

POST GRADUATE DIPLOMA IN FOOD QUALITY AND SAFETY

Preamble

Food is an indispensable part of our life and safety of food is the grave concern for us. Food Quality and Safety has been an area of priority for consumers, retailers, manufacturers and regulators.

The PG Diploma is intended for post graduates 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. The programme shall also open new vista for entrepreneurs who intend to diversify in Food Safety and Quality Aspects.

This programme is designed to develop a practical “hands on training” in food safety and quality. The programme incorporates the specialized knowledge and skills required to implement the fundamental principles of ‘Quality Assurance.’ Schedules will be provided with knowledge required to either enter into or progress within the food industry. This programme is equally beneficial to those who wants complement their pre-existing skills and knowledge by upgrading.

Eligibility: Candidate with Masters Degree in Botany/ Applied Botany/Biotechnology/ Microbiology/ Biochemistry/ Plant Science/ Agriculture/ Sericulture/ Food and Nutrition/ Bioscience/ Life Science.

Duration: Two Semesters of four months each.

Admissions: The intake for course shall be twenty for the first academic year as per the approval of UGC. Ten seats are for Mysore University students and remaining ten seats are for other Universities and Foreign National Students as approved by UGC.

Fee structure: The fee structure of the course shall be as decided by the University from time to time. However, the course shall not be self financing as per the conditions stipulated by the UGC.

Selection of Candidates: The selection of eligible candidates for admission to course shall be based on only merit and reservation policy of University of Mysore from time to time.

Course Structure and Scheme of Examination:

The first Semester is devoted to course work and the second Semester is devoted to Dissertation work. Theory papers shall be set by internal and external examiners and approved by the BOE. If the difference between two valuations is 20% or more, then such answer scripts shall be evaluated by the third examiner. The practical shall be conducted by internal and

external examiners. The valuation of dissertation and *viva-voce* examination shall be conducted by internal and external examiners.

**COURSE STRUCTURE FOR ONE YEAR POST GRADUATION DIPLOMA
DEGREE IN FOOD QUALITY AND SAFETY**

I SEMESTER

Paper Code	Title of the Paper	No. of Hours / Week	Total No. of Hours	Internal Assessment.	Theory/ Practical I	Total Marks
PGD 1.1	Food Microbiology	03	48	20	80	100
PGD 1.2	Food Chemistry and Nutrition	03	48	20	80	100
PGD 1.3	Food Packaging and Food Quality Management	03	48	20	80	100
PGD 1.4	Food Microbiology (Practical I)	06	96	10	40	50
PGD 1.5	Food Chemistry, Food Packaging and Quality (Practical II)	06	96	10	40	50
Total Marks for First Semester						400

II SEMESTER

PGD 2.1	Project Work	Both internal and external examiners shall evaluate the Project Work				200
PGD 2.2	Viva- Voce	Project Guide and external examiner shall conduct the viva-voce examination				100
Total Marks for Second Semester						300
Grand Total of I Semester and II Semester Marks						700

COURSE CONTENT

PGD 1.1 - Food Microbiology

Theory

(48hours)

1. History of microbiology of food. Types of micro-organism normally associated with food- mold, yeast, and bacteria, Microbial growth pattern, physical and chemical factors influencing destruction of microorganisms. **4**

Hours.

2. Microorganisms in natural food products and their control. Biochemical changes caused by microorganisms, deterioration and spoilage of various types of food products – Physical, chemical and microbiological spoilages (Enzymatic or fermentative spoilage – rancidity, hydrolytic spoilage, putrefaction, souring, off flavour etc.; Texture deformations – slime, ropiness, curdling, discoloration etc.; Toxin production –endotoxins and exotoxins).

6 Hours.

3. Contaminants of foods-stuffs, fruits vegetables, cereals, pulses, oilseeds, milk and meat during handling and processing. **6**

Hours.

4. Microbial spoilage of foods – food borne pathogens, food poisoning, food infection and intoxication. Examples: *E. coli O157:H7*, *Salmonella*, *Campylobacter jejuni*, *Bacillus cereus*, *Shigella sp.*, *Clostridium sp.*, *Staphylococcus sp.*, *Norwalk like viruses*, Hepatitis A. **8**

Hours.

5. Processing and preservation of food -preservation by low-temperature, heat, drying, chemical, non-thermal methods and irradiation. **8**

Hours.

6. Analytical techniques in Microbiology- Screening and Enumeration of spoilage microorganisms. Detection of pathogens in food (Traditional Biochemical test using kits, specialized media), Rapid detection technique for microorganisms – Total ATP measurement, PCR based, Biosensor based, Immunological (Latex agglutinations,

ELISA, Immunomagnetic assays, etc.), Bacteriophage based markers etc. **8**

Hours.

7. Food fermentation -Traditional fermented foods of India and other Asian countries; Probiotics and prebiotics; Fermented foods based on milk, meat and vegetables; Fermented beverages. **8**

Hours.

PGD 1.2 -Food chemistry and Nutrition

Theory

(48hours)

1. Importance of food. Scope of food chemistry. Introduction to different food groups: their classification and importance. Water in food, water activity and shelf life of food. **6**

Hours

2. Carbohydrates-chemical reactions, functional properties of sugars and polysaccharides in foods chemical make-up, properties, nutritional and industrial importance. **6**

Hours

3. Proteins: nutritional aspects– amino acids, essential amino acids, biological value, PER (Protein Efficiency Ratio), and industrial importance. **4**

Hours

4. Lipids: classification, and use of lipids in foods, physical and chemical properties, essential fatty acids, Polyunsaturated Fatty Acids hydrogenation, rancidity and industrial importance. **8**

Hours

5. Vitamins and Minerals, Effect of processing on vitamins and minerals. Effect of processing and storage of Vitamins. Principles of microbial assay of b group Vitamins. **8**

Hours

6. Food pigments and synthetic dyes Natural pigments, their occurrence and characteristic properties, their changes during processing and storage, industrial applications. **8**

Hours

7. Enzymes used in food industry: Definition, importance, sources, nomenclature, classification and their applications in food processing. **8**

Hours

PGD 1.3 -Food Packaging and Food Quality Management

Theory

(48hours)

1. Food packaging: Definitions, objectives and functions of packaging and packaging materials. Packaging requirements and selection of packaging materials; Types of packaging materials. **6**
Hours
2. Food packaging systems: Different forms of packaging such as rigid, semi-rigid, flexible forms and different packaging system for (a) dehydrated foods (b) frozen foods (c) dairy products (d) fresh fruits and vegetables (e) meat, poultry and sea foods. **8**
Hours
3. Packaging equipment and machinery: Vacuum, CA and MA packaging machine; gas packaging machine; seal and shrink packaging machine; form and fill sealing machine; aseptic packaging systems; bottling machines: carton making machines. **8**
Hours
4. Food Quality: 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. **8**
Hours
5. Sanitation and hygiene, GMP, GLP, Statistical quality control. Food laws and standard, PFA, AGMARK. **6**
Hours
6. Sampling and specification of raw materials and finished products, Concept of Codex Alimentarius/USFDA/ISO 9000 series, rules and regulations for waste disposals. **6**
Hours
7. 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. **6**
Hours

PGD 1.4-Practical I: Food Microbiology

Practical

(36 hours)

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.

PGD 1.5 - Practical II: Food Chemistry, Food Packaging and Quality

Practicals:

(36 hours)

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.