

Syllabus of “Diploma Programme in Value Added Products from Fruits and Vegetables (DVAPFV)”

Code: BPVI-001 COURSE I – FOOD FUNDAMENTALS

| S.No | Block & Unit |
|----------------|--|
| Block 1 | Introduction to Food science & Technology |
| Unit 1 | Introduction to Food Science |
| Unit 2 | Food processing Industries |
| Unit 3 | Food Laws and Associated Bodies |
| Block 2 | Characteristics of Edible Agriculture Produce |
| Unit 4 | Food Grains, Oilseeds and Pulses |
| Unit 5 | Fruits and Vegetables |
| Unit 6 | Dairy, Poultry, Meat, Fisheries and marine Products |
| Unit 7 | Commercial crops (Plantation Crops, spices), Medicinal & Aromatic Plants |
| Block 3 | Nutrition |
| Unit 8 | Nutritional Aspects |
| Unit 9 | Food for growth and Repair |
| Unit 10 | Loss of food Value in fresh Produce and Processed Products |
| Unit 11 | Anti-nutritional factors, Food contaminants and toxic elements |
| Block 4 | Quality aspects |
| Unit 12 | Quality Characteristics |
| Unit 13 | Deteriorative factors and their control |
| Unit 14 | Quality assurance, Regulation, Codes, grades & standards |

PRACTICAL MANUAL

| Experiment No. | Name of Experiment |
|-----------------------|------------------------------------|
| EXPERIMENT 1 | Equilibrium Moisture Content (EMC) |
| EXPERIMENT 2 | Bulk Density |
| EXPERIMENT 3 | True Density |
| EXPERIMENT 4 | Measurement of Fat/Oil |
| EXPERIMENT 5 | Crude Protein (Total Protein) |
| EXPERIMENT 6 | Total Carbohydrates |
| EXPERIMENT 7 | Free Fatty Acids (FFA) |

Code: BPVI-002 COURSE II – PRINCIPLES OF POST HARVEST MANAGEMENT OF FRUITS AND VEGETABLES

| S.No | Block& Unit |
|----------------|---|
| Block 1 | Need & Importance |
| Unit 1 | Importance of Post harvest management |
| Unit 2 | Causes of Pre and post harvest Losses |
| Unit 3 | Maturity Indices & Harvesting parameters |
| Unit 4 | Packaging of Fruits and Vegetables |
| Unit 5 | Transportation of Fresh Produce & control of Losses |
| Block 2 | Post Harvest Treatments |
| Unit 6 | Cleaning, Selection, Sorting, Grading and Packaging |
| Unit 7 | Treatments: Pre-Cooling, Curing, Inhibition of Sprouting and fungicide application and Ripening |
| Block 3 | Storage and marketing |
| Unit 8 | Factors affecting Storage Life |
| Unit 9 | Storage Structures |
| Unit 10 | Market and Market mechanization |
| Unit 11 | Market information System |
| Block 4 | Processing and Preservation |
| Unit 11 | Primary Processing/ Minimal Processing |
| Unit 13 | Heat Application |
| Unit 14 | Drying and Dehydration |
| Unit 15 | Freezing |
| Unit 16 | Chemical |

PRACTICAL MANUAL

| Experiment No. | Name of Experiment |
|-----------------------|---|
| EXPERIMENT 1 | Assessment of Post Harvest Losses at Different Levels (From Field to Consumers) |
| EXPERIMENT 2 | Demonstration of Value-Addition - By Post Harvest Handling and Packaging |
| EXPERIMENT 3 | On Farm Storage - Pusa Zero Energy Cool Chamber |
| EXPERIMENT 4 | Solar Drying of Fruits and Vegetables |
| EXPERIMENT 5 | Primary and Minimal Processing |
| EXPERIMENT 6 | Extraction and Preservation of Pulps and Juices |
| EXPERIMENT 7 | Preparation of Whole Tomato Concentrate |
| EXPERIMENT 8 | Utilization of Waste Generated during Fresh Handling and Processing |

| S.No | Block & Unit |
|----------------|--|
| Block 1 | Introduction |
| Unit 1 | An Overview of Food Chemistry |
| Unit 2 | An Overview of Food Physiology |
| Block 2 | Food Constituents |
| Unit 3 | Food Constituents – Carbohydrates and Lipids |
| Unit 4 | Food Constituents - Proteins, Enzymes and Water |
| Unit 5 | Vitamins and Minerals |
| Unit 6 | Food Additives |
| Block 3 | Food Physiology |
| Unit 7 | Ethylene Liberation and its control |
| Unit 8 | Growth, maturation and senescence |
| Unit 9 | Physiological disorder |
| Block 4 | Food Fermentation |
| Unit 10 | Fermentation, Method of Fermentation and Industrial Significance |
| Unit 11 | Fruit and Vegetable Based Fermentations and their Commercial Products |
| Unit 12 | Fruit Based Alcoholic Beverages |
| Unit 13 | Technological Aspects of Industrial Production of Alcoholic Beverages and Related Products |

PRACTICAL MANUAL

| Experiment No. | Name of Experiment |
|----------------|---|
| EXPERIMENT 1 | Determination of Acidity and pH |
| EXPERIMENT 2 | Determination of Moisture |
| EXPERIMENT 3 | Determination of Ash and its Characteristics |
| EXPERIMENT 4 | Determination of Reducing Sugars, Total Reducing Sugars, Sucrose and Starch |
| EXPERIMENT 5 | Determination of Crude Fibre |
| EXPERIMENT 6 | Determination of Alcohol by Specific Gravity Method |
| EXPERIMENT 7 | Detection and Determination of Synthetic Colours |

Code: BPVI-004 COURSE IV – FOOD PROCESSING AND ENGINEERING - I

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|----------------|---|
| S.NO | Blocks & Units |
| Block 1 | Introduction |
| Unit 1 | Unit Operations |
| Unit 2 | Moisture Contents & Equilibrium Moisture Contents |
| Unit 3 | Cleaning & Grading |
| Unit 4 | Storage |
| Block 2 | Unit Operations: Milling, Size Reduction; Material handling & Transportation |
| Unit 5 | Size Reduction |
| Unit 6 | Milling |
| Unit 7 | Material Handling |
| Unit 8 | Transportation and Packaging |
| Block 3 | Value Added Products from Fruits & Vegetables |
| Unit 9 | Juice and Beverages |
| Unit 10 | Jams, Jellies, Marmalade and Other Sugar-based Products |
| Unit 11 | Pickles, Chutney& tomato products |
| Unit 12 | Dehydrated Products |
| Block 4 | Plant Layout, Equipment and Mechanisation |
| Unit 13 | Site Selection and Layout |
| Unit 14 | Equipment & Machinery |
| Unit 15 | Plant Sanitation and Effluent Treatment |

PRACTICAL MANUAL

| Experiment No. | Name of Experiment |
|-----------------------|--|
| EXPERIMENT 1 | Preparation of Fruit Beverages – Squash, Cordial, RTS Beverage, Fruit Nectar and Sharbets |
| EXPERIMENT 2 | Production of Fruit Jam, Jelly, Marmalade, Fruit Butters, Confectionary and Cheese, Preserve and Candies |
| EXPERIMENT 3 | Preparation of Pickles and Chutneys, Relishes and Sauces |
| EXPERIMENT 4 | Production of Tomato Juice, Ketchup, Puree and Paste |
| EXPERIMENT 5 | Drying and Dehydration of Fruits and Vegetables |
| EXPERIMENT 6 | Repair and Maintenance of Machines |

Code: BPVI-005 COURSE V – FOOD MICROBIOLOGY

| S.No | Block & Units |
|----------------|--|
| Block 1 | Introduction |
| Unit 1 | Classification of Microorganisms Important in the Food Industry: Bacteria, Yeasts and Mold |
| Unit 2 | Factors Affecting Growth and Inhibition of Microorganisms in Food |
| Unit 3 | Industrially Important Yeast, Mold and Bacteria |
| Unit 4 | Spoilage and Associated Chemical/Physical Changes in Food |
| Block 2 | Controlling Microorganisms |
| Unit 5 | Concepts, Determination of Process Lethality Requirements and Importance |
| Unit 6 | Thermal Control of Microorganisms |
| Unit 7 | Drying |
| Unit 8 | Chemicals |
| Block 3 | Food Poisoning |
| Unit 9 | Food borne Diseases |
| Unit 10 | Food intoxications |
| Unit 11 | Food infections |
| Block 4 | Safe Chemicals and Microbial Limits for Different Foods |
| Unit 12 | Chemical |
| Unit 13 | Microbial |

PRACTICAL MANUAL

| Experiment No. | Name of Experiment |
|-----------------------|---|
| EXPERIMENT 1 | Preparation of Media |
| EXPERIMENT 2 | Microscopic Staining Techniques |
| EXPERIMENT 3 | Culturing and Identification of Microorganisms |
| EXPERIMENT 4 | Aseptic Culture Technique |
| EXPERIMENT 5 | Visual and Microscopic Examination of Raw and Processed Product |
| EXPERIMENT 6 | Enumeration of Bacteria by Dilution and Plating |

Code: BPVI-006 COURSE VI – FOOD PROCESSING AND ENGINEERING II

| S.No | Blocks & Units |
|----------------|---|
| Block 1 | Food Preservation by Application of Heat |
| Unit 1 | Principles of Heat & Mass Transfer |
| Unit 2 | Heat application |
| Unit 3 | Canning of Fruits and vegetables |
| Block 2 | Food preservation through Water Removal |
| Unit 4 | Forms of Water in Foods, Sorption and Desorption of Water in Foods and Water Activity |
| Unit 5 | Drying, Dehydration and Evaporation |
| Block 3 | Food Preservation through Temperature Reduction, Atmospheric Control and Irradiation |
| Unit 6 | Chilling |
| Unit 7 | Controlled and Modified Atmosphere Storage |
| Unit 8 | Food Irradiation |
| Block 4 | Product Utilization |
| Unit 9 | Types of By-Products |
| Unit 10 | Utilization of Fruits and Vegetables Processing Wastes for Food, Feed, Fuel and Industrial Products |
| Unit 11 | Food Fortification |
| Block 5 | Food Packaging |
| Unit 12 | Need & Importance |
| Unit 13 | Packaging materials |
| Unit 14 | Packaging process & machinery |

PRACTICAL MANUAL

| Experiment No. | Name of Experiment |
|-----------------------|--|
| EXPERIMENT 1 | Adequacy of Blanching of Fruits/Vegetables |
| EXPERIMENT 2 | Canning of Fruits and Vegetables |
| EXPERIMENT 3 | Cut-out Analysis of Canned Product |
| EXPERIMENT 4 | Testing of Flexible Packaging Material |
| EXPERIMENT 5 | Preparation of Fruit-based Carbonated Drinks |

Code: BPVI-007 COURSE VII – FOOD QUALITY TESTING AND EVALUATION

| S.No | Blocks & Units |
|----------------|---|
| Block 1 | Quality |
| Unit 1 | Definition and importance of food quality |
| Unit 2 | Quality standardization |
| Unit 3 | Food safety management (with Supplementary Material on FSSAI) |
| Block 2 | Testing and Evaluation |
| Unit 4 | Physical Methods |
| Unit 5 | Chemical & Microbiological Methods |
| Unit 6 | Sensory Analysis of Foods/ Beverages |
| Block 3 | Laboratory Equipment and Instrumentation |
| Unit 7 | Analytical Balance, pH Meter & Chromatography |
| Unit 8 | Analytical Instrumentation Based on Electromagnetic Radiation |

PRACTICAL MANUAL

| Experiment No. | Name of Experiment |
|-----------------------|---|
| EXPERIMENT 1 | Determination of Ascorbic Acid by Titrimetric and Colorimetric Methods |
| EXPERIMENT 2 | Determination of Sodium Chloride |
| EXPERIMENT 3 | Determination of Total Carotenoids and Beta-Carotene by Colorimetric Method |
| EXPERIMENT 4 | Determination of Sulphur Dioxide |
| EXPERIMENT 5 | Estimation of Benzoic Acid |
| EXPERIMENT 6 | Determination of Hardness of Water |
| EXPERIMENT 7 | Estimation of Residual chlorine in Water |
| EXPERIMENT 8 | Determination of Total Soluble Solids (⁰ BRIX) |
| EXPERIMENT 9 | Contaminants: Tin Content in Canned Foods |
| EXPERIMENT 10 | Sensory Evaluation of Food Products - Hedonic Rating Test |

Code: BPVI-008 COURSE VIII – ENTREPRENEURSHIP AND MARKETING

| S.No | Blocks/ Units |
|----------------|--|
| Block 1 | Entrepreneur and Entrepreneurship |
| Unit 1 | Being an entrepreneur-what does it involve |
| Unit 2 | Entrepreneurial skills |
| Unit 3 | Developing entrepreneurial skill |
| Block 2 | Setting up an Enterprise |
| Unit 4 | Business idea-How to get it? |
| Unit 5 | Market Assessment-What is a Market? |
| Unit 6 | What does marketing involve, How to assess the market for your business idea. |
| Unit 7 | Analysing the Competitive situation |
| Block 3 | Planning for the Enterprise |
| Unit 8 | Preparation of the Business Plan |
| Unit 9 | Arranging the financing |
| Unit 10 | Understanding the Components for Marketing Mix |
| Block 4 | Marketing Management of the Enterprise |
| Unit 11 | Production Consideration |
| Unit 12 | Setting the price-understanding costs, Pricing fundamentals, Administering the Price |
| Unit 13 | Developing and Managing Distribution |
| Unit 14 | Understanding the Managing Promotion |
| Block 5 | Assessing Performance |
| Unit 15 | Performance Measurement and control |
| Unit 16 | Managing Growth |
| Unit 17 | International Markets-Scope for small enterprises. |

PRACTICAL MANUAL

| Exercise No. | Name of Exercise |
|---------------------|---|
| EXERCISE 1 | Preparation of Cost of Project and Means of Finance |
| EXERCISE 2 | Preparation of Depreciation Schedule |
| EXERCISE 3 | Preparation of Statement of Production, Raw Material Consumed and Gross Sales |
| EXERCISE 4 | Calculations of Working Capital |
| EXERCISE 5 | Preparation of Profitability Statement |
| EXERCISE 6 | Preparation of Taxation Statement |
| EXERCISE 7 | Preparation of Balance Sheet |
| EXERCISE 8 | Preparation of Break Even Analysis Statement |
| EXERCISE 9 | Preparation of Statement of Power Calculation |
| EXERCISE 10 | Preparation of Statement of Analytical and Comparative Ratios |