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)
**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)

**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)
charging section - Residential status and scope of Income Tax - Heads of income - exempted incomes under sec 10 (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)

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, chili, 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.
APPLICATION AGRICULTURAL TECHNOLOGY

Unit 1 Hi-Tech Agriculture (69 periods)

Unit 2 Organic farming and certification (55 periods)

Unit 3 Food safety measures and Certification (72 periods)

Unit 4 Agri- Enterprises (84 periods)
Mushroom cultivation –Spawn production and Cultivation of oyster mushrooms- 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)
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.
MODULE III
INTEGRATED PEST AND DISEASE MANAGEMENT

Unit 1 Pest and Disease Diagnosis (100 hrs)
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 (150 hrs)

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 - peruvalam 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**

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 -electostatic sprayer- Fogging machine- Rat traps -site specific spraying, maintenance of PP equipments- field problems and remedies.

**MODULE IV**

**HITECH FARMING**

**Unit 1. Protected Cultivation**

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**

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)**


**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 agriclinics - Kisan Call Centres, Farmer support schemes
Module 3
FARM MECHANISATION AND POST HARVEST ENGINEERING

(340 Periods)

3.1 Agricultural Implements

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)-H 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.


3.2 Plant Protection Machinery


3.3 Harvesting Machines

3.4 Post Harvesting Operations

(70 Periods)


3.5 Food Processing

(60 Periods)


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 Raw planter Hill Dropper, Pneumatic Seeders (Vacuum type & Air suspension Type) Electronic Seeders (Precision)

3.1.9 Weeding- Concepts- types of weeders - Rotary Weeder, 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, Arial 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)
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

Unit 4 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
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Induced maturation and spawning
Packing and transportation of shrimp seed

3.8 Seed production of Giant Freshwater Prawn
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
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
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
Familiarization of aquarium fishes
Classification of aquarium fishes namely egg layers and live bearers
Exotic and indigenous varieties

4.2 Aquarium plants
Familiarization of aquarium plants
Aquarium plant rearing and propagation
Aquarium plant and water quality

4.3 Aquarium equipments and accessories
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
Measurements and cutting of glass pieces
Glass tank making tools
Making of glass tank
Acrylic tanks

4.5 Assembling an aquarium
Assembling the aquarium
4.6 **Aquarium management**
Water quality management
Usage of water test kits to measure chemical parameters
(Dissolved O₂, CO₂, NH₃, NO₂, NO₃, Alkalinity & Acidity)

4.7 **Fish Diseases-Quarantine, prophylactic and therapeutic measures**
Ichthyophtheriasis
Fin rot and Tail rot
Saprolegniasis
Dropsy
Protozoan infections

4.8 **Breeding and seed production of Aquarium fishes**
Brood stock maintenance
Breeding and spawning
Life feed culture
Nursery rearing

4.9 **Marine Aquarium**
Familiarization of marine ornamental fishes
Familiarization of marine ornamental plants and organisms
Marine aquarium accessories
Water quality management
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  (58 Periods)
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.
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

UNIT 4.1: 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

UNIT 4.2: MARKETING OF BANKING PRODUCTS

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

UNIT 4.3: 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)
Module 3

PALLIATIVE AND GERIATRIC CARE

(340 Hrs/Periods)

Unit No. 3.1 Administration of Medication 60 Periods

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

**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

**Unit 4.5 Maternal and Child Health**
Periods: 40
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

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.
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.

UNIT 4 : 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 Eletrolyte analyser, Blood gas analyser, incubator and water bath, 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, Blod bank centrifuges, cryo centrifuge, cry bath, deep freezers, Apheresis machines, donor couch, blood bag sealer, platelet agitator, blood shaker.

UNIT 5: 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 EQUIPMENT S IN OTHER DEPARTMENTS
Fiber optics in medicine(List out equipment and its uses), civil engineering - water supply, mechanical workshop, air conditioning, electrical.

MODULE 4
Medical Imaging
UNIT1: RADIOGRAPHY
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.
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

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

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. (1 no)
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.)

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**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

**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 building (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 the Indian type water closet fitting with necessary fittings
Practice the European type water closet fitting with flushing cistern and health faucet
## Module 3
### Object Oriented Programming and Databases

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<td>3.2.5.1</td>
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</table>

### 3.1.1 Types of computer languages
- Language translators
- Approaches in problem solving
- Programming methodologies
- Algorithm and flowchart

### 3.1.2 Language translators

### 3.1.3 Approaches in problem solving

### 3.1.4 Programming methodologies

### 3.1.5 Algorithm and flowchart

### 3.2.1.1 Introduction to C++
- Character set and tokens
  - Input/Output statements
  - Turbo and Geany development environment

### 3.2.1.2 Data types

### 3.2.1.3 Control statements
- Branching statements
- Looping statements
- Jump statements

### 3.2.2 Arrays and Strings
- Arrays
- Strings
- String manipulation functions

### 3.2.3 Structure
- Structure
- Nested structure
- Array of structure

### 3.2.4 Functions and Pointers
- Built-in functions
- User defined functions
- Parameter passing
- Pointers

### 3.2.5 Object Oriented Programming
- Object Oriented Programming Concepts
- Class and Objects
- Member functions
- Friend functions and Friend class
- 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

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

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

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

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 Server Side Scripting

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**

4.4.1 Types of web hosting
4.4.2 Buying hosting space
4.4.3 Domain name registration
4.4.4 FTP software

**Periods: 15**

**Unit No 4.5 - Trends in Computing Technologies**

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

**Periods: 30**
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
3.2.6 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.


3.5 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-government 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
4.6.3 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
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
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- continuous 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-loc 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
<table>
<thead>
<tr>
<th>UNIT 4.2 Fixed orthodontic appliances</th>
<th>(20 periods)</th>
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<tr>
<td>4.2.1 Components of fixed orthodontic appliances</td>
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<th>UNIT 4.3 Removable orthodontic appliances</th>
<th>(130 periods)</th>
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<tr>
<td>4.3.1 Components of removable orthodontic appliances</td>
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<td>4.3.2 Clasps</td>
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<td>4.3.3 Bows</td>
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<td>4.3.4 Springs</td>
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<td>4.3.5 Expansion components</td>
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<td>4.3.6 Fabrication of appliance</td>
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<tr>
<th>UNIT 4.4. Myofunctional appliances</th>
<th>(20 periods)</th>
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<td>4.4.1 Introduction to myofunctional appliances</td>
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<td>4.4.2 Myofunctional appliances</td>
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<th>UNIT 4.5 Space maintainers</th>
<th>(10 periods)</th>
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<td>4.5.1 Introduction to space maintainers</td>
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<td>4.5.2 Fixed space maintainers</td>
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<td>4.5.3 Removable space maintainers</td>
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<tr>
<th>UNIT 4.6 Habit breaking appliances</th>
<th>(25 periods)</th>
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<tr>
<td>4.6.1 Introduction to habit breaking appliances</td>
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<td>4.6.2 Habit breaking appliances</td>
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<th>UNIT 4.7 Retainers</th>
<th>(20 periods)</th>
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<td>4.7.3 Fixed retainers</td>
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<tr>
<th>UNIT 4.8 Dental assistance part 2</th>
<th>(50 periods)</th>
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<tr>
<td>4.8.1 Dental x rays</td>
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<td>4.8.2 Front office management</td>
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<td>4.8.3 Chair side management</td>
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<td>UNIT 4.9 Soldering and Welding 50 periods)</td>
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<tr>
<td>4.9.1 Introduction to soldering and welding</td>
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<td>4.9.2 Flux, antiflux</td>
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<td>4.9.3 Procedure for soldering</td>
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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
  - 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 multimedia

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 Assessment (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)
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)

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 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

**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**

**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.
Module III
Microcontroller and Robotics

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


PIC µC 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, Timer1, 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)

UNIT : IV - Mobile Communication (153 periods)

UNIT - V- Engineering Graphics (27 periods)
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 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
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
Unit II - Computer hardware and operating system  
80 Periods


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 - Formulæ - 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


Unit V - Internet and Malayalam computing  
60 Periods

# GRAPHIC DESIGN & PRINTING TECHNOLOGY

## Module 3

**Offset and Modern Printing Techniques**

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## Module 4

**Binding and Packaging**

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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, Managemental 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 cats - 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
- Anthropozoonosis, 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
## Module 3

### FISH QUALITY CONTROL AND INSPECTION SYSTEMS

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## Module 4

### FISHERY VALUE ADDED AND BYPRODUCTS

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• Packaging of dried products
• Packaging of value added fishery products and byproducts
• Packaging of canned fish and fish pickle
• Modern packaging techniques
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,  
Inclinometer, 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

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

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

Unit 4.5 - Welding and Welding Defects

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

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


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


**Unit 4 Financial Planning & Portfolio Management. (60)**


**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}
### Module 3

#### Unit 1 Laboratory Management  
40 periods

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<tr>
<th>Unit No.</th>
<th>Unit</th>
<th>Period</th>
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<tbody>
<tr>
<td>3.1.1</td>
<td><strong>Lab safety</strong></td>
<td>20</td>
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<tr>
<td></td>
<td>Introduction</td>
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<td></td>
<td>Signs and symbols used in a laboratory</td>
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<td>Handling and storage of chemicals in a laboratory</td>
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<td></td>
<td>Laboratory Hazards- Physical, Chemical, Biological, Electrical, Fire, Radiation</td>
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<td>Laboratory Safety Precautions- Personal Hygiene</td>
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<td>Fire Extinguishers</td>
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<td>Biomedical Waste Management</td>
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<td>First Aid Practice in Laboratory</td>
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<td>3.1.2</td>
<td><strong>Laboratory Management</strong></td>
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<td>Introduction</td>
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<td></td>
<td>Code of Ethics of a laboratory Professional</td>
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<td>Role of communication in laboratory</td>
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<td>Organization of a Laboratory</td>
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<td>Components of a Laboratory</td>
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<td>Lay out plan of a multi-room laboratory</td>
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<td>Organizational pattern of a Laboratory</td>
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<td>Familiarization of Request forms and report forms.</td>
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<td>Ordering and Utilization of supplies</td>
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<td>Maintenance of Stock Registers- Consumables, Non-consumables</td>
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<td>Accreditation and Certification of Laboratories.</td>
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<td>Accrediting Agencies- NABL, ISO, CAP, CRISIL</td>
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<td>- Bar coding and Total Laboratory Automation (TLA)</td>
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<td>Familiarization of Common Laboratory Software</td>
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## Module 3  Unit 2
### Clinical Pathology  100 periods

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<tr>
<td>3.2.1</td>
<td>Introduction</td>
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<tr>
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<td>Importance, Common specimens,</td>
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<td>General guidelines for sample</td>
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<td>3.2.2</td>
<td>Urine Analysis</td>
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<tr>
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<td>- Importance, Types of urine</td>
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<tr>
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<td>samples</td>
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<td></td>
<td>- Methods of collection,</td>
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<td>preservatives</td>
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<td></td>
<td>- Physical Examination</td>
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<td></td>
<td>- Chemical Examination-Sugar,</td>
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<td>Protein, Blood, Ketone bodies,</td>
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<td>Bile pigments, Bile salts,</td>
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<td>Urobilinogen</td>
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<td>- Microscopic Examination</td>
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<td>- hCG test in Urine</td>
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<td>3.2.3</td>
<td>Sputum Examination</td>
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<td>- Importance, Specimen collection</td>
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<td>- Microscopic examination</td>
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<td>3.2.4</td>
<td>Stool Analysis</td>
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<td>- Physical examination</td>
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<td>- Chemical examination Occult</td>
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<td>blood, Reducing substances</td>
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<td>- Microscopic examination</td>
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<td>Saline &amp; Iodine mount</td>
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<td>3.2.5</td>
<td>Semen Analysis</td>
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<td>- Importance, Specimen Collection</td>
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<td>- Physical Examination, Liquefaction Time,</td>
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<td>- Microscopy- Total Sperm Count,</td>
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<td>Motility, Morphology</td>
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<td>- Chemical Examination- Fructose,</td>
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<td>Acid phosphatase</td>
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<td>3.2.5</td>
<td>CSF and other body fluids</td>
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<td>- CSF- Introduction</td>
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<td>- Specimen collection</td>
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<td>- Physical &amp; Microscopic</td>
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<td>Examination</td>
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<td>- Chemical Examination- protein,</td>
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<td>glucose, chloride</td>
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<td>(Name of method of estimation</td>
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<td>&amp; clinical significance only)</td>
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<td>- Other body fluids</td>
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<td>- Recent advances in Clinical</td>
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## Module 3  Unit 3

### Clinical Biochemistry  200 periods

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<th>Unit No.</th>
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<tr>
<td>3.3.1</td>
<td>Introduction to Biochemistry</td>
<td>12</td>
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<tr>
<td></td>
<td>- Types of chemicals and preparation of solutions.</td>
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<td></td>
<td>- Types of specimens in clinical Biochemistry</td>
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<td></td>
<td>- Collection and processing of specimens for biochemical analysis</td>
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<td>- Types of assays- Endpoint and Kinetic (definition and example only)</td>
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<td>- Cleaning of glass wares for biochemical analysis</td>
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<td>3.3.2</td>
<td>Instruments used in Biochemistry</td>
<td>8</td>
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<tr>
<td></td>
<td>- Familiarise with Colorimeter, Spectrophotometer, Flame photometer, Centrifuge, Electronic balance, Distillation apparatus, Deionizer</td>
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<td>3.3.3</td>
<td>Blood Glucose Estimation</td>
<td>28</td>
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<tr>
<td></td>
<td>- Introduction to Diabetes - features, types, complications,</td>
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<td></td>
<td>- Types of samples- FBS, PPBS, RBS, Anticoagulant used</td>
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<td></td>
<td>- Methods of estimation- GOD-POD in detail</td>
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<td>- Normal value and Clinical Significance - Hyper and hypoglycaemia</td>
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<tr>
<td></td>
<td>- Mention Glucometer Technique</td>
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<td>- GTT and GCT procedures,</td>
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<td>- Mention relevance HbA1C</td>
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<td>3.3.4</td>
<td>Renal Function Tests</td>
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<tr>
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<td>- Introduction, Common tests included</td>
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<tr>
<td></td>
<td>• Estimation of Blood Urea</td>
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<td></td>
<td>Mention common methods</td>
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<td></td>
<td>Urea-Berthelot method in detail,</td>
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<td></td>
<td>Normal value and Clinical significance</td>
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<td>Renal, Pre-renal, Post renal conditions of Uraemia</td>
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<td>• Estimation of S. Creatinine.</td>
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<td>Mention common methods.</td>
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<td>Jaffe's method in details,</td>
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<td>Normal value and Clinical significance</td>
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<td>• Estimation of Uric Acid. Mention common methods.</td>
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<td>Uricase method in detail.</td>
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<td>Normal value and Clinical Significance.</td>
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<td>- Mention Clearance tests- Urea and Creatinine</td>
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<td>- Mention Importance of Micro-albumin and Cystatin-C</td>
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<td>3.3.5</td>
<td>Liver Function Tests</td>
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<td>• Introduction, Common tests included</td>
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<td>Bilirubin-Formation of Bilirubin</td>
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<tr>
<td>3.3.6</td>
<td>Lipid Profile • 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</td>
<td>21</td>
</tr>
<tr>
<td>3.3.7</td>
<td>Other parameters of Diagnostic importance • 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</td>
<td>10</td>
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<tr>
<td>3.3.8</td>
<td>Quality control in Biochemistry - Introduction. Common terms used in Quality control, Errors - random and systemic, L.J. Chart, External QC and Internal QC</td>
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<tr>
<td>3.3.9</td>
<td>Automation and Recent advances Need for Automation, Advantages of Automation Types of Auto Analysers-Semi and Fully automated Electrolyte Analyser (ISE) in brief Advanced Diagnostic Methods in brief - C.L.I.A., C.L.F.A, Turbidometry, Nephelometry, HPLC, Mention Point of care testing (POCT)</td>
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## Module 4  Unit 1

**Diagnostic Microbiology**  
290 periods

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<tr>
<th>Unit No.</th>
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<td>4.1.1</td>
<td><strong>Introduction to Microbiology</strong></td>
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<tr>
<td></td>
<td>• Classification of Microbes, pathogen, commensals, type of Infections, communicable diseases, Carriers Historical aspects in Microbiology</td>
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<td>4.1.2</td>
<td><strong>Structure and classification of bacteria</strong></td>
<td>15</td>
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<td>• Structure- Cell wall, flagella, fimbriae, capsule, spore, plasmid</td>
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<td>• Classification of bacteria based on morphology- Arrangement, Motility and oxygen requirement</td>
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<td>4.1.3</td>
<td><strong>Sterilization and disinfection</strong></td>
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<tr>
<td></td>
<td>• Importance of sterilization and Disinfection</td>
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<tr>
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<td>• Methods of sterilization</td>
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<tr>
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<td>Physical methods- Dry heat, Moist Heat</td>
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<td>Chemical methods- alcohols, aldehydes, gases</td>
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<td>Mechanical methods- Filtration, Radiation</td>
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<td>• Describe principle, parts, and use of</td>
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<td>- Hot air Oven, Autoclave</td>
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<td>• Disinfectants and Antiseptics and their application</td>
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<td>4.1.4</td>
<td><strong>Growth &amp; Cultivation of Bacteria</strong></td>
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<td></td>
<td>• Bacterial growth and replication</td>
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<td>- Mention essential growth requirements- Temperature, PH, Gaseous requirements</td>
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<td>• Culture media</td>
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<td>Classification of culture media with examples</td>
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<td></td>
<td>• Preparation and use of common media</td>
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<td>Peptone water, Nutrient Agar, Blood Agar, Chocolate agar, Mac Conkey Agar</td>
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<td>• Bacteriological wire loop, Straight wire</td>
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<td>• Inoculation of Culture media- Liquid and Solid</td>
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<td>• Mention Streak, Stroke, Stab, Lawn culture</td>
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<td>• Mention Anaerobic techniques- Gaspak</td>
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<td>4.1.5</td>
<td><strong>Basic identification Techniques</strong></td>
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<td>Introduction</td>
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<td></td>
<td>Identification of bacteria</td>
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<td>• Different methods</td>
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<td>• Detection of motility</td>
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<td>- Name different methods</td>
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<td>- Hanging drop method in detail</td>
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<td>• Staining</td>
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<td>- Principle, requirement, procedure and interpretation of Simple stain, Grams stain, AFB stain-Diagnostic significance Biochemical tests- Coagulase, Catalase, IMViC</td>
<td>35</td>
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<tr>
<td>4.1.6</td>
<td><strong>Immunology and its diagnostic applications</strong> Introduction - Types of Immunity, Antigen, Antibody - Structure of antibody Types of antibody- Ig G, IgM, IgA, IgD, Ig E - Antigen Antibody reactions- Specificity, Sensitivity, Avidity, Pro-zone, post-zone, Titre Clinical applications of Agglutination, precipitation, flocculation, ELISA, Immunofluorescence.</td>
<td>30</td>
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<tr>
<td>4.1.7</td>
<td><strong>Laboratory Diagnosis of Common Bacterial diseases</strong> - Collection, Processing and transportation of common specimens-Urine, Blood, Sputum, CSF, Stool, Pus, body fluids, swabs General considerations- Macroscopy, Microscopy, Culture - Mention common culture media and identification methods used. Antibiotic Sensitivity Testing (ABST) - Kirby Bauer Method - Common Disease and pathogens encountered - Typhoid, Tuberculosis, Cholera, Dysentery, Syphilis, Leptospirosis, Tetanus, Meningitis &amp; UTI - Common Serological Techniques for diagnosis of Bacterial diseases- - ELISA &amp; its commercial preparations - Immunochromatographic technique - WIDAL, RPR, - Procedure and interpretation</td>
<td>20</td>
</tr>
<tr>
<td>4.1.8</td>
<td><strong>Laboratory Diagnosis of Common Viral diseases</strong> - Introduction to viruses - Common viral diseases and pathogens encountered - AIDS, Hepatitis, Dengue, Chickun Guinia, Rabies, Influenza, Mumps and Measles. - Diagnostic techniques for viral infections - Mention common Serological tests used, Latex agglutination, Card tests, ELISA, Tissue culture, PCR Technique</td>
<td>40</td>
</tr>
<tr>
<td>4.1.9</td>
<td><strong>Laboratory Diagnosis of Common Parasitic diseases</strong> - Introduction to parasites - Parasite, Commensal, Symbiosis, Host (Intermediate &amp;</td>
<td></td>
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<tr>
<td>Unit No.</td>
<td>Unit</td>
<td>Period</td>
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<tr>
<td></td>
<td>Definitive host), Vector, Zoonosis</td>
<td></td>
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<tr>
<td></td>
<td>• Classification-Intestinal &amp; Blood Parasites</td>
<td></td>
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<tr>
<td></td>
<td>• Common blood parasites and their lab diagnosis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Blood collection-</td>
<td></td>
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<tr>
<td></td>
<td>- Time of collection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Preparation of smear-Thick and thin</td>
<td></td>
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<tr>
<td></td>
<td>- Dehaemoglobinisation of thick smear</td>
<td></td>
</tr>
</tbody>
</table>

**Lab Diagnosis of Malaria**
- 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**
- Disease, mode of transmission, host, and nocturnal habit
- Lab diagnosis- wet smear examination, thick smear examination, Concentration technique.

**Lab Diagnosis of Intestinal parasites**
- 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 Floatation & Sedimentation methods
# Module 4 Unit 2

## Histotechnology & Cytology

<table>
<thead>
<tr>
<th>Unit No.</th>
<th>Unit</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.2.1</td>
<td><strong>Histotechnology</strong>&lt;br&gt;Introduction&lt;br&gt;- Methods of examination of Tissues and cells&lt;br&gt;- Gross examination&lt;br&gt;- Microscopic examination&lt;br&gt;- Examination of Unfixed Tissue&lt;br&gt;- Examination of Fixed Tissue&lt;br&gt;- Collection of specimens - Biopsy - Autopsy&lt;br&gt;- Fixation&lt;br&gt;- 10% Formalin&lt;br&gt;- Decalcification</td>
<td>20</td>
</tr>
<tr>
<td>4.2.2</td>
<td><strong>Tissue Processing</strong>&lt;br&gt;- Steps in tissue processing&lt;br&gt;- Dehydration&lt;br&gt;- Clearing&lt;br&gt;- Impregnation&lt;br&gt;- Embedding&lt;br&gt;- Microtomes-Rotary Microtome,-Cryostat&lt;br&gt;- Section cutting&lt;br&gt;- Mention role of adhesives&lt;br&gt;- Staining -H&amp;E Staining&lt;br&gt;- Mounting of Tissue sections&lt;br&gt;- Filing and storage of tissue sections</td>
<td>20</td>
</tr>
<tr>
<td>4.2.3</td>
<td><strong>Diagnostic cytology</strong>&lt;br&gt;- Introduction&lt;br&gt;- Types of specimens&lt;br&gt;- Processing&lt;br&gt;- Fixation&lt;br&gt;- Staining&lt;br&gt;Advantages and applications in diagnostic cytology</td>
<td>10</td>
</tr>
</tbody>
</table>
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

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
3.4.2 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


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**


**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 Backward defense, 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)
### Module - 3

<table>
<thead>
<tr>
<th>Unit No</th>
<th>Unit Name</th>
<th>Periods</th>
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<tbody>
<tr>
<td>3.1</td>
<td>Introduction to physiotherapy</td>
<td>25</td>
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<tr>
<td>3.2</td>
<td>Exercise therapy</td>
<td>150</td>
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<tr>
<td>3.3</td>
<td>Human locomotion (gait)</td>
<td>25</td>
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<tr>
<td>3.4</td>
<td>Hydro therapy</td>
<td>15</td>
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<td>3.5</td>
<td>Suspension therapy</td>
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<tr>
<td>3.6</td>
<td>Relaxation</td>
<td>5</td>
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<tr>
<td>3.7</td>
<td>Chest physiotherapy</td>
<td>10</td>
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<tr>
<td>3.8</td>
<td>Electrotherapy</td>
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<td><strong>Total</strong></td>
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### Module - 4

<table>
<thead>
<tr>
<th>Unit No</th>
<th>Unit Name</th>
<th>Periods</th>
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</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Introduction to Neurological Physiotherapy</td>
<td>90</td>
</tr>
<tr>
<td>4.2</td>
<td>Introduction to orthopaedic Physiotherapy</td>
<td>105</td>
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<tr>
<td>4.3</td>
<td>Introduction of paediatric Conditions and relevance of physiotherapy</td>
<td>40</td>
</tr>
<tr>
<td>4.4</td>
<td>Introduction of physiotherapy in surgical condition</td>
<td>40</td>
</tr>
<tr>
<td>4.5</td>
<td>Orthotics and prosthetics</td>
<td>25</td>
</tr>
<tr>
<td>4.6</td>
<td>Geriatric physiotherapy</td>
<td>40</td>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>340</strong></td>
</tr>
</tbody>
</table>
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)


3.3 Extrusion (60 Periods)


3.4 Blow molding and rotational molding (60 Periods)


3.5 Thermoforming and calendaring (60 Periods)


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
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)

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 prepps, 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.
SPLIT AND DUCTABLE AIR CONDITIONERS

Unit No.: 3.1 ENGINEERING GRAPHICS

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

Unit No.: 3.3 BASIC ELECTRICITY & ELECTRIC MOTORS

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
Module 3

Weaving technology

Periods: 340

<table>
<thead>
<tr>
<th>Unit</th>
<th>Name of unit</th>
<th>Periods</th>
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<tbody>
<tr>
<td>1</td>
<td>Weaving preparatory processes:</td>
<td>60</td>
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<tr>
<td>2</td>
<td>Handloom</td>
<td>100</td>
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<tr>
<td>3</td>
<td>Power loom</td>
<td>140</td>
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<tr>
<td>4</td>
<td>Fabric structure</td>
<td>40</td>
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Module 4

Textile dyeing and printing technology

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<tr>
<th>Unit</th>
<th>Name of unit</th>
<th>Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Preparatory processes for dyeing and printing</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Classification of textile dyes based on water solubility:</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>Dye application on cotton textile</td>
<td>120</td>
</tr>
<tr>
<td>4</td>
<td>Textile printing</td>
<td>100</td>
</tr>
</tbody>
</table>
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 (familiarisation 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 an 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)

Module 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 websites 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 Reservation System

[Total Period 340]

30% theory 70% practical
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  ENTRPRENSE 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

Unit 5  ENTRPRENSE 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
1.2.1.1. 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 (22 Periods)
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
6.10. Partition Values – Quartiles, Deciles and Percentiles
6.11. Quartiles - 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.
7.3. 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. Coefficient of Quartile Deviation
7.9. Coefficient of Mean Deviation
7.11. Coefficient 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