

## Post Graduate Diploma in Food Safety & Quality Management (PGDFSQM)

			Instructional System								
Course Code	SLM Code	Name of Subject	PC P	A W	VG D	PD P	PE C	P P W	II I L	Credit s	Marks
PGDFSQM-1	MVP-001	Food Fundamentals & Chemistry	√	√	√					4	100
PGDFSQM-2	MVPI-001	Food Microbiology	√	√	√					4	100
PGDFSQM-3	MVP-002	Food Laws and Standards	√	√	√					4	100
PGDFSQM-4	MVP-003	Principles of Food Safety and Quality Management	√	√	√					4	100
PGDFSQM-5	MVP-004	Food Safety and Quality Management Systems	√	√	√					4	100
PGDFSQM-6	MVPL-001	Food Safety and Quality Auditing (Practical)	√	√	√		√			4	100
PGDFSQM-7	MVPL-002	Chemical Analysis and Quality Assurance (Practical)	√		√		√			4	100
PGDFSQM-8	MVPP-001	Project Work	√					√	√	4	200
<b>Total</b>										<b>32</b>	<b>900</b>

**Paper-I**  
**Food Fundamentals & Chemistry (MVP-001)**

**Block-1**

**UNIT 1        FOOD BASICS**

- 1.1    Food Source
- 1.2    Food Chain
- 1.3    Food Safety
- 1.4    Food Constituents
- 1.5    Food and its Functions
- 1.6    Sacred Foods and Food Taboos
- 1.7    Food as Source of Nutrients
- 1.8    Cuisines
- 1.9    Consumption Trends
- 1.10   Food Industry
- 1.11   Processing and Value Addition
- 1.12   National Food Processing Policy
- 1.13   Food Trade

**UNIT 2        FOOD FROM PLANT SOURCES**

- 2.1    Food Grains
- 2.2    Cereals
- 2.3    Grain Legumes
- 2.4    Oilseeds: Characteristics
- 2.5    Horticultural Crops: Structure and Composition

**UNIT 3        FOOD OF ANIMAL ORIGIN**

- 3.1    Food Safety
- 3.2    Meat and Meat Products
- 3.3    Eggs and Egg Products
- 3.4    Milk and Milk Products
- 3.5    Fish and Fishery Products

**UNIT 4 –      OTHER FOODS**

- 4.1    Comfort Foods
- 4.2    Health Foods
- 4.3    Nutraceuticals
- 4.4    Ayurvedic Medicinal Foods
- 4.5    Traditional Indian Foods
- 4.6    Honey
- 4.7    Genetically Modified Foods
- 4.8    Infant Foods
- 4.9    Organic Foods

## **Block – 2**

### **UNIT 5 – WATER**

- 5.1 Water: Structure and Properties
- 5.2 Water in Foods
- 5.3 Water Activity
- 5.4 Sorption Isotherms
- 5.5 Food Spoilage
- 5.6 Water Quality and Standards

### **UNIT 6 - CARBOHYDRATES**

- 6.1 Occurrence
- 6.2 Structure and Classification
- 6.3 Physicochemical Properties of Carbohydrates
- 6.4 Effect of Food Processing on Carbohydrates
- 6.5 Application of Carbohydrates in Foods
- 6.6 Nutritional and Clinical Importance of Carbohydrates

### **UNIT 7 - PROTEINS AND ENZYMES**

- 7.1 Occurrence of Proteins
- 7.2 Classification of Proteins
- 7.3 Structure of Proteins
- 7.4 Properties of Proteins
- 7.5 Enzymes
- 7.6 Enzyme Utilization in Food Industry

### **UNIT 8 - LIPIDS**

- 8.1 Occurrence and Sources
- 8.2 Classification of Lipids
- 8.3 Structure of Lipids
- 8.4 Properties of Lipids
- 8.5 Deteriorative Changes in Fats and Oils and their Prevention
- 8.6 Applications in Foods and Nutrition

### **UNIT 9 - VITAMINS AND MINERALS**

- 9.1 Classification of Vitamins
- 9.2 Fat Soluble Vitamins
- 9.3 Water Soluble Vitamins
- 9.4 Classification of Minerals
- 9.5 Effect of Food Processing on Vitamins and Minerals
- 9.6 Toxic Metals: Sources and Symptoms
- 9.7 Fortification – Need and Types

## **UNIT 10 - FOOD ADDITIVES**

- 10.1 What are Food Additives?
- 10.2 Preservatives
- 10.3 Antioxidants
- 10.4 Acidulants
- 10.5 Colouring Agents
- 10.6 Flavouring Agents
- 10.7 Sweeteners
- 10.8 Miscellaneous Additives

### **Block- 3**

## **UNIT 11 – SAMPLING TECHNIQUES OF FOOD PRODUCTS**

- 11.1 Sample Collection
- 11.2 Sampling Standards
- 11.3 The Sampling Plan
- 11.4 Sampling Techniques/Methods
- 11.5 Three Class Sampling Plan
- 11.6 Preparation of Sampling Plans
- 11.7 Sub Sampling for Analysis and Taking the Test Portion
- 11.8 Sample Preparation for Analysis
- 11.9 Difficulties in Sampling
- 11.10 Sample Accountability
- 11.11 Retention of Samples and Records
- 11.12 Case Study

## **UNIT 12 – PHYSICAL AND CHEMICAL ANALYSIS OF FOODS**

- 12.1 Physical Properties
- 12.2 Chemical Properties
- 12.3 Physical and Chemical Properties of Oils and Fats

## **UNIT 13 – INSTRUMENTATION IN FOOD ANALYSIS**

- 13.1 Selecting an Appropriate Instrumental Technique
- 13.2 Chromatographic Techniques
- 13.3 Liquid Chromatography
- 13.4 Thin Layer Chromatography
- 13.5 High Performance Thin Layer Chromatography (HPTLC)
- 13.6 Hyphenated Techniques
- 13.7 Spectroscopic Techniques
- 13.8 Spectroscopic Instruments
- 13.9 Thermal Methods of Analysis

## **UNIT 14 – SENSORY EVALUATION OF FOOD PRODUCTS**

- 14.1 Selection of Panel
- 14.2 Maintaining Suitable Environmental Conditions
- 14.3 Sample Preparation
- 14.4 Types of Tests
- 14.5 Application of Sensory Evaluation

## **Block – 4**

### **UNIT 15 – INTRODUCTION TO FOOD PRESERVATION AND PRECESSING**

- 15.1 Methods of Food Preservation
- 15.2 Emerging Technologies for Minimally Processed Fresh Fruit Juices

### **UNIT 16 – FOOD PACKAGING**

- 16.1 Need for Packaging of foods
- 16.2 Types of Packaging
- 16.3 Forms of Packaging
- 16.4 Packaging Material
- 16.5 Some Modern Packaging Concepts
- 16.6 Modified Atmosphere Packaging
- 16.7 Active and Intelligent Packaging
- 16.8 Labelling
- 16.9 Bar Coding in Packaging
- 16.10 Packaging and Environment
- 16.11 Edible Packaging of Foods
- 16.12 Biodegradable Plastics
- 16.13 Recycling of used Packaging Materials
- 16.14 Packaging Machines

### **UNIT 17 – WASTE MANAGEMENT IN FOOD PROCESSING INDUSTRY**

- 17.1 Energy Efficiency and Conservation
- 17.2 Water Conservation
- 17.3 Byproduct Utilization
- 17.4 Treatment of Solid Wastes
- 17.5 Treatment of Liquid Wastes
- 17.6 Corporate Social responsibility

## **Paper-II**

### **Food Microbiology (MVPI-001)**

#### **Block – 1**

#### **UNIT 1 – INTRODUCTION TO FOOD MICROBIOLOGY**

- 1.1 The Science of Microbiology
- 1.2 Food Microbiology – its Origins and Scope
- 1.3 Importance of Micro-organisms in Foods
- 1.4 Classification and Nomenclature of Micro-organisms
- 1.5 Micro-organisms in Food
- 1.6 Important Micro-organisms in Food
- 1.7 Normal Microflora of some Common Foods

#### **UNIT 2 – FOOD CONTAMINATION AND SPOILAGE**

- 2.1 Food Contamination
- 2.2 Food Spoilage
- 2.3 Role of Micro-organisms
- 2.4 Factors Affecting Spoilage
- 2.5 Deteriorative Effect of Micro-organisms
- 2.6 Different Types of Spoilage
- 2.7 Common Methods of Food Preservation

#### **UNIT 3 – FOOD-BORNE DISEASES**

- 3.1 What is a Disease?
- 3.2 How Do Micro-organisms Cause Disease?
- 3.3 Food-borne Diseases and the Agents
- 3.4 Types of Food-borne Diseases
- 3.5 Common Food-borne Pathogens and their Symptoms
- 3.6 Factors Responsible for Food-borne Diseases
- 3.7 Emerging Food-borne Pathogens

#### **UNIT 4 – BENEFICIAL ROLE OF MICRO-ORGANISMS**

- 4.1 Fermentation
- 4.2 Fermented Foods and their Importance
- 4.3 Food Fermentation-Science and Technology
- 4.4 Types of Food Fermentations
- 4.5 Common Examples of Food Fermentation
- 4.6 Fermented foods as Functional Foods

## **Block – 2**

### **UNIT 5 – GENERAL TECHNIQUES OF DETECTION AND ENUMERATION OF MICRO-ORGANISMS IN FOOD**

- 5.1 Microbiological Media
- 5.2 Enumeration Procedures
- 5.3 Pure Culture Method
- 5.4 Microscopic Examination of the Bacterial Culture

### **UNIT 6 – SCREENING AND ENUMERATION OF SPOILAGE MICRO-ORGANISMS IN FOOD**

- 6.1 Detection and Enumeration of Spoilage Micro-organisms

### **UNIT 7 – DETECTION OF PATHOGENS IN FOODS**

- 7.1 Detection of *Bacillus cereus*
- 7.2 Detection of *Campylobacter*
- 7.3 Detection of *Escherichia coli* and coliforms
- 7.4 *Listeria monocytogenes*
- 7.5 *Salmonella*
- 7.6 *Staphylococcus aureus*
- 7.7 *Clostridium perfringens*
- 7.8 Viral Pathogens

### **UNIT 8 – RAPID DETECTION TECHNIQUES FOR FOOD MICRO-ORGANISMS**

- 8.1 Need for rapid Detection techniques
- 8.2 Biochemical Kits
- 8.3 Immunological Methods
- 8.4 Genetic Methods
- 8.5 Flow Cytometry
- 8.6 Impedance
- 8.7 Biosensors
- 8.8 Other Methods
- 8.9 Limitations

## **PRACTICAL MANUAL**

### **EXPERIMENT 1 – INTRODUCTION TO BASIC MICROBIOLOGY LABORATORY PRACTICES**

- 1.1 Laboratory rules
- 1.2 Basics requirements
- 1.3 Understanding the use of equipments

### **EXPERIMENT 2 – CLEANING AND METHODS OF STERILIZATION**

- 2.1 Experiment

### **EXPERIMENT 3 – CULTIVATION AND SUB-CULTURING OF MICROBES**

- 3.1 Principle Involved
- 3.2 Preparation and sterilization of nutrient medium
- 3.3 Preparation of slants, stabs & pouring of Petri plates with nutrient agar
- 3.4 sub culturing of cultures
- 3.5 Observations
- 3.6 Results
- 3.7 Precautions

### **EXPERIMENT 4 – STAINING TECHNIQUES**

- 4.1 Principle
- 4.2 Preparation of smear
- 4.3 Simple staining
- 4.4 Gram staining
- 4.5 Endospore staining

### **EXPERIMENT 5 – STANDARD PLATE COUNT METHOD**

- 5.1 Principle
- 5.2 Materials Required
- 5.3 Materials Required
- 5.4 Procedure
- 5.5 Observations
- 5.6 Result
- 5.7 Precautions

### **EXPERIMENT 6 – DIRECT MICROSCOPIC EXAMINATION OF FOODS**

- 6.1 Principle
- 6.2 Material required
- 6.3 Procedure
- 6.4 Observations
- 6.5 Results
- 6.6 Precautions

### **EXPERIMENT 7 – ENUMERATION OF FUNGI (YEASTS AND MOLDS)**

- 7.1 Principle
- 7.2 Material required
- 7.3 Procedure
- 7.4 Observations
- 7.5 Results
- 7.6 Precautions

### **EXPERIMENT 8 – ASSESSMENT OF AIR USING SURFACE IMPINGEMENT METHOD**

- 8.1 Principle
- 8.2 Materials required
- 8.3 Procedure
- 8.4 Observations
- 8.5 Results
- 8.6 Precautions



**EXPERIMENT 9 – ASSESSMENT OF SURFACE STERILIZATION USING SWAB AND RINSE METHOD**

- 9.1 Experiment
- 9.2 Principle
- 9.3 Material required
- 9.4 Procedure
- 9.5 Observations
- 9.6 Results
- 9.7 Precautions

**EXPERIMENT 10 – DETECTION OF COLIFORMS AND INDICATOR ORGANISMS  
(1) MOST PROBABLE NUMBER**

- 10.1 Principle Involved
- 10.2 Material Required
- 10.3 Procedure
- 10.4 Observations
- 10.5 Results
- 10.6 Precautions

**EXPERIMENT 11 - DETECTION OF COLIFORMS AND INDICATOR ORGANISMS  
(2) CONFIRMED AND COMPLETED TESTS, MEMBRANE  
FILTER TECHNIQUES**

- 11.1 Principle Involved
- 11.2 Materials required
- 11.3 Procedure
- 11.4 Observations
- 11.5 Result
- 11.6 Precautions

**EXPERIMENT 12 – INTERPRIETATION OF MICROBIOLOGICAL DATA AND ITS  
INFERENCES**

- 12.1 Lab Tests for Micro-organisms
- 12.2 Sampling
- 12.3 Interpreting Test Results
- 12.4 Test Results and interpretation of quality
- 12.5 Taking Action from Test Results
- 12.6 Example of interpretation of APC

## **Paper-III**

### **Food Laws and Standards (MVP-002)**

#### **Block-1**

#### **UNIT 1 – PREVENTION OF FOOD ADULTERATION ACT AND RULES**

- 1.1 Enforcement of the Prevention of Food Adulteration (PFA) Act 1954
- 1.2 Prevention of Food Adulteration (PFA) Act
- 1.3 Functions/Responsibilities of Various Authorities
- 1.4 Central Food Laboratories
- 1.5 Role of Food Inspectors
- 1.6 Penalties (Section 16)
- 1.7 Powers of the State Governments
- 1.8 Discussion on Amendments to the PFA Act and Rules
- 1.9 Other Mandatory Standards
- 1.10 Harmonization of PFA Act with Codex

#### **UNIT 2 – FOOD SAFETY AND QUALITY REQUIREMENTS**

- 2.1 Global Considerations
- 2.2 Food Safety and Quality Requirements
- 2.3 Voluntary Requirements
- 2.4 Legal Requirements
- 2.5 Some of the Major Mandatory Provisions Prescribed in Prevention of Food Adulteration (PFA) Act, 1954 and Rules, 1955
- 2.6 Mandatory Labelling Provisions
- 2.7 Ministries/Departments Responsible for Ensuring Food Safety and Quality in India

#### **UNIT 3 – FOOD SAFETY AND STANDARD ACT, 2006**

- 3.1 Existing Food Laws in India
- 3.2 Why Integrated Food Laws i.e. Food Safety and Standards Act, 2006?
- 3.3 Objectives of the Food Safety and Standards Act, 2006
- 3.4 Salient Features of Food Safety and Standards Act, 2006
- 3.5 Important Provisions of Food Safety and Standards Act, 2006
- 3.6 Implementation and Enforcement of the Act

#### **UNIT 4 – ESSENTIAL COMMODITIES ACT, 1955**

- 4.1 Salient Features of Various Sections of the Essential Commodities Act, 1955
- 4.2 Various Control Orders Passed Under the Essential Commodities Act, 1955
- 4.3 Fruit Products Order (FPO), 1955
- 4.4 Meat Food Products Order (MFPO), 1973
- 4.5 Milk and Milk Products Order, 1992
- 4.6 Edible Oils Packing (Regulation) Order, 1998
- 4.7 Vegetable Oils Products (Regulation) Orders, 1998
- 4.8 Sugar Control Order, 1966

## **Block – 2**

### **UNIT 5 – CODEX ALIMENTARIUS COMMISSION (CAC)**

- 5.1 Statutes of the Codex Alimentarius Commission
- 5.2 Difference between CAC and Codex Alimentarius
- 5.3 Importance of CAC in International Trade
- 5.4 Functions of CAC
- 5.5 Functions of Codex Committees
- 5.6 Standard Formulating Process
- 5.7 Domestic Shadow Codex Committees
- 5.8 Need for Harmonizing National Standards with Codex

### **UNIT 6 – WTO IMPLICATIONS**

- 6.1 Understanding SPS Agreements
- 6.2 Understanding TBT Agreements
- 6.3 Similarities and Differences between SPS and TBT Agreements
- 6.4 Relationship between Codex and WTO
- 6.5 Dispute Settlement

### **UNIT 7 – OTHER INTERNATIONAL STANDARD SETTING BODIES**

- 7.1 Role of International Bodies in Setting Food Safety and Quality Standards
- 7.2 Role on Non-Government Organizations (NGOs) in Food Safety and Quality Standards
- 7.3 Role of Developed Countries in Setting Food Safety and Quality Standards

## **Block – 3**

### **UNIT 8 – FTDR ACT, 1992 AND FOREIGN TRADE POLICY**

- 8.1 Salient Features of Foreign Trade Development and Regulation (FTDR) Act 1992
- 8.2 Foreign Trade Policy
- 8.3 General Provisions Regarding Export/Import
- 8.4 Pre-requisite of Import/Export
- 8.5 Export Promotion Schemes
- 8.6 Regulations of Exports
- 8.7 General Conditions for the Imports

### **UNIT 9 – EXPORT (QUALITY CONTROL AND INSPECTION) ACT, 1963**

- 9.1 Salient Feature of the Export (Quality Control and Inspection) Act, 1963
- 9.2 Pre-Liberalization Era
- 9.3 Present Scenario
- 9.4 Procedure for Approval and Renewal
- 9.5 Residue Monitoring Plans (RMP)
- 9.6 Provisions and Requirements for Items Covered Under Mandatory Export Certification
- 9.7 Equivalence/Recognition Agreements

## **UNIT 10 – EXPORT REGULATIONS AND PROMOTION BODIES**

- 10.1 Agricultural and Processed Food Products Export Development Authority (APEDA)
- 10.2 Marine Product Export Development Authority (MPEDA)
- 10.3 Coffee Board
- 10.4 Spices Board
- 10.5 Tobacco Board
- 10.6 Tea Board of India
- 10.7 The Cashew Export Promotion Council of India (CEPC)

## **UNIT 11 – PLANT AND ANIMAL QUARANTINE**

- 11.1 Plant Quarantine regulations in India
- 11.2 WTO-SPS Regulations
- 11.3 Roles and Implementation of Plant Quarantine (PQ)
- 11.4 Animal Quarantine

## **UNIT 12 – CUSTOMS ACT AND IMPORT CONTROL REGULATIONS**

- 12.1 Items Allowed for Import/Export
- 12.2 Compliance with Laws
- 12.3 Procedure for Import of Goods into India
- 12.4 Steps for Obtaining Importer/Exporter Code (IEF No.)
- 12.5 Requirement of Import Authorisation
- 12.6 Special Import Provisions
- 12.7 Procedure for Import Clearance in India
- 12.8 Levy of Customs Duty
- 12.9 Import of Goods by Post
- 12.10 Warehousing of Imported Goods
- 12.11 Green Channel for Import Cargo Clearance
- 12.12 Imports by 100% EoUs/SEZ Units
- 12.13 Duty Free Imports
- 12.14 Special Economic Zone Scheme (SEZ)
- 12.15 Import of Commercial Samples
- 12.16 Exchange Control Regulations and Imports

## **Block – 4 (OTHER LAWS AND STANDARDS RELATED TO FOODS)**

### **UNIT 13 – OTHER LAWS RELATED TO FOOD PRODUCTS**

- 13.1 Provisions of Weights & Measures Act, 1976
- 13.2 The Insecticides Act, 1968
- 13.3 Consumer Protection Act, 1986
- 13.4 Customs Act, 1962
- 13.5 The Infant Milk Substitutes, Feeding Bottles & Infant Food (Regulations of Productions, Supply & Distribution) Act, 1992 & Rules 1993
- 13.6 Environment (Protection) Act, 1986
- 13.7 The Water (Prevention & Control of Pollution) Act, 1974
- 13.8 The Air (Prevention and Control of Pollution) Act, 1981

**UNIT 14 – VOLUNTARY NATIONAL STANDARDS: BIS AND AGMARK**

- 14.1 Bureau of Indian Standards
- 14.2 AGMARK [Agricultural Produce (Grading and Marking) Act. 1973]

**UNIT 15 – NATIONAL AGENCIES FOR IMPLEMENTATION OF INTERNATIONAL FOOD LAWS AND STANDARDS**

- 15.1 Role of Ministry of Health & Family Welfare/Directorate General of Health Services (Codex Contact Point)
- 15.2 Agencies Involved in Implementation of Provisions of Agreement on Technical Barriers to Trade
- 15.3 Agencies Involved in Implementation of Provisions of Agreement on Sanitary and Phyto-sanitary Measures
- 15.4 Role of States/Local Bodies
- 15.5 Agencies Involved in Quality Control and Pre-shipment Inspection for Exports
- 15.6 Role of Ministry of Environment and Forest
- 15.7 Role of Department of Agriculture & Cooperation, Ministry of Agriculture in Implementing Insecticides Act, 1968

**UNIT 16 – FOOD LABELING**

- 16.1 What is Food Labelling?
- 16.2 Need for Food Labelling
- 16.3 Definitions Related to Food Labelling
- 16.4 Nutrition Labelling
- 16.5 Codex Guidelines on Nutrition Labelling
- 16.6 FDA and USDA Requirements for Food Labelling
- 16.7 PFA Requirements for Food Labelling
- 16.8 Labelling Requirements under Weight and Measures (Packaged Commodities) Rule
- 16.9 Labelling Requirements under-Fruit Product Order (FPO) 1955
- 16.10 Labelling Requirements under Meat Food Product Order (MFPO), 1973

## **Paper-IV**

### **Principles of Food Safety and Quality Management (MVP-003)**

#### **Block – 1 FOOD SAFETY AND QUALITY MANAGEMENT SYSTEMS**

##### **UNIT 1 – INTRODUCTION TO FOOD SAFETY**

- 1.1 Hazards to Safe Food
- 1.2 Contamination and Spoilage
- 1.3 What is Hygiene?
- 1.4 Sources of Contamination
- 1.5 Food Quality
- 1.6 The Food Safety Challenge
- 1.7 Protecting Food from Contamination
- 1.8 Reduce the Effect of Contamination that does Occur
- 1.9 Role of Food Processing Industry/Sector

##### **UNIT 2 – FOOD SAFETY SYSTEM**

- 2.1 Changes in the Patterns of Food Consumption
- 2.2 The Increased Risks of Food Borne Infection
- 2.3 Inadequacy of the Existing Methods to Control the Risk
- 2.4 Need for Food Safety Management Systems
- 2.5 Emerging Trends in Food Safety

##### **UNIT 3 – TOTAL QUALITY MANAGEMENT**

- 3.1 Why Quality Management?
- 3.2 Understanding Some Basic Concepts
- 3.3 Need for Safety and Health in Industry
- 3.4 The Approach Towards Safety
- 3.5 Safety Management
- 3.6 Assessment and Elimination of Risks
- 3.7 Statistical Quality Control
- 3.8 General Occupational Health Problems
- 3.9 Safety and Health Management System
- 3.10 Case Studies

##### **UNIT 4 – PROJECT MANAGEMENT**

- 4.1 The Three Phases of Project Management
- 4.2 The 7-S of Project Management
- 4.3 The Project as a Conversion Process
- 4.4 The Relationship between Project management and Line Management
- 4.5 The Role of Strategy in Project Management
- 4.6 Time Planning-Tools and Techniques
- 4.7 Project Structures-Teams and Organisation
- 4.8 The Role of Teams
- 4.9 Control Systems
- 4.10 Control of Major Constraints-Cost and Time
- 4.11 Management and Controlling Suppliers and Contractors
- 4.12 Project Completion and Handover

## **Block – 2      RISK ANALYSIS**

### **UNIT 5 –      INTRODUCTION TO RISK ANALYSIS**

- 5.1    Changing International Environment
- 5.2    Increasing Demand for “Safe and wholesome Food”
- 5.3    Risk Analysis Definitions Related to Food Safety
- 5.4    Risk Analysis
- 5.5    Challenges and Benefits in the Application of Risk Analysis

### **UNIT 6 –      RISK MANAGEMENT**

- 6.1    Definitions of Key Risk Management Terms
- 6.2    General Principles of Food Safety Risk Management
- 6.3    A General Risk Management Framework
- 6.4    Role of Food Chain Professionals in Risk Management

### **UNIT 7 –      RISK ASSESSMENT**

- 7.1    Definitions Related to Risk Assessment
- 7.2    Principles of Food Safety Risk Assessment
- 7.3    Scientific Approaches for Assessing Risks
- 7.4    Responsibilities of Risk Managers in Commissioning and Guiding a Risk Assessment
- 7.5    General Criteria of Risk Assessment
- 7.6    Risk Assessment Methodology
- 7.7    Risk Assessment for Chemical Hazards
- 7.8    Risk Assessment of Biological Hazards
- 7.9    Biotechnology Risk Assessment
- 7.10   Sensitivity Analysis
- 7.11   Validation
- 7.12   Establishment of ‘Targets’ in the Food Chain as Regulatory Standards

### **UNIT 8 –      RISK COMMUNICATION**

- 8.1    Understanding Risk Communication
- 8.2    The Goals of Risk Communication
- 8.3    Key Communication Stages during Food Safety Risk Analysis
- 8.4    Roles and Responsibilities for Risk Communication
- 8.5    Elements of Effective Risk Communication
- 8.6    Principles of Risk Communication
- 8.7    Some Practical Aspects of Risk Communication

## **Block – 3      HACCP**

### **UNIT 9 –      HISTORY, BACKGROUND AND STRUCTURE OF HACCP**

- 9.1    Food Chain Steps
- 9.2    Food Hazards
- 9.3    Biological Hazards
- 9.4    Chemical Hazards
- 9.5    Physical Hazards
- 9.6    History of HACCP
- 9.7    Benefits and Barriers in Implementing HACCP
- 9.8    HACCP Principles
- 9.9    Process of HACCP Certification

## **UNIT 10 – HACCP PREREQUISITES AND GOOD HYGIENIC PRACTICES**

- 10.1 Environmental Hygiene
- 10.2 Design and Facilities in the Establishment
- 10.3 Premises and Rooms
- 10.4 Equipments
- 10.5 Utilities
- 10.6 Control of Operations
- 10.7 Personnel Health and Hygiene
- 10.8 Pest Control
- 10.9 Training
- 10.10 Traceability and Recall Procedures

## **UNIT 11 – PRINCIPLES AND IMPLEMENTATION OF HACCP**

- 11.1 Identification of Hazards and Control Measures
- 11.2 Determination of Significant Hazards
- 11.3 Determination of Critical Control Points
- 11.4 Establishing the Critical Limits
- 11.5 Establishment of A Monitoring System
- 11.6 Establish Corrective Actions
- 11.7 Establish Verification Procedures
- 11.8 Establish Documentation and record Keeping
- 11.9 Validation
- 11.10 General Errors in HACCP Plans
- 11.11 Quantitative Approach in HACCP
- 11.12 When to Implement HACCP Plan

## **UNIT 12 – CASE STUDIES ON HACCP**

- 12.1 Guava Juice Production Plant
- 12.2 Hazard Analysis Worksheet
- 12.3 CCP Decision Tree
- 12.4 Determination of Critical Limits
- 12.5 Monitoring
- 12.6 Corrective Actions
- 12.7 Verification Procedures
- 12.8 Record Keeping Procedures

## **Block – 4 (OTHER FOOD SAFETY PRACTICES)**

## **UNIT 13 – GOOD AGRICULTURE PRACTICES, GOOD ANIMAL HUSBANDRY PRACTICES AND GOOD MANUFACTURING PRACTICES**

- 13.1 Good Agricultural Practices
- 13.2 Good Animal Husbandry Practices
- 13.3 Good Manufacturing Practices
- 13.4 Good Hygiene Practices



**UNIT 14 – GOOD RETAIL PRACTICES, GOOD TRANSPORT PRACTICES, AND NUTRITION LABELLING**

- 14.1 Good Retail Practices (GRP)
- 14.2 Good Transport Practices (GTP)
- 14.3 Nutrition Labelling
- 14.4 Traceability Records

**UNIT 15 – TRACEABILITY STUDIES**

- 15.1 What is traceability?
- 15.2 Rationale and Objective of Traceability
- 15.3 Traceability and Codex
- 15.4 Components of the Traceability/Product Tracing Tool
- 15.5 Limitations of implementing the traceability/Product Tracing Tool
- 15.6 Alternatives to the traceability/Product Tracing Tool
- 15.7 Recommended Steps for the Application of Traceability/Product Tracing Tool
- 15.8 India's Experience with Traceability-The Grape Story
- 15.9 The Vision

**Paper-V**  
**Food Safety and Quality Management Systems (MVP-004)**

**Block – 1 (MANAGEMENT SYSTEMS, AUDITING AND ACCREDITATION)**

**UNIT 1 – INTRODUCTION TO MANAGEMENT SYSTEMS**

- 1.1 ISO 9001:2000 Quality Management System-Requirements
- 1.2 ISO 14001:2004 Environmental Management System-Requirements
- 1.3 OHSAS 18001:2007 Occupational Health and Safety Management System Requirements
- 1.4 ISO/IEC 27001:2005 Information Technology-Security Techniques-Information Security Management System-Requirements

**UNIT 2 – AUDITING**

- 2.1 Clause 1 – Scope of the Standard
- 2.2 Clause 2 – Normative References
- 2.3 Clause 3 – Terms and Definitions
- 2.4 Clause 4 – Principles of Auditing
- 2.5 Clause 5 – Managing an Audit Program
- 2.6 Clause 6 – Audit Activities
- 2.7 Clause 7 – Competence and Evaluation of Auditors

**UNIT 3 – STANDARDIZATION AND ACCREDITATION**

- 3.1 International Accreditation Forum (IAF)
- 3.2 International Laboratory Accreditation Cooperation (ILAC)
- 3.3 Quality Council of India (QCI)
- 3.4 National Accreditation Board for Testing and Calibration Laboratories (NABL)
- 3.5 ISO/TS 22003:2007 Food Safety Management System-Requirement for Bodies Providing Audit and Certification of Food Safety Management Systems
- 3.6 ISO Guide 65: General Requirements for Bodies Operating Product Certification Systems
- 3.7 ISO/IEC 17020:1998 General Criteria for the Operation of Various Types of Bodies Performing Inspections
- 3.8 ISO/IEC 17021:2001-Conformity Assessment-Requirements for Bodies Providing Audit and Certification of Management System
- 3.9 ISO 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories

**Block – 2 (ISO 9001:2000)**

**UNIT 4 – ISO 9001:2000 – An Overview**

- 4.1 ISO 9000
- 4.2 Quality Management Principles
- 4.3 ISO 9000:2005, Quality Management Systems: Fundamentals and Vocabulary
- 4.4 ISO 9001:2000, Quality Management Systems: Requirements
- 4.5 ISO 9004:2000, Quality Management Systems: Guidelines for Performance Improvements

**UNIT 5 – ISO 9001:2000 – STRUCTURE**

- 5.1 Documentation Structure of ISO 9001:2000
- 5.2 ISO 9001:2000 Clauses

**UNIT 6 – CLAUSE WISE INTERPRETATION OF ISO 9001:2000**

- 6.1 Clause-wise Explanation of ISO 9001:2000

**UNIT 7 – ISO 9001:2000 – CASE STUDIES**

- 7.1 Enterprise Sector-wise Case Studies

**Block – 3 (ISO 22000:2005)**

**UNIT 8 – ISO 22000:2005 – AN OVERVIEW**

- 8.1 Key Features of ISO 22000:2005
- 8.2 Who Should Use ISO 22000:2005?
- 8.3 Why to Use ISO 22000:2005?
- 8.4 ISO 22000 and HACCP
- 8.5 Codex Alimentarius
- 8.6 HACCP
- 8.7 ISO Family

**UNIT 9 – ISO 22000:2005 – STRUCTURE**

- 9.1 Economic Loss due to Food Borne Illness
- 9.2 ISO 22000:2005 Clauses
- 9.3 FSMS Documentation Structure
- 9.4 Food Safety Team Structure

**UNIT 10 – CLAUSE-WISE INTERPRETATION OF ISO 22000:2005**

- 10.1 Clause-wise Explanation of the Standard

**UNIT 11 – ISO 22000:2005 – CASE STUDIES**

- 11.1 Implementation in a Typical Food Industry

## **Block – 4 (LABORATORY QUALITY MANAGEMENT SYSTEM)**

### **UNIT 12 – AN OVERVIEW AND REQUIREMENTS OF ISO 17025**

- 12.1 Laboratory Quality Management System (Lab QMS) General Concepts
- 12.2 International Standards for Laboratory Quality Management System
- 12.3 ISO 17025:2005 Requirements
- 12.4 Management Requirements
- 12.5 Technical Requirements
- 12.6 Laboratory Accreditation
- 12.7 NABL-APLAC and ILAC MRA'S

### **UNIT 13 – REQUIREMENTS SPECIFIC TO FOOD TESTING LABORATORIES- PHYSICAL AND CHEMICAL PARAMETERS**

- 13.1 Quality and Safety Requirements of Food Products
- 13.2 Chemical and Physical Testing Requirements of Food Products
- 13.3 Laboratory Quality Management System
- 13.4 Management Requirements (Clause 4 of ISO 17025)
- 13.5 Technical Requirements (Clause 4 of ISO 17025)
- 13.6 Traceability of Measurement
- 13.7 Sampling
- 13.8 Handling Test and Calibration Items
- 13.9 Assuring the Quality of Test and Calibration Results

### **UNIT 14 - REQUIREMENTS SPECIFIC TO FOOD TESTING LABORATORIES- BIOLOGICAL PARAMETERS**

- 14.1 Quality and Safety Requirements of Food Products
- 14.2 Biological Testing Requirements of Food Products
- 14.3 Application of Laboratory Quality Management Requirements
- 14.4 Management Requirements (Clause 4 of ISO 17025)
- 14.5 Technical Requirements (Clause 4 of ISO 17025)
- 14.6 Traceability of Measurement
- 14.7 Sampling
- 14.8 Handling Test and Calibration Items
- 14.9 Assuring the Quality of Test and Calibration Results
- 14.10 Reporting of Results

### **UNIT 15 - GENERAL TOPICS: RELATED TO FOOD TESTING LABORATORIES**

- 15.1 Method Validation
- 15.2 Ruggedness (or Robustness)
- 15.3 Uncertainty of Measurement
- 15.4 International Accreditation Aspects
- 15.5 Statements of Compliance-Effect of Uncertainty
- 15.6 Reference Materials
- 15.7 Proficiency Testing
- 15.8 Why Proficiency Testing are Essential?
- 15.9 Different Types of Proficiency Test Schemes/Program
- 15.10 Codex Food Control Laboratory

**Block – 5 (RETAILER STANDARDS)**

**UNIT 16 - BRC FOOD AND BRC/IOP STANDARDS- AN OVERVIEW**

- 16.1 BRC Global Standard – Food (Issue 5, January 2005)
- 16.2 BRC/IOP Global Standard Issue 3 2001 (Food Packaging and Other Packaging Materials)

**UNIT 17 - INTERNATIONAL FOOD STANDARD (IFS)**

- 17.1 Background of the IFS
- 17.2 Service Protocol of the IFS ISSUE 5
- 17.3 IFS-Catalogue of Requirements
- 17.4 Requirements for Certification Bodies and Auditors
- 17.5 Report

**UNIT 18 - SQF 1000 AND SQF 2000**

- 18.1 SQF 1000
- 18.2 Interpretation of SQF 1000 Standard
- 18.3 SQF 2000
- 18.4 Interpretation of SQF 2000 Standard

**UNIT 19 - GLOBAL GAP AND INDIA GAP**

- 19.1 Potential Benefits and Challenges Related to Good Agricultural Practices (GAP)
- 19.2 Description of the FAO/GAPs
- 19.3 USDA GAP/GHP Programme
- 19.4 Global GAP
- 19.5 India GAP

**Paper-VI**  
**Food Safety and Quality Auditing (Practical) (MVPL-001)**

**PRACTICAL MANUAL (MVPL-001)**

**EXPERIMENT 1: VISIT TO A NEARBY FOOD ESTABLISHMENT**

- 1.1 Introduction
- 1.2 Principle/Rationale/Approach
- 1.3 Materials Required
- 1.4 Experiment/Activities/Procedures
- 1.5 Observation
- 1.6 Result
- 1.7 Precautions

**EXPERIMENT 2: CHP AND GMP IN FOOD FACTORY**

- 2.1 Introduction
- 2.2 Principle/Rationale/Approach
- 2.3 Materials Required
- 2.4 Experiment/Activities/Procedures
- 2.5 Checklist Preparations
- 2.6 Observations
- 2.7 Result
- 2.8 Precautions

**EXPERIMENT 3: DEVELOPING THE PROCESS FLOW FOR THE FOOD ESTABLISHMENT INCLUDING ALL THE INPUTS, OUTPUTS AND INTERIM LOOPS**

- 3.1 Introduction
- 3.2 Principle/Rationale/Approach
- 3.3 Material Required
- 3.4 Experiment/Activities/Procedures
- 3.5 Observations
- 3.6 Result
- 3.7 Precautions

**EXPERIMENT 4 DEVELOPMENT OF METHODOLOGY (*DECISIONS THEES*) AS PER CLAUSE 7.4.4 OF ISO 22000 FOR A FOOD ESTABLISHMENT**

- 4.1 Introduction
- 4.2 Operational Prerequisite Programme (OPRP)
- 4.3 Principle/Rationale
- 4.4 Materials Required
- 4.5 Conducting the Assessment
- 4.6 Observations
- 4.7 Result
- 4.8 Attachments

## **EXPERIMENT 5 DEVELOPING FSMS (MODULE 1)**

- 5.1 Introduction
- 5.2 Principle/Approach/Rationale
- 5.3 Materials Required
- 5.4 Method
- 5.5 Observations
- 5.6 Result

## **EXPERIMENT 6 DEVELOPING FSMS (MODULE 2)**

- 6.1 Introduction
- 6.2 Principle/Rationale/Approach
- 6.3 Materials Required
- 6.4 Experiment/Activities/Procedures
- 6.7 Observation
- 6.8 Result
- 6.9 Attachments

## **EXPERIMENT 7 DEVELOPING FSMS (MODULE 3)**

- 7.1 Introduction
- 7.2 Principle/Rationale/Approach
- 7.3 Materials Required
- 7.4 Experiment/Activities/Procedures
- 7.5 Observations
- 7.6 Results

## **EXPERIMENT 8 DEVELOPING FSMS (MODULE 4)**

- 8.1 Introduction
- 8.2 Principle/Rationale/Approach
- 8.3 Materials Required
- 8.4 Experiment/Activities/Procedures
- 8.5 Observation
- 8.6 Result

## **EXPERIMENT 9 APPLICATION OF ISO 9001 MODEL**

- 9.1 Introduction
- 9.2 Principle/Rationale
- 9.3 Experiment
- 9.4 Observations
- 9.5 Result
- 9.6 Attachments

## **EXPERIMENT 10 FOOD LAWS (MODULE 1)**

- 10.1 Introduction
- 10.2 Principle/Rationale/Approach
- 10.3 Materials Required
- 10.4 Experiment/Activities/Procedures
- 10.5 Observations
- 10.6 Result
- 10.7 Precautions

## **EXPERIMENT 11 FOOD LAWS (MODULES 2)**

- 11.1 Introduction
- 11.2 Principle/Rationale/Approach
- 11.3 Material Required
- 11.4 Experiment/Activities/Procedures
- 11.5 Observations
- 11.6 Results
- 11.7 Precautions

## **EXPERIMENT 12 FOOD LAWS (MODULE 3)**

- 12.1 Introduction
- 12.2 Principle/Rationale/Approach
- 12.3 Material Required
- 12.4 Experiment/Activities/Procedures
- 12.5 Observations
- 12.6 Result
- 12.7 Precautions

## **EXPERIMENT 13 MATRIX PREPARATION TO FIND CORRESPONDENCE BETWEEN ISO 22000, HACCP SERIES AND BRC AND ANY OTHER RELATED STANDARD (FOOD RETAIL MANAGEMENT-BASIC REQUIREMENTS)**

- 13.1 Introduction
- 13.2 Principle/Rationale/Approach
- 13.3 Experiment/Activities/Procedures
- 13.4 Observations
- 13.5 Result
- 13.6 Attachments

## **EXPERIMENT 14 UNDERSTANDING ISO 17025 REQUIREMENTS FOR 9001 AND CLAUSE 8.3 IN ISO 22000:2005**

### **Structure**

- 14.1 Introduction
- 14.2 Principle/Rationale/Approach
- 14.3 Materials Required
- 14.4 Experiment/Activities/Procedure
- 14.5 Observations
- 14.6 Result

## **EXPERIMENT 15 AUDIT PLANNING**

- 15.1 Introduction
- 15.2 Principle/Rationale/Approach
- 15.3 Material Required
- 15.4 Experiment/Activities/Procedure
- 15.5 Observation
- 15.6 Result
- 15.7 Attachments



**EXPERIMENT 16 PRODUCE AN AUDIT CHECKLIST INCLUDING SALIENT FEATURES OF ISO 9001 AND FSMS 22000 (MODULE 3)**

- 16.1 Introduction
- 16.2 Principle/Rationale/Approach
- 16.3 Materials Required
- 16.4 Experiment/Activities/Procedure
- 16.5 Observations
- 16.6 Result

**EXPERIMENT 17 DOCUMENT REVIEW AS PER THE CASE STUDY (MODULE 4)**

- 17.1 Introduction
- 17.2 Principle/Rationale/Approach
- 17.3 Materials Required
- 17.4 Experiment/Activities/Procedure
- 17.5 Observation
- 17.6 Result

**EXPERIMENT 18 AUDITING (MODULE 5)**

- 18.1 Introduction
- 18.2 Principle/Rationale/Approach
- 18.3 Material Required
- 18.4 Experiment/Activities/Procedure
- 18.5 Observations
- 18.6 Result

**EXPERIMENT 19 MOCK AUDIT EXERCISE TO DEVELOP INTERPERSONAL SKILLS INFORMATION GATHERING TECHNIQUES AND EXERCISING OBJECTIVITY IN THE REVIEW OF EVIDENCES COLLECTED (MODULE 6)**

- 19.1 Introduction
- 19.2 Principle/Rationale/Approach
- 19.3 Material Required
- 19.4 Experiment/Activities/Procedure
- 19.5 Observation
- 19.6 Result

**EXPERIMENT 20 POST AUDIT ACTIVITIES (MODULE 7)**

- 20.1 Introduction
- 20.2 Principle/Rationale/Approach
- 20.3 Material Required
- 20.4 Experiment/Activities/Procedure
- 20.5 Observations
- 20.6 Result
- 20.7 Precautions

**Paper-VII**  
**Chemical Analysis and Quality Assurance (Practical) (MVPL-002)**

**EXPERIMENT 1 CALIBRATION OF GLASSWARE**

- 1.1 Introduction
- 1.2 Calibration of Glassware
- 1.3 Calculation
- 1.4 Results and Inference
- 1.5 Precautions

**EXPERIMENT 2 PREPARATION OF STANDARD VOLUMETRIC SOLUTIONS**

- 2.1 Introduction
- 2.2 Preparation of Standard Volumetric Solutions
- 2.3 Precautions

**EXPERIMENT 3 DETERMINATION OF MOISTURE IN FOOD PRODUCTS BY HOT AIR OVEN-DRYING METHOD**

- 3.1 Introduction
- 3.2 Principle
- 3.3 Requirements
- 3.4 Procedure
- 3.5 Results and Inference
- 3.6 Precautions

**EXPERIMENT 4 DETERMINATION OF MOISTURE IN FOOD PRODUCTS USING KARL FISCHER TITRATION METHOD**

- 4.1 Introduction
- 4.2 Principle
- 4.3 Requirements
- 4.4 Apparatus
- 4.5 Procedure
- 4.6 Calculation
- 4.7 Results and Inference
- 4.8 Precautions

**EXPERIMENT 5 DETERMINATION OF MOISTURE IN FOOD PRODUCTS BY DEAN AND STARK METHOD**

- 5.1 Introduction
- 5.2 Principle
- 5.3 Requirements
- 5.4 Procedure
- 5.5 Calculation
- 5.6 Results and Inference
- 5.7 Precautions

## **EXPERIMENT 6 DETERMINATION OF PROTEIN CONTENT IN FOOD PRODUCTS BY KJELDAHL METHOD**

- 6.1 Introduction
- 6.2 Principle
- 6.3 Requirements
- 6.4 Procedure
- 6.5 Calculation
- 6.6 Results and Inference
- 6.7 Precautions

## **EXPERIMENT 7 DETERMINATION OF CRUDE FAT IN FOODS BY SOXHLET EXTRACTION METHOD**

- 7.1 Introduction
- 7.2 Principle
- 7.3 Requirements
- 7.4 Procedure
- 7.5 Calculation
- 7.6 Results and Inference
- 7.7 Precautions

## **EXPERIMENT 8 DETERMINATION OF TOTAL FAT IN FOODS BY ROSE GOTTLIEB METHOD**

- 8.1 Introduction
- 8.2 Principle
- 8.3 Requirements
- 8.4 Procedure
- 8.5 Calculation
- 8.6 Results and Inference
- 8.7 Precautions

## **EXPERIMENT 9 DETERMINATION OF VOLATILE OIL IN SPICES**

- 9.1 Introduction
- 9.2 Principle
- 9.3 Requirements
- 9.4 Procedure
- 9.5 Calculation
- 9.6 Results and Inference
- 9.7 Precautions

## **EXPERIMENT 10 DETERMINATION OF STARCH IN CEREAL GRAINS BY ACID HYDROLYSIS METHOD**

- 10.1 Introduction
- 10.2 Principle
- 10.3 Requirements
- 10.4 Procedure
- 10.5 Calculation
- 10.6 Results and Inference
- 10.7 Precautions

## **EXPERIMENT 11 DETERMINATION OF STARCH IN CEREAL GRAINS BY GLUCOAMYLASE METHOD**

- 11.1 Introduction
- 11.2 Principle
- 11.3 Procedure
- 11.4 Calculation
- 11.5 Results and Inference
- 11.6 Precautions

## **EXPERIMENT 12 DETERMINATION OF CRUDE FIBRE IN FOOD SAMPLE**

- 12.1 Introduction
- 12.2 Principle
- 12.3 Requirements
- 12.4 Procedure
- 12.5 Calculation
- 12.6 Result and Inference
- 12.7 Precautions

## **EXPERIMENT 13 DETERMINATION OF TOTAL ASH CONTENT IN FOOD PRODUCTS**

- 13.1 Introduction
- 13.2 Principle
- 13.3 Requirements
- 13.4 Procedure
- 13.5 Calculation
- 13.6 Result and Inference
- 13.7 Precautions

## **EXPERIMENT 14 DETERMINATION OF ACID INSOLUBLE ASH IN FOOD PRODUCTS**

- 14.1 Introduction
- 14.2 Principle
- 14.3 Requirements
- 14.4 Procedure
- 14.5 Calculation
- 14.6 Result and Inference
- 14.7 Precautions

## **EXPERIMENT 15 DETERMINATION OF pH OF FOOD PRODUCTS BY USING pH METER**

- 15.1 Introduction
- 15.2 Principle
- 15.3 Requirements
- 15.4 Procedure
- 15.5 Results and Inference
- 15.6 Precautions

## **EXPERIMENT 16 DETERMINATION OF FREE FATTY ACIDS AND ACID VALUE IN OILS AND FATS**

- 16.1 Introduction
- 16.2 Principle
- 16.3 Requirements
- 16.4 Procedure
- 16.5 Calculation
- 16.6 Results and Inference
- 16.7 Precautions

## **EXPERIMENT 17 DETERMINATION OF UNSAPONIFIABLE MATTER IN OILS AND FATS**

- 17.1 Introduction
- 17.2 Principle
- 17.3 Requirements
- 17.4 Procedure
- 17.5 Calculation
- 17.6 Results and Inference
- 17.7 Precautions

## **EXPERIMENT 18 DETERMINATION OF MELTING POINT OR SOLIDIFICATION POINT OF OILS AND FATS**

- 18.1 Introduction
- 18.2 Principle
- 18.3 Requirements
- 18.4 Procedure
- 18.5 Results and Inference
- 18.6 Precautions

## **EXPERIMENT 19 DETERMINATION OF REFRACTIVE INDEX OF OILS AND FATS**

- 19.1 Introduction
- 19.2 Principle
- 19.3 Requirements
- 19.4 Procedure
- 19.5 Results and Inference
- 19.6 Precautions

## **EXPERIMENT 20 DETERMINATION OF SPECIFIC GRAVITY OF OILS AND FATS**

- 20.1 Introduction
- 20.2 Principle
- 20.3 Requirements
- 20.4 Procedure
- 20.5 Calculation
- 20.6 Results and Inference
- 20.7 Precautions

## **EXPERIMENT 21 DETERMINATION OF TITRE VALUE OF OILS AND FATS**

- 21.1 Introduction
- 21.2 Principle
- 21.3 Requirements
- 21.4 Procedure
- 21.5 Results and Inference
- 21.6 Precautions

## **EXPERIMENT 22 DETERMINATION OF COLOUR OF OILS AND FATS BY LOVIBOND TINTOMETER**

- 22.1 Introduction
- 22.2 Principle
- 22.3 Requirements
- 22.4 Procedure
- 22.5 Calculation
- 22.6 Results and Inference
- 22.7 Precautions

## **EXPERIMENT 23 DETERMINATION OF IODINE VALUE IN OILS AND FATS**

- 23.1 Introduction
- 23.2 Principle
- 23.3 Requirements
- 23.4 Procedure
- 23.5 Calculation
- 23.6 Results and Inference
- 23.7 Precautions

## **EXPERIMENT 24 DETERMINATION OF SAPONIFICATION VALUE IN OILS AND FATS**

- 24.1 Introduction
- 24.2 Principle
- 24.3 Requirements
- 24.4 Procedure
- 24.5 Calculation
- 24.6 Results and Inference
- 24.7 Precautions

## **EXPERIMENT 25 DETERMINATION OF ACETYL VALUE AND HYDROXYL VALUE IN OILS AND FATS**

- 25.1 Introduction
- 25.2 Principle
- 25.3 Requirements
- 25.4 Procedure
- 25.5 Calculation
- 25.6 Results and Inference
- 25.7 Precautions

## **EXPERIMENT 26 DETERMINATION OF ALLYL ISOTHIOCYANATE IN MUSTARD OIL**

- 26.1 Introduction
- 26.2 Principle
- 26.3 Requirements
- 26.4 Procedure
- 26.5 Calculation
- 26.6 Results and Inference
- 26.7 Precautions

## **EXPERIMENT 27 DETERMINATION OF REICHERT MEISSL (RM) VALUE AND POLENSKE VALUE (PV) IN OILS AND FAT**

- 27.1 Introduction
- 27.2 Principle
- 27.3 Requirements
- 27.4 Procedure
- 27.5 Calculation
- 27.6 Results and Inference
- 27.7 Precautions

## **EXPERIMENT 28 DETERMINATION OF PEROXIDE VALUE OF OILS AND FATS**

- 28.1 Introduction
- 28.2 Principle
- 28.3 Requirements
- 28.4 Procedure
- 28.5 Calculation
- 28.6 Results and Inference
- 28.7 Precautions

## **EXPERIMENT 29 DETERMINATION OF SODIUM CHLORIDE CONTENT IN BUTTER**

- 29.1 Introduction
- 29.2 Principle
- 29.3 Requirements
- 29.4 Procedure
- 29.5 Calculation
- 29.6 Results and Inference
- 29.7 Precautions

## **EXPERIMENT 30 DETERMINATION OF GLUTEN CONTENT IN WHEAT FLOUR**

- 30.1 Introduction
- 30.2 Principle
- 30.3 Requirements
- 30.4 Procedure
- 30.5 Calculation
- 30.6 Results and Inference
- 30.7 Precautions

### **EXPERIMENT 31 DETERMINATION OF SORBIC ACID IN FOOD PRODUCTS**

- 31.1 Introduction
- 31.2 Principle
- 31.3 Requirements
- 31.4 Procedure
- 31.5 Calculation
- 31.6 Results and Inference
- 31.7 Precautions

### **EXPERIMENT 32 DETERMINATION OF COPPER, ZINC, LEAD AND CADMIUM IN FOOD PRODUCTS BY ATOMIC ABSORPTION SPECTROSCOPY**

- 32.1 Introduction
- 32.2 Principle
- 32.3 Requirements
- 32.4 Procedure
- 32.5 Calculation
- 32.6 Results and Inference
- 32.7 Precautions

### **EXPERIMENT 33 DETERMINATION OF CHOLESTEROL CONTENT IN GHEE BY GC**

- 33.1 Introduction
- 33.2 Principle
- 33.3 Requirements
- 33.4 Procedure
- 33.5 Calculation
- 33.6 Results and Inference
- 33.7 Precautions

### **EXPERIMENT 34 DETERMINATION OF VITAMIN A CONTENT IN GHEE BY HPLC**

- 34.1 Introduction
- 34.2 Principle
- 34.3 Requirements
- 34.4 Procedure
- 34.5 Calculation
- 34.6 Results and Inference
- 34.7 Precautions

### **EXPERIMENT 35 SENSORY EVALUATION LABORATORY**

- 35.1 Introduction
- 35.2 Principle
- 35.3 Outline and Setup of Sensory Room or Laboratory
- 35.4 Activity



**EXPERIMENT 36 SELECTION OF SENSORY PANELISTS**

- 36.1 Introduction
- 36.2 Principle
- 36.3 Procedure of Selection
- 36.4 Observations
- 36.5 Inference

**EXPERIMENT 37 SENSORY EVALUATION OF FOOD PRODUCTS-HEDONIC RATING TEST**

- 37.1 Introduction
- 37.2 Experiment: Hedonic Rating Test for Ketchup Samples
- 37.3 Precautions

**EXPERIMENT 38 JUDGING OF MILK**

- 38.1 Introduction
- 38.2 Experiment
- 38.3 Precautions