constraints in Kerala – Green House/ poly house– definition – classification based on shape, structure and cladding material – components of green house - Growing media and bed preparation- list of crops cultivated commonly in protected cultivation- drip irrigation, fertigation- automated climate regulation in protected cultivation - Mistifiers, foggers- cultivation practices of yard long beans, cucumber and rose- rain shelter cultivation-New trends in high-tech agriculture techniques like aquaponics, aeroponics and other soil less cultivation practices.

Unit 2 Organic farming and certification (55 periods)

Concept - importance with reference to global scenario – scope in Kerala – organic farming principles and practices - Organic plant nutrient management ,compost, biofertilizers ,Organic plant protection, Biocontrol agents, Botanicals- plant growth promoting preparations- Organic certification procedure – agencies involved.

Unit 3 Food safety measures and Certification (72 periods)

International scenario on food safety -FSSAI – Good Agricultural Practices -GAP definition, objectives, principles and certification- GLOBALGAP -HACCP—GMP -GHP- Hazards associated with production flow-biological, physical and chemical -residual toxicity - Maximum residue limit – waiting period concepts – Biomagnification hazards. Pesticide residue elimination methods of common food materials with special emphasis to fruits and vegetables.

Unit 4 Agri- Enterprises (84 periods)

Mushroom cultivation –Spawn production and Cultivation of oyster mushroom- Value addition in mushroom-Apiculture – Importance and Scope- Honey bee species- Honey bee castes, General Apiary management Practices- collection of Honey - value added products from Bee keeping- pest and disease.-Sericulture Technology-Vegetable seed Production-Landscaping-Basic principles of landscape design- Lawn making– After care and management-Flower arrangement

Unit 5 Farmer Support Services (60 periods)

Services from Krishibhavan - agriclincs - Concept of IPDM-Identification of pest – Nature of damage and diseases–symptoms and management – Rice, Coconut, Rubber, Banana, Mango, Cashew, Pepper, Solanaceous vegetables – cucurbits – cowpea Amaranthus Bhindi - Agri-input centers – biopharmacy –Various Schemes under Dept of Agri-ICT enabled extension services in Agriculture – Practicing e – crop doctor and other related software for Pest and disease diagnosis – Familiarization of popular agri extension related softwares- crop decision support system – pest, disease and nutrient deficiency diagnosis softwares - – Kisan Call Centres – KrishiVigyanKendras - NGOs

MODULE IV

POST HARVEST AND PROCESSING TECHNOLOGY

Unit 1 Post harvest Technology (30 periods)

Post harvest Technology-Concept - Importance with reference to agricultural products - Present scenario with reference to World, India and Kerala- Scope- extent of Post harvest losses – causes of Post harvest losses – salient features of Post harvest management

Unit 2 Post harvest Handling (50 periods)

Steps in Post harvest Handling – Harvesting stages – maturity indices of fruits and vegetables - sorting and Grading- Precooling – Pretreatments- Importance of packing – Types of Package used for packing of commercial products - Methods of storage — transportation

Unit 3 Post harvest technology of major crops (114 periods)

Post harvest technology and product diversification aspect of important crops like

- Cereals – Rice;
- Fruits – Jack fruit, mango, banana;
- Spices – Ginger, Pepper, Turmeric;
- Plantation crops - Coconut, Cashew;
- Commercial Flowers

Unit 4 Agro-Processing Technology (116 periods)

Concept– steps and Principles - methods of preservation - important commercial methods like - Canning, preparation of Jam, Jelly, Pickles, Squash, Crush, Marmalade, etc.

Unit 5 Entrepreneurship Development in Agri-based processing industries (30 periods)

Scope of self-employability – Present scenario - licensing and FSSAI registration aspects -list of machineries used in processing industry- marketing strategies.

AGRICULTURE - CROP HEALTH MANAGEMENT

MODULE III

INTEGRATED PEST AND DISEASE MANAGEMENT

Unit 1 Pest and Disease Diagnosis (100hrs)

Pest - definition - classification- into insects and non insects and weeds with examples, categories of pests -based on occurrence - based on level of infestation - based on percentage of crop loss they cause with examples, pest outbreak-definition-reasons, Impact of global warming on pest status, Insect - its specific characteristics - classification into bugs, beetles, flies, moths etc. - types of mouthparts -feeding habit - metamorphosis -young ones- wing characters and destructive stages, disease definition - classification - biotic (infectious) and abiotic(non infectious), biotic factors(pathogen) - fungus- bacteria- virus- phytoplasma-algae with examples, abiotic factors - physiological disturbances- nutrient deficiency-air pollutants-lack of moisture- stress, classification of disease based on pathogen- based on mode of spread with examples , diagnosis of disease - signs and symptoms of plant diseases- Koch's postulates - ooze test, disease epidemiology- disease triangle, plant disease forecasting and its application, E-Crop doctor and other related softwares for pest and disease diagnosis.

Unit 2 Integrated Pest and Disease Management of Crops of Kerala (150hrs)

Integrated Pest Management (IPM)- concept-principles of IPM, Economic Threshold Level (ETL)-Economic Injury Level(EIL), Methods of IPM- ecological engineering -cultural methods - mechanical methods-physical methods-legal methods- biological methods- chemical methods , Plant disease management - Integrated Disease Management(IDM)-concept, Weed management - cultural -mechanical-chemical-biological- Integrated weed management, Integrated Pest and Disease Management (IPDM)- concept- components, Pest surveillance -objectives , Identification of pests and diseases of important crops of Kerala - symptoms- management(IPDM) - rice- coconut- banana- pepper-solanaceous vegetables-cucurbitaceousvegetables- cowpea- bhindi-amaranthus- cardamom- ginger- Mango-rubber- cashew- papaya - tea- coffee-tapioca-sweetpotato - ornamentals, Pests of stored products -identification-nature of damage-management.

Unit 3 Agro Biopharmacy (50 hrs)

Agro biopharmacy- definition- concept ,Botanicals -preparation- application- neem oil emulsion- neem oil garlic emulsion- neem seed kernel extract- tobacco decoction- hyptis emulsion - andrographis garlic mixture -papaya leaf extract-birds eye chilli cow's urine extract- peruvallam extract- custard apple seed extract,-baking soda turmeric asafoetida mixture- tulsi extract-leaf extracts, preparation of permitted fungicides for organic farming- Bordeaux mixture- Bordeaux paste, Preparation of organic nutrient solutions- panchagavya - dasagavya, fish amino acid, egg amino acid, Biofertilizers - Familiarization and application- Rhizobium -Azotobacter -Azospirillum-

Acetobacter-azolla- Phosphate solubilising microorganisms-Arbuscular Mycorrhizal Fungus(AMF) -application techniques, biocontrol agents - fungal and bacterial pathogens-AMF-Trichoderma-Pseudomonas- Method of production of Trichoderma - media preparation-inoculation- formulation-mass multiplication and field application of Trichoderma,Entomopathogens - Fungi,bacteria,virus, common pheromone traps used for insect control - Low cost Pheromone traps for fruitfly management.

Unit 4. Plant Protection Equipments (40 hrs)

Plant Protection(PP) equipments - parts of a sprayer, types of sprayers- manually operated hydraulic sprayers-hand sprayers, hydraulic knapsack sprayer, rocker sprayer, bucket sprayer, manually operated pneumatic sprayers, pneumatic hand sprayers, pneumatic knapsack sprayers, power sprayers, dusters, other PP equipments-Granule applicator -electrostatic sprayer-Fogging machine-Rat traps -site specific spraying, maintenance of PP equipments- field problems and remedies.

MODULE IV HITECH FARMING

Unit 1. Protected Cultivation (170 hrs)

Protected cultivation - definition - benefits - scope , Factors emphasizing the need of Hitech Horticulture in Kerala, Different types of protected structures - classification based on structural material -shape of the structure -use of structure -covering material -type of ventilation - environmental control - cost, Important parts of Green House, crops recommended for cultivation in protected cultivation, Principles and practices to be followed in protected cultivation, Climate control inside green houses-equipments for measuring climatic parameters in green houses - Automation in climate control, micro irrigation system- components, fertigation - characteristics of fertilizers used for fertigation - Advantages and disadvantages of fertigation, nutritional disorders - Major Pests and disease of greenhouse crops -factors affecting multiplication of pests under polyhouse-management, General integrated management procedures -preventive approaches-sanitation and cultural practices-inspection- scouting and surveillance- trap crops or indicator plants, curative approach -biological control - neem based and homemade botanical pesticides for pest management - entomopathogenic fungi useful in protected cultivation - Chemical management - List of safe pesticides and other options for management of pest and diseases in polyhouses, Crop protection equipments, Soil less cultivation- hydroponics-aquaponics - advantages and disadvantages.

Unit 2. Pesticides and Pesticide Residue Management (100 hrs)

Pesticides-classification- classification of insecticides-Based on mode of entry- mode of action and chemical nature- common insecticides, fungicides-classification, herbicides-classification, pesticide formulations- solid and liquid - other formulations- pesticide adjuvants, list of new generation pesticides and banned pesticides with substitutes, Calculation of pesticide formulations(Insecticide, fungicide, herbicide), Pesticides and Toxicity - Acute toxicity - Chronic toxicity - Toxicity categories, Pesticide labels and labelling-Legal regulatory measures regarding



pesticide handling, Bio magnification-Residual toxicity- Maximum Residue Limit - Waiting Period, Precautions to be taken while handling pesticides, pesticide residue decontamination - simple methods to remove pesticide residues from vegetables.

Unit 3. Organic Certification (20 hrs)

Definition- production standards-purpose , Process of organic certification-product labelling, Organic certification in India -Agencies involved, Good Agricultural Practices - definition-objectives- key elements- potential benefits.

Unit 4. ICT Enabled Extension Services in Agriculture (50 hrs)

ICT enabled extension services in Agriculture - Familiarization with popular agri extension related softwares - crop decision support system - pest, disease and nutrient deficiency diagnose softwares - ICT enabled agriclincs - Kisan Call Centres, Farmer support schemes

AGRO MACHINERY & POWER ENGINEERING

Module 3

FARM MECHANISATION AND POST HARVEST ENGINEERING

(340 Periods)

3.1 Agricultural Implements

(80 Periods)

Farm Power Source-Statics-Human, Animal, Mechanical, Renewable. Introduction to Tillage-Objectives, Classifications, Types Primary Tillage-Implements-MB plough , Disc plough, Sub soiler , Chisel plough Secondary Tillage-Implements-Cultivator (spring type, Rigid Type)-Harrows-Different types, Renovator ,Bund former, Ridger, Digger , Puddler , Leveler Seeding methods-Broadcasting, Drilling, Dibbling, Transplanting, Seed Dropping, Hill Dropping, Checkrow Planting Seed Drilling -Principle& Operation -Components, Seed cum fertilizer Drill, Seed metering Mechanism-Seed conditioning, Seed dressing ,Seed graders.

Transplanter-Types-Paddy Transplanter , Veg. Transplanter Paddy Transplanter- Principle, Operation , Parts-Types-Walk behind, Riding type Mat nursery preparation Veg. Transplanter-Principle, Operation Seed dibbler, Drum Seeder, Check Row planter Hill Dropper, Pneumatic Seeders (Vacuum type& Air suspension Type) Electronic Seeders(Precision) Weeding-Concepts-types of weeders -Rotary Weeders , ConoWeeder, Power weeder, Brush weeder,Peg, Tooth weeder, Brush cutte Fertilizer Applications-Fertilizer Broadcaster ,Liquid Fertilizer Fertilizer Injector

3.2 Plant Protection Machinery

(60 Periods)

Introduction-Classification-Sprayers , Dusters ,Foggers, fumigators Sprayers-Classifications based on Atomization 3 types 1) Hydraulic/Hydro-pneumatic 2) Air assisted/Air blast 3) Centrifugal. Hydraulic Sprayers- Principle-Parts-Working. Air assisted-- Principle-Parts-Working, Centrifugal sprayers- Principle-Parts-Working. Classification based on mode of operation-Hand sprayer , Air compression sprayer, power sprayer ,Rocker sprayer ,Knapsack sprayer, Traction operated sprayer, Arial sprayer, Duster, Fogger, Fumigator-Principle &working Repair and Maintenance of Sprayers &Dusters , Safety Precautions.

3.3 Harvesting Machines

(70 Periods)

Harvesting-Principle, Objectives Harvesting Equipments-Principle of cutting, Shear Force, impact Force-Sickle-vertical conveyor repair Mower for Fodder Harvesting, Lawn Mower, Coconut Climber, Digger, Fruit harvester, Vegetable Harvester, Reapers Combine Harvester-Types-Cereals/Vegetables &Fruits Combine Harvester (Paddy)-Principle, Parts, working operation, Maintenance, servicing Combine Harvester (Vegetables) Combine Harvester (Fruits).



3.4 Post Harvesting Operations

(70 Periods)

Threshing- Principle , operation ,Threshing methods (Manual ,Animal , Mechanical), Mechanical Threshers (Axial flow & Cross Flow)-Ground Nut Decorticator , Maze Sheller Parts of a Thresher- Concave, Drum, Cleaning unit, Type of Threshers-Peg tooth , spike tooth , Rasp bar , Angle bar , loop type & Hammer mill Winnower- Principle , parts , blower. Drying & Storage- Principle of drying -MC-Sun drying (conduction, convection, Radiation) Mechanical Drying , Infrared , Chemical, Grain drying (deep bed , Thin layer).

3.5 Food Processing

(60 Periods)

Paddy-parboiling-hullers-polishing-milling, Fruits & Vegetable - Processing Packing & Storage Method-Cold Storage, Refrigeration, Inert gas filling, Controlled atmospheric storage (N₂ Filling, CO₂ Filling) Dry storage method-Bins, Scale, Godowns, Silos

Unit 1 Agricultural Implements

(80 periods)

- 3.1.1 Farm Power Source-Statics-Human, Animal, Mechanical, Renewable
- 3.1.2 Introduction to Tillage-Objectives, Classifications, Types
- 3.1.3 Primary Tillage-Implements-MB plough , Disc plough, Sub soiler , Chisel plough
- 3.1.4 Secondary Tillage-Implements-Cultivator(spring type, Rigid Type)-Harrows-Different types, Renovator, Bund former, Ridger, Digger , Puddler, Leveler
- 3.1.5 Seeding methods-Broadcasting, Drilling, Dibbling, Transplanting, Seed Dropping, Hill Dropping, Checkrow Planting
- 3.1.6 Seed Drilling -Principle & Operation -Components, Seed cum fertilizer Drill, Seed metering Mechanism-Seed conditioning, Seed dressing ,Seed graders
- 3.1.7 Transplanter-Types-Paddy Transplanter , Veg. Transplanter
Paddy Transplanter- Principle, Operation ,Parts-Types-Walk behind, Riding type
Mat nursery preparation
Veg. Transplanter-Principle, Operation
- 3.1.8 Seed dibbler, Drum Seeder, Check Row planter Hill Dropper, Pneumatic Seeders (Vacuum type & Air suspension Type) Electronic Seeders(Precision)
- 3.1.9 Weeding-Concepts-types of weeders-Rotary Weeders ,ConoWeeder, Power weeder, Brush weeder,Peg Tooth weeder, Brush cutter
- 3.1.10 Fertilizer Applications-Fertilizer Broadcaster ,Liquid Fertilizer ,Fertilizer Injector

Unit 2 Plant Protection Machinery

(80 periods)

- 3.2.1 Introduction-Classification-Sprayers ,Dusters ,Foggers, fumigators
- 3.2.2 Sprayers-Classifications based on Atomization 3 types
 - 1) Hydraulic/Hydro-pneumatic
 - 2) Air assisted/Air blast
 - 3) Centrifugal
- 3.2.3 Hydraulic Sprayers- Principle-Parts-Working

- 3.2.4 Air assisted-- Principle-Parts-Working, Centrifugal sprayers- Principle-Parts-Working
- 3.2.5 Classification based on mode of operation-Hand sprayer, Air compression sprayer, power sprayer, Rocker sprayer, Knapsack sprayer, Traction operated sprayer, Aerial sprayer
- 3.2.6 Safety Precautions while using plant protection machineries

Unit 3 Harvesting Machines (70 periods)

- 3.3.1 Harvesting-Principle, Objectives
- 3.3.2 Harvesting Equipments-Principle of cutting, Shear Force, impact Force-Sickle-vertical conveyor repair
- 3.3.3 Mower for Fodder Harvesting ,Lawn Mower ,Coconut Climber ,Digger, Fruit harvester , Vegetable Harvester ,Reapers
- 3.3.4 Combine Harvester-Types -Cereals/Vegetables &Fruits
- 3.3.5 Combine Harvester (Paddy)-Principle, Parts, working operation, Maintenance, servicing
- 3.3.6 Combine Harvester (Vegetables)
- 3.3.7 Combine Harvester (Fruits)

Unit 4 Post Harvesting Operations (70 periods)

- 3.4.1 Threshing- Principle, operation, Threshing methods (Manual, Animal, Mechanical)
- 3.4.2 Mechanical threshers (Axial flow &Cross Flow)-Ground Nut Decorticator, MazeSheller
- 3.4.3 Parts of a Thresher-Concave, Drum ,Cleaning unit, Type of Threshers-Peg tooth ,spike tooth ,Rasp bar ,Angle bar ,loop type& Hammer mill
- 3.4.4 Winnower- Principle , parts ,blower
- 3.4.5 Drying & Storage-Principle of drying -MC-Sun drying (conduction, convection, Radiation) Mechanical Drying ,Infrared ,Chemical, Grain drying(deep bed ,Thin layer)

Unit 5 Food Processing (60 periods)

- 3.5.1 Paddy-parboiling-hullers-polishing-milling
- 3.5.2 Fruits &Vegetable -Processing
- 3.5.3 Packing & Storage Method-Cold Storage, Refrigeration, Inert gas filling, Controlled atmospheric storage (N2 Filling,CO2 Filling)
- 3.5.4 Dry storage method-Bins, Scale, Godowns, Silos.

**Module 4
IRRIGATION AND PRECISION FARMING**

(340 Periods)

4.1 Irrigation (90 periods)

Introduction-Different types of irrigation Mechanical irrigation-pump, sprinkler, drip Sprinkler-components-lay out & Design, Installation Drip- components-lay out & Design, Installation Mist-components-applications Fogger -components-applications



4.2 Pump for Irrigation (90 periods)

Pump-introductions & classifications, CF PUMP -working, principles, parts JET pump, reciprocating pump - working, principles, parts, Selection of pumps-WHP Calculation, servicing, repair & Maintenance.

4.3 Green House Technology (90 periods)

Green House-Concept, Advantages, Disadvantages Types of Green House-Poly House, Glass House, Hardening unit (Temp.&Humidity controller), Rain Shelter, Shade House Green House construction-Frame, covering materials-irrigation system (Fogger, Mist, Drip) Mulch, Fertigation

4.4 Mechanical Auto-cad (70 periods)

Introduction to Auto-Cad, Learn commands, Limit setting, And Drawing of simple Machine parts.

Unit 1 Irrigation (90 periods)

- 4.1.1 Introduction-Different types of irrigation
- 4.1.2 Mechanical irrigation-pump, sprinkler, drip
- 4.1.3 Sprinkler-components-lay out& Design, Installation
- 4.1.4 Drip- components-lay out &Design, Installation
- 4.1.5 Mist-components-applications
- 4.1.6 Fogger -components-applications

Unit 2 Pump for Irrigation (90 periods)

- 4.2.1 Pump-introductions & classifications
- 4.2.2 CF PUMP -working, principles, parts
- 4.2.3 JET pump, reciprocating pump -working, principles, parts
- 4.2.4 Selection of pumps-WHP Calculation, servicing, repair & Maintenance

Unit 3 Green House Technology (90 periods)

- 4.3.1 Green House-Concept, Advantages, Disadvantages
- 4.3.2 Types of Green House-Poly House, Glass House, Hardening unit (Temp. & Humidity controller), Rain Shelter, Shade House
- 4.3.3 Green House construction-Frame, covering materials-irrigation system (Fogger,Mist,Drip)
- 4.3.4 Mulch, Fertigation

Unit4 Mechanical Auto-cad (70 periods)

- 4.4.1 Introduction to Auto-Cad
- 4.4.2 Learn commands
- 4.4.3 Limit setting
- 4.4.4 Drawing of simple Machine parts

AQUACULTURE

Module 3

FISH QUALITY CONTROL AND INSPECTION SYSTEMS

Sl. No.	Particulars	Page no.
3.1	Introduction to reproduction in fin fishes and shell fishes Factors affecting natural reproduction in fin fishes and shellfishes. Physiology of reproduction Sexual dimorphism and hermaphroditism, Induced breeding, Fish genetics and selective breeding Recent developments	14
3.2	Seed production of Carps Commercial carp species and its sexual dimorphism Natural collection of carp seeds Induced breeding and larval rearing Materials and equipments used for Induced breeding Hatchery systems (Happa system, Chinese hatchery system and Jar hatchery system)	17
3.3	Seed production of Tilapia (GIFT) Sexual dimorphism in Tilapia Induced breeding and selective breeding in Tilapia Hormonal sex reversal in Tilapia Physical, chemical and biological parameters of water for larval rearing	23
3.4	Seed production of Pearl Spot Sexual dimorphism in Pearl spot Breeding under captivity/cages Physical, chemical and biological parameters of water for larval rearing	26
3.5	Seed production of Air breathing Fishes Sexual dimorphism in Air breathing fishes Induced breeding in Air breathing fishes	29
3.6	Seed production of Asian Sea bass Sexual dimorphism in brackish water and marine Fishes Induced breeding and larval rearing of Asian Sea bass	32
3.7	Seed production of Penaeid Shrimps Sexual dimorphism in Penaeid Shrimps Familiarization of larval stages Larval rearing techniques	34



	Induced maturation and spawning	
	Packing and transportation of shrimp seed	
3.8	Seed production of Giant Freshwater Prawn	39
	Sexual dimorphism in Giant Freshwater Prawn	
	Water quality parameters in larval rearing	
	Larval rearing of Giant Freshwater Prawn	
	Collection centres of brood stock from wild	
3.9	Seed production of Mud Crab	42
	Sexual dimorphism in Mud Crab	
	Water quality parameters	
	Familiarization of larval stages	
	Larval rearing techniques	
	Collection of water crabs for fattening	
3.10	Seed collection of Bivalves	44
	Commercial bivalve species (Oyster and Mussels)	
	Collection of Oyster and Mussel spats	
	Preparation of Oyster Ren and Mussel Ren	

Module IV

Ornamental Fisheries and Aquarium Management

4.1	Aquarium fishes	48
	Familiarization of aquarium fishes	
	Classification of aquarium fishes namely egg layers and live bearers	
	Exotic and indigenous varieties	
4.2	Aquarium plants	53
	Familiarization of aquarium plants	
	Aquarium plant rearing and propagation	
	Aquarium plant and water quality	
4.3	Aquarium equipments and accessories	57
	Familiarization of Aquarium equipments and accessories (Aerators, Heaters, Illuminating lamps, Sand filter bed, Submersible pumps and filters Bio filters, Drift wood, Rock & pebbles)	
	Principle and functioning of Bio filter	
4.4	Making of an aquarium tank	61
	Measurements and cutting of glass pieces	
	Glass tank making tools	
	Making of glass tank	
	Acrylic tanks	
4.5	Assembling an aquarium	63
	Assembling the aquarium	

4.6	Aquarium management	64
	Water quality management	
	Usage of water test kits to measure chemical parameters (Dissolved O ₂ , CO ₂ , NH ₃ , NO ₂ , NO ₃ , Alkalinity & Acidity)	
4.7	Fish Diseases-Quarantine, prophylactic and therapeutic measures	66
	Ichthyophthiriasis	
	Fin rot and Tail rot	
	Saprolegniasis	
	Dropsy	
	Protozoan infections	
4.8	Breeding and seed production of Aquarium fishes	69
	Brood stock maintenance	
	Breeding and spawning	
	Life feed culture	
	Nursery rearing	
4.9	Marine Aquarium	72
	Familiarization of marine ornamental fishes	
	Familiarization of marine ornamental plants and organisms	
	Marine aquarium accessories	
	Water quality management	

AUTOMOBILE TECHNOLOGY

MODULE 3

AUTOMOTIVE TRANSMISSION SYSTEMS

3.1 CLUTCH (80 Periods)

Purpose of clutch - Functions of clutch-Requirements of clutch - Types of clutch-Single plate clutch, multi plate clutch, centrifugal clutch, diaphragm spring clutch, semi centrifugal clutch -dry and wet clutches- construction and working of single plate(thrust spring type and diaphragm spring type), multi-plate, centrifugal clutch - Clutch components-clutch disc, clutch facing, pressure plate, springs, bearings- Clutch actuating mechanisms-mechanical, hydraulic, electromagnetic, vacuum and clutch-by-wire- clutch free pedal play adjustment.

3.2 MANUAL TRANSMISSION (96 Periods)

Types of gears- straight spur gear, helical spur gear, bevel gear, spiral bevel gear, hypoid gear- Gear ratio-function and necessity of transmission-resistance on moving vehicle- necessity of providing gear box- types of gear box-sliding mesh, constant mesh, synchromesh gear box- construction and working of constant mesh gear box and synchromesh gear boxes-synchronizing unit-selector mechanisms--gear box lubrication-transfer box-transaxles

3.3 AUTOMATIC TRANSMISSION (74 Periods)

Semi- automatic- fully automatic - epicyclic gear box- free wheel unit -fluid flywheel -torque converter-overdrive - Continuously Variable Transmission (CVT)- Automated Manual Transmission (AMT) - types of AMT, single sided clutch transmission (SSCT), double sided clutch transmission (DSCT), dual clutch transmission (DCT/DSG) modern shift control techniques - Select Shift Manual (SSM) and Auto Shift Manual (ASM) modes

3.4 DRIVE LINE (90 Periods)

Drive line- propeller shaft- slip joint-universal joints-hooks joint(variable velocity), rzeppa joints(constant velocity) - final drive- types of crown wheel and pinion drive-straight bevel gear, spiral bevel gear, hypoid gear- construction and working of differential -limited slip differential-types of rear axle casing-rear axle drives- Hotchkiss drive, Torque tube drive rear axle shaft supporting- semi- floating axle, full floating axle and three quarter floating axle

MODULE 4

AUTOMOTIVE ELECTRICAL SYSTEMS

4.1 AUTOMOTIVE BATTERY (60 Periods)

Function-types of battery-lead acid, alkaline battery, zinc-air battery, nickel- metal hydride battery, lithium- ion battery-construction and working of lead acid battery-characteristics of battery - cell voltage, battery capacity ,battery rating - battery testing-specific gravity test, open volt test, high discharge test, cadmium test- battery charging methods- slow rate charging, quick rate charging, trickle charging - care and maintenance of battery

4.2 CHARGING SYSTEM (50 Periods)

Function- requirements-charging circuit-generator principle-faraday's law of electromagnetic induction-alternator- construction and working of alternator-alternator regulation- comparison of alternator with DC generator

4.3 STARTING SYSTEM (40 Periods)

Function-starting circuit-starting motor- construction and working of starting motor-starter drives-bendix drive, overrunning clutch or pre engaged type drive, dyer drive-construction and working of axial starter motor, construction and working of over running clutch drive -construction and working of solenoid switch- electronic starter control

4.4 LIGHTING SYSTEMS AND ELECTRICAL EQUIPMENTS (58Periods)

Electrical symbols-wire color codes- lighting circuits- head lamp circuit, tail lamp circuit, stop light circuit, parking light circuit, number plate light circuit, instrument panel light circuit, interior light circuit-types of head lamps- incandescent lamps, halogen lamps, High Intensity Discharge (HID) lamps, LED lamps-lighting switches- light switch, dimmer switch, stop light switch- instrument panel indicating lights-main beam warning lights, ignition warning lights, flashing indicator warning light, oil pressure warning light, charge indicator light-direction indicator circuit-flasher unit- horn circuit-construction and working of electric horn- horn relay- wind screen wiper-speedometer and odometer- central locking-power window- - seat belts -pre tensioner and load limiter-air bags

4.5 IGNITION SYSTEM (82 Periods)

Function of ignition system-types of ignition system-battery coil ignition system- magneto ignition system-electronic ignition system- working of battery coil ignition system with circuit diagram -working of magneto ignition system with circuit diagram- components of ignition system- battery, ignition coil, contact breaker, condenser, distributor, spark plug , magneto -construction and working of ignition coil, spark plugs - function and working of distributor - concept and function of centrifugal and vacuum advance systems -comparison between battery coil and magneto ignition systems

Basic electronics-semi-conductors, diodes, transistors, thyristor-Electronic ignition systems-contactless distributor type, distributor less type - Capacitor Discharge Ignition (CDI) -coil on plug -timers- pulse generator, hall-effect pulse generator, optical pulse generator.

4.6 EMISSION CONTROL (50 Periods)

Necessity of emission control-sources of automotive emission-charts showing Euro norms of Bharat Stage 3 and 4 of passenger cars, Heavy duty diesel vehicles and 2 wheeler-implementation schedule of euro norms in India- positive crank case ventilation- vapour recovery system-EGR system- air injection system- Pulse Air- Injection Reactor (PAIR) system- catalytic converters- two way and three way catalytic converters.



BANKING & INSURANCE SERVICES

MODULE III INSURANCE SERVICES

Unit 3.1: INTRODUCTION TO INSURANCE

Meaning of risk
Classification of risk
Features of Insurable Risk
Meaning and Functions of Insurance
Peril and hazard
Importance of Insurance
Types of Insurance
Essentials of valid a contract
Meaning and Types of Contracts
Difference between Insurance Contract and Wagering contract
Legal Principles of Insurances

Unit 3.2: UNDERWRITING AND INSURANCE DOCUMENTS

Meaning of Underwriting
Underwriting procedure of Life Insurance
Assignment, Nomination, Revival and Surrender
Underwriting of non-life Insurance
Insurance Premium
Insurance documents

Unit 3.3: INSURANCE CLAIMS

Meaning , Importance and type of claims
Procedure of settlement of Life Insurance claims
Procedure of settlement of Non-life Insurance claim

Unit 3.4: IRDA REGULATIONS

IRDA Regulations
Insurance operations
Final accounts of insurance companies and usage of accounting software (Tally)

MODULE IV

MARKETING OF BANKING AND INSURANCE PRODUCTS

UNIT4.1: MEANING AND IMPORTANCE OF SERVICE MARKETING

Meaning and features of service
Types of Services
Meaning and Significance of Service Marketing
Difference between product marketing and service marketing
7 P's of service Marketing (Marketing mix)
Consumer behavior in service market
Role of Service Marketing in India

UNIT4.2: MARKETING OF BANKING PRODUCTS

Concept of Marketing of Banking Products.
Users of Banking Products
Selling Strategy in Banking Products
Marketing of various Banking Products

UNIT4.3: MARKETING OF INSURANCE PRODUCTS

Insurance marketing concept
Segments of Insurance Market
Strategies for Insurance Marketing
Qualities of a good salesman
Marketing of various life Insurance products
Marketing of major non-life Insurance products

Unit 4.4: AN INTRODUCTION TO FINANCIAL MARKET

Various investment opportunities in financial market
Types of financial securities
Securities Market
Pre requisites of investing in financial securities
Trading procedure on secondary market
Securities Market Regulator(SEBI)

BASIC NURSING AND PALLIATIVE CARE

Module 3

PALLIATIVE AND GERIATRIC CARE

(340 Hrs/Periods)

Unit No. 3.1 Administration of Medication 60 Periods

Meaning of drug, medicine, Nomenclature, Forms of medicines, Classification of medicines, Abbreviations in common use, Medication order, Types of medication order, Effects of drug on the body, Dosage , Weight and measures , Calculation of dosage , Storage of drugs, Drug Delivery systems, Routes of medication administration , Safety measures , Storage of drugs, Administration of Oral Medication, Topical Medication Applications a. Dermatologic (Skin Surface) b. Transdermal Patch c. Ophthalmic - Eye Drops- Eye Ointments, d. Otic (Ear) e. Nasal Instillation - Administer nasal drops- Administer nasal spray, f. Administering Medication by Inhalation- Metered-dose inhalers and Turbo inhalers. Nebulisation, Injections a. Types of injections b. Purpose of injections c. Complications of injections d. Drugs and fluids administered e. Safety measures f. Selection of equipment for injections g. Forms of medications available h. Principles involved in the administration of injections i. Administration of injections- Subcutaneous injection including Insulin pen, Intramuscular injections

Unit No. 3.2 Oxygen Administration 40 Periods

Definition , Indications for oxygen therapy, Methods of Oxygen Administration , Supply of oxygen , Care of oxygen cylinder, Complications of oxygen therapy, General Instructions for oxygen administration, Management of home oxygen therapy , Applying nasal cannula, oxygen mask and nasal catheter , Using Home Oxygen Equipment

Unit No. 3.3 Care of Wound 30 Periods

Concept of wound, Types of wound, Factors affecting wound healing, Wound dressing, Types of wound dressing, Purposes of wound dressing, Dressing materials, Complications of wound healing, Principles involved in care of wounds, General instructions for care of wounds , Applying wound dressing

Unit No. 3.4 Palliative Care 100 Periods

Palliative Care , Introduction to Palliative Care –Definition, Common conditions requiring palliative care, Hospice Care, Pharmacology - common drugs used in palliative care, Pain Management, Symptom Management (Dyspnea, Nausea and Vomiting, Constipation, Fungating wounds, Dysphagia, Diarrhea, Urinary Incontinence, Urinary retention and hesitancy, Halitosis, insomnia, Bedsores, Lymphedema), General care of patient , Spirituality, Care at the End of Life (Active Dying), Carry out last office (death care), Support during grief and bereavement

Unit No. 3.5 Geriatric Care 50 Periods

Concept of old age and related terms, Factors affecting old age, Changes in old age, Health

problems of the aged, General care of elderly, Prevention of accidents in elderly , Elderly abuse

Unit No. 3.6 Care of Unconscious Patient 30 Periods

Consciousness, Levels of consciousness, Unconsciousness, Causes of unconsciousness, Assessment of unconscious patient, Care of an unconscious patient, Management of complications

Unit No: 3.7 Care of Client’s with Special needs 30 Periods

Care of Client’s With Special Needs – Dementia, Challenged Children – Attention Deficit Hyperactivity Disorder(ADHD), Autism, Mentally Challenged, Cerebral Palsy

MODULE 4

COMMUNITY HEALTH

(340 Hrs/Periods)

Unit 4.1 Introduction to Health Periods: 20

Introduction to health- Concept of Health and disease, Determinants of health, New trends in health care

Unit 4.2 Hygiene Periods:60

Hygiene- Concepts of hygiene, Types a. Personal b. Environmental, Personal Hygiene a. Care of skin and hair b. Care of teeth c. Care of eyes, ears, hands & feet d. Menstrual Hygiene e. Rest and sleep, postures, exercises and recreation, Environmental Hygiene 1. Water - Safe and wholesome water, Uses of water, Sources of water supply, Sanitary well, Water pollution, Water related diseases, Purification of water 2. Air 3. Ventilation 4. Housing 5. Lighting 6. Noise 7. Food hygiene 8. Disposal of waste 9. Control of Mosquitoes, flies, rodents.

Unit 4.3 Nutrition Periods: 20

Nutrition- Relation of nutrition to health, Functions of food, Classification of food, Constituents of food - Protein, fat and carbohydrates, Vitamins, Minerals and water, Balanced diet, Nutritional problems, Community nutritional programmes

Unit 4.4 Communicable and Non Communicable Diseases Periods:80

A.Prevention and Control of Infectious Diseases – Bacterial (Diphtheria, Whooping Cough/ Pertussis, Tetanus, Tuberculosis , Typhoid, Leprosy or Hansen’s Diseases, Meningococcal meningitis (cerebro spinal fever), Leptospirosis (Weil’s disease) and Cholera, Viral {Chicken Pox (Varicella), Measles / Rubeola, German Measles/Rubella, Mumps (Infectious Parotiditis), Poliomyelitis, Viral Hepatitis, SARS, Dengue fever, Chikungunya and Acquired Immuno Deficiency Syndrome (AIDS)} and protozoan(malaria and filarisis) B. Prevention and Control of Non Communicable Diseases 1. Coronary Artery Disease 2. Hypertension 3. Stroke 4. Cancers 5. Diabetes Mellitus 6. Obesity 7. Blindness 8. Accidents and injuries C. Mental Health D. Alcoholism and drug dependence

Unit 4.5 Maternal and Child Health Periods:40

Maternal and child health – a. Menstruation and Fertility b. Antenatal care, c. Post-Natal Care d. Newborn Care e. Breast feeding f. Complementary feeding g. Immunization h. Family Planning Methods

**Unit no: 4.6 Adolescence****Periods: 20**

Adolescence- Physical and physiological changes in adolescence, Problems of adolescents - physical, physiological and psychosocial, Promoting optimum health during adolescence

Unit 4.7 National Health Programmes**Periods: 20**

National Health Programmes – 1. Mission Indradhanush 2. National Vector Borne Disease Control Programme 3. Revised National Tuberculosis Eradication Programme 4. National AIDS Control Programme 5. National Programme For Control Of Blindness 6. Universal Immunization Programme 7. Pulse Polio Immunization Programme 8. National Health Mission 9. Reproductive, Maternal, Newborn, Child and Adolescent Health 10. National Cancer Control Programme 11. National Mental Health Programme 12. Janani Shishu Suraksha Karyakram 13. Rashtriya Kishor Swasthya Karyakram 14. National Programme For Prevention And Control Of Diabetes, Cardiovascular Diseases And Stroke 15. National Family Welfare Programme

Unit 4.8 Health Care of the Community**Periods:40**

Health Care of the Community - Levels of health care, Primary Health care , Millennium development goals, Primary Health care in India – Village level, Sub centre, Primary health centre, Community Health centre - Integrated Child Development Scheme – Anganawadis, Local self government - Panchayati Raj , International health agencies - WHO, UNICEF, RED CROSS, National Health agencies – Bharat Sevak Samaj, Family planning association of India, Professional bodies

Unit 4.9 Health Education**Periods:20**

Health Education - Concept, Aims and Objectives, Contents of Health education, Principles of health education, Settings for health education, Methods of health education, Audiovisual aids, Steps for health education

Unit no: 4.10 Disaster Management**Periods:20**

Disaster – Definition, Types of disaster, Phases of disaster, Disaster management.

BIOMEDICAL EQUIPMENT TECHNOLOGY

MODULE 3

Surgical/Analytical and Therapeutic Equipment

UNIT 1: OPERATION THEATRE EQUIPMENT

Basic fundamentals of operation theatre, List of OT equipment and its applications (OT tables, OT lights, Anesthesia machines, Anesthesia ventilators, multi para monitor, ESU, central suction, heart lung machine - names and uses only), Characteristics, classification, types of OT table (mechanical, pneumatic and electrical) and light (Lux, voltage and wattage), fundamentals of Anesthesia, parts of anesthesia machine and applications, principle of surgical diathermy, different electrodes used in surgical diathermy, different modes of operation in surgical diathermy (electrotomy, coagulation, fulguration, desiccation), block diagram and description of ESU, applications of ESU, safety in OT - general guidelines, equipment safety - ESU and anesthesia machines, concept of modular OT.

UNIT 2 : CENTRAL STERILE SUPPLY DEPARTMENT (CSSD)

Aims and objectives of CSSD, workflow in CSSD, concept of sterilization - definition and importance of sterilization, classification and methods of sterilization, equipment used for sterilization and their uses, autoclave - working principle - parts, procedure, maintenance and uses, hot air oven - parts, procedure, maintenance and uses. Equipment safety and sterilization controls (chemical and biological controls), introduction to liquid oxygen supply.

UNIT 3 : CENTRAL MEDICAL GAS DISTRIBUTION SYSTEM

Introduction to concept of central medical gas supply system, basic components, manifold, suction apparatus - parts, working and uses, introduction to pendant for gas supply, safety and precautions in manifold and pipeline supply.

UNIT4 : LABORATORY AND BLOOD BANK INSTRUMENTS

Microscopy - introduction , different types of microscopes, working principle, parts, magnification, adjustments, maintenance and uses of a compound microscope, photoelectric colorimeter - working principle, parts, block diagram, procedure, maintenance and applications, introduction to glucometers. PHmeter- working principle, parts, block diagram, procedure, maintenance and applications, Clinical relevance of blood PH, Centrifuge- parts, working, maintenance of table top centrifuge, Fundamentals of Electrolyte analyser, Blood gas analyser, incubator and waterbath , Familiarise Automatic Hemoanalysers and blood cell counters, General safety, equipment safety and Quality Control in Medical laboratories, name and uses of Blood bank equipments-Blood bank refrigerators, Blood bank centrifuges, cryo centrifuge, cry bath, deep freezers, Apheresis machines, donor couch, blood bag sealer, platelet agitator, blood shaker.

UNIT5: DIALYSIS EQUIPMENT

Introduction to dialysis - Importance of dialysis, Types of dialysis - peritoneal dialysis and hemo dialysis, Hemodialysis - fundamentals and applications



UNIT 6: THERAPEUTIC EQUIPMENTS

Introduction to types of therapeutic equipments- Radiotherapy , physiotherapy ,phototherapy, magneto therapy equipment. Radiotherapy Equipment -

Physiotherapy equipment - Short wave diathermy, microwave diathermy, ultrasound diathermy, nerve and muscle stimulators, TENS, IFT, IR lamps, CPRM, (names and uses only is required)

UNIT 7: BIOMEDICAL WASTE MANAGEMENT

Introduction to biomedical waste management - definition and classification of biomedical waste., steps in waste management, segregation, collection, storage, transportation, disposal - equipment used, autoclave, incinerator, safety aspects regarding biomedical waste.

UNIT 8: AUDIOMETRY

Anatomy of ear and mechanism of hearing. Types of audiometers - Pure tone audiometer and speech audiometer, the parts and operation of pure tone audiometer, the types and uses of hearing aids.

UNIT 9: MAJOR EQUIPMENTS IN OTHER DEPARTMENTS

Fiber optics in medicine(List out equipment and its uses) ,

civil engineering - water supply, mechanical work shop, air conditioning, electrical.

MODULE 4

Medical Imaging

UNIT1: RADIOGRAPHY

Production, properties and applications of X-rays, absorption of X-rays, unit of X-ray the principle of radiography, block diagram of X-ray machine , types of X-ray machine, unit of X rays- Mobile, stationary, OPG, C arm, mammography, digital X-ray. X-ray film- Construction- processing and digital processing. AERB regulations and general safety in radiography, Effect of X-ray in human body.

UNIT2 : ULTRASONOGRAPHY

To understand ultra sound physics, principle of oscillation, circuit diagram- working of crystal oscillator, fundamentals of ultra sonography, medical applications of ultra sonography

Unit 3 - MODERN EQUIPMENT IN MEDICAL IMAGING

Fundamentals of CT scanning, Fundamentals of MRI scanning. Familiarization of modern imaging techniques- names only, Applications of PET, SPECT, gamma camera.

Unit 4 - PATIENT SAFETY

Importance of general safety in hospitals, the effects of electricity on human body, electric shock hazards and precautions to avoid shock, IEC document and safety codes of biomedical equipment, grounding in Biomedical Equipment, familiarize Rules and Ethics in medical field.

CIVIL CONSTRUCTION TECHNOLOGY

Module 3

Quantity Surveying & Costing

Unit 3.1 - Introduction to Quantity Survey Periods: 49

Estimation - Purpose of estimation - Data required to prepare an estimate - Standard units of measurement - Units and modes of measurement as per IS 1200 - Types of areas - Plinth area, floor area, carpet area and circulation area - Specification of items of work - Necessity of specification- General specification of I class buildings - Detailed specifications of different items of work - Earthwork excavation, PCC works, RR masonry, Brick masonry, and plastering.

Unit 3.2 - Types of Estimate Periods: 238

Preliminary or approximate estimate - Plinth area estimate - Cubical content estimate - Detailed estimate - Work charged establishment - Different methods of estimation of buildings - Exercises of residential buildings - Bar bending schedule.

Unit 3.3 - Analysis of Rates Periods:15

Factors affecting cost of an item of work - schedule of rates - Analysis of rates of different items of work - Earthwork excavation in ordinary soil and hard soil - PCC work - RCC works - RR masonry - Brick masonry - Analysis of rates - Preparation of abstract of cost using spreadsheet.

Unit 3.4 - Contracts & Tenders Periods: 10

Contract - Tender - Earnest money deposit - Security deposit - Kinds of contracts - Work order form - Administrative approval - Technical approval - Procedure for inviting tender - Invitation of tenders - e tender - Contract agreement - Conditions of contract - Obligations of contractor, engineer and client - Measurement book- Muster roll.

Unit 3.5 - Network Analysis Periods: 10

Introduction - Developing a network using CPM - Developing network using PERT Difference between PERT and CPM - Construction safety management.

Unit 3.6 - Valuation of buildings Periods: 18

Factors affecting the value of a property - Purpose of valuation - Valuation based on cost - Valuation based on profit - Methods of valuation - Sinking fund method- Depreciation method - Quantity survey method - Mortgage - Annuity - Rent fixation.

List of Practicals

Unit 1 Plinth area calculation

Prepare the plan, elevation and section of a two storied residential building and find out the plinth area (2 nos.)

Unit 2 Measurement Practice

- a) Measure the dimensions of a compound wall. (1no)



- b) Measure the dimensions of a single room and prepare the sketch. (Inner and outer dimensions) (1 no)
- c) Measure the dimensions of all components of a residential building and prepare the line sketch. (2 nos)

Unit 3 Quantity survey

Calculation of quantities of following items of works by measuring the dimensions of an existing building / building under construction.

- a) Earth work in excavation for foundation
- b) RR Masonry for foundation and basement
- c) Masonry for super structure
- d) RCC works
- e) Plastering
- f) Floor finishing works

Unit 4 – Estimation (Long wall Short wall method)

- a) Estimation of quantities of items of a compound wall (1 no.)
- b) Estimation of quantities of items of a single room (1 no.)
- c) Estimation of quantities of items of a residential building (2 nos.)
- d) Estimation of quantities of items of a school building, (1 no.)

Unit 5 – Estimation (Centre line method):

- a) Preparation of detailed estimate using given centre line plan, (3 nos.)
- b) Preparation of detailed estimate using centre line method for a given plan (4 nos.)

Module 4

Water Supply & Sanitary Arrangements

Unit 4.1 - Sources and treatment of water

Periods: 7

Sources of water - Impurities in water- Factors affecting the selection of sources of water- Hardness in water and its removal- Steps in water purification- Aeration - Sedimentation with coagulation- Filtration - Chlorination - Water softening- Water demand for Residences, Restaurants, Cinemas and Theatres, Day Schools, Boarding Schools, Hostels, Hospitals with Laundry, Offices, etc. (per head per day) IS standards of potable water.

Unit 4.2 - Water supply system

Periods: 15

Distribution of water - Continuous and intermittent system - Layout of distribution system - Gravitational system - Pumping system - Combined system - Factors affecting storage of water - Rainwater harvesting - Objectives - methods - Collection for different uses - Rainwater collection for groundwater recharge

Unit 4.3 - Plumbing

Periods: 208

History of plumbing- Plumbing tools- Types and sizes of pipes - Pipe fittings -valves - Water tap with censor- Water meter- Fire hydrants - Pipe fixtures -Pipe joining materials - Method of laying pipe lines - Types of pumps -Hot water appliances and installation -House connection from public water supply system- Lay out with estimation of plumbing system- Study of rain water harvesting system -Irrigation system for domestic farming and gardening (drip and sprinkler)

Unit 4.4 - Sanitary System

Periods: 90

Introduction - Technical terms -Traps -Inspection chamber- Different systems of sewage disposal -Conservancy and water carriage system-Classification of water carriage system-Comparison between conservancy and water carriage system- Septic tank - Different types -System of plumbing- Layout and estimation of sanitary system in a building - Waste management - Methods of waste disposal - Waste minimisation.

Unit 4.5 Sanitary fixtures

Periods: 20

Wash basin- Showers - Sink -Water closet (Indian and European type)- Bidet- Health faucet-Flushing cistern .Maintenance and repair of plumbing system.

List of Practicals

Unit 01: Study of tools, Identification and its working

Unit 02 : Plumbing

Pipe cutting with hacksaw- Pipe threading with Die set - Study of different types of fittings (L-Bow, Bend, Tee, Coupling, Reducer, Union, Plug)

Fixing of pipe fittings with pipes using Threaded connection, shellac and cotton. Teflon tape and solvent cement.

Make a flanged joint connection using GI Flanged pipes of convenient diameter

Practicing water tap connection in a water line

Practicing parallel connections of three water taps in a main water supply line

Making a house water connection from a public water supply line with water meter fitting.

Practice a drip irrigation connection for domestic purpose and small scale farming

Draw neat sketch of a layout plan of water supply system of one bedroomed residential bulding (2 nos)

Draw a neat sketch of layout plan of a rain water harvesting system for a residential building.

Unit 03 Sanitary system

Practice shower fitting with stop cock

Practice the wash basin and kitchen sink fitting with necessary piple fittings

Practice teh Indian type water closet fitting with necessary fittings

Practice the European type water closet fitting with flushing cistern and health faucet



COMPUTER SCIENCE & INFORMATION TECHNOLOGY

Module 3

Object Oriented Programming and Databases

Unit No 3.1- Fundamentals of Computer Languages Periods: 30

- 3.1.1 Types of computer languages
- 3.1.2 Language translators
- 3.1.3 Approaches in problem solving
- 3.1.4 Programming methodologies
- 3.1.5 Algorithm and flowchart

Unit No 3.2 - Programming In C++ Periods: 140

3.2.1. Introduction to C++

- 3.2.1.1 Character set and tokens
 - o Input/Output statements
 - o Turbo and Geany development environment
- 3.2.1.2 Data types
- 3.2.1.3 Control statements
 - o Branching statements
 - o Looping statements
 - o Jump statements

3.2.2 Arrays and Strings

- 3.2.2.1 Arrays
- 3.2.2.2 Strings
- 3.2.2.3 String manipulation functions

3.2.3 Structure

- 3.2.3.1 Structure
- 3.2.3.3 Nested structure
- 3.2.3.4 Array of structure

3.2.4 Functions and Pointers

- 3.2.4.1 Built-in functions
- 3.2.4.2 User defined functions
- 3.2.4.3 Parameter passing
- 3.2.4.4 Pointers

3.2.5 Object Oriented Programming

- 3.2.5.1 Object Oriented Programming Concepts
- 3.2.5.2 Class and Objects
- 3.2.5.3 Member functions
- 3.2.5.4 Friend functions and Friend class
- 3.2.5.5 Constructors and Destructors

3.2.6 Polymorphism and Inheritance

- 3.2.6.1 Polymorphism
- 3.2.6.2 Implementation of Polymorphism
 - o Function overloading
 - o Operator overloading
- 3.2.6.3 Inheritance

3.2.7 Files in C++

- 3.3.7.1 File stream classes
- 3.3.7.2 File modes
- 3.3.7.3 File operations
 - o Read ()
 - o Write ()
- 3.3.7.4 Error handling functions

Unit No 3.3 - Database Designing**Periods: 40**

- 3.3.1 Concept of DBMS
- 3.3.2 Advantages of the database management system
- 3.3.3 Data abstraction and Data independence
- 3.3.4 Data models
- 3.3.5 Terminologies in RDBMS.
- 3.3.6 Keys in RDBMS

Unit No 3.4 - SQL (Structured Query Language)**Periods: 80**

- 3.4.1 Features of Structured Query Language.
- 3.4.2 Data types and commands
- 3.4.3 Practice on SQL commands
- 3.4.4 Clauses associated with DML commands
- 3.4.5 Aggregate Functions

Unit No 3.5- Engineering Graphics**Periods: 50**

- 3.5.1 Application areas of Engineering Graphics
- 3.5.2 Drawing Instruments
- 3.5.3 Lettering, Numbering and Dimensioning.
- 3.5.4 Lines
- 3.5.5 Scales
- 3.5.6 Geometric construction
- 3.5.7 Basic geometric shapes
- 3.5.8 Projection
- 3.5.9 Orthographic and isometric projection



Module 4

Web Application Development

Unit No 4.1 - Internet and Cyber Security **Periods: 45**

4.1.1 History of Internet

4.1.2 Terminologies

4.1.3 Cyber ethics

4.1.4 Legal Issues

Unit No 4.2 - Web Design Using HTML **Periods: 45**

4.2.1 BASIC HTML

4.2.1.1 Web pages

4.2.1.2 Static and Dynamic web pages

4.2.1.3 Tags in HTML

4.2.1.4 Structure tags

4.2.1.5 Formatting tags

4.2.1.6 Comments in an HTML document

4.2.1.7 Image Tags

4.2.1.8 Linking tag

4.2.1.9 List Tags

4.2.2 - Advanced HTML **Periods: 55**

4.2.2.1 Table Tags

4.2.2.2 Form Tags

4.2.2.3 Frame tag

4.2.2.4 Cascading style sheet

4.2.2.5 Multimedia contents

Unit No 4.3 - Web Development using Javascript & PHP **Periods: 50**

4.3.1 CLIENT SIDE SCRIPTING

4.3.1.1 Scripting languages

4.3.1.2 Importance of JavaScript

4.3.1.3 Data Types & Variables

4.3.1.4 Operators

4.3.1.5 Control Structures

4.3.1.6 Functions

4.3.1.7 Accessing values through a text box

4.3.2 Sever Side Scripting **Periods: 100**

4.3.2.1 Features of PHP

4.3.2.2 Syntax of PHP statement

4.3.2.3 Comments

4.3.2.4 Variables and Constant

4.3.2.5 Data types and Operators

4.3.2.6 Control structures

4.3.2.7 Functions

4.3.2.8 Arrays

4.3.2.9 PHP Forms

4.3.2.10 PHP global variables and Super Global arrays

4.3.2.11 Database functions used in PHP

4.3.2.12 Database connectivity

Unit No 4.4 - Web Hosting

Periods: 15

4.4.1 Types of web hosting

4.4.2 Buying hosting space

4.4.3 Domain name registration

4.4.4 FTP software

Unit No 4.5 - Trends in Computing Technologies

Periods: 30

4.5.1 Mobile network

4.5.2 Generation of networks

4.5.3 Wireless networking technologies

4.5.4 Mobile application development

4.5.5 Computing technologies

4.5.6 IoT

4.5.7 Artificial Intelligence



COMPUTERISED OFFICE MANAGEMENT

MODULE III

COMMUNICATION AND PUBLISHING ART

(340 PERIODS)

3.1 OFFICE COMMUNICATION

(40 Periods)

- 3.1.1 Introduction to communication
- 3.1.2 Meaning, definition and features of communication
- 3.1.3 Importance of communication
- 3.1.4 Communication process
- 3.1.5 Barriers to communication and measures to overcome it
- 3.1.6 Types of communication and its advantages and disadvantages – On the basis of source of origin, direction, way of expression and organisational structure
- 3.1.7 Communication methods, devices, their use, merits and demerits/ limitations – Internet, e-mail, Video conferencing, Inmarsat, Telephone, Mobile phones, Voice Over Internet Protocol (VoIP), Interactive Voice Response System (IVRS), EPABX, Fax, eFax, Social Media
- 3.1.8 Telephone and e-mail etiquettes
- 3.1.9 Postal services – Ordinary letters, Registered letters, Speed post, Value Payable Parcel, Reply-Paid Service, Postage Prepaid Service, Insured Cover
- 3.1.10 Courier Service

3.2 COMMUNICATION THROUGH LETTERS

(60 Periods)

- 3.2.1 Meaning and importance of correspondence
- 3.2.2 Structure of a business letter
- 3.2.3 Layout of a letter
- 3.2.4 Types of business letters – Circular letter, Sales letter, enquiry letter, offers and quotations, Order letter, collection letter, form letters, application letters and bio-data
- 3.2.5 Types of Government letters – Official letter, Demi Official (D.O) letters
- 3.2.5 Inter Office Communications – Memo, Notice
- 3.2.6 Mail service – Inward and outward mail handling procedures

3.3 COMPUTERISED TYPING (English and Malayalam)

(100 periods)

- 3.3.1 Typing practice to achieve a speed of 35 w.p.m in English and 25 w.p.m in Malayalam.
- 3.3.2 Typing hand written/manuscript of letters, circular, etc.

3.4 DESKTOP PUBLISHING (ENGLISH & MALAYALAM) (110 Periods)

- 3.4.1 Pagemaker/Scribus - Application of Pagemaker/Scribus – Introducing Pagemaker/Scribus ‘Tools’ – Constructing a publication – Importing pictures and graphics – Editing text – Formatting text – Creating and importing styles – Creating master pages – Working with images, graphics and objects - Managing and printing a publication
- 3.4.2 Photoshop/GIMP - Components of Photoshop/GIMP window - Familiar with Photoshop/GIMP tool box - Familiar with palettes - understand image resolution - Formatting image - Understand file formats PSD, TIFF, JPEG and PDF - Working with selection tools - Drawing, painting and retouching tools - Explore colour picker dialog box - Familiar with retouching tools - Working with layers - Apply blend models - Use type masking and shape masking.
- 3.4.3 CoralDraw/Inkscape – Introduction – Tools – CoralDraw/Inkscape essentials – Working with text, object - Editing – Calendar Designing – Card Designing – Importing images – Exporting files

3.5 COMMUNICATION AT WORK PLACE (30 Periods)

- 3.5.1 Describing one’s job
- 3.5.2 Describing one’s work place (company)
- 3.5.3 Handling an angry customer
- 3.5.4 Directing a customer over phone
- 3.5.5 Preparing a daily and weekly work plan
- 3.5.6 Giving and receiving simple instructions
- 3.5.7 Enquiring about a job vacancy
- 3.5.8 Facing an interview
- 3.5.9 Effective communication techniques
- 3.5.10 Duties of Customer Service Representatives
- 3.5.11 Presenting a specific topic

MODULE IV

ENTERPRISE RESOURCE PLANNING

(340 Periods)

4.1 ENTERPRISE RESOURCE PLANNING (ERP) (100 periods)

- 4.1.1 Introduction to Enterprise Resource Planning
- 4.1.2 Meaning and definition of Enterprise Resource Planning
- 4.1.3 Need for ERP in business
- 4.1.4 Benefits and limitations of ERP
- 4.1.5 Components of ERP



4.1.6 ERP Packages – ERP and business – Functionalities of ERP Packages

4.1.7 Ideal ERP Modules – Internet enabled ERP systems

4.1.8 ERP software – Application of Ideal ERP Modules

4.1.9 ERP Implementation – Methodologies - Life cycle - Issues

4.2 PAPERLESS OFFICE (30 periods)

4.2.1 Introduction to paperless office

4.2.2 Meaning and features of paperless office

4.2.3 How to set up a paperless office?

4.2.4 Merits and demerits of paperless office

4.2.5 Office in pocket

4.3 E-GOVERNANCE (30 periods)

4.3.1 Concept of e-governance

4.3.2 Meaning of E-governance and E-government

4.3.3 Objectives of E-Governance

4.3.4 Domains of E-Governance

4.3.5 Major E-governance projects of Government of Kerala

4.3.6 E-governance services to citizens

4.3.7 Benefits of E-governance – to the Government – to the citizens

4.3.8 M - Governance

4.4 COMPUTERISED TYPING (English and Malayalam) (100 periods)

4.4.1 Typing practice to achieve a speed of 45 w.p.m in English and 30 w.p.m in Malayalam.

4.4.2 Typing hand written manuscript of government order, proceedings, statements, etc.

4.5 IT ENABLED SERVICES (20 periods)

4.5.1 Introduction and meaning of ITES

4.5.2 Business Process Outsourcing

4.5.3 Blog - creation – writing - publication

4.5.4 Medical Transcription

4.5.5 Affiliate Marketing

4.5.6 Call Centres

4.5.7 Virtual Assistants

4.5.8 Freelance Journalism

4.5.9 Computerised Accounting

4.6 WEB PAGE DESIGNING (40 Periods)

- 4.6.1 Introduction to HTML
- 4.6.2 Starting with HTML – HTML Document – Headers tag, Body tag – Elements of HTML Document
- 4.6.3 HTML tags for text, images, videos, lines, tables, lists, layouts, styles, hyperlink
- 4.6.4 Cascade Style Sheet
- 4.6.5 Static and Dynamic websites - Advantages and disadvantages
- 4.6.5 Web Server and Domain Name

4.7 CYBER ETHICS (20 periods)

- 4.7.1 Introduction to Cyber ethics
- 4.7.2 Meaning of Cyber ethics
- 4.7.3 Computer crimes
- 4.7.4 Cyber crimes/Internet crimes
- 4.7.5 Offences and penalties under Information Technology Act, 2000

Practical activities at the end of 3rd and 4th Module

I. Module 3 : Communication and Publishing Art

1. Create e-mail account and send e-mails
2. Open an account in social media and manage it for office purpose
3. Send fax message
4. Prepare business letters, statements, etc.
5. Speed typing in English and Malayalam
6. Type handwritten letters, statements, etc.
7. Prepare a Pagemaker/Scribus file with two or more boxes.
8. Design and create visiting card
9. Design a brochure
10. Resizing photos with given size and resolution

II. Module 4 : Enterprise Resource Planning

1. Create a blog
2. Work in ERP Software –Data entry – Report generation
3. Speed typing in English and Malayalam
4. Typing various handwritten/manuscript letters, statements, government order, etc.
5. Design a Website
6. OJT
7. Field visit



COSMETOLOGY & BEAUTY THERAPY

Module 3 Makeup Artistry

3.1 Art of Make Up

- 3.1.1 Introduction
- 3.1.2 Facial Anatomy
- 3.1.3 Corrective make up
- 3.1.4 Types of makeup

3.2 Mehandi Designing

- 3.2.1 Introduction
- 3.2.2 History of Mehandi
- 3.2.3 Mehandi Cone Preparation
- 3.2.4 Types of Mehandi Designing

3.3 Flower Arrangement and Bouquet setting

- 3.3.1 Introduction
- 3.3.2 Principles of flower arrangement
- 3.3.3 Flower making
- 3.3.4 Styles in flower arrangement
- 3.3.5 Types of flower arrangement
- 3.3.5 Bouquet setting

3.4 Jewel Making

- 3.4.1 Introduction
- 3.4.2 Tools and Materials used
- 3.4.3 Types of jewel

Module 4 Beauty Business Management

4.1 Beauty Business

- 4.1.1 Introduction
- 4.1.2 Importance of beauty business
- 4.1.3 Beauty business management

4.1.4 Functions of beauty parlour manager

4.2 Health and Wellness

4.2.1 Introduction

4.2.2 Dimensions of Health and Wellness

4.2.3 Components of Physical Fitness

4.2.4 Nutrition and diet

4.2.5 Exercise

4.2.6 Yoga

4.3 Personality Development

4.3.1 Introduction

4.3.2 Definition and characteristics of personality

4.3.3 Techniques in personality development

4.3.4 Personal Grooming

4.3.5 Stress Management

4.4 Beauty Entrepreneurship

4.4.1 Introduction

4.4.2 Scope of Entrepreneurship in beauty business

4.4.3 Women Entrepreneurs

4.4.4 SWOT Analysis in beauty Entrepreneurship



CRECHE AND PRE SCHOOL MANAGEMENT

MODULE: 3

Unit: 1 the foundations of Montessori Education 70 periods

- Maria Montessori, her life and contributions
- Historical background of Montessori Education
- Aims of Montessori Education
- The Philosophy of Montessori Education
- Principles of Montessori Education
- Other key concepts of Montessori education-the absorbent mind, the sensitive period, normalization of deviated children through work, nature in education, observation and discovery
- The three components in Montessori Education-the child, the favorable environment and the teacher.

Unit: 2 Methods and areas of Montessori teaching 100 periods

- Areas of learning in Montessori method- Practical life, sensorial education, Arithmetic Education, Language education, Zoology, Botany, Geography and other cultural aspects of life
- Methods of Montessori education
- Differences between Montessori method, Kindergarten method and other traditional methods of preschool education
- Stories and rhymes and ways of presentation
- Montessori Directress- role preparation, qualities
- Daily observations, study visits, long walks and nature observation

Unit: 3 Organization of Montessori Environment and classroom designs 100 periods

- Class room design
- The specially prepared environment- nature, facilities, preparation
- The didactic apparatuses/Montessori materials
- Arrangement of materials and areas
- Furniture
- Maintaining the environment

Unit: 4 Assessments and Evaluation in Montessori Education 70 periods

- Methods of assessment and evaluation- continous observation and formative assessment of activities, performance assessment
- Evaluation of written work
- Purpose of assessment
- Teachers role in assessment
- The concept of self correction

- Remedies
- Records to be maintained for individual child

MODULE: 4

- 1 Planning and Organization of Crèche /pre schools and Montessori Schools** **70 periods**
- Management-Meaning, Role, steps
 - Resource-Meaning, classification and characteristics
 - Importance and ways of managing resources like time, energy, money a
 - Role of communication in management
- 2 Human Resource Management** **100 periods**
- Human Resource Management-importance
 - Human Resource recruitment and selection
 - Delegation of authority and responsibility
 - Training and empowerment
 - Workers participation in organizational success
 - Methods of resolving conflicts
 - Role of vision and mission
- 3 Infrastructural Requirements** **70 periods**
- Land
 - Building
 - Environment
 - Sanitary facilities
 - Drainage
 - Drinking water facility
 - Pollution
 - Furniture
 - Play equipments
 - Additional facilities needed for crèche and Montessori schools
 - Child Safety-Precautions and facilities
- 4 Fiscal Management & Budgeting** **100 periods**
- Fiscal Management-Fund mobilization, Budgeting
 - Registers to be maintained
 - Basic accounts needed for a firm.
 - Agencies which support entrepreneurship
 - How to write a good proposal/project
 - Tax filing



CUSTOMER RELATIONSHIP MANAGEMENT

MODULE III

FRONT OFFICE OPERATIONS IN HOSPITALITY SECTOR

Unit 3.1 Introduction to Hospitality Industry (30 Periods)

- 3.1.1 Meaning of Hospitality Industry
- 3.1.2 Origin of Hospitality Industry
- 3.1.3 Nature of Hospitality Industry
- 3.1.4 Components of Hospitality Industry
- 3.1.5 Hotel Industry Meaning and Definition

Unit 3.2 Hotel Organisation (70 Periods)

- 3.2.1 Classification of Hotels
- 3.2.2 Process for star Classification
- 3.2.3 Types of rooms
- 3.2.4 Hotel plans
- 3.2.5 Tariff
- 3.2.6 Hotel Departments
- 3.2.7 Classification of Hotel department on location basis

Unit 3.3 Front Office Functions (130 periods)

- 3.3.1 Importance of Front Office
- 3.3.2 Structure of Front Office
- 3.3.3 Front Office Operations/sections
- 3.3.4 Reservation
- 3.3.5 Registration
- 3.3.6 Front Office

Unit 3.4 Front Office Accounting (70 Periods)

- 3.4.1 Stages of accounting
- 3.4.2 Creation of Documents and Accounts
- 3.4.3 Maintenance of Accounts
- 3.4.4 Internal control
- 3.4.5 Settlement of Accounts
- 3.4.6 Classification of Hotel Activities on Financial Basis

Unit 3.5 Guest Cycle (40 Periods)

- 3.5.1 Stages of Guest Cycle
- 3.5.2 Check in Procedure
- 3.5.3 Check out Procedure
- 3.5.4 Latest Trends

MODULE IV

Front Office Operations in Healthcare Sector

4.1 Health Care and hospital management

- 4.1.1 Introduction to health
- 4.1.2 Health care
- 4.1.3 Health care service
- 4.1.4 Hospital
- 4.1.5 Patient welfare scheme
- 4.1.6 Quality maintenance in hospital

4.2 Front Office management in hospitals

- 4.2.1 Importance of front office in hospitals
- 4.2.2 Sections of hospital front office
- 4.2.3 Functions of hospital front office sections
- 4.2.4 Duties and responsibilities of medical receptionist
- 4.2.5 Qualities and skills and front office staff in hospitals
- 4.2.6 General guidelines to hospital front office staff
- 4.2.7 Crisis handling in hospitals

4.3 Patient support services in hospitals

- 4.3.1 OP Department Services
- 4.3.2 IP Services
- 4.3.3 Dietary services
- 4.3.4 Emergency Services
- 4.3.5 Security Services
- 4.3.6 Patient related functions of accounts department
- 4.3.7 Patient safety management programme
- 4.3.8 Patient information and education programme
- 4.3.9 Patients' rights and responsibilities

4.4 Public relations in hospitals

- 4.4.1 Need for public relations in hospitals
- 4.4.2 Importance of communication in health care sector
- 4.4.3 Marketing functions of hospitals
- 4.4.4 Handling of Health Insurance
- 4.4.5 Application of IT in health care sector



DENTAL TECHNOLOGY

MODULE 3

DENTAL MECHANICS 2

Fabrication Of Fixed Partial Dentures

- | | |
|---|--------------|
| UNIT 3.1 Steps in casting | (5 periods) |
| 3.1.1 Introduction to prosthodontics | |
| 3.1.2 Steps in casting | |
| UNIT 3.2 Tooth preparations | (10 periods) |
| 3.2.1. Principles of tooth preparation | |
| 3.2.2 Tooth preparation in anterior | |
| 3.2.3 Tooth preparation in posteriors | |
| 3.2.4 Gingival finish lines | |
| UNIT 3.3 Cast duplication | (15 periods) |
| 3.3.1 Objectives of cast duplication | |
| 3.3.2 Cast duplication with alginate | |
| 3.3.3 Cast duplication with reversible hydrocolloid | |
| 3.3.4 Electroforming of die | |
| UNIT 3.4 Die preparation | (20 periods) |
| 3.4.1 Solid cast with individual system | |
| 3.4.2 Pindex system | |
| 3.4.3 di-lok and DVA system | |
| UNIT 3.5 Wax pattern fabrication | (90 periods) |
| 3.5.1 Wax pattern fabrication on anterior teeth | |
| 3.5.2 Wax pattern fabrication on posterior teeth | |
| 3.5.3 Waxing up of occlusal aspect | |
| 3.5.4 Finishing of margins | |
| UNIT 3.6 Pontic | (10 periods) |
| 3.6.1 Classification of pontic | |
| 3.6.2 Pontic design | |
| 3.6.3 Types of pontic | |
| UNIT 3.7 Investing | (20 periods) |
| 3.7.1 Sprue | |
| 3.7.2 Spruing procedure for single casting | |
| 3.7.3 Spruing procedure for multiple casting | |
| 3.7.4 Casting ring and liner | |
| 3.7.5 Investing | |

UNIT 3.8 Burn out (10 periods)

3.8.1 Alloy solidification shrinkage

3.8.2 Burn out procedure

UNIT 3.9 Casting (30 periods)

3.9.1 Casting machines

3.9.2 Melting of alloy

3.9.3 Casting of metal

UNIT 3.10 Divesting and finishing (20 periods)

3.10.1 Divesting

3.10.2 Pickling

3.10.3 Finishing and polishing

UNIT 3.11 Casting defects (20 periods)

3.11.1 Consequence of casting defect

3.11.2 Distortion of casting

3.11.3 Surface roughness and irregularities

3.11.4 Porosity

3.11.5 Incomplete casting with missing details

UNIT 3.12 Fabrication of ceramic crowns (10 periods)

3.12.1 Dental ceramic

3.12.2 Classification of dental ceramic

3.12.3 Steps in fabrication of ceramic crown and bridge

UNIT 3.13 Materials used in casting (60 periods)

3.13.1 Investment material

3.13.2 Alloys used in casting procedures

3.13.3 Model cast and die materials

3.13.4 Finishing and polishing materials in casting

UNIT 3.14 Tarnish and corrosion (20 periods)

3.14.1 Tarnish and corrosion

3.14.2 Types of corrosion

**Module 4
Orthodontics**

UNIT 4.1 Introduction to orthodontics (15 periods)

4.1.1 Basics of orthodontics

4.1.2 Tooth movements in orthodontics

4.1.3 Anchorage

4.1.4 Orthodontic appliances

4.1.5 Instruments used for wire bending



UNIT 4.2 Fixed orthodontic appliances	(20 periods)
4.2.1 Components of fixed orthodontic appliances	
UNIT 4.3 Removable orthodontic appliances	(130 periods)
4.3.1 Components of removable orthodontic appliances	
4.3.2 Clasps	
4.3.3 Bows	
4.3.4 Springs	
4.3.5 Expansion components	
4.3.6 Fabrication of appliance	
UNIT 4.4. Myofunctional appliances	(20 periods)
4.4.1 Introduction to myofunctional appliances	
4.4.2 Myofunctional appliances	
UNIT 4.5 Space maintainers	(10 periods)
4.5.1 Introduction to space maintainers	
4.5.2 Fixed space maintainers	
4.5.3 Removable space maintainers	
UNIT 4.6 Habit breaking appliances	(25 periods)
4.6.1 Introduction to habit breaking appliances	
4.6.2 Habit breaking appliances	
UNIT 4.7 Retainers	(20 periods)
4.7.1 Retention	
4.7.2 Removable retainers	
4.7.3 Fixed retainers	
UNIT 4.8 Dental assistance part 2	(50 periods)
4.8.1 Dental x rays	
4.8.2 Front office management	
4.8.3 Chair side management	
UNIT 4.9 Soldering and Welding 50 periods)	
4.9.1 Introduction to soldering and welding	
4.9.2 Flux, antflux	
4.9.3 Procedure for soldering	

DIARY TECHNOLOGY

MODULE 3

Milk Products and Quality Assurance

Unit 3.1 Special Milks

(25 periods)

■ Sterilized milk and Flavoured milks:

- Definition
- Types
- Details of manufacture with flow diagram
- Sterilized flavoured milks-details of manufacture.

■ Definition and FSSAI standards of:

- Toned milk
- Double toned milk
- Recombined milk
- Reconstituted milk
- Standardized milk
- Soft curd milk
- Vitaminized/ irradiated milk
- Frozen Concentrated milk
- Humanized milk
- Filled milk
- Imitation milk
- Vegetable toned milk

Unit 3.2 Fermented Milks

(30 periods)

■ Fermented milks:

- Definition
- health benefits

■ Starter culture:

- classification
- Starter culture-Definition and propagation.

■ Preparation of fermented milks:

- Preparation of buttermilk
- Preparation of Acidophilus milk
- Preparation of Yoghurt
- Preparation of Dahi
- Preparation of Lassi

**Unit 3.3 Fat Rich Dairy Products****(30 periods)****■ Cream:**

- Definition
- Composition
- FSSAI standards
- Types of cream
- Methods of separation- Gravitational and centrifugal

■ Butter:

- Definition
- Composition
- FSSAI standards
- Classification of butter
- Method of manufacture
- Overrun in butter-measuring and its causes
- Desi butter-FSSAI definition, Standards and preparation

■ Ghee

- Definition
- Composition
- FSSAI standards
- Methods of preparation-creamery butter method, prestratification method, Direct cream method and Desi method.
- Agmark grading of ghee and Agmark standards
- Packaging and storage of ghee
- Adulterants in Ghee
- Butter oil -definition and composition

Unit 3.4 Condensed and Dried Milks**(20 periods)****■ Condensed milk:**

- FSSAI definition and standards of sweetened condensed milk
- sweetened condensed skim milk ,Evaporated milk, Evaporated skim milk
- preparation of sweetened condensed milk.

■ Dried Milks:

- Milk powder(whole milk powder and skim milk powder), Baby food, malted milk.
- FSSAI definition and standards.

3.5 CHEESE**(40 periods)****■ Cheese**

- FSSAI Definition with standards
- Popular varieties
- Preparation of cheddar cheese

- Preparation of cottage cheese
- Preparation of processed cheese
- Uses of cheese

3.6 FROZEN DAIRY PRODUCTS (45 periods)

■ ICE CREAM

- FSSAI definition and standards, ISI recommendations
 - Different varieties of ice cream – Plain, Chocolate, fruit, nut, milk ices, ices, sherbets, fancy, moulded, novelties, softy.
 - Methods of manufacture with flow diagram -
 - ❖ selection of ingredients, figuring the mix, making the mix, pasteurizing the mix, homogenizing the mix, cooling and ageing the mix, freezing the mix, packaging, hardening and storage
- Role of constituents in ice cream, Overrun in ice cream

3.7 Indigenous Milk Products/ Sweets (90 periods)

■ Indigenous Milk Products/ Sweets:

- Definition
- Classification
- **Khoa and khoa based sweets** – Peda, Gulabjamun, Kalakand, Burfi-method of preparation
- **Chhana and chhana based sweets** - Sandesh, Rasagolla, Rasamalai, Chhana-kheer, Chhana-murki, pantooa - method of preparation
- **Paneer and paneer based products.**
- **Chakka and Srikhand**

3.8 Dairy By-products and waste management in dairy industry

(30 periods)

■ Dairy By-products:

- Definition and classification
- Casein – rennet casein, acid casein, edible casein –definition and method of preparation
- Whey – whey beverage, whevit, whey sip-up, whey drink - method of preparation
- ETP (Effluent Treatment Plant)

3.9 Quality Assurance

(30 periods)

- Current awareness on quality and safety of dairy foods
- HACCP, GMP, ISO standards, FSSAI, AGMARK, MMPO, PFA
- Milk borne diseases (pathogens) - public health significance
- Action plan to avoid hazards – briefing of importance of hygienic precautions to be taken right from the milking of cattle (farm to plant)
- Cold chain in milk preservation
- Automation in dairy plants-quality control lab, bulk vending machines.



MODULE 4

Dairy Business Management and Entrepreneurship

Unit 4.1: Introduction to Dairy Extension

(65 periods)

■ **Basics of dairy extension:**

- Objectives
- Relevance in dairy industry

■ **Extension teaching methods – introduction to audio visual aids**

- Use of audio aids in dairy extension activities
- Use of visual aids in dairy extension activities
- Charts
- Posters
- Bulletins

■ **Handling of audio-visual aids**

- Basic idea about operating a camera, OHP projector, TV and multi-media

Unit 4.2 Dairy co-operative Management

(80 periods)

■ **Live stock development programmes and Five year plans:**

- History
- Basic concepts

■ **Operation flood programme:**

- Aim of white revolution and its achievements
- Achievements of operation flood

■ **Formation of dairy co-operatives:**

- Basic requirements of a dairy co-operative society
- Registration of a dairy co-operative society

■ **Working of dairy co-operatives and unions:**

- Basic working principles of dairy co-operatives and union

■ **Registers and records maintained in the society:**

- Basic idea about the common registers maintained in a society

■ **Maintenance of accounts of dairy co-operative societies:**

- Basic idea about the account maintenance in a primary society

■ **Functions of milk federation:**

- Basic idea about the structure of APCOS
- Functions of Federation

■ **Function of dairy development department:**

- Various schemes by the department
- Implementation procedure

Unit 4.3 : Packaging of milk and milk products (50 periods)

- Definition – Purpose of packaging
- Common packaging materials
- Packaging of milk and milk products
- Design of packaging materials

Unit 4.4 : Marketing of milk and milk products (70 periods)

- **Marketing:**
 - Definition and basic concepts of marketing.
- **Marketing plans:**
 - Transportation of milk and milk products
- **Analysis of consumer demand and acceptance:**
 - Market Survey
- **Role of salesman and marketing personalities in marketing of milk and milk products:**
 - Basic idea

Unit 4.5 : Dairy Economics (75 periods)

- **Cost analysis of milk and milk products:**
 - Basic concepts
 - Method
- **Economic institutions supporting Dairy Development programmes:**
 - Functioning of Dairy Development Programmes
- **Project report for starting a small scale dairy farm:**
 - A project of 20 cow farm
- **Project report for starting a small scale dairy processing unit:**
 - A project of a small scale production unit



ECG & AUDIOMETRIC TECHNOLOGY

MODULE III

NAME: BASICS OF AUDIOLOGY

3.1 SOUND AND HEARING (65 Periods)

- 3.1.1 Definition of sound, Generation and Transmission of sound
- 3.1.2 Physical and Psychological attributes of sound
- 3.1.3 Types of sound: Pure tones, complex tones, Noise
- 3.1.4 Range of Human hearing
- 3.1.5 Development of auditory behavior
- 3.1.6 Sound Treated Rooms

3.2 AUDITORY SYSTEM - ANATOMY & PHYSIOLOGY (130 periods)

- 3.2.1 Ear - External ear, Middle ear, Inner ear
- 3.2.2 Auditory nerve and Central Auditory Pathway
- 3.2.3 Theories of hearing

3.3 HEARING LOSS (75 Periods)

- 3.3.1 Hearing loss, Types of Hearing Loss - Organic, Non organic Causes - Congenital vs Acquired, Prelingual vs Post lingual, Noise Induced Hearing loss, Presbycusis
- 3.3.2 Degrees of Hearing loss, Configuration of hearing loss, Unilateral vs Bilateral, Symmetrical vs Asymmetrical, Progressive vs Sudden hearing loss, Fluctuating vs stable hearing loss
- 3.3.3 Audiogram: Notations used for plotting audiograms
- 3.3.4 Audiogram patterns in different types of hearing loss
- 3.3.5 Effects of hearing loss on development

3.4 HEARING ASSESMENT (70 Periods)

- 3.4.1 Audiometers, Types of Audiometers
- 3.4.2 Pure tone Audiometer - Instrumentation
- 3.4.3 Case History Evaluation and its importance
- 3.4.4 Tuning fork Tests

MODULE IV

MODULE NAME: BASICS OF PRACTICAL AUDIOMETRY

4.1.1 PURE TONE AUDIOMETRY (120 Periods)

Patients and Clinicians Role in Testing - Air conduction testing, Bone conduction Testing, Plotting Audiograms, Audiogram Interpretation

4.1.2 Play Audiometry, Free field Audiometry, Aided Audiometry

4.1.3 Masking - Minimum masking, effective Masking, Over Masking, Masking Noise

4.1.4 Calibration of Audiometers

4.2 SPECIAL TESTS OF HEARING (40 Periods)

Loudness Recruitment - Short Increment Sensitivity Index, ABLB Test, Tone Decay Test

4.3 SPEECH AUDIOMETRY (65 Periods)

Need for Test Environment - Speech Discrimination test, Speech Reception Threshold, Speech discrimination score

Most Comfortable Loudness, Uncomfortable Loudness, Dynamic Range

4.4 OBJECTIVE TESTS OF AUDIOMETRY (50 Periods)

Brain Stem Evoked Response Audiometry (BERA)

Otoacoustic Emission (OAE)

Impedence Audiometry - Tympanometry, Reflexometry

4.5 HEARING AID AND EAR MOULDS (65 Periods)

4.5.1 Hearing Aids - Instrumentation, Characteristics of Hearing aids

Classification, Hearing aid selection, Care and maintenance of hearing aid, Cochlear Implants

4.5.2 Ear Mould - Types, Preparation of Ear Mould (Brief)

ELECTRICAL AND ELECTRONICS TECHNOLOGY

Module - 3

(Solar PV system installation and Maintenance)

Unit -1 Cells and Batteries (55 Periods)

Cells- concepts of Primary and secondary Cells- Lead Acid Cell- Steps of Construction, Defects, Self discharge/shelf life, Capacity and efficiency of battery, Charging and Discharging, Care and Maintenance, Interconnection of Cells- Series and parallel, Instruments and tools used for battery testing, Battery bank installation, testing and commissioning. Types of lead acid battery- Liquid vented, Tubular- Sealed or VRLA - AGM & Gel, Applications of Nickel cadmium & Lithium ion cells.

Unit -2 Electronic components and Devices - II (85 Periods)

Transistor-types, testing connections-Transistor as an amplifier, Basic oscillator circuit, SCR- TRIAC-DIAC-FET-MOSFET-IGBT-terminals-applications and testing. Zener diode-voltage regulator using zener diode and 78XX series- applications of LCD-photodiode-photo transistor, Thermistor, LDR, Super capacitor. Inverter & UPS - Basic circuit and working - Familiarising inverter circuit using MOSFET/IGBT.

Number systems- binary and decimal - Logic gates-AND, OR, NOT, NAND, NOR & XOR

Unit - 3 Solar PV System installation and maintenance (200 Periods)

Introduction to Energy- Renewable and non-renewable energy sources-Energy situation in Kerala and contribution of different energy sources to the energy mix. Solar Energy- Advantages and disadvantages (5)

Solar PV Modules- Photo Voltaic effect-Solar cells-Construction , Series and Parallel connections of solar cells, fabrication of solar PV module. Mismatch in cells/module, Shading and hot spots. Factors affecting power of a PV Module. Rating of PV Module.

I-V characteristics of PV module- Open circuit voltage-Short circuit current and maximum power point , Selection of solar module according to requirement. (60)

Solar PV system and its installation- Components of solar PV System- Choice of batteries for PV modules.DC to DC Converter, Inverter (DC to AC converter), Charge controllers, Wire sizing in P V systems. Types of PV Systems- Stand alone, Grid connected and Hybrid system. Installation of PV module - Orientation and inclination requirements- Module mounting structures- Selection of appropriate equipment, materials, accessories and tools for installation of battery , inverter and other support systems. Safety precautions for installing a solar photo voltaic system. (100)

Solar PV system maintenance -Basic Maintenance-cleaning of module and maintenance of battery. (20)

Solar PV devices - Solar lantern, Solar Street lights - Parts & Working. (15)

Module - 4

(Servicing of common home appliances)

Unit - 1 Electrical Machines **(50 Periods)**

DC Machines- DC Generator- Parts, Working principle, Types - DC Motors- Working principle, Types Applications-necessity of starters.

A.C Motors -Principle of working and types of 3 phase Induction motors- Starters-Connection of DOL and Star delta starter-Single phase Induction Motor-Types-Working -Circuit Diagram and Applications of PSC, CSIR, Universal, Shaded pole, Stepper motor and BLDC Motors.

Unit - 2 Servicing of common home Appliances **(200 Periods)**

Parts, working, testing, precautions and servicing of :

1. Electric iron- Non Automatic and Automatic
2. Electric Water Heater-
3. Ceiling fan
4. Wall mount/Pedestal fan
5. Mixer Grinde
6. Wet grinder
7. Washing Machine - Semi and Fully automatic
8. Water pump-Centrifugal and Jet.

UNIT - 3 Engineering Graphics **(90 Periods)**

Engineering drawing

Engineering drawing- Uses-Instruments- Types of lines, Lettering and dimensioning, Geometrical construction -bisecting lines- perpendiculars- dividing line into equal parts, Angles. Construction of triangle, square, rectangle, pentagon and hexagon. Conic sections-concept - definition of ellipse, helix, parabola & hyperbola , construction of ellipse, parabola. Involute, triangle & square .Projections of points & lines. Projection of planes (first quadrant only). Orthographic Projection - Orthographic views of simple objects- Pictorial Drawing-Isometric projection-Principle, isometric scale, isometric view. Auxiliary views, Free hands sketching of straight lines, rectangles, squares, circles- Sectional views of simple engineering components and devices. Development of surfaces -concept & applications-development of cylinder and pyramid.

Computer Aided Drafting

Introduction to CAD -starting to use CAD software- Application of CAD in Engineering drawing -opening of CAD-Setting of units and limits-saving of drawing. Draw commands (lines, circles, arc, ellipse, hatch, modify, erase, etc.) Dimensioning and text commands. Drawing of 2D figures, creating a new drawing. Introduction to electrical Auto CAD. Familiarise & practice electrical Auto CAD software.

ELECTRONICS & COMMUNICATION TECHNOLOGY

Module III

Microcontroller and Robotics

UNIT- I: Introduction to Microprocessors and Microcontrollers (25 periods)

Hexadecimal and ASCII, Embedded system – over view, Define an Embedded system, Different applications, Types of embedded system. Processors vs. Controller-RISC and CISC – Microcontroller Family, Architecture of μ C Specification of controllers, Criteria for choosing controllers.

PIC μ C Families, general block diagram. Introduction to PIC architecture, I/O Ports and special function registers, Architecture of PIC 16F87x, special features of PIC, Pin details.

UNIT- II- - PIC Controller Programming (85 periods)

Memory organization – program memory and data memory, addressing modes – different types- direct and indirect , Instruction set- bit level, byte level, arithmetic, logic, increment/decrement, data transfer, rotate, branch, clear and other miscellaneous instructions, Oscillator types, RESET types, Simple Programming based on above instructions.

UNIT – III -Basic Programming Concepts using Assembly Language & Embedded C (116 periods)

Introduction to MPLAB X IDE, Creating new projects in MPLAB, Text Editor, Writing and saving codes, Adding files to Projects, Building and check for build errors and warnings. Introduction to Embedded C- Structure of C Program, Data types, Operators- Arithmetic, Boolean and Logical, Time Delays, I/O Programming. Familiarization of simulation tools- PROTEUS - Simulation of code using PROTEUS, porting of HEX code to hardware, Simple Programs.

UNIT – IV Features of PIC and peripheral interfacing (87 periods)

Timer – discuss various timer functions – Timer 0, Timer 1, Timer 2, Timer 1 modes – Compare and capture modes, Timer 2 modes – PWM, Synchronous serial port modes – serial peripheral interface and inter integrated circuit. Interrupts, Watch dog timer, power down/sleep mode, USART – Transmit mode – receive mode, Registers used in USART. Basic hardware connections with PIC, Interfacing circuit using PIC– LED, LCD, Stepper/servomotor DC motor, ADC, LDR and Relay circuits.

Introduction to Robotics – Definition, Types, Uses of Robot, Key Components, Mechanical elements, sensors and its types, Controller, Storage hardware, Computation hardware and interface hardware. Robots in Industry

Simple project.

UNIT –V- Basic Engineering Graphics (27 periods)

Engineering drawing- Uses- Free hands sketching of straight lines, rectangles, squares, circles, etc.- Geometrical construction of square, rectangle, triangle, circle, ellipse, etc.- Lettering practice

MODULE – IV**Wireless Communication and Mobile Technology****UNIT: I- Radio Communication (50 periods)**

Introduction – Block diagram of a communication system, Electromagnetic waves, Electromagnetic frequency spectrum and frequency band Allocation, Propagation Characteristic – Ground wave, Space Wave(Line of Sight) and Sky waves, their Applications. Modulation, Need of modulation – Define AM, FM and PM. AM Transmitter- Receiver, FM Transmitter- Receiver (Block diagram explanation only).Antenna- Basic concepts -Types.

UNIT : II- Satellite Communication (25 periods)

Principle of Satellite Communication, Satellite Frequency Bands, Geosynchronous Satellite-Advantages, Earth Station Transmitter- Block diagram, Transponder, Earth Station Receiver-Block diagram, DTH, GIS. Alternative communication systems during Disasters – Modes for emergency communication, Amateur radio, satellite based communication systems, IRS.

UNIT : III - DATA Communication (85 periods)

Basic Concepts of Digital Communication- Types- Simplex, Half duplex, Full duplex, PCM, ASK, FSK, PSK (explanation only), Block diagram of digital Communication System, - Advantages. Transmission Media – Twisted Pair, Coaxial cable, Wave guides, Optical fiber, Structure of coaxial cable and optical fiber. Introduction to Fiber Optic Communication, Concept of data transmission through optical fiber.

UNIT : IV - Mobile Communication (153 periods)

Cellular Mobile Communication, Concepts of Cell and Frequency Reuse, Hand off, GSM, Mobile Station, Base Station Subsystem, SIM, Network and Switching Subsystem. Advantages of GSM, CDMA, Advantages of CDMA, Introduction to GPRS, 3G Services, Features of 4G. Bluetooth, Wifi, Wimax (Basic concepts).

UNIT –V- Engineering Graphics (27 periods)

Orthographic views of simple objects-. Free hand sectional views of Electronics engineering components and devices. Auxiliary views- Pictorial Drawing- isometric views of simple objects/ tools.



FASHION & APPAREL DESIGNING

MODULE - III

PATTERN MAKING & GARMENT CONSTRUCTION

- | | | |
|------------|---|-------------------|
| 3.1 | BODY MEASUREMENTS | 20 periods |
| | 3.1.1. Introduction | |
| | 3.1.2. Learning outcomes | |
| | 3.1.3. Body Measurements | |
| | 3.1.4. Important Body Measurements | |
| | 3.1.5. Standard Body Measurements | |
| | 3.1.6. Points to be considered while taking body measurements | |
| | 3.1.7. Figure Types - Normal Figure & Abnormality in Figures | |
| | 3.1.8. Practicals | |
| | 3.1.9. Assessment Activities | |
| | 3.1.10. TE Questions | |
| 3.2 | PATTERN MAKING | 80 periods |
| | 3.2.1. Introduction | |
| | 3.2.2. Learning outcomes | |
| | 3.2.3. Patterns | |
| | 3.2.4. Importance of Pattern Making | |
| | 3.2.5. Computer Aided Pattern Making | |
| | 3.2.6. Types of Patterns | |
| | 3.2.7. Tools & Equipments | |
| | 3.2.8. Pattern Making Terminology | |
| | 3.2.9. Pattern Development | |
| | 3.2.10. Draping | |
| | 3.2.11. Drafting | |
| | 3.2.12. Finishing of Patterns | |
| | 3.2.13. Pattern Defects | |
| | 3.2.14. Drafting - Basic Pattern Set | |
| | 3.2.15. Pattern Grading | |
| | 3.2.16. Practicals | |
| | 3.2.17. Assessment Activities | |
| | 3.2.18. TE Questions | |
| 3.3 | GARMENT DESIGN DEVELOPMENT | 70 periods |
| | 3.3.1. Introduction | |
| | 3.3.2. Learning outcomes | |
| | 3.3.3. Dart Manipulation | |
| | 3.3.4. Stylelines | |

- 3.3.5. Sleeve Variations - Puff, Bell, Cape, Petal
- 3.3.6. Skirt Variation - A line, Flare, Circular
- 3.3.7. Pattern Alteration
- 3.3.8. Pattern Layout
- 3.3.9. Practicals
- 3.3.10. Assessment Activities
- 3.3.11. TE Questions

3.4 CONSTRUCTION OF HOUSEHOLD TEXTILES 40 periods

- 3.4.1. Introduction
- 3.4.2. Learning outcomes
- 3.4.3. Household Textiles
- 3.4.4. Types and Use
- 3.4.5. Construction of Pillow Cover
- 3.4.6. Construction of Apron
- 3.4.7. Practicals
- 3.4.8. Assessment Activities
- 3.4.9. TE Questions

3.5 CONSTRUCTION OF CHILDREN'S AND LADIES' GARMENTS 70 periods

- 3.5.1. Introduction
- 3.5.2. Learning outcomes
- 3.5.3. Construction of A - Line Frock
- 3.5.4. Construction of Salwar
- 3.5.5. Construction of Kameez
- 3.5.6. Practicals
- 3.5.7. Assessment Activities
- 3.5.8. TE Questions

3.6 CONSTRUCTION OF GENTS' GARMENTS 60 periods

- 3.6.1. Introduction
- 3.6.2. Learning outcomes
- 3.6.3. Construction of Shirt
- 3.6.4. Construction of Kurtha
- 3.6.5. Practicals
- 3.6.6. Assessment Activities
- 3.6.7. TE Questions

MODULE - IV

FASHION DESIGNING & BOUTIQUE MANAGEMENT

4.1 ELEMENTS OF DESIGN 30 periods

- 4.1.1. Introduction
- 4.1.2. Learning outcomes
- 4.1.3. Design



4.1.4. Types of Design	
4.1.5. Elements of Design	
4.1.6. Lines	
4.1.7. Shape	
4.1.8. Form	
4.1.9. Colour	
4.1.10. Texture	
4.1.11. Light	
4.1.12. Practicals	
4.1.13. Assessment Activities	
4.1.14. TE Questions	
4.2 PRINCIPLES OF DESIGN	50 periods
4.2.1. Introduction	
4.2.2. Learning outcomes	
4.2.3 Design Principles	
4.2.4. Balance	
4.2.5. Proportion	
4.2.6. Rhythm	
4.2.7. Emphasis	
4.2.8. Harmony	
4.2.9. Practical	
4.2.10. Assessment Activities	
4.2.11. TE Questions	
4.3 COLOUR	40 periods
4.3.1. Introduction	
4.3.2. Learning outcomes	
4.3.3. Dimensions of Colour	
4.3.4. Prang Colour System	
4.3.5. Colour Schemes	
4.3.6. Colour schemes in dress	
4.3.7. Colour Rendering	
4.3.8. Practical	
4.3.9. Assessment Activities	
4.3.10. TE Questions	
4.4 FASHION ILLUSTRATION	100 periods
4.4.1. Introduction	
4.4.2. Learning outcomes	

- 4.4.3 Figure Illustration
- 4.4.4. 10 Head theory
- 4.4.5. Fashion Figure - Stick Figure
- 4.4.6. Fashion Figure - Block Figure
- 4.4.7. Fashion Figure - Flesh Figure
- 4.4.8. Figure Detailing
- 4.4.9. Illustration of hair styles.
- 4.4.10. Types of Necklines
- 4.4.11. Types of Collars
- 4.4.12. Types of Sleeves
- 4.4.13. Types of Trousers
- 4.4.14. Types of Skirts
- 4.4.15. Practical
- 4.4.16. Assessment Activities
- 4.4.17. TE Questions

4.5 DESIGNING & PORTFOLIO DEVELOPMENT 100 periods

- 4.5.1. Introduction
- 4.5.2. Learning outcomes
- 4.5.3. Fashion Portfolio
- 4.5.4. Practical
- 4.5.5. Assessment Activities
- 4.5.6. TE Questions

4.6 FASHION MERCHANDISING AND BOUTIQUE MANAGEMENT 20 periods

- 4.6.1. Introduction
- 4.6.2. Learning outcomes
- 4.6.3. Fashion Merchandising
- 4.6.4. Duties and responsibilities of a Fashion Merchandiser
- 4.6.5. Visual Merchandising
- 4.6.6. Boutique - Meaning
- 4.6.7. Boutique Management
- 4.6.8. Practical
- 4.6.9. Assessment Activities
- 4.6.10. TE Questions

FOOD AND RESTAURANT MANAGEMENT

Module III

Catering and Restaurant Supervisor

Unit I - Fish and Meat Cookery 75 Periods

Classification of fish, Purchase specification of fish, Cuts of fish, Meat cookery, beef – Purchase specification, Cuts of beef, Mutton - Purchase specification, Cuts of mutton

Pork – Purchase specification, Cuts of pork, Poultry – Purchase specification, Cuts of poultry

Unit II - Cheese, Pastas and Sandwiches 25 Periods

Cheese – Classification of Cheese, Pastas – Introduction to pastas cookery, Types of pastas

Sandwiches – Types of sandwiches

Unit III - Bakery and Sweets 30 Periods

Bread – Ingredients & Bread making, Cakes, Pastry, Biscuits, Cookies, Sweets

Unit IV - International and Regional Cuisine 40 Periods

Continental Cuisine, Chinese Cuisine, Indian - South Indian & North Indian Cuisine

Unit V - Types of Service and Menu Planning 60 Periods

English Service, French Service, American Service, Silver Service, Russian Service, Room Service, Cafeteria Service, Gueridon Service, Menu Planning – Factors to be considered while planning a menu

Unit VI - Alcoholic beverages and their service 40 Periods

Introduction to Alcoholic beverages, Classification of Alcoholic Beverages, Fermented drinks – (Beer, wine) Distilled Drinks – (whisky, brandy, gin, vodka, rum, tequila), Service of alcoholic beverages, Cocktails and liqueurs

Unit VII - Function Catering 70 Periods

Types of Functions, Banquets – Staff organization, Banquet booking, Banquet Table layouts, Outdoor Catering

Module IV

Computer Application in Food and Restaurant Management

Unit I - Information Technology 50 Periods

Introduction to Information Technology – Data processing - Data presented inside a computer - Characteristics of computers - History of computers - Evolution of computers - Classification of computers - Hardware programming and stored program concept - Computer Organisation – Computer as a data processing machine - Basic computer operations - Functional units - System components - Input/ Output ports (I/O ports) – Microprocessor - The Memory - Memory organisation - Types of memory - Advanced portable storage devices - Memory hierarchy - Input/Output Devices - Computer Software - Software - Classification of software - Malicious Software – Copyright - Software piracy - Licensing - Free software philosophy - Application of information Technology – Communication – Business - Medicine and Health care – Entertainment

- E-Governance – Education - Engineering manufacturing – Science - IT policy in Kerala state - E-commerce - M-commerce - Online trading - Net-Banking

Unit II - Computer hardware and operating system

80 Periods

Components of a Personal Computer - Parts of a personal computer – Booting – BIOS – POST - Disk Operating System - Windows 7 OS - Basic file and folder operations - Accessories - Installing and Managing Windows 7 – Steps to install Windows 7 - Hard drive preparation – Formatting - Device Driver - Installing a printer driver - Changing file views in windows7 - Control panel - User creation and rights - Trouble shooting - Creating start-up disk - Sharing files - Internet connection and Firewall -Windows Explorer- Installing MS office- Installing DTP software – Installing Tally - Maintaining Computer Software - Transferring computer data

Unit III - Office Automation

100 Periods

Office Automation basics - Concept of office -Nature of work in office - Need for office automation - MS Word- User interface of MS word - Creating a document - MS Excel - Starting MS Excel - User interface of MS Excel- The work sheet - Formulae - Sorting - Working with chart - MS Power point - Creating presentation in different ways - Inserting a new slide - Adding themes - Saving a presentation- Set up the show - MS Access -Advantages of DBMS - Data Models - Terminologies used in RBDMS - MS Access - Creating a query in the query design option - Creating a form using Form wizard – Reports – Import - MS Outlook

Unit IV - Linux and open office

50 Periods

Introduction to Linux -History of Linux - Advantages of GNU Linux - Linux file system structure - Linux Kernel - Login and logout in Linux - Linux command - Open Office writer - Introduction to Open office - Apache Open Office - System requirement Starting Open Office Writer - Advanced features of Open Office Writer - Character Formatting - Background Colour - Paragraph Formatting - Bullets and Numbering - Indents - Creating an index of a document - Open office calc -Selecting cells - Cell formatting - Inserting Rows/Columns - Built in functions - Charts in Calc - Addressing Cells - Data Range - Work sheet -Auto fill – Filter - Data Sorting - Totals and sub totals - Protection - Open office impress - Important features of impress - Bringing different objects into slides - Adding Text - Different views - Adding New Slides to Your Presentation – Background - Slide Transition -Animating objects in a slide -Watching slide show.

Unit V - Internet and Malayalam computing

60 Periods

Introduction Computer Networks - LAN Topologies – Protocols - Connectivity devices - Windows 7 Firewall Settings - Internet and Email - History of the Internet - Connecting Computer to Internet Connection - World Wide Web (WWW) - Web Browser - Search Engines - Email (Electronic mail) - Creating and using free email account with Gmail - Types of Internet Web page Designing – HTML-Starting with HTML - Attributes of <HTML> tag-Malayalam Computing - Malayalam through Computers - Free Software and Language Computing - Malayalam and Technology - Malayalam digital Technology – Unicode -Malayalam Using Transliteration - Malayalam Word Processing - Downloading and Installing Malayalam Fonts - Installing Fonts in Windows - How to enable Malayalam in Web Browsers - Malayalam in UBUNTU - Malayalam keyboard and Typing - Ethical and Social Issues in Information Systems.



GRAPHIC DESIGN & PRINTING TECHNOLOGY

Module 3

Offset and Modern Printing Techniques

Unit 1	Printing Materials	(Periods 65)
Unit 2	Sheetfed Offset Press	(Periods 40)
Unit 3	Offset Press Operations	(Periods 45)
Unit 4	Web Offset Press	(Periods 30)
Unit 5	Press maintenance and Troubleshooting	(Periods 60)
Unit 6	Flexo and Gravure	(Periods 40)
Unit 7	Screen Printing	(Periods 60)

Module 4

Binding and Packaging

Unit 1	Safety, Health and Green printing	(Periods 40)
Unit 2	Conventional Binding	(Periods 100)
Unit 3	Modern Finishing Operations	(Periods 45)
Unit 4	Packaging	(Periods 70)
Unit 5	Basic Engineering	(Periods 25)
Unit 6	Engineering Graphics	(Periods 60)

LIVESTOCK MANAGEMENT

MODULE 3

POULTRY, PET AND LAB ANIMAL MANAGEMENT

Unit 1: Introduction to Poultry Husbandry (10 periods)

Poultry related terms-

- Poultry, broiler, chick, grower, layer, external morphology of chicken
Scientific names of different species of poultry
- Chicken, duck, turkey, quail

Trends in poultry Industry-

- Current scenario of poultry industry in Kerala and India
- Merits and demerits of poultry rearing

Unit 2: Anatomy and physiology of poultry (40 periods)

Major organ systems of chicken

- Digestive system- mouth, oesophagus, stomach, liver and pancreas, small intestine, caeca, cloaca
- Reproductive system - Male and female
- Respiratory system- syrinx, airsacs
- Skin and feathers - types of feathers

Egg formation

- Physiology of egg formation
- Effect of light on egg formation

Moulting and bleaching

- Definition
- Relation with egg production

Unit 3: Feeds and feeding of poultry (20 periods)

BIS standards for poultry feeds

- BIS standards of crude protein and metabolisable energy for broiler and layer chicken feeds

Poultry feed ingredients

- Common ingredients used for the formulation of poultry feed

Feeding systems

- Adlibitum feeding
- Restricted feeding
- Mash feeding
- Pelleted feeding
- Phase feeding

Feed efficiency and feed additives

- Definitions
- Feed efficiency in layers and broilers



- Feed additives

Feeders and waterers

- Different types of feeders and waterers

Feed requirement for chicken

- Average requirement of total feed for chicks, growers, layers and broilers

Unit 4: Management of chicken

(70 periods)

Management of chicks

- Brooding – types of brooding, brooder set up
- Brooder management
- Debeaking, dubbing and sexing of chicks

Management of growers-

- Space requirement and general management

Management of layers

- Factors influencing egg production
- Culling of layer birds (differentiating good and poor layers), Standards of egg production, Managerial practices for producing good quality eggs

Management of breeders

- Mating methods, Artificial insemination in chicken
- Trap nesting

Management of broilers

- General guidelines for broiler management

Unit 5: Selection of eggs and Hatchery management

(70 Periods)

Structure of egg

- Yolk, Albumen, shell membranes, shell

Abnormal eggs

- Double yolked egg, an egg within an egg, pale egg, soft shelled egg, blood spot, meat spot

Candling and grading of eggs

- method of candling and Grade as per quality

Selection of hatching eggs-

- Size, shape, shell quality and internal quality

Incubation

- Natural incubation
- Artificial incubation

Management of incubator

- Types of incubator
- Parts of incubator
- Physical requisites for incubation

Hatchery operations

- Collection of eggs, selection, fumigation, candling, setting, transfer, taking out of hatch, identification, sexing, vaccination, dubbing, debeaking, packing and despatch of chicks

Unit 6: Diseases of poultry**(50 periods)****Bacterial diseases of chicken**

- Pasteurellosis
- Pullorum disease

Viral diseases of chicken

- New castle disease (NCD)
- Fowl pox
- Marek's disease (MD)
- Infectious bursal disease (IBD)
- Avian influenza

Fungal diseases of chicken

- Aspergillosis

Protozoan diseases of chicken

- Coccidiosis

Parasitic diseases

- Endoparasites - Round worm infection (*Ascaridia galli*), Caecal worm infection
- Ectoparasites - Lice, mites and ticks infestation

Nutritional deficiency diseases

- Rickets
- Vitamin A deficiency
- Crazy Chick disease
- Curled toe paralysis

Prevention of diseases

- Treatment
- Vaccination
- Litter management
- Disinfection
- Deworming
- Fumigation
- Biosecurity measures
- Screening tests
- Hatchery management for disease prevention



Unit 7: Rearing of duck, turkey and quail (30 periods)

Husbandry of ducks

- Advantages of duck rearing
- Housing, feeding and management of ducks
- Sex differentiation

Diseases of ducks and health care

- Pasteurellosis
- Duck plague
- Duck hepatitis
- Aflatoxicosis

Husbandry of Turkey

- Housing, feeding and management of Turkey
- Sex differentiation

Diseases of turkey and health care

- Pasteurellosis
- Black head disease

Husbandry of quail

- Advantages of quail rearing
- Housing , feeding and management of quail
- Sex differentiation

Diseases of quail and health care

- Quail enteritis

Unit 8: Husbandry of pet birds (10 periods)

Common types of pet birds

- Parrots (African grey parrot, Macaws, Budgerigars, African love birds, Cockatoos, Cockatiels, conures), Doves and Pigeons, Finches
- Fancy chicken breeds - silkie, polish cap and frizzled

Housing, feeding and management of pet birds

- Cages, aviary
- Types of feed required for different pet birds

Diseases of pet birds

- sour crop, egg bound, psittacosis

Unit 9: Management of dogs and cats (20 periods)

Management of dogs

- Important breeds of dogs - German Shepherd, Labrador, Doberman, Rottweiler, Japanese spitz, Pug
- Restraining of dogs
- Selection of pups
- Grooming
- Feeding of dogs

- Breeding of dogs
- Diseases of dogs - rabies, canine distemper, parvo viral enteritis
- Health care of dogs- vaccination and deworming

Management of cats

- Important breeds of cats – Persian, Burmese
- Restraining of cats
- Feeding of cats
- Diseases of cat - feline pan leukopenia

Unit 10: Rearing of rabbits and laboratory rodents (20 periods)

Introduction to mouse, rat and rabbit management

- Importance of rabbits and laboratory rodents
- Restraint and handling
- Different routes of inoculation of materials
- Precautions for blood collection

Husbandry of rabbits

- Breeds of rabbit-Angora, Soviet chinchilla, New Zealand white, Grey giant
- Housing, feeding and reproduction of rabbits
- Diseases of rabbits – Pasteurellosis, sore hock, mange

Husbandry of laboratory mouse

- Breeds/strains of lab mouse- Swiss albino, BALB/C
- Housing, feeding and reproduction of laboratory mouse

Husbandry of laboratory rat

- Breeds/strains of lab rat – Wistar, Sprague Dawley.
- Housing, feeding and reproduction of laboratory rat

MODULE 4

LIVESTOCK PRODUCTS PROCESSING AND FOOD SAFETY

Unit 1. Milk and milk products (80 periods)

Nutritive value of milk

- Water, fat, protein, lactose, ash

BIS standards of milk and milk products

- Cow milk, buffalo milk, goat milk, toned milk, double toned milk, ice cream, whole milk powder, table butter, ghee

Preservation of milk

- Pasteurization, sterilization, chilling

Types of milk commercially available

- Toned milk, double toned milk, Homogenized milk, Condensed milk

Preparation of various types of milk products

- Acid Coagulated products - Paneer,
- Concentrated products - Khoa, Gulab jamun



- Fermented products - Dahi, Cheese
- Fat rich products – Ghee, Cream
- Byproducts from milk - Butter milk, Whey, skim milk
- Frozen products – Ice cream

Unit 2. Wholesome milk production (40 periods)

Measures for clean milk production

- Sources of contamination and hygienic measures

Adulterants of milk

- Starch, Cane sugar, Water (specific gravity method)

Unit 3. Processing of meat and Abattoir management (70 periods)

Terminologies of meat processing

- Abattoir, lairage, humane slaughter, carcass, meat, pork, chevon, mutton, veal, kara beef

Methods of stunning

- Physical, Mechanical, electrical and chemical stunning methods

Various steps in animal slaughter – (buffalo and cattle, pig, chicken)

- Flow chart and definitions – buffalo and cattle, pig, chicken

Ante mortem and post mortem examination

- Definition and purpose

Requirements for a slaughter house

- Space and light requirements of various rooms in an abattoir

Rendering of slaughter house waste

- Definition and importance of rendering

HACCP

- Definition and importance

Unit 4. Egg and meat products (50 periods)

Nutritive value of egg and meat

- Water, protein, fat, carbohydrate, ash, vitamins

Preservation of egg

- Chilling, freezing, pickling, house hold methods (water glass method, lime sealing)

Preservation of meat

- Chilling, freezing, thermal processing, canning, curing, smoking, irradiation

Egg products

- Commercial egg products like Egg powder and egg pickle

Meat products

- Sausage, meat cutlet

Unit 5. Zoonotic diseases (70 periods)**Definition of zoonosis and classification**

- Anthroozoonosis, zooanthroponosis, amphixenosis

Common zoonotic diseases –

- Tuberculosis, anthrax, rabies, brucellosis, leptospirosis, bird flu

Important Food borne diseases originating from livestock products-

- Colibacillosis, botulism, cholera, taeniasis

Unit 6. Animal welfare and food safety guidelines (30 periods)**Prevention of cruelty to animals (PCA) act**

- Purpose, general cruelties to animals

Guidelines related to transportation of animals

- By foot, by road and by rail - cattle and chicken

Food safety and standards act (FSS act)

- Purpose, general provisions as to articles of food



MARINE FISHERIES AND SEA FOOD

Module 3

FISH QUALITY CONTROL AND INSPECTION SYSTEMS

Unit No.	Name of units	Page No.
3.1	Basic Microbiology <ul style="list-style-type: none"> • Bacterial structure • Growth of bacteria • Classification of bacteria • Pathogenic and non pathogenic bacteria 	10
3.2	Fishery Microbiology <ul style="list-style-type: none"> • Sampling methods • Methods of sterilisation • Total Plate count • Laboratory equipments 	18
3.3	Microbes in Public health <ul style="list-style-type: none"> • <i>Escherichia coli</i> • <i>Faecal Streptococcus</i> • <i>Staphylococcus aureus</i> • <i>Salmonella typhi</i> • <i>Vibrio cholerae</i> • <i>Vibrio parahaemolyticus</i> • <i>Clostridium botulinum</i> • <i>Shigella</i> • Microbial limits in seafood 	25
3.4	Hygiene and Sanitation in Fish Processing Plants <ul style="list-style-type: none"> • Good Manufacturing Practices (GMP) • Standard Sanitary Operating Procedures (SSOP) • Chlorination • Cleaning schedule 	32
3.5	Quality Standards for Fish and Fishery Products <ul style="list-style-type: none"> • National and International standards • Various inspection systems • Hazard Analysis and Critical Control Point (HACCP) • Registers maintained in processing plants 	40

Module 4

FISHERY VALUE ADDED AND BYPRODUCTS

4.1	Value Added Fishery Products <ul style="list-style-type: none"> • Fish marinades • Fish cutlet • Fish wafers 	62
-----	--	----

	<ul style="list-style-type: none"> • Fish sausage • Fish ball • Fish finger • Fish momos • FPC • Fish soup powder • Dried prawn pulp • Masmin flakes 	
4.2	Fishery Byproducts	72
	<ul style="list-style-type: none"> • Chitin and chitosan • Shrimp extract • Fish meal • Fish body oil • Pearl essence • Isinglass • Fish silage 	
4.3	Miscellaneous Aquatic Products	78
	<ul style="list-style-type: none"> • Algin • Agar agar • Carrageenan • Beche-de-mer • Ambergris 	
4.4	Packaging of fishery products	83
	<ul style="list-style-type: none"> • Packing materials • Packaging of frozen products • Packaging of dried products • Packaging of value added fishery products and byproducts • Packaging of canned fish and fish pickle • Modern packaging techniques 	

MARINE TECHNOLOGY

Module-3

Unit 3.1- Introduction to Marine Diesel Engine (20 - Periods)

Diesel engine Cycle- Diesel engine description - working of 2 - stroke and 4 Stroke CI engines.
- Differences between SI & CI engines

Unit 3.2- Marine Low Speed Engine Construction (60 - Periods)

Categorization of Marine engines - Low, medium & High Speed engines - Necessity of Main & Auxiliary engines in Ships & Vessels - Advantages of 2 - stroke low speed engine as Main engine in Marine Ships & Vessels.- Heavy vessel diesel engine construction

Unit 3.3- Marine Diesel Engines Systems (140 - Periods)

Fuel system - electronic injector - Starting system- Air starting system - Cooling system - Lubrication system - Air intake and Exhaust systems - Transmission System - Steering system governor, decompression mechanism, blow past mechanism.

Unit 3.4- Marine Diesel Engines: Maintenance and Trouble Shooting (60 - Periods)

Daily maintenance - Periodic maintenance - Preventive maintenance - Break down maintenance - Fault diagnosis and rectification - Propeller efficiency low - Smoke colour -Blue, White and Black - Cavitations in propeller - Engine temperature high - Low mileage - Detonation inside the engine - Decarburization - Valve Clearance adjustment - Cylinder piston clearance - Compression pressure checking low/ high - Crank case explosion - Oil mist detection - Engine oil quality checking - Visual, Viscosity, water, microbial degradation

Unit 3.5- Gauges and Meters (40 - Periods)

Different gauges and meters used in marine engines - Pressure gauge, temperature gauge, tachometer - Different gauges and meters used in marine engines -Ammeter, flow meter, pyrometer, Inclinator, gauge glass, hour meter

Unit 3.6- Vessel and Vessel Terminology (20 - Periods)

Vessel terminology - Engine room layout - Colour lights and code used in ships

Module- 4

Unit 4.1 - Marine Auxiliary Machines (60 - Period)

Auxiliary Machines-Pumps (Centrifugal pump, reciprocating pump, Gear pump and Hand Pump)
-Compressor (Reciprocating compressor Single stage, Multi-stage, Centrifugal compressor) - AC Generator - Power take off (Mechanical, Electrical and Hydraulic)

Unit 4.2- Deck Equipments and Fishing Accessories (40 - Periods)

Deck Equipments and fishing Accessories- Mechanical Trawl winch, fishing Accessories- Line Hauler, Power block (open and closed) - Net drum-Gallows - Mast -Derrick and pulleys

Unit 4.3 - Navigation Aids (20 - Periods)

Navigation aids - GPS, Gyroscope, AIS, VHF Radio, RADAR, Ultra sonic devices (Fathometer, SONAR, Fish finder), Magnetic compass and Gyro compass

Unit 4.4 - Life Saving Equipments (10 - Periods)

Life - saving Equipments - Life raft, Life buoy, Life Jacket and Life Boat

Unit 4.5- Welding and Welding Defects (110 - Periods)

Welding Methods - Fusion welding, Pressure welding and Thermo chemical welding - Gas Welding (Oxy-Acetylene), Arc Welding Methods- SMAW, GMAW/MIG, GTAW/TIG and Submerged arc welding - Different welding positions- Flat, Horizontal, vertical and Overhead - Under water welding and its two types such as Wet (Metal Arc) and Dry (Flux cored arc) - Welding defects - Lack of penetration, Lack of fusion, Porosity, Slag inclusion, undercut, Overlays, Cracking, Blowholes, Burn through, Excessive penetration, spatter and arc strike

Unit 4.6 Non-Destructive Tests (100 - Periods)

Types of weld tests - destructive and non destructive - Different types of non -destructive testing - visual inspection, liquid penetrant test, magnetic particle test, radiographic test and ultra sonic test



MARKETING & FINANCIAL SERVICES

MODULE III RETAIL MARKETING

Unit 1 Fundamentals of Retailing (80)

Basics of Retailing - Meaning and Importance - Classification of Retailers - Retailing formats - Types of retail formats- Functions of Retailers - Duties and Responsibilities of Retailers - Retail Marketing Mix-- Trends in Retailing - Various segments in Indian Retailing-- Driving forces in Indian retailing.

Unit 2 Retail Store management (70)

Different locations of Retail store- Factors affecting choice of store location
- concept of store layout - different types of store layout - Design-- visual merchandise displays
-- Store Associate- functions--duties and responsibilities.

Unit 3.Retail Selling Skills (70)

Methods of selling in retail - Basic retailing skills-Retail communication--Retail selling process-- Sales promotion activities in store - Organize the receipt and storage of goods in retail environment -Billing Procedure in retail store--Customer Relation-- Concept of CRM and its importance - Identify the means of customer support-- Handling Customer Grievances.

Unit 4 Health Safety and Hygiene practices in Retail (60)

Describe the need for maintaining hygiene in retail store - Health care activities and health care rights-Personal grooming -- - Potential hazards and accidents at work place - Precautions to be taken for safety

Unit 5. Non Store Retailing (60)

Concept of e-retailing - advantages and disadvantages of e-retailing -- Factors that contribute to success of e-retailing -- Concept, advantages and disadvantages of Telemarketing - Call centre Operations-designing of e - retail web site using html-online purchase practices (familiarizing various online shopping sites)-methods of payments -Television home shopping-vending machine retailing.-Measures to prevent fraudulent transactions in e-retailing

MODULE 4 MARKETING OF FINANCIAL SERVICES

Unit 1. Financial System & Financial Markets. (60)

Introduction to Financial System - Components Of financial system--Financial Markets - Classification-Money market-- Capital Markets--Role of SEBI and RBI ---BSE, NSE, SENSEX, NIFTY, --International Markets-Domestic Markets- Market-Financial Services- Features-Types.

Unit 2. Marketing of Banking and Insurance Products. (60)

Marketing of Banking Instruments---Mortgage loan, vehicle loan, personal loan, consumer loan, Credit card, CASA , Insurance- Life Insurance- types of policies- Endowment, Whole life, Term life, Money back -ULIP- General Insurance-health, Motor Vehicle, Marine

Unit 3 Emerging Opportunities in Financial Service Sector. (90)

Share trading Business -Products -- operations-day trading and delivery-ETF-- -Commodities Trading---Forex Trading---Portfolio Management Services---Wealth Management through Mutual Funds---Types of Mutual Funds-Equity, Debt, Balanced, Tax Saving , Fund of funds, Comparison of Returns of Different funds-One time investment -SIP-NAV--Marketing NBFC instruments - Fixed Deposits-Bonds -Postal Department Agency-Recurring Deposits-Fixed deposits-Postal Life Insurance--Chitty Canvassing Business-collection agents.

Unit 4 Financial Planning & Portfolio Management. (60)

Financial Planning -Concepts- Purpose- Portfolio Management-concepts-- Financial Planning for Insurance- Retirement- Income Tax- Process of Financial planning - Establishing relationship with the client- Gathering client data-Determining goals and expectations-Analyzing clients objectives-Needs and financial situations-Developing appropriate strategies and presenting financial plans-Implementation of Financial Plan-Monitoring financial plans.

Unit 5 Professional Selling in Financial Service Sector (70)

Professional Selling-importance-Personality development-Time management-stress management-Relationship Management -- Activities for lead generation---follow up--team work-critical thinking-negotiation tactics-presentation skills-group discussion--professional etiquettes-e mail etiquettes --Netiquettes-- business meeting etiquettes-- Servicing the customer- -Ethics in selling\



MEDICAL LABORATORY TECHNOLOGY

Module 3

Unit 1 Laboratory Management

40 periods

Unit No.	Unit	Period
3.1.1	Lab safety Introduction Signs and symbols used in a laboratory Handling and storage of chemicals in a laboratory. Laboratory Hazards-Physical, Chemical, Biological, Electrical, Fire, Radiation Laboratory Safety Precautions-Personal Hygiene Fire Extinguishers Biomedical Waste Management First Aid Practice in Laboratory	20
3.1.2	Laboratory Management Introduction Code of Ethics of a laboratory Professional Role of communication in laboratory Organization of a Laboratory Components of a Laboratory Lay out plan of a multi-room laboratory Organizational pattern of a Laboratory Familiarization of Request forms and report forms. Ordering and Utilization of supplies Maintenance of Stock Registers- Consumables, Non-consumables Accreditation and Certification of Laboratories. Accrediting Agencies- NABL, ISO, CAP, CRISIL - Bar coding and Total Laboratory Automation (TLA) Familiarization of Common Laboratory Software	20

Module 3 Unit 2

Clinical Pathology

100 periods

Unit No.	Unit	Period
3.2.1	Introduction Importance, Common specimens, General guidelines for sample collection	10
3.2.2	Urine Analysis <ul style="list-style-type: none"> - Importance, Types of urine samples Methods of collection, preservatives - Physical Examination - Chemical Examination-Sugar, Protein, Blood, Ketone bodies, Bile pigments, Bile salts, Urobilinogen - Microscopic Examination - hCG test in Urine 	44
3.2.3	Sputum Examination <ul style="list-style-type: none"> - Importance, Specimen collection - Physical examination - Microscopic examination 	5
3.2.4	Stool Analysis <ul style="list-style-type: none"> - Importance, Specimen collection - Physical examination - Chemical examination- Occult blood, Reducing substances - Microscopic examination- Saline & Iodine mount 	15
3.2.5	Semen Analysis <ul style="list-style-type: none"> - Importance, Specimen Collection - Physical Examination, Liquefaction Time, - Microscopy- Total Sperm Count, Motility, Morphology - Chemical Examination-Fructose, Acid phosphatase 	16
3.2.5	CSF and other body fluids <ul style="list-style-type: none"> - CSF- Introduction - Specimen collection - Physical & Microscopic Examination - Chemical Examination- protein, glucose ,chloride (Name of method of estimation & clinical significance only) - Other body fluids - Recent advances in Clinical pathology 	10



Module 3 Unit 3

Clinical Biochemistry

200 periods

Unit No.	Unit	Period
3.3.1	Introduction to Biochemistry <ul style="list-style-type: none"> - Types of chemicals and preparation of solutions. - Types of specimens in clinical Biochemistry - Collection and processing of specimens for biochemical analysis - Types of assays- Endpoint and Kinetic (definition and example only) - Cleaning of glass wares for biochemical analysis 	12
3.3.2	Instruments used in Biochemistry <ul style="list-style-type: none"> - Familiarise with Colorimeter, Spectrophotometer, Flame photometer, Centrifuge, Electronic balance, Distillation apparatus, Deionizer 	8
3.3.3	Blood Glucose Estimation <ul style="list-style-type: none"> - Introduction to Diabetes - features, types, complications, - Types of samples- FBS, PPBS,RBS, Anticoagulant used - Methods of estimation- GOD-POD in detail - Normal value and Clinical Significance - Hyper and hypoglycaemia - Mention Glucometer Technique - GTT and GCT procedures, - Mention relevance HbA1C 	28
3.3.4	Renal Function Tests <ul style="list-style-type: none"> - Introduction, Common tests included • Estimation of Blood Urea Mention common methods Urea-Berthelot method in detail, Normal value and Clinical significance Renal, Pre-renal, Post renal conditions of Uraemia • Estimation of S. Creatinine. Mention common methods. Jaffe's method in details, Normal value and Clinical significance • Estimation of Uric Acid. Mention common methods. Uricase method in detail. Normal value and Clinical Significance. - Mention Clearance tests- Urea and Creatinine - Mention Importance of Micro-albumin and Cystatin-C 	40
3.3.5	Liver Function Tests <ul style="list-style-type: none"> • Introduction, Common tests included Bilirubin-Formation of Bilirubin 	40

Unit No.	Unit	Period
	<p>Types of Bilirubin- conjugated and unconjugated Estimation of Bilirubin. Malloy- Evelyn method in detail. Normal value and Clinical Significance</p> <ul style="list-style-type: none"> • Estimation of Total protein- Biuret method in details • Estimation of Albumin- BCG method in details Normal value and clinical significance of total protein and Albumin, A-G Ratio. • Other LFT Parameters- ALP, ALT, AST in brief. 	
3.3.6	<p>Lipid Profile</p> <ul style="list-style-type: none"> • Introduction - Relevance, tests included in the Profile • Estimation of S.Cholesterol. Mention common methods, CHOD-PAP method in detail, Normal value and Clinical Significance Mention Triglycerides, HDL, LDL 	25
3.3.7	<p>Other parameters of Diagnostic importance</p> <ul style="list-style-type: none"> • Serum Electrolytes- Serum Sodium and Potassium Normal value and Clinical significance • Clinically important Minerals- Calcium and Phosphorus (normal value and significance only) • Name Diagnostically important Hormones T3, T4, TSH, FSH, LH, Prolactin, progesterone • Name Clinically important enzymes- Acid Phosphatase, S. Amylase, GGT, • Name Cardiac markers- Troponin-I, Troponin-T CPK, CK-MB, LDH, SGOT • Name Tumour Markers- CA-125, CEA, AFP,CA-19.9, PSA, Beta hCG 	21
3.3.8	<p>Quality control in Biochemistry</p> <ul style="list-style-type: none"> - Introduction, Common terms used in Quality control, Errors - random and systemic , L.J. Chart, External QC and Internal QC 	10
3.3.9	<p>Automation and Recent advances</p> <p>Need for Automation, Advantages of Automation Types of Auto Analysers-Semi and Fully automated Electrolyte Analyser (ISE) in brief Advanced Diagnostic Methods inbrief</p> <ul style="list-style-type: none"> - C.L.I.A.,C.L.F.A, Turbidometry, Nephelometry, HPLC, Mention Point of care testing (POCT) 	16



Module 4 Unit 1

Diagnostic Microbiology

290 periods

Unit No.	Unit	Period
4.1.1	Introduction to Microbiology <ul style="list-style-type: none"> • Classification of Microbes, pathogen, commensals, type of Infections, communicable diseases, Carriers Historical aspects in Microbiology 	15
4.1.2	Structure and classification of bacteria <ul style="list-style-type: none"> • Structure- Cell wall, flagella, fimbriae, capsule, spore, plasmid • Classification of bacteria based on morphology- Arrangement, Motility and oxygen requirement 	15
4.1.3	Sterilization and disinfection <ul style="list-style-type: none"> • Importance of sterilization and Disinfection • Methods of sterilization Physical methods- Dry heat, Moist Heat Chemical methods- alcohols, aldehydes, gases Mechanical methods- Filtration, Radiation <ul style="list-style-type: none"> • Describe principle, parts, and use of <ul style="list-style-type: none"> - Hot air Oven, Autoclave • Disinfectants and Antiseptics and their application 	45
4.1.4	Growth & Cultivation of Bacteria <ul style="list-style-type: none"> • Bacterial growth and replication - Mention essential growth requirements- Temperature, PH, Gaseous requirements • Culture media <ul style="list-style-type: none"> Classification of culture media with examples • Preparation and use of common media <ul style="list-style-type: none"> Peptone water, Nutrient Agar, Blood Agar, Chocolate agar, Mac Conkey Agar • Bacteriological wire loop, Straight wire <ul style="list-style-type: none"> - Inoculation of Culture media- Liquid and Solid • Mention Streak, Stroke, Stab, Lawn culture <ul style="list-style-type: none"> - Mention Anaerobic techniques- Gaspak 	40
4.1.5	Basic identification Techniques <p>Introduction</p> Identification of bacteria <ul style="list-style-type: none"> • Different methods • Detection of motility <ul style="list-style-type: none"> - Name different methods - Hanging drop method in detail • Staining 	50

Unit No.	Unit	Period
	<ul style="list-style-type: none"> - Principle, requirement, procedure and interpretation of Simple stain, Grams stain, AFB stain-Diagnostic significance Biochemical tests- Coagulase,Catalase, IMViC	
4.1.6	Immunology and its diagnostic applications Introduction <ul style="list-style-type: none"> - Types of Immunity, Antigen ,Antibody - Structure of antibody Types of antibody- Ig G, IgM, IgA, IgD, Ig E <ul style="list-style-type: none"> • Antigen Antibody reactions- Specificity, Sensitivity, Avidity, Pro-zone ,post-zone, Titre Clinical applications of Agglutination, precipitation, flocculation, ELISA, Immuno-Fluorescence.	35
4.1.7	Laboratory Diagnosis of Common Bacterial diseases <ul style="list-style-type: none"> • Collection, Processing and transportation of common specimens-Urine, Blood, Sputum, CSF, Stool, Pus, body fluids, swabs General considerations- Macroscopy , Microscopy, Culture <ul style="list-style-type: none"> • Mention common culture media and identification methods used. Antibiotic Sensitivity Testing (ABST)- Kirby Bauer Method <ul style="list-style-type: none"> • Common Disease and pathogens encountered -Typhoid, Tuberculosis, Cholera, Dysentery, Syphilis, Leptospirosis, Tetanus, Meningitis& UTI • Common Serological Techniques for diagnosis of Bacterial diseases- • ELISA & its commercial preparations - Immunochromatographic technique • WIDAL,RPR,-Procedure and interpretation 	30
4.1.8	Laboratory Diagnosis of Common Viral diseases <ul style="list-style-type: none"> • Introduction to viruses • Common viral diseases and pathogens encountered - AIDS, Hepatitis, Dengue, Chickun Guinia, Rabies, Infuenza, Mumps and Measles. • Diagnostic techniques for viral infections - Mention common Serological tests used,Latex agglutination, Card tests, ELISA, Tissue culture, PCR Technique	20
4.1.9	Laboratory Diagnosis of Common Parasitic diseases <ul style="list-style-type: none"> • Introduction to parasites - Parasite, Commensal, Symbiosis, Host (Intermediate & 	40



Unit No.	Unit	Period
	Definitive host), Vector, Zoonosis <ul style="list-style-type: none"> • Classification-Intestinal & Blood Parasites • Common blood parasites and their lab diagnosis - Blood collection- - Time of collection - Preparation of smear-Thick and thin - Dehaemoglobinisation of thick smear 	
	Lab Diagnosis of Malaria <ul style="list-style-type: none"> - Disease,mode of transmission, hosts causative agent, types of malaria. - Examination of thick and thin smear-Morphological identification of different stages of parasite - Other stains used- JSB - Other methods- Card method , QBC 	
	Lab Diagnosis of Filariasis- <ul style="list-style-type: none"> - Disease, mode of transmission, host, and nocturnal habit - Lab diagnosis- wet smear examination, thick smear examination, Concentration technique. 	
	Lab Diagnosis of Intestinal parasites <ul style="list-style-type: none"> - Introduction -Helminthic infections and parasites - Amoebiasis -Entamoeba histolytica- Disease, Mode of Transmission, Trophozoite & Cyst Lab diagnosis -Macroscopic examination Microscopic examination -Stained & Unstained preparation • Common Helminths- Tape worm, Round worm, Hook worm, Whip worm, Pin worm, - Lab diagnosis-Macroscopic & Microscopic examination - Concentration Techniques of Stool sample- Mention Flootation & Sedimentation methods 	

Module 4 Unit 2

Histotechnology & Cytology

50 periods

Unit No.	Unit	Period
4.2.1	Histotechnology Introduction <ul style="list-style-type: none"> - Methods of examination of Tissues and cells - Gross examination - Microscopic examination • Examination of Unfixed Tissue • Examination of Fixed Tissue - Collection of specimens - Biopsy - Autopsy - Fixation - 10% Formalin - Decalcification 	20
4.2.2	Tissue Processing <ul style="list-style-type: none"> • Steps in tissue processing - Dehydration - Clearing - Impregnation - Embedding Microtomes-Rotary Microtome,-Cryostat <ul style="list-style-type: none"> - Section cutting - Mention role of adhesives - Staining -H&E Staining - Mounting of Tissue sections - Filing and storage of tissue sections 	20
4.2.3	Diagnostic cytology <ul style="list-style-type: none"> • Introduction • Types of specimens • Processing • Fixation • Staining Advantages and applications in diagnostic cytology	10

PHYSICAL EDUCATION

Module 3

Physical Education - Theory Health and fitness management

Unit 3.1. Growth And Development.

Growth and development- meaning, various stages of growth and development-infancy, childhood, adolescence, adulthood, later adulthood. Factors affecting growth and development. (12 Periods)

Unit 3.2. Sports Training

Sports training- definition, Training load, adaptation, super compensation. Principles of training. (13 Periods)

Unit 3.3. Physical Fitness And Wellness

3.3.1 Physical fitness- definition, wellness- definition, Health - related physical fitness and its components, skill - related physical fitness and its components.

3.3.2 Types of strength, Speed abilities.

3.3.3 Importance of warming up and cooling down. (17 Periods)

Unit 3.4. Development Of Physical Fitness

3.4.1 Development of strength. Resistance training, plyometrics, circuit training. Development of endurance- continuous method, interval method, repetition method, competition method. Development of speed abilities. Development of flexibility- ballistic method, slow stretch and hold method, PNF stretching.

3.4.2 Training cycle-Micro cycle, Meso cycle and Macro cycle. Periodisation (35 Periods)

Unit 3.5. Drugs And Doping

Drugs- meaning, Drugs commonly used by sportsman and its effects, ill effects of drug abuse, Blood doping. (10 Periods)

Unit 3.6. First Aid And Sports Injury Management

Skin injuries and its management- (abrasion, lacerations, incision, puncture wound, blisters). Soft tissue injuries and its management- (confusion, strain, sprain, overuse injuries). Bone injuries and its management - (fracture, dislocation). (15 Periods)

Practical

Unit 3.7. Resistance Training

Various resistance training methods using own body weight, barbells, dumbbells, machines and medicine balls. Ordering the exercise, fixing frequency, intensity, repetition, sets, and rest.

(35 Periods)

Unit 3.8. Aerobics

Rhythmic movements, synchronized movements by count, rhythmic with music, aerobics with box.

(30 Periods)

Unit 3.9. Swimming

Floats, Freestyle, Back stroke, Breast stroke, Butterfly stroke.

(15 Periods)

Unit 3.10. Track And Field

Skills of Triple jump, Pole vault, Discus throw, Hammer throw, Javelin throw. Marking and officiating of field events- Javelin throw, Shot put, Discus throw, and Hammer throw.

(30 Periods)

Unit 3.11. Badminton

Court marking and measurements. Skills- Grip, Fore hand drive, Back hand drive, Clear, Service, Drop shot, Smash. Officiating.

(25 Periods)

Unit 3.12. Practice Teaching

General lesson-Class formation, calisthenics, rhythmic, aerobics, exercises using light apparatus. Specific lesson.

(30 Periods)

Unit 3.13. Specialization

Any one of the following game is chosen for specialization. Basketball, Hockey, Volleyball, Athletics, Taekwondo, Football, Cricket. Officiating, teaching and coaching in specialization.

(60 Periods)

Unit 3.14. Intramural

Organization of competitions in selected games.

(13 Periods)

Module 4

Health And Yogic Science

Unit 4.1 Fundamentals Of Yoga

4.1.1 History, Introduction to classic yogic texts- Pathanjali yoga sutra, Hatha yoga pradipika, Gherenda samhitha and Goreksha samhitha.

4.1.2 Meaning and definition of Yoga, Introduction to Yoga therapy

4.1.3 Astanga Yoga (Pathanjali Yoga)

4.1.4 Satkriyas (cleansing process) Neti, Douthi, Nouli, Basthi, Kapalabathi and Trataka. Mudras and Bandas.



- 4.1.5 Asanas (postures) -Meaning and definition, Number of Asanas in different traditional Yogic texts.
- 4.1.6 Pranayama - Physiology of breathing. Types of breathing- Chest breathing, Abdominal breathing.
- 4.1.7 Meditation (Dhyana)- meaning, Different types of meditation.
- 4.1.8 Difference between Yogic asanas and physical exercises. Yogic practices for lifestyle diseases- Diabetics melitus, Blood pressure, Obesity. (25 Periods)

Unit 4.2 Health Education

Health- meaning, definition. Components of Health, Scope and importance of health education. (12 Periods)

Unit 4.3 Posture And Corrective Measures

Meaning and definition of posture. Importance of good posture. Causes of poor posture. Postural deformities- Flat foot, Knock knee, Kyphosis, Lordosis, Scoliosis. Corrective exercises for the deformities. Causes of postural deformities. (15 Periods)

Unit 4.4 Sports Nutrition

Nutrients; Energy nutrients and its role during physical activity, Aerobic and anaerobic energy, Balance diet, diet before, during and after physical activities, water loading. (20 Periods)

Unit 4.5 Sports Psychology

- 4.5.1 Meaning of sports psychology. Psychological factors effecting sports performance
- 4.5.2 Personality - meaning, personality traits. Role of sports in developing personality
- 4.5.3 Motivation - meaning, types of motivation. Role of teacher in motivating students. (20 Periods)

Unit 4.6 Sociology

- 4.6.1 Meaning of sociology. Role of play and sports in socialization process.
- 4.6.2 Recreation- meaning, Characteristics of recreation, Objectives of recreation. (10 Periods)

Practical

Unit 4.7 Yogic Science

- 4.7.1 Asanas - Sitting asanas, Standing asanas, Prone lying, Supine lying, Twisting asanas, Forward bending asanas Backward bending asanas.
- 4.7.2 Pranayama - Suryabedhana, Ujjayi, Sithali, Sithakari, Bramari, Plavini, Muurcha, Basthrika.
- 4.7.3 Mudra - Chin mudra, Jnana mudra, Viparit karani mudra.
- 4.7.4 Kriyas - Neti, Douthi, Nouli, Basthi, Kapalabathi and Trataka. (70 Periods)

Unit 4.8 Cricket

Court marking and measurements, Skill - Grip, Stance, Forward and Backwarddefense, Drive, Catching, Fielding, Bowling, Rules and regulations and Officiating (25 Periods)

Unit 4.9. Kho-kho

Court marking and measurements, Skill - Sitting in the square, Giving kho, Tapping, Diving, Chasing, Running, Rules and regulations and Officiating (25 Periods)

**Unit 4.10. Handball**

Court marking and measurements, Skill - holding the ball, passing skills, catching skills, dribbling, throw shots. Rules and regulations and officiating. (25 Periods)

Unit 4.11 Specialization

Any one of the following games are chosen for specializations. Basketball, Hockey, Volleyball, Athletics, Taekwondo, Football, Cricket. Officiating, teaching and coaching in the specialization. (60 Periods)

Unit 4.12 Intramurals

Organization of competitions in selected games. (33 Periods)



PHYSIOTHERAPY

Module - 3

Unit No.	Unit Name	Periods
3.1	Introduction to physiotherapy	25
3.2	Exercise therapy	150
3.3	Human locomotion (gait)	25
3.4	Hydro therapy	15
3.5	Suspension therapy	5
3.6	Relaxation	5
3.7	Chest physiotherapy	10
3.8	Electrotherapy	105
Total		340

Module - 4

Unit No	Unit Name	Periods
4.1	Introduction to Neurological Physiotherapy	90
4.2	Introduction to orthopaedic Physiotherapy	105
4.3	Introduction of paediatric Conditions and relevance of physiotherapy	40
4.4	Introduction of physiotherapy in surgical condition	40
4.5	Orthotics and prosthetics	25
4.6	Geriatric physiotherapy	40
Total		340

POLYMER TECHNOLOGY

Module 3 PLASTIC PROCESSING

3.1 Introduction to plastic processing (20 Periods)

Introduction to plastic processing, Different plastic processing techniques. Effect of polymer properties on processing. Moisture absorption, Thermal stability. Important properties, applications and processing parameters of common plastics such as HDPE, LDPE, PP, PS, PMMA, PVC, ABS, SAN, Nylon6, 66, 12, PET, PBT, PC, and POM.

3.2 Injection molding (90 Periods)

Injection molding process - advantages, disadvantages. Injection molding machine - plunger type, screw type. Different parts of injection molding machines and their respective functions. Screw Design - feed, transition and metering zones, L/D ratio, compression ratio. Clamping Systems - Manual clamping, Toggle clamping, Hydraulic clamping, and Tie bar less clamping. Molds - two plate molds, three plate molds. Parts of molds - Runner - cold runner, hot runner, gate, ejection systems, cooling channels. Process parameters - Shot weight, Barrel residence time, Clamping force, - melt and mold temperatures, screw speed, back pressure, injection pressure and holding pressure, injection speed, holding time, cooling time, mold open time. Molding cycle. Processing defects, causes, and remedies.

3.3 Extrusion (60 Periods)

Plastic extrusion fundamentals, classification of extruder, different parts and its function of screw extruder - feed hopper, extruder barrel and screw, feed, compression and metering zones, screw nomenclature, types of screws - polyolefin, PVC and Nylon screws, dies, screen pack, breaker plate, heating and cooling elements and drive system. Extrusion dies - solid cross section and hollow cross section dies. Sheet extrusion, profile extrusion, pipe extrusion, blown film extrusion, extrusion of cable. Extrudate swell, melt fracture.

3.4 Blow molding and rotational molding (60 Periods)

Blow molding - Different types of blow molding - extrusion blow molding, injection blow molding, stretch blow molding. Problems and trouble shooting in blow molding. Rotational molding - Advantages, disadvantages, Rotational molding vs. blow molding, applications. Faults and remedies in rotational molding.

3.5 Thermoforming and calendaring (60 Periods)

Thermoforming, materials for thermoforming, Different forming processes - Vacuum forming, pressure forming, matched mold forming, plug assisted forming, drape forming. Calendaring of plastics. Different types of calenders, gauge control - roll bending, roll crossing, and roll crowning.

3.6 Testing of plastics (50 Periods)

Testing of plastics- Need for testing, Specifications and standards, specific gravity, Mechanical - Tensile and flexural properties, Impact strength. Hardness. Thermal - Melt

flow Index, Vicat softening point, heat deflection temperature. Environmental stress crack resistance

Module 4

FIBRE REINFORCED COMPOSITES

- 4.1 Introduction to composites (30 Periods)**
 Definition of composites, Basic features of composites, Constituents of composites - Matrix, reinforcement and interphase, Advantages, disadvantages and applications of composites. Classification of composites - based on matrix - Polymer matrix, Metal Matrix, Ceramic matrix, based on reinforcement - Fibrous, Flake filled, particulate filled, laminates, sandwiches, Oriented fibre - Uniaxial, Bi axial, Random fibre, Textile, Knitted, Braided.
- 4.2 Reinforcement Fibres (40 Periods)**
 Functions of reinforcement, requirements of reinforcement fibres, terminology used in fibre science - filament, strand, roving, size, coupling agents, tex, tow, denier, tenacity, drape etc. Forms of reinforcement - Reinforcing mat - Chopped strand mat (CSM), continuous filament mat, veil, woven roving/fabric.
 Glass fibres - E-Glass, S-Glass, C-Glass, Carbon fibre, Aramid fibre, Boron fibre, UHMWHDPE, Natural fibres - Flax, Hemp, Jute, and Sisal
- 4.3 Matrix Materials and additives (60 Periods)**
 Functions of matrix, Thermosets and thermoplastics, Polyester resins, Epoxy resins, Phenolic resins, Vinyl ester resins. Curing reactions, gelation and gel time, cure time, reaction rates. Catalyst or initiators - MEKP, Benzoyl Peroxide, Accelerators - cobalt naphthenate, Inhibitors- Tertiary Butyl Catechol, Curing agents - Amines, anhydrides, Fillers - Calcium carbonate, Talc, Clay, Silica, mineral fillers, Pigments and dyes, Lubricants, UV stabilizers, Anti static agents, heat stabilizers, Colorants Release agents and sealing compounds, Coupling agents. Core materials, Gel coats.
- 4.4 Manufacturing Methods (140 Periods)**
 Introduction, Classification of FRP Manufacturing methods, Open mould processes - Hand lay-up, Spray lay-up, Filament Winding. Closed mould processes - Compression molding - Dough molding compound (DMC), Sheet molding Compound (SMC) and prepregs, Vacuum bag molding, Pressure bag molding, autoclave molding, Injection molding, Resin transfer molding, Vacuum assisted resin infusion molding. Continuous processes - Pultrusion, Braiding.
- 4.5 Quality and safety in FRP processing (70 Periods)**
 Storage of raw materials, Workshop conditions - Reinforcement preparation area, Compounding and mixing area, Mold preparation and molding area, finishing area. Process care - Curing reaction, gel time, hardening time, maturing time, hot cure, cold cure, resin to glass ratio, degree of cure. Mold care. Preparation of molds, Repair of composites - repair of gel coat layer, filling dents and cracks.

REFRIGERATION & AIR CONDITIONING

MODULE 3

SPLIT AND DUCTABLE AIR CONDITIONERS

Unit No.: 3.1 ENGINEERING GRAPHICS

Orthographic Projection - Orthographic views of simple objects - Pictorial Drawing - Isometric projection-Principle, isometric scale, isometric view. Auxiliary views – Principle – need - primary auxiliary views. Sectional views of objects. Free hands sketching of straight lines, rectangles, squares, circles - Sectional views of simple engineering components and devices. Development of surfaces - concept – applications - development of cylinder and pyramid.

Computer Aided Drafting

Introduction to CAD-compare conventional drawing and CAD –Starting to use CAD software –Application of CAD in engineering drawing-Opening of CAD-Setting of units and limits-Saving of drawing-Draw Commands (lines, circle, arc, ellipse, hatch, modify, erase, etc.).Dimensioning and text commands-Practice (different methods of drawing lines) Drafting of 2D figures creating a new drawing.

Unit No.: 3.2 PSYCHROMETRY

Air conditioning- comfort and industrial. Factors of comfort air conditioning. Psychometric properties of air. DBT, WBT and DPT, Vapour pressure, Specific and relative humidity, enthalpy. Psychometric charts- Sensible heating and cooling, Cooling by pass factor, Humidification and dehumidification processes. Classification- summer, winter, year round. Simple problems using psychometric chart.

Unit No.: 3.3 BASIC ELECTRICITY & ELECTRIC MOTORS

Basics of electricity. Single phase and three phase induction motor- working principle. Three phase motors- squirrel cage, slip ring. Single phase motors- split phase induction motors, capacitor start induction motors, capacitor start and capacitor run motors, permanent capacitor motor.

Unit No.: 3.4 AIRCONDITIONING EQUIPMENTS

Brief explanation about window, split, package, central, chilling plant & VRF air conditioning systems. Areas of application.

Unit No.: 3.5 WINDOW AC

Types-common, portable and precision-applications, working, care and maintenance-merits and demerits.

Unit No.: 3.6 SPLIT AC (Wall, Floor, Ceiling Mounted & Tower/Slim line)

Construction and working principle, types, trouble shooting-description of electrical components-study about the wiring circuit-Split AC (Tower/Slim line): Construction, working principle, types, trouble shooting. Description of electrical components used in split AC. Study about the wiring circuit.

**Unit No.: 3.7 SPLIT AC (Duct, Multi/Dual Split)**

Study of the ductable split AC, its construction and working principle.

MODULE 4**APPLICATION OF AIR CONDITIONING & CONTROLS****Unit No.: 4.1 INVERTER SPLIT AC**

Construction and working principle-comparison between an AC with star rating (energy efficiency ratio) and inverter AC, Inverter AC-Normal compressor + variable speed compressor. Special features-motor, insulation, piping.

Unit No.: 4.2 HEAT LOAD CALCULATION

Importance of cooling load calculation. Different components contributing the total cooling load-heat load due to structural wall, infiltration, ventilation, occupants and power equipment of a building. Simple problems.

Unit No.: 4.3 SPECIAL AIRCONDITIONING APPLICATIONS

Elementary ideas of automobiles, railways, clean room, hospital and theatre air-conditioning. Elementary idea of Reefer air-conditioners, HVAC.

Unit No.: 4.4 REFRIGERATION & AIRCONDITIONING CONTROLS

Study of relays-amperage, voltage, PTC and hot wire relays. DOL Starter. OLP, thermostat, pressure controls and oil pressure failure controls. Variable speed drives.

Unit No.: 4.5 TRANSMISSION AND DISTRIBUTION OF AIR

Duct-classification of duct- supply, return and fresh air ducts, air outlets. Ducting components-fan, filter, duct openings. Introduction to different duct design methods, duct arrangement.

Unit No.: 4.6 SIMPLE PROJECT WORKS

One simple working model (skeletons) of refrigerator, water cooler, ice cream churner, car AC or any other relevant activity

TEXTILE TECHNOLOGY

Module 3

Weaving technology

Periods: 340

Unit	Name of unit	Periods
1	Weaving preparatory processes:	60
2	Handloom	100
3	Power loom	140
4	Fabric structure	40

Module 4

Textile dyeing and printing technology

Unit	Name of unit	Periods
1	Preparatory processes for dyeing and printing	100
2	Classification of textile dyes based on water solubility:	20
3	Dye application on cotton textile	120
4	Textile printing	100



TRAVEL AND TOURISM

Module 3

Tour And Hospitality Assistant

Unit 3.1. Tour Handling

- 3.1.1 Itineraries
- 3.1.2 Tour costing and Pricing
- 3.1.3 Tour Brochure
- 3.1.4 Etiquettes of Tour Guides
- 3.1.5 Approval of tour guides in India region wise
- 3.1.6 Basic phrases in foreign languages [French& German].

Practicals

- Construct tour itineraries
- Construct tour costing
- Prepare chart of foreign language phrases
- Role plays using basic phrases in foreign languages.
- Field visits to museums, heritage sites, etc.
- Introduction to Photoshop
- Usage of basic tools and edge refinement, isolate and edit parts of an image
- Manipulate layers through positioning, scaling, rotation and adjustments
- Prepare images for web and printout with appropriate sizing and resolution
- Apply painted masks, selection based masks, and blend modes to create image effect.
- Prepare a tour brochure

Unit 3.2. Hospitality Management

- 3.2.1 Hospitality industry
- 3.2.2 Major hotel chains in India and world (familiarisaion level).
- 3.2.3 Departments in hotel
- 3.2.4 Front Office
- 3.2.5 Lay out of Front Office
- 3.2.6 Types of reservation
- 3.2.7 House Keeping
- 3.2.8 Functions of House keeping
- 3.2.9 Types of Room
- 3.2.10 Types of Bed
- 3.2.11 Food and Beverage Production
- 3.2.12 Food and Beverage Service
- 3.2.13 Equipments used in kitchen
- 3.2.14 Co-operation with other Depts.
- 3.2.15 Terms used in hotel industry.

Practical

- Preparation of organizational charts
- Picture albums of different kinds of hotels and resorts
- Field visits to hotels/resorts
- Table setting in a hotel/ restaurant
- Introduction to Coral draw
- Drawing lines, shapes, inserting pictures, objects, tables and tinplates.
- Creation of visiting cards and Id cards.
- Creation of outline map of (India/Kerala) using coral draw

Unit 3.3. Event Management

- 3.3.1 Event
- 3.3.2 Event Management
- 3.3.3 Characteristics of event management
- 3.3.4 Five C's of event management (Conceptualization, Costing, Canvassing, Customization, Carrying out)
- 3.3.5 Categories of event
- 3.3.6 Process of event management
- 3.3.7 Key elements of events
- 3.3.8 MICE
- 3.3.9 ICCA.
- 3.3.10 ICPB
- 3.3.11 Major travel fairs in the world ITB Berlin, Arabian Travel Market (ATM), WTM, KTM.

Practical

- Organize a event in connection with World and National Tourism Day celebration at school
- Prepare a sample event budgeting/ expenditure in excel format
- Prepare a chart and PPT of C's of events and categories of events
- Prepare a picture album of major tourism events in the world
- Visit to any major event like KTM/TTF /exhibition /fairs etc
- Logo Creation on any aspect of tourism(e.g. organizations, airlines, car rentals)

Moudle 4

Online Travel Services and Computer Reservation Systems

Unit 4.1 Air Travel and Airport Management

- 4.1.1 Air Travel Organizations-ICAO,IATA -UFTAA-PATA,ASTA TAAI [familiarization level]
- 4.1.2 International Conventions Warsaw,Chicago, Montreal
- 4.1.3 Freedoms of Air
- 4.1.4 Major continents of the world
- 4.1.5 TC Areas
- 4.1.6 Major countries, capitals, cities, airports with codes



- 4.1.7 Airline codes
- 4.1.8 Currency codes
- 4.1.9 Airport procedures
- 4.1.10 Various class of services in a flight
- 4.1.11 Arrival formalities
- 4.1.12 World Time Zones and Flying Time Calculation
- 4.1.13 Journey
- 4.1.14 Global indicators
- 4.1.15 Familiarization of (Manual)Fare calculation (One way- Mileage principle HIP,BHC,ec)-
- 4.1.16 Air cargo and logistics

Practical

- PPT - type of journey with examples
- Field visit to Airports
- Visit Tourist Reception Centre of KTDC and CRS
- PPT presentation of air travel organizations
- Role play of check-in formalities
- Preparation of chart showing World Time Zones
- Introduction to internet usage
- Networking, browsing skill and fundamentals of web designing
- Website creation of a tourism firm.

Unit 4.2 Global Distribution System

- 4.2.1 Introduction to Galileo
- 4.2.2 Functions of Galileo
- 4.2.3 Types of screens
- 4.2.4 Working with GDS
- 4.2.5 Phonetic alphabets
- 4.2.6 SSR and OSI codes
- 4.2.7 Billing and Settlement Plan [BSP]

Practicals

- Map work - IATA Codes for cities and Airports, Routing
- Visit Seva Kendra/Passport Seva Kendra and familiarize with the amenities at the Airports.
- Practicing in GDS
- Practicing PNR creation in GDS (AMADEUS/GALILEO)
- Travel portals: Make my trip, Yatra.com, Travel advisor.

Unit 4.3. Marketing & Recent Trends in Tourism

- 4.3.1 Tourism Marketing
- 4.3.2 Unique features of Tourism Product
- 4.3.3 Major steps in Tourism marketing
- 4.3.4 Marketing Mix-7 P's of marketing

- 4.3.5 Tourism Market segmentation
- 4.3.6 Benefits of market segmentation
- 4.3.7 Criteria used for dividing market segmentation
- 4.3.8 Tourism promotion and sales promotion tools
- 4.3.9 Major travel portals and travel apps

Practical

- Prepare a chart of Marketing Mix
- Prepare PPT/Chart - features of tourism products
- Prepare international tourist arrivals in excel format-graphs.pie diagram etc.
- Prepare individual Blogs of Students on tourism.
- Familiar with Apps .used in travel industry.
- Practice in online travel web sites like IRCTC, yatra, clear trip, etc.

Name of Module: Tour And Hospitality Assistant**[Total Period 340]**

30% theory 70% practical

Name Of Module: Online Travel Services and Computer Rservation System**[Total Period 340]**

30% theory 70% practical

ENTREPRENEURSHIP DEVELOPMENT

Unit 1 ENTREPRENEURIAL OPPORTUNITY IDENTIFICATION

Basic concept and elements of business opportunity - Sensing of business opportunity - Sources of business opportunity - Environmental scanning, business environment micro and macro environment- (PESTEL Model) - Implementation of business idea - market assessment- (Demand, Supply, nature of competition, Cost, pricing of products, Project innovation and Trend spotting (Read trends, Talk trends, Watch trends, Think trends) **(15 Periods)**

Unit 2 ENTREPRISE PLANNING

Forms of private sector enterprises a) sole trading concern b) Partnership c) Joint Stock Company d) co-operative society - Characteristics, features and registration procedure-Registration procedure under MSMED Act-, Legal formalities expected to be complied by the entrepreneur to start an enterprises, Recent Trends in Entrepreneurship Development, E-Entrepreneurship, Technopreneur, Virtual Marketing, Enlightened Marketing ((brief study only), Institutional finance to entrepreneurs (brief study only). **(15 Periods)**

Unit 3 PROJECT FORMULATION

Project - Meaning, Characteristics - phases of project - Stages of Project formulation -Project finance - Determinants of working capital - Operating cycle of working capital-Concept of working capital - Calculations working capital- Sources of finance - short term medium term and long term sources - Types of costs - fixed, variable, semi variable, total cost, average cost and marginal cost _ Break even analysis, problems- Ratio Analysis, current ratio, debt-equity ratio, debt service coverage ratio, profitability ratio, calculations - Return on investment - Cash flow statement- projected income statement - projected balance sheet. **(20 Periods)**

Unit 4 PROJECT APPRAISAL AND REPORT

Meaning and importance of project appraisal- Aspects of project appraisal, technical aspects, management aspects - environmental aspects - market aspects - Economic and financial aspects - Tools of project appraisal - Payback method, calculations - NPV Method, Calculations - Profitability index - Internal Rate of Return - Meaning and significance of Project Report- Process of Project Report-Contents of Project Report- Performa of a Project Report- Preparation of a Project Report. **(15 Periods)**

Unit 5 ENTREPRISE MANAGEMENT

Meaning and Definition of Management- Importance of Management- Functions of Management- principles of management - Meaning and Definition of Marketing Management- Functions of Marketing Management- Marketing Mix- Elements or components of Marketing Mix. **(15 Periods)**

MANAGEMENT

Unit I ECONOMIC ENVIRONMENT FOR MANAGEMENT (26 Periods)

- 1.1. Economic environment – Meaning and Significance
- 1.2. Basic concepts in Economic Environment
 - 1.2.1. National Income: Gross Domestic Product, Net Domestic Product, Gross National Product, Net National Product
 - 1.2.1.1. Methods of Measuring National Income
- Value Added Method - Income Method - Expenditure Method
 - 1.2.1.2. Problems in the calculation of National Income
 - 1.2.2. Business Cycle - Phases of Business Cycle

Unit II WORKING CAPITAL MANAGEMENT (22Periods)

- 2.1 Meaning and Concept of Working Capital
- 2.2 Components of Working Capital
- 2.3 Types of Working Capital
- 2.4 Meaning and significance of working capital management
- 2.5 Approaches to working capital Management

Unit III LONG RUN INVESTMENT DECISION - CAPITAL BUDGETING (24 Periods)

- 3.1. Meaning and Importance of Capital Budgeting
- 3.2. Capital Budgeting Process
- 3.3. Methods of Capital Budgeting – Traditional (Non- Discounted Cash Flow Methods)
 - 3.3.1. Pay Back Method
 - 3.3.2 Average Rate of Return Method
- 3.4. Methods of Capital Budgeting – Discounted Cash Flow Methods
 - 3.4.1. Net Present Value Method
 - 3.4.2. Profitability Index Method
 - 3.4.3. Internal Rate of Return Method

Unit IV PRODUCTION AND OPERATIONS MANAGEMENT (22 Periods)

- 4.1. Meaning and Importance of Production and Operations Management.
- 4.2. Difference between Production and Operation
- 4.3. Major Decisions of Production Management
- 4.4. Plant Location and factors affecting plant location
- 4.5. Plant Layout and different types of Plant Layouts



- 4.6. Aggregate Planning – Meaning, Importance and Strategies
- 4.7. Master Production Scheduling - Meaning, Significance and Development of Master Production Schedule (MPS)

Unit V QUALITY MANAGEMENT (16 Periods)

- 5.1. Meaning and Definition of Quality
- 5.2. Dimensions of Quality – Product and Service
- 5.3. Meaning and Concept of Quality Management
- 5.4. Principles of Quality Management
- 5.3. Quality Systems
 - 5.3.1. Elements
 - 5.3.2. ISO 9000:2000

Unit VI MEASURES OF CENTRAL TENDENCY (32 Periods)

- 6.1. Meaning and Significance of Central Tendency
- 6.2. Qualities of a good average
- 6.3. Types of Average
- 6.4. Simple Arithmetic Mean – Individual Observation, Discrete Series, Continuous Series.
- 6.5. Weighted Arithmetic Mean
- 6.6. Combined Arithmetic Mean
- 6.7. Correction in Mean
- 6.8. Median - Individual Observation, Discrete Series, Continuous Series.
- 6.9. Determination of Median Graphically.
- 6.10. Partition Values – Quartiles, Deciles and Percentiles
- 6.11. Quartiles - Individual Observation, Discrete Series, Continuous Series.
- 6.12. Percentiles - Individual Observation, Discrete Series, Continuous Series.
- 6.13. Mode - Individual Observation, Discrete Series, Continuous Series.
- 6.14. Locating Mode Graphically
- 6.15. Comparison of mean, median and mode

Unit VII MEASURES OF DISPERSION (28 Periods)

- 7.1. Meaning and Significance of Measures of Dispersion.
- 7.2. Methods of studying Dispersion.
- 7.3. Absolute and Relative Measures of Dispersion.
- 7.4. Range - Individual Observation, Discrete Series, Continuous Series.
- 7.5. Coefficient of Range.
- 7.6. Quartile Deviation - Individual Observation, Discrete Series, Continuous Series.

- 7.7. Co efficient of Quartile Deviation
- 7.8. Mean Deviation - Individual Observation, Discrete Series, Continuous Series.
- 7.9. Co efficient of Mean Deviation
- 7.10. Standard Deviation - Individual Observation, Discrete Series, Continuous Series.
- 7.11. Co efficient of Standard Deviation/Variance
- 7.12. Qualities of a good measure of Dispersion.

Unit VIII CORRELATION

(18 Periods)

- 8.1. Meaning of Correlation
- 8.2. Types of Correlation
 - 8.2.1. Simple, Partial and Multiple
 - 8.2.2. Positive and Negative
 - 8.2.3. Perfect and Imperfect
 - 8.2.4. Linear and Non linear
- 8.3. Methods of studying correlation
 - 8.3.1. Scatter Diagram method
 - 8.3.2. Pearson's Co-efficient of Correlation
 - 8.3.3. Spearman's Rank Correlation

Unit IX INDEX NUMBERS

(22 Periods)

- 9.1. Meaning
- 9.2. Types of Index Numbers
 - 9.2.1. Price Index
 - 9.2.2. Quantity Index
 - 9.2.3. Cost of Living Index
 - 9.2.4. Whole Sale Price Index
- 9.3. Uses and Purpose
- 9.4. Methods of constructing Index Numbers
 - 9.4.1. Simple Index Number
 - 9.4.2. Weighted Index Number
 - Laspeyres' Method
 - Paasche's Method