



**SCHOOL OF VOCATIONAL STUDIES & APPLIED SCIENCES  
GAUTAM BUDDHA UNIVERSITY  
DEPARTMENT OF FOOD PROCESSING AND TECHNOLOGY  
GAUTAM BUDH NAGAR, GREATER NOIDA,  
UTTARPRADESH, 201312**

**POST GRADUATE DIPLOMA IN FOOD SAFETY AND QUALITY MANAGEMENT (FSQM)**

**WITH EFFECTIVE FROM 2021-2022 ONWARDS**

## **POST GRADUATE DIPLOMA IN FOOD SAFETY & FOOD QUALITY**

### **Significance of the course:**

Food safety and quality 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. The PG Diploma is intended for postgraduates in Science/ Agriculture/ Food Science or Allied Disciplines contemplating a career in Food Quality and Safety Management. It is also intended for Professionals in food Processing and Quality Control for strengthening their proficiency in design and implementations of quality management systems.

### **Objectives of the Course:**

The core objective of the PG diploma programme is to provide a practical and theoretical knowledge to the students. Knowledge may be well implected in the area of food Safety and Quality Management Systems. The programme incorporates the specialized knowledge and skills required to implement the fundamental principles of 'Quality Assurance.'

It seeks to develop India's capability to meet the Global food safety and quality requirements and enhance the competitiveness of food products.

### **Job Opportunities:**

- Quality Control Officer or Quality Assurance/ Management professionals in food /hospitality/ retail industry and laboratories, Auditor.
- Food Safety Officer in the regulatory bodies,
- Trainer/ Counselor in Food Safety & Quality Management Systems, and
- Self-Employment as food certifying/auditing professionals for the Food Safety and Quality Management Systems

**Duration of the Course:** One year (2 semester)

**Eligibility for Admission:**

- Graduation in Science with Chemistry/ Bio-chemistry/Biotechnology /Microbiology/ Life Science
- Degree in allied sciences like Agriculture / Food Science and Technology / Nutrition/Post Harvest Technology / Home Sciences/ Life Sciences /Horticulture / Dairy Technology / Veterinary / Fisheries / Hotel Management and Catering / Hospitality Management etc.
- Art graduate with 3 year experience in Food Processing/ Food Quality Control/ Hotel Management (food preparation/ food catering)

**Evaluation Criteria:**

Title of the Paper	Marks	Evaluation
Post Graduate Diploma In Food Safety And Quality Management (FSQM) (Theory) – Each Paper	100	<ul style="list-style-type: none"><li>• Internal Assessment – 30 marks</li><li>• External Examination – 70 marks</li></ul>
Post Graduate Diploma In Food Safety And Quality Management (FSQM) (practical's) – Each Practical	100	<ul style="list-style-type: none"><li>• Performance at the time of examination – 60 marks.</li><li>• Record – 20 marks</li><li>• Viva – 20 marks</li></ul>
Project Work	100	<ul style="list-style-type: none"><li>• Dissertation – 60 marks</li><li>• Presentation – 20 marks</li><li>• Viva – 20 marks</li></ul>

**Course Fees:** Rs. 35,000/- [Per Semester]

**Intake Capacity:** 30 students

**Course Structure:**

**Total Credits:** 45

**Theory:** 26 credits,

**Practical work & Project work:** 19 credits

**Department of Food Processing and Technology, SoVSAS**  
**Post Graduate Diploma in Food Safety and Quality Management (FSQM)**  
**Duration -1 Year (2 Semester)**  
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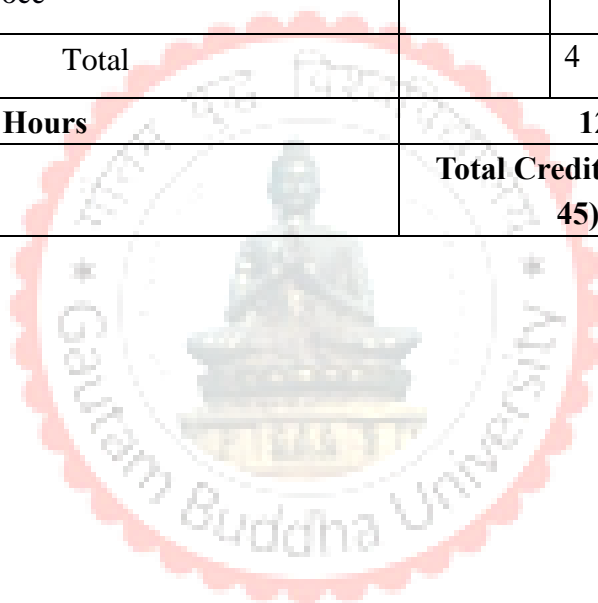
**Course Structure**

**Semester I**

S. No.	Subject Code	Courses	Course Type	L	T	P	Credits
<b>THEORY</b>							
1	FQD-401	Food Chemistry and Analysis	Core	4	0	0	4
2	FQD-403	Food Microbiology	Core	4	0	0	4
3	PGD-405	Food Laws and Standards	Core	4	0	0	4
4	FQD-409	Principles of Food Safety and Quality Management	Core	4	0	0	4
5	BS 101	Human Values & Buddhist Ethics	Core	2	0	0	2
<b>PRACTICALS</b>							
1	FQD-411	Food Microbiology Lab	Core	0	0	8	4
2	FQD-413	Chemical Analysis and Quality Assurance	Core	0	0	8	4
Total				18	0	16	<b>26</b>
<b>Total Contact Hours</b>				<b>34</b>			

## Semester II

S. No.	Subject Code	Courses	Course Type	L	T	P	Credit
1	FQD-402	Methods of Food analysis & Sampling	Core	4	0	0	4
2	FQD-404	Food Safety and Quality Auditing	Core	0	0	8	4
3	FQD-406	Seminar	Core	0	0	2	1
4	FQD-408	Industrial Visit/Academic Visit/Field Visit	Core	0	0	0	2
5	FQD-410	Project Work and Viva Voce	Core	0	0	0	8
	Total			4	0	8	<b>19</b>
	<b>Total Contact Hours</b>			<b>12</b>			
				<b>Total Credit (26+19=45)</b>			



## Course Structure for PG Diploma in Food Safety and Quality Management (FSQM)

Duration -1 Year (2 Semester)

(Effective from Session 2021 Onward)

### Semester-I

#### **FQD-401 Food Chemistry and Analysis (4+0+0)**

##### **UNIT-I (16 hour)**

**Food chemistry:** Introduction to Food Science, Scope, introduction, definition and importance of food chemistry. Classification, structural, analytical, nutritional and functional properties of carbohydrates, protein and lipids in foods. Types of fibers and its constituents, soluble fibers, insoluble fibers and their important functions. Proteins from milk, egg and meat. Allergens, toxic constituents and anti-nutritional factors of foods (enzyme inhibitors, trypsin and chymotrypsin inhibitor, amylase inhibitor, flatulence causing oligosaccharids, phytolectins).

##### **UNIT-II (12 hour)**

Water activity and its impact on shelf life of food. Chemistry and stability of vitamins and minerals during processing. Food additives, emulsion and emulsifier. Enzymatic and non-enzymatic browning in Food. Enzymes in foods, and food industry,

##### **UNIT-III (12 hour)**

**Sampling techniques.** Fundamental principles, spectral behavior, UV-Visible spectroscopy, Atomic absorption spectroscopy, Fluorescence spectroscopy, Emission spectroscopy, Mass-spectroscopy, IR.

##### **UNIT-IV (12 hour)**

**Food Analysis:** Physical and Chemical Analysis of Foods, Food from Plant Sources, Food from animal Sources Sensory Evaluation of Food Products, Waste Management in Food Processing Industry

##### **UNIT-V (8 hour)**

**Special techniques:** Thermal methods in food analysis and Texture measurement techniques, Dough rheology, Hunter-Lab ColorFlex, Polarimetry, Refractometry.

#### **SUGGESTED READINGS:**

1. Fennema, O.R. Ed. 1976. Principles of Food Science: Part-I Food Chemistry. Marcel Dekker, New York.
2. Bamji MS, Rao NA & Reddy V. 2003. Textbook of Human Nutrition. Oxford & IBH.
3. Leo ML. 2004. Handbook of Food Analysis. 2nd Ed. Vols. I-III.
4. Linden G. 1996. Analytical Techniques for Foods and Agricultural Products. VCH.
5. Nielsen S. (Eds.). 1994. Introduction to Chemical Analysis of Foods. Jones & Bartlett.
6. Pomrenz Y & Meloan CE. 1996. Food Analysis - Theory and Practice. 3rdEd. CBS.
7. Ranganna S. 2001. Handbook of Analysis and Quality Control for Fruit and Vegetable Products. 2nd Ed. Tata-McGraw-Hill.

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### **Semester I**

#### **FQD-403 Food Microbiology (4+0+0)**

##### **UNIT- I (16 hour)**

Development and scope of Microbiology. Introduction to food microbiology: Classification of microbes, Types of microorganism normally associated with food- mold, yeast, and bacteria. Importance of microorganisms in food. Primary sources of microorganisms in food. Growth curve. Parameters affecting the growth of microorganisms.

##### **UNIT- II (16 hour)**

Biochemical changes caused by micro-organisms, deterioration of various types of food product, Contamination of foods- fruits, vegetables, cereals, milk, meat, eggs and canned foods during handling and processing. Fermented and microbial foods: fermented milk and milk products, fermented fruits and vegetables, fermented meat and fish products, fermented beverages (beer, vinegar and wine), single cell protein.

##### **UNIT- III (14 hour)**

Heat Resistance of microorganisms and spores. Thermal destruction of microorganism. Microbiology of food preservation by heating process, irradiation, low temperature storage, chemical preservatives, high-pressure processing, control of water activity.

##### **UNIT- IV (12 hour)**

Foods microbiology and public health - Types of food poisonings, important features and control; Overview of algal, fungal and viral food borne illnesses. Disinfected agents. Hurdle Technology and its applications

#### **SUGGESTED READINGS:**

1. Jay J.M. 1986. Modern Food Microbiology. 3rd Edn. VNR, New York.
2. Robinson, R.K. Ed. 1983. Dairy Microbiology. Applied Science, London.
3. Banawart GJ. 1989. Basic Food Microbiology. 2nd Ed. AVI Publ.
4. Frazier J & Westhoff DC. 1988. Food Microbiology. 4th Ed. McGraw Hill.
5. Jay JM, Loessner MJ & Golden DA. 2005. Modern Food Microbiology. 7th Ed. Springer.
6. Ray B. 2004. Fundamentals of Food Microbiology. 3rd Ed. CRC.

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**Semester I**

### **FQD-405 Food Laws and Standards (4-0-0)**

#### **UNIT-1**

**(14 hour)**

Introduction, concept of food safety and standards (FSSAI), food safety strategies. Food hazards and contaminations - biological, chemical and physical factors. Prevention and control of microbiological and chemical hazards.

#### **UNIT-2**

**(12 hour)**

Indian Food Regulatory Regime (Existing and old), PFA Act and order, Additives, Contaminants and Pesticide Residue. Essential Commodities Act, 1955, Global Scenario, Codex Alimentarius, Legal Metrology act, Weight and Measurement act

#### **UNIT-3**

**(14 hour)**

**International Food Standards. WTO:** Introduction to WTO Agreements: SPS and TBT Agreement, Export (Quality Control and Inspection) Act, 1963. BIS Other product specific standards; AGMARK. FTDR Act, 1992 and Foreign Trade Policy, Customs Act and Import Control Regulations.

#### **UNIT-4**

**(08 hour)**

Risk assessment studies: Risk management, risk characterization and communication. Food Safety and Standard Act, 2006,

#### **UNIT-5**

**(12 hour)**

Voluntary Quality Standards and Certification GMP, GHP, HACCP, GAP, Good Animal Husbandry Practices, Good Aquaculture Practices, ISO 9000, ISO 22000, ISO 14000, ISO 17025, PAS 22000, IFS. Halal & Kosher Standard.

### **SUGGESTED READINGS:**

1. Singal RS, Handbook of indices of food quality and authenticity; Woodhead Publ. Cambridge, UK.
2. Shapton DA, Principles and practices of safe processing of foods; Butterworth Publication, London.
3. Winton AL, Techniques of food analysis; Allied Science Publications New Delhi.
4. Pomeranze Y, Food analysis - Theory and Practice; CBS Publications, New Delhi.
5. Jacob MB, The chemical analysis of foods and food products; CBS Publ. New Delhi
6. FSSAI website: [www.fssai.gov.in](http://www.fssai.gov.in)



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**Semester-I**

**FQD-409 Principles of Food Safety and Quality Management (4-0-0)**

**UNIT-I**

**(14 Hour)**

**Introduction to food safety and security:** Hygienic design of food plants and equipments, Food Contaminants (Microbial, Chemical, Physical), Food Adulteration (Common adulterants), Food Additives (functional role, safety issues), Food Packaging & labeling. Sanitation in warehousing, storage, shipping, receiving, containers and packaging materials. Control of rats, rodents, mice, birds, insects and microbes. Cleaning and Disinfection, ISO 22000 – Importance and Implementation

**UNIT-II**

**(12 Hour)**

**Food quality:** Various Quality attributes of food, importance and functions of quality control. Methods of quality, assessment of food materials-fruits, vegetables, cereals, dairy products, meat, poultry, egg and processed food products. Instrumental, chemical and microbial Quality control. Sensory evaluation of food and statistical analysis. Water quality and other utilities.

**UNIT-III**

**(12 Hour)**

**Critical Quality control:** Control point in different stages of production including raw materials and processing materials. Food Quality and Quality control including the HACCP system. Food inspection and Food Law, Risk assessment – microbial risk assessment, dose response and exposure response modelling, risk management, implementation of food surveillance system to monitor food safety, risk communication

**UNIT-IV**

**(8 Hour)**

**Indian and global regulations:** FAO in India, Technical Cooperation programmes, Bio-security in Food and Agriculture, World Health Organization (WHO), World Animal Health Organization (OIE), International Plant Protection Convention (IPPC)

**UNIT-V**

**(14 Hour)**

Sanitation and hygiene, GMP, GLP, Statistical quality control. Food laws and standard, PFA, AGMARK. Sampling and specification of raw materials and finished products, Concept of Codex Alimentarius /USFDA/ISO 9000 series, National Codex contact point (NCCP), Codex Committee of India – ToR, Functions, Shadow Committees etc., rules and regulations for waste disposals. Food adulteration and food safety. HACCP, Sensory evaluation-introduction, panel screening, Sensory and instrumental analysis in quality control, IPR and Patents, ISO system – 9001, 14001, 17025 and 22000.

## **SUGGESTED READINGS:**

1. Sara Mortimore and Carol Wallace. 1997. HACCP- A practical approach. Chapman & Hall, Madras.
2. Jacob,M. 2004. Safe Food Handling. CBS Publishers and Distributors, New Delhi.  
Inteaz Alli, 2004.
3. Quality assurance Principles and Practice. Boca Raton London New York  
Washington, D.C



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### **Semester-II**

#### **FQD- 402 Methods of Food analysis & Sampling (4-0-0)**

##### **UNIT – I (14 Hour)**

Introduction to Food Analysis: Rules & Regulations of Food Analysis, Safety in Laboratory. Sampling and sampling techniques, sample preparation for analysis. Basic principles of spectroscopy: UV-VIS molecular absorption spectrometry, atomic absorption & emission spectrometry, fluorescence spectrometry, Atomic mass spectrometry, IR spectrometry.

##### **UNIT – II (8 Hour)**

Separation Science: Basic principles of chromatography, HPLC, GC, TLC, Super critical fluid extraction chromatography

##### **UNIT-III (12 Hour)**

Analysis of liquids: Total liquids concentration, Solvent extraction; Non-solvent liquid extraction methods; instrumental methods. Determination of liquid composition.

##### **UNIT-IV (14 Hour)**

Electrophoresis methods, Chemical methods; enzymatic methods; physical methods; immunoassays; analysis of polysaccharides fiber. Analysis of proteins Determination of overall protein concentration; protein separation and characterization; methods based on different adsorption characteristics separation due to size differences; separation by electrophoresis.

##### **UNIT-V (8 Hour)**

Radiochemical Methods: Use of radio isotopes, viscosity and consistency measurements of food, measurement of rheological properties.

#### **SUGGESTED READINGS:**

1. AOAC methods for Food Analysis.
2. Y. Pomeranz and C. E Meloan, Food Analysis, Theory and practice; AVI publishing company, INC West Port, Connecticut, USA.
3. Fung, D.Y.C. and Matthews, R., Instrumental Methods for Quality Assurance in Foods; Marcel Dekker, Inc. New York.
4. Moskowitz, H. R., Food Texture: Instrumental and Sensory Measurement; Marcel Dekker, Inc. New York
5. Ronald et al., Handbook of Food Analytical Chemistry, Wiley.

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**Semester-I**

**FQD-411 Food Microbiology Lab**

**Practical (0-0-4)**

1. Introduction to basic microbiology, laboratory practices.
2. Cultivation and sub-culturing of Microbes.
3. Direct microscopic examination of foods.
4. Estimation of total microbial count of yeast and molds.
5. Estimation of total microbial bacterial plate count of food sample by direct microscopic and SPC method.
6. Assessment of air using Surface Impingement method.
7. Detection of efficacy of surface sterilisation using swab and Rinse method.
8. Enumeration of Coliforms and indicator organisms (Most Probable Number)
9. Detection of Coliforms and indicator organisms by confirmed and completed tests, and using membrane filter techniques.
10. Study of the growth curve of micro-organisms.
11. Study of the microbiological quality of milk by MBR test.
12. Estimation of total microbial count of (a) milk products (b) fruits and vegetable products (c) meat, fish and poultry products (d) canned foods.
13. Interpretation of Microbiological Data and its Inferences
14. Detection of Coliforms and Indicator Organisms, Confirmed and Completed Tests, Membrane filter Techniques
15. Staining Techniques

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**Semester-I**

**FQD-413 Chemical Analysis and Quality Assurance (0-0-4)**

1. Determination of moisture in a given food sample.
2. Determination of protein and carbohydrates in a given food sample.
3. Determination of ash in a given food sample.
4. Determination of crude fat in a given food sample
5. Estimation of acidity of given food sample/beverage
6. Estimation of total non-reducing and reducing sugars.
7. Estimation of vitamin C in given food sample.
8. Determination of diastase enzyme activity
9. Determination of pigments in a given food sample.
10. Determination of water vapour transmission rate for different materials.
11. Estimation of toxins and pesticides in food.
12. Detection of adulteration in foods.
15. Measurement of pH and Preparation of Buffers.
16. Preparation of standard volumetric solutions.
17. Sensory evaluation of Food Products –Hedonic rating Test

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### Semester-II

#### FQD-404 Food Safety and Quality Auditing

1. Development of FSMS
  - i. Data collection and hazard identification (Physical, Chemical and microbiological)
  - ii. Hazard analysis. ( Usage of FMEA technique for risk assessment) Exercise on preparing hazard analysis work sheet
2. Deign of SSOP/HACCP plan for a food industry
3. Development of FSMS
  1. Development of OPRP(operational pre-requisite programme) and development of HACCP Plan (critical limits ( including rationale for limits), monitoring procedure, correction and corrective measures)
  2. Managing unsafe product.
4. Development of FSMS
  1. Verification and validation of control measures (OPRP and HACCP Plan) as per codex guidelines on validation
  2. emergency situation, preparedness and response plan
  3. communication (external and internal)
5. Developing FSMS
  - Traceability System as a tool for, Recall/ Withdrawal (ISO22005: 2007)
6. Application of ISO 9001 Model
  1. Understanding Process approach
  2. defining quality policy and objectives,
  3. Correction Corrective action and preventive action
  4. Continual improvement
7. Food laws : Identification of legal requirements for following food groups product standards:
  - (a) Fruit/Vegetables, (b) Dairy, (c) Meat & Meat products (d) Cereal, Pulses and Oilseeds
  - e) fish and sea foods (f) and ready to eat foods
8. Auditing:
  1. Role and responsibilities of auditors and lead auditors and Pre-audit information required to plan the audit

2. Preparation of an on-site audit plan that is appropriate to the audit scope (Stage 1 and Stage 2) (ISO: 22003 and 17021)
9. Produce an audit checklist including salient Features of ISO 9001 and FSMS
10. 1. Conducting the opening meeting and closing meeting (as per ISO :19011)
  2. Establishing qualification criteria for auditors and lead auditors (ISO 17021 & ISO 22003 for a food industry)
11. Matrix preparation to find correspondence between ISO 22000, HACCP series and BRC and any other related standard
12. Development of the process flow for the Food establishment including all the inputs, outputs & interim loops.
13. Development of GHP and GMP Plan for a food factory
  1. Identifying gaps in its implementation and
  2. Closure plans for identified gaps in a food factory/ food outlet.
14. Document Review as per the Case Study
15. Mock Audit exercises to develop interpersonal skills, information gathering techniques and exercising objectivity in the review of evidence collected

