

## **4. POST GRADUATE DIPLOMA IN FOOD SAFETY AND QUALITY MANAGEMENT**

Food Safety is a fundamental public health concern. The food Safety and Quality has become an area of priority and necessity for consumers, retailers, manufactures and regulators. Changing global patterns of food production, international trade, technology, public expectations for health protection and many other factors have created a huge demand for food safety and quality auditing professionals.

IGNOU and APEDA have come together to launch this programme, the first such initiative in India, with an emphasis on practical proficiency development exercises. This programme is expected to meet the increasing human resource requirements for food safety and quality management professionals in the agriculture and food sectors.

### **4.1 Programme Objectives**

The core objective of the PG diploma programme is to prepare professionals for development, implementation and auditing of food Safety and Quality Management Systems in the country. It seeks to develop India's capability to meet the Global food safety and quality requirements and enhance the competitiveness of food products. In long term perspective, it would contribute to ensure consumer safety within and outside the country.

The PG programme shall enable the students to:

- ✍ Comprehend the issues of safety and quality in food production, handling, processing and trade.
- ✍ Build technical proficiency in undertaking in food safety and quality assurance in food processing chain. ie., from farm to work.
- ✍ Ensure the safety and quality of food products as per mandatory legal requirements and voluntary standards including export regulations if required.
- ✍ Design and implement
  - Good Hygienic Practices (GHP)
  - Good Manufacturing Practices (GMP)
  - Hazard Analysis and Critical Control Point (HACCP)
  - Quality Management Systems (QMS) : ISO 9001
  - Food Safety Management Systems (FSMS) : ISO 22000
  - Laboratory Management System: ISO 17025
  - Retail Standards
- ✍ Be able to effectively plan, conduct, report and audit as per the guidelines of the ISO 19011 : 2002
- ✍ Undertake Standard Microbiological and Chemical analysis of Food Products.
- ✍ Apply Good Hygienic, Manufacturing, Laboratory, Transportation and Retail Practices in Food Processing/Hospitality industry and Retail outlets.

## 4.2 Programme Structure

The PG diploma consists of eight courses as outlined in the following table (Table 2.1)

Sl. No.	Course Code	Title of the Course	Nature of the Course	Credits T+P =
1	MVP – 001	Food Fundamentals and Chemistry	Theory	4+0 = 4
2	MVP – 001 (T+Prac.)	Food Microbiology	Integrated	2+2 = 4
3	MVP – 002	Food Laws and Standards	Theory	4+0 = 4
4	MVP – 003	Principles of Food Safety and Quality Management	Theory	4+0 = 4
5	MVP – 004	Food Safety and Quality Management Systems	Theory	4+0 = 4
6	MVPL – 001	Food Safety and Quality Auditing (Practical)	Practical	0+4 = 4
7	MVPL – 002	Chemical Analysis and Quality Assurance	Practical	0+4 = 4
8	MVP P– 001	Project Work	Project Work	0+4 = 4

## 4.3 Syllabus of the Programme

**Code : MVP – 001 COURSE 1 – FOOD FUNDAMENTALS AND CHEMISTRY**

(4+0: Theory course)

Sl. No.	Title of the Course
<b>Block 1</b>	Introduction to Food Science
Unit 1	Food Basics
Unit 2	Food from Plant Sources
Unit 4	Other Foods
<b>Block 2</b>	Food Chemistry
Unit 5	Water
Unit 6	Carbohydrates
Unit 7	Proteins and Enzymes
Unit 8	Lipids
Unit 9	Vitamins and Minerals
Unit 10	Food Additives
<b>Block 3</b>	Food Analysis
Unit 11	Sampling Techniques of Food Products
Unit 12	Physical and Chemical Analysis of Foods
Unit 13	Instrumentation in Food Analysis
Unit 14	Sensory Evaluation of Food Products
<b>Block 4</b>	Food Processing and Processing
Unit 15	Introduction to Food Preservation and Processing
Unit 16	Food Packaging
Unit 17	Waste Management in food Processing Industry

**Code: MVP–001 COURSE 2–FOOD MICROBIOLOGY (2+2: Integrated Course)**

<b>Sl. No.</b>	<b>Block &amp; Unit</b>
<b>Block 1</b>	<b>Fundamentals of Food Microbiology</b>
Unit 1	Introduction to Food Microbiology
Unit 2	Food Contamination and Spoilage
Unit 3	Food Borne Disease
Unit 4	Beneficial Roles of micro-Organisms
<b>Block 2</b>	<b>Analytical Techniques in Microbiology</b>
Unit 5	General Techniques of Food Micro-Organisms
Unit 6	Screening and Enumeration of Spoilage Micro-Organisms
Unit 7	Direction of Pathogens in Food
Unit 8	Rapid Detection Technique for Food Micro-organisms

### **PRACTICAL EXERCISES**

<b>Experiment No.</b>	<b>Name of Experiment</b>
Experiment 1	Introduction to the Basic Microbiology Laboratory Practices
Experiment 2	Cleaning and Methods of Sterilization
Experiment 3	Cultivation and Sub-culturing of Microbes
Experiment 4	Staring Techniques
Experiment 5	Standards Plate Count Method
Experiment 6	Direct Microscopic Examination of Foods
Experiment 7	Enumeration of Fungi(Yeasts and Molds)
Experiment 8	Assessment of Air using Surface Impingement Method
Experiment 9	Assessment of Surface Sterilization using Swab and Rinse Method
Experiment 10	Detection of Coliforms and Indicator Organisms(Most Probable Number)
Experiment 11	Detection of Coliforms and Indicator Organisms Confirmed and completed Tests, Membrane Filter Techniques
Experiment 11	Interpretation of Microbiological Data and its Interfaces
Appendix 1	Staring Reagents
Appendix 2	Microbiological Media

### **Code: MVP-002 COURSE3-FOOD LAWS AND STANDARDS (4+0: Theory Course)**

<b>Sl.No.</b>	<b>Block &amp; Unit</b>
<b>Block 1</b>	<b>Indian Food Regulatory Regime</b>
Unit 1	PFA Act and Rules
Unit 2	Food Safety and Quality Requirements
Unit 3	Food Safety and Quality Requirements
Unit 4	Essential Commodities Act, 1955
<b>Block 2</b>	<b>Global Scenario</b>
Unit 5	Codex Alimentarius Commission(CAC)
Unit 6	CAC: Implications
Unit 7	Other International Standards Setting Bodies
<b>Block 3</b>	<b>Export &amp; Import Laws and Regulations</b>

Unit 8	FTDR Act, 1992 and Foreign Trade Policy
Unit 9	Export (Quality Control and Inspection) Act, 1963
Unit 10	Export Related Regulations and Standards Set by Export Promotion Bodies
Unit 11	Plant and Animal Quarantine
Unit 12	Customs Act and Import Control Regulations
<b>Block 4</b>	<b>Other Laws and Standards Related to Food</b>
Unit 13	Other Laws Related to Food Products
Unit 14	Voluntary National Standards: BIS and AGMARK
Unit 15	National Agencies for Implementation of International Food Laws and Standards
Unit 16	Accreditation System for Conformity Assessment Bodies

**Code: MVP 003 COURSE 4-PRINCIPLES OF FOOD SAFETY AND QUALITY MANAGEMENT (4+0: Theory Course)**

Sl. No.	Block & Unit
<b>Block 1</b>	<b>Fundamentals of Food Microbiology</b>
Unit 1	Introduction to Food Safety
Unit 2	Food Safety System
Unit 3	Total Quality Management
Unit 4	Project Management
<b>Block 2</b>	<b>Analytical Techniques in Microbiology</b>
Unit 5	An Introduction to Risk Analysis
Unit 6	Risk Management
Unit 7	Risk Assessment
Unit 8	Risk Communication
<b>Block 3</b>	<b>HACCP</b>
Unit 9	History, Background and Structure
Unit 10	Pre-requisites
Unit 11	Principles
Unit 12	Case Studies
<b>Block 4</b>	<b>Other Food Safety Practices</b>
Unit 13	Good Agriculture Practices, Good Animal Husbandary Practices and Good Manufacturing Practices
Unit 14	Good Retail Practices, Good Transport Practices and Nutrition Labelling
Unit 15	Traceability Studies

**Code: MVP 004 COURSE 5-FOOD SAFETY AND QUALITY MANAGEMENT SYSTEMS (4+0: Theory Course)**

Sl. No.	Block & Unit
<b>Block 1</b>	<b>Management Systems, Auditing and Accreditation</b>
Unit 1	Introduction to Management Systems

Unit 2	Auditing
Unit 3	Standard and Accreditation
<b>Block 2</b>	<b>ISO 9001 : 2000</b>
Unit 4	ISO 9001 : 2000 – An Overview
Unit 5	ISO 9001 : 200 - Structure
Unit 6	Clause –wise Interpretation of ISO 90001 : 2000
Unit 7	ISO 9001 : 2000 –Case Studies
<b>Block 3</b>	<b>ISO 22000: 2005</b>
Unit 9	ISO 22000: 2005 – An Overview
Unit 10	Clause –wise Interpretation ISO 22000: 2005
Unit 11	ISO 22000: 2005- Case Studies
<b>Block 4</b>	<b>Laboratory Quality Management System</b>
Unit 12	An Overview and Requirements of ISO 17025
Unit 13	Requirements Specific to Food Testing Laboratories – Physical and Chemical Parameters
Unit 14	Requirements Specific to Food Testing Laboratories-Biological Parameters
Unit 15	General Topics : Related to Food Testing Laboratories
<b>Block 5</b>	<b>Retailer Standards</b>
Unit 16	BRC Food and BRC IOP Standards : An Overview
Unit 17	International Food standard (IFS)
Unit 18	SQF : 1000 SQF : 2000
Unit 19	Global Gap and India Gap

**Code: MVP 001 COURSE 6-FOOD SAFETY AND QUALITY AUDITING**

**(0+4: Practical Course)**

<b>Experiment No.</b>	<b>Name of Experiment</b>
Experiment No. 1	Development of GHP and GMP Plan for a food factory (Module 1) a) Identifying the key focus areas for GHP & GMP b) Identifying gaps in its implementation c) Closure plans for identified gaps in a food factory / food outlet. <b>Exercise b and c shall be covered in Experiment 3.</b>
Experiment No. 2	Visit to the nearby Food establishment (e.g. Food joint or food factory)
Experiment No. 3	Development of GHP and GMP Plan for a food factory (Module 2) a) Identifying gaps in its implementation b) Closure plans for identified gaps in a food factory / food outlet
Experiment No. 4	Development of the process flow for the Food establishment including All the inputs, outputs & interim loops.
Experiment No. 5 & 6	Development of FSMS (Module) a) Data Collection and hazard identification (Physical ,

	<p>Chemical, and microbiological)</p> <p>b) Hazard Analysis (Usage of FMEA technique for risk assessment)</p>
Experiment No. 7	Development of methodology (decisions tree ) as per clause 7.4.4 of ISO 22000 for a food establishment
Experiment No. 8& 9	<p>Development of FSMS (Module 2)</p> <p>a) Development of OPRP (operational pre –requisite programme) and development of HACCP Plan [critical limits (including rationale for limits), monitoring procedure, correction, and corrective measures.</p> <p>b) Managing unsafe product.</p>
Experiment No. 10	<p>Development of FSMS (Module 3)</p> <p>a) Verification and validation of control measures (OPRP and HACCP Plan as per codex guide lines on validation.</p> <p>b) Emergency situation, preparedness and response plan</p> <p>c) Communication (external and internal)</p>
Experiment No. 11	Developing FSMS( Module 4) Traceability System as a tool for, Recall/Withdrawal (ISO 22005 : 2007)
Experiment No. 12, 13	<p>Application of ISO 9001 Model</p> <p>a) Understanding Process approach</p> <p>b) Defining quality policy and objectives</p> <p>c) Correction Corrective action and preventive action</p> <p>d) Continual improvement</p>
Experiment No. 14	<p>Food Laws (Module 1) : Identification of legal requirements for following food groups product standards:</p> <p>a) Fruit / Vegetables (b) Dairy (C) Meat &amp; Meat Products (d) Cereal ,</p> <p>b) Pulses and Oilseeds (e) Fish and sea foods (F) Ready to eat foods (<i>specific legal requirements</i>)</p>
Experiment No. 15	<p>Food Laws (Module 2): Hygienic requirements for manufacturing premises as per legal requirements.</p> <p>Food Laws (Module 3) : Design label for any food product</p>
Experiment No. 16	<p>Matrix preparation to find correspondence between ISO 22000, HACCP series and BRC and any other related standard(Food Retail management – basis requirements)</p>
Experiment No. 17	<p>Understanding ISO 17025 requirements for FSMS and QMS Audits relating to clause 7.6 in ISO 9001 and clause 8.3 in ISO 22000(Establishing Traceability to national/international standards)</p>
Experiment No. 18	Auditing:

	<p>Planning (1,2)</p> <p>Module 1: Role and responsibilities of auditors and lead auditors and  Pre-audit information required to plan the audit.</p> <p>Module 2: Preparation of an on-site audit plan that is appropriate to the  audit scope(Stage 1 and Stage 2)ISO : 22003 and 17021)</p>
Experiment No. 19	<p>Module 3: Produce an audit check list including salient Features of ISO  9001 and FSMS</p>
Experiment No. 20	Module 4: Document Review as per the Case Study
Experiment No. 21	<p>Module 5: a) Conducting the opening meeting and closing meeting (as  per ISO : 19011  b) Establishing qualification criteria for auditors and lead  auditors(ISO 17021 &amp; ISO 22003 for a food industry)</p>
Experiment No. 22	<p>Module 6: Mock Audit exercises to develop interpersonal skills, information gathering techniques and exercising objectivity  in the review of evidence collected.</p>
Experiment No. 23	<p>Module 7: Post Audit activities  a) Report writing, including writing valid, factual and value adding non- conformity report  b) Proposals for corrective action and follow up</p>

**Code: MVPL-002 COURSE 7- CHEMICAL ANALYSIS AND QUALITY ASSURANCE**  
(0+4: Practical Course)

<b>Experiment No.</b>	<b>NAME OF EXPERIMENT</b>
Experiment No. 1	Calibration of Glassware
Experiment No. 2	Preparation of Standard Volumetric Solutions
Experiment No. 3	Moisture in Food Products by Hot-air-oven-drying Method
Experiment No. 4	Moisture in Food Products by Dean & Stark Method
Experiment No. 5	Moisture in Food Products using Karl Fischer Titration Method
Experiment No. 6	Protein Content in Food Products by Kjeldahl Method
Experiment No. 7	Crude Fat in Food Products by Soxhlet Extraction Method.
Experiment No. 8	Total fat in foods by Rose Gottlieb Method
Experiment No. 10	Starch in Cereal Grains by Acid Hydrolysis Method
Experiment No. 11	Starch in Cereal Grains by Glucoamylase Method
Experiment No. 12	Crude Fibre in Food Sample
Experiment No. 13	Total Ash Content in Food Products
Experiment No. 14	Acid Insoluble Ash in Food Products
Experiment No. 15	pH of Food Products by Using pH Meter

Experiment No. 16	Free Fatty Acids and Acid Value in Oils and Fats
Experiment No. 17	Unsaponifiable Matter in Oils and Fats
Experiment No. 18	Melting point of Oils and Fats
Experiment No. 19	Refractive Index of Oils and Fats
Experiment No. 20	Specific Gravity of Oils and Fats
Experiment No. 21	Titre Value of Oils and Fats
Experiment No. 22	Colour of Oils and Fats by Lovibond Tintometer
Experiment No. 23	Iodine Value in Oils and Fats
Experiment No. 24	Saponification Value in Oils and Fats
Experiment No. 25	Acetyl Value and Hydroxyl Value in Oils and Fats
Experiment No. 26	Allyl Isothiocyanate in Mustard Oil
Experiment No. 27	Reicher Meissel (RM) Value and Polenske value (PV) in Oils and Fats
Experiment No. 28	Peroxide Value of Oils and Fats
Experiment No. 29	Sodium Chloride Content in Butter
Experiment No. 30	Gluten Content in Wheat Flour
Experiment No. 31	Sorbic Acid in Food Products
Experiment No. 32	Copper, Zinc, Lead and Cadmium in Food Products by Atomic Absorption Spectroscopy
Experiment No. 33	Cholesterol Content in Ghee by GC
Experiment No. 34	Vitamin A Content in Ghee and Vegetable Fat by HPLC
Experiment No. 35	Sensory Evaluation Laboratory
Experiment No. 36	Selection of sensory Panelists
Experiment No. 37	Sensory Evaluation of Food Products – Hedonic Rating Test
Experiment No. 38	Judging of Milk

**Code: MVPP-001 COURSE 8(0+4: Project Work)**

- a) Objective: Study in implementation of QMS / FSMS in Food Establishments. This could be undertaken in establishments like: Manufacturing, Hospitality, Retail and Street food hawkers. The suggestive lists of topics are as follows.

**List of Suggestive Topics:**

1. Study on effective implementation of correction, corrective action and preventive actions as per QMS in an organization.
2. Study on implementation of process approach as required by QMS in a organization
3. Study of GMP in different food industries (organized and unorganized) in different food groups.
4. Development of Training Modules for workers on GMP & GHP.
5. Development of Training Modules for middle management: Internal Audit and concept and implementation of HACCP.
6. Study on compliance to legal and customer requirements related to food safety and hygiene in a food establishment.
7. Study on appropriate CCP Monitoring, corrective actions and certifications in a food organization and purpose improvement.



8. Study on appropriate CCP identification for a food establishment as required by ISO 22000 clause 7.4.4.
9. Study on CCP Monitoring, corrective actions and certifications in a food organization and propose improvement.
10. Food Safety and Standards Act: Study of existing food laws versus Food Safety and Standards Act 2006.
11. Study on different emergency situations affecting food safety in a food establishment and propose mitigation plan.
12. Study on Internal communication in an organization for ensuring compliance to 22000 clause 5.6.
13. Study on External communication in an organization for ensuring compliance to 22000 clause 5.6.
14. Study effective cleaning of equipment /machinery (food contact surfaces including food gloves) in a food establishment.
15. Study on hygienic practices at raw material suppliers' premises and recommendations for improvement.
16. Study on suitability of packaging material at various stages of processing(raw, intermediate and finished product) as per prescribed standards.
17. Study on compliance to labeling requirements for domestic and imported food items (minimum four different category of products).
18. Study on repeatability and reproducibility of testing methods and results in an organization.
19. Designing an ideal plant layout for a food establishment related to food safety.
20. Study on calibration techniques of instruments in food industry, food laboratories and CCP monitoring.
21. Study on waste (liquid and solid) Management in a food establishment.
22. Study on Pest Management in a food establishment.
23. Study on existing versus idealist process for identification, Traceability and withdrawal (recall) as per ISO 22000 and ISO 22005.
24. Study on method adopted for finalizing / establishing shelf life of a product against declared/claim.
25. Study on allergens, intolerants (e.g. Lactose)and their control in a food products.

#### **4.4 Eligibility for Admission**

- Graduation in Science with Chemistry/Bio-chemistry or Microbiology as one of the subjects.
- Degree in allied sciences like Agriculture / Food Science and Technology / Post Harvest Technology / Home Sciences/ Life Sciences / Microbiology / Biochemistry / Biotechnology / Horticulture / Dairy Technology / Veterinary / Fisheries / Hotel Management and Catering / Hospitality Management etc. or equivalent. A consolidated information is given in the Table 2.2.
- Science graduates in disciplines like Geography, Statistics with Physics & Math, Art Subjects and Medical Lab Technology and with minimum three years experience in food processing and/or quality control. These students should have minimum one year experience in quality control activities.
- Art Graduates with diploma in food science disciplines viz. Fruits and vegetables, dairy technology, meat technology, cereal, pulses and oilseed etc.,

with minimum five years experience in food processing/ Food Quality Control and out of which two years experience should be in quality control activities. This shall provide vertical mobility to diploma holders.

- B.A/B.Com. Graduates with minimum of 7 years experience or holding the position in Govt./Semi Govt. Units involved in Food Quality Control.

**Consolidated Information about PGDFSQM**

- 1. Name of the Programme: Post Graduate Diploma in Food Safety and Quality Management.**
- 2. Programme Code: PGDFSQM**
- 3. Eligibility:**
  - a) Science Graduates with Chemistry/Bio-Chemistry or Microbiology as one of the subjects.
  - b) Degree in allied science like Agriculture / Food Science and Technology / Post Harvest Technology / Home Science / Life Science / Microbiology / Biochemistry / Biotechnology / Horticulture / Dairy Technology / Veterinary / Fisheries / Hotel Management and Catering / Hospitality Management etc. or equivalent.
  - c) Science graduates in disciplines like Geography, Statistics with Physics & Math, Art Subjects and Medical Lab Technology and with minimum three years experience in food processing and / or quality control. (minimum 1 year experience)
  - c) Art Graduates with diploma in Food Science disciplines viz. Fruits and vegetables, dairy technology, meat technology, cereal, pulses and oilseeds etc., with minimum 5 years experience in food processing/Food Quality Control (2 years experience in quality control).
- 4. Minimum ages as on 1st Jan. of the Academic Year: No bar**
- 5. Duration in years:**
  - a) **Minimum : 1year**
  - b) **Maximum : 4 year**
- 6. Programme Fee : Rs. 9,000/-**
- 7. Medium of Instruction : English**