POST GRADUATE DIPLOMA

IN

FOOD SAFETY AND FOOD QUALITY

Deccan Education Society's

Fergusson Centre for Higher Learning

Kurrakalva (V), Papanaidupeta (P), Renigunta (M), 517526, Chittoor Dist.,

Andhra Pradesh, India

POST GRADUATE DIPLOMA IN FOOD SAFETY & FOOD QUALITY

Significance of the course:

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.

Objectives of the Course:

The core objective of the PG diploma programme is to prepare professionals for development and implementation of food Safety and Quality Management Systems in the country, to increase employability and to bridge the gap between the industry and academia.

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 and processing.
- Build technical proficiency in undertaking food safety and quality assurance in food processing.
- Ensure the safety and quality of food products as per mandatory legal requirements

Job Opportunities:

- Quality Control Officer or Quality Assurance/ Management professionals in food /hospitality/ retail industry and laboratories,
- 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

Infrastructure and Equipments:

Necessary infrastructure and equipments are available with DES's FCHL, A.P.

Duration of the Course: One Semester **(Six Months)**

Eligibility for Admission:

- Graduation in Science with Chemistry/ Bio-chemistry/Biotechnology /Microbiology/ Life Science
- Degree in allied sciences like Agriculture / Food Science and Technology / Post Harvest Technology / Home Sciences/ Life Sciences /Horticulture / Dairy Technology / Veterinary / Fisheries / Hotel Management and Catering / Hospitality Management etc.

Scheme of Examination:

Title of the Paper	Internal Assessment Marks	External Marks	Total Marks
Introduction of food science and food chemistry	20	80	100
Microbiological safety of foods	20	80	100
Food quality analysis and Assurance	20	80	100
Food Chemistry Practical – I	-	100	100
Food Microbiology Practical – II	-	100	100
Project Work	-	100	100
Total Marks			600

Evaluation Criteria:

Title of the Paper	Marks	Evaluation
Post Graduate Diploma In FSFQ (Theory) – Each Paper	100	• Internal Assessment – 20 marks • Written Examination – 80 marks
Post Graduate Diploma In FSFQ (practical's) – Each Practical	100	• Performance at the time of examination – 60 marks. (Major/ Minor Questions) • Record – 20 marks • Viva – 20 marks
Project Work	100	• Dissertation – 60 marks • Presentation – 20 marks • Viva – 20 marks

Course Fees: Rs. 25,000/- [GST as applicable] **Intake capacity:** 30 students

Course Structure:

Total Credits: 24

Theory: 12 credits, **Practical work**: 8 credits, **Project work**: 4 credits

Practical Course Work: Atleast 80% of the practicals listed in the curriculum must be completed. A record of the laboratory work must be maintained, and the signature and remarks of the laboratory incharge during/after each practical assignment must be obtained. The laboratory work must be presented in the Laboratory Journal.

Duration of the Course: 6 months / one semester

(5 months teaching, 0ne month project work / internship)

Module No. 1: Introduction to Food Science and Chemistry	
1.	**Types of foods:**Based on the Shelf Life,Fermented Foods, Alcoholic and Non-Alcoholic Beverages, Processed Foods, Nutraceuticals, Functional foods, Dehydrated Foods, Ready to Eat Foods, Organic Foods, Ethnic Foods, Pre and Probiotics in Fermented Foods and Beverages,GM Foods and their safety Physico- Chemical Characterization Of Foods. Different Food Groups: Classification and Importance. Types of Foods- Plant and animal origin
2.	Importance of food and Scope of Food Chemistry. **Water:** Physical and Chemical properties, Water Activity Determination and its influence on Food Quality and Stability **Carbohydrates:** Chemical Reactions, Functional Properties of Sugars and Polysaccharides in Foods. **Proteins:** Nutritional Aspects – Amino Acids, Essential Amino Acids
3.	**Lipids:** Classification, and Use of Lipids in Foods, Physical and Chemical Properties, Essential Fatty Acids **Vitamins and Minerals**, in relation to Processing Effects. **Enzymes in Foods** associated with Processing, Food Deterioration
4.	Food Sanitation: Definition and Regulation of Food Sanitation, Sources of Contamination, Sanitation and hygiene. Indices of Food Sanitary Quality.

Module No.2 Microbiological safety of foods.

1.	**Importance and Significance** of Microorganisms in Food Safety, Intrinsic and Extrinsic Factors Affecting the Growth of Microorganisms in Foods. Microbiological Standards and Criteria, Indicator organisms, Microbiological standards / Criteria – Their significance and interpretation
2.	**Food spoilage:** Types of Microorganisms normally associated with Food Spoilage of various types of Food Products – Physical, Chemical and Microbiological Spoilages [Enzymatic or Fermentative Spoilage – Rancidity, Hydrolytic Spoilage, Putrefaction, Souring, Off flavour etc.; Characteristic Features, Sources, Dynamics and Significance of Spoilage of Different Groups of Foods - Cereal and Cereal Products, Vegetables and Fruits, Meat Poultry and Sea Foods, Milk and Milk Products, Packaged and Canned Foods.
3.	**Methods of Food Preservation:**Processing and Preservation of Foods - Preservation by Low-Temperature, Heat, Drying, Canning, Chemical, Non-Thermal Methods and Irradiation. Use of Chemical Preservatives – Advantages and Disadvantages.
4.	**Food Borne Diseases:** Characteristics and Incidence- Food Borne Pathogens, Food Poisoning - Global and Indian Scenario, 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. Food Borne Diseases – Bacterial, Viral, Protozoa, Animal Parasite,Mycotoxicosis; Mushroom Poisoning; Emerging and Re-Emerging Food Borne Diseases and case studies of recent outbreaks

Module No. 3 : Food Quality analysis and Assurance	
1.	**Food Analysis:** Introduction, Functions of Food Analysts, Sampling and Sample Preparation, Quality Control of Raw Materials, in –Process Food Control& Quality Control Of Finished Products,
2.	**Compositional/Analytical Evaluation of Foods-**Proximate composition – Moisture, Total and Acid Insoluble Ash, Crude Fat, Crude Protein, Crude Fiber, Carbohydrate [by difference]. **Introduction to Advanced laboratory techniques** for Detection of Pesticide Residues, Toxicants, Heavy Metals, Processing Contaminants (Direct and Indirect). Simple Tests for Detection of Food Adulteration.
3.	**Food Quality Indices:** Cereals and Pulses and their Products, Meat and Meat Products, Fish and Fish Products, Milk and Dairy Products, Fruits and Vegetables and their Products, Coffee, Tea and Spices. **Microbiological Analysis of Foods:** Bacteria, Fungi, yeast, and other common pathogens associated with Food Spoilage.
4.	**Food Laboratories:** Accreditation of Food Laboratory, Referral Laboratories, Hierarchy of Food Safety Authorities. **International Standards for Quality Assurance:** a) GMP/ GHP, GLP, GAP,GVP b) Regulations related to food adulteration PFA and AGMARK c) Hazard analysis and critical control procedures (HACCP) – pre-requisites, principles and case studies d) ISO 9001 : 2000 – structure, clause –wise Interpretation and case studies e) ISO 22000 : 2005 – structure, clause –wise Interpretation and case studies

PRACTICALS

Food Chemistry: Practical - 1

a. Determination of Moisture by Air and Vacuum Oven Method
b. Estimation of Crude Fat [Soxhlet Extraction Method].
c. Determination of Crude Protein [Micro Kjeldhal method]
d. Determination of Total and Acid insoluble Ash
e. Estimation of Crude Fiber in Foods [Gravimetric Method]
f. Measurement of pH and Preparation of Buffers.
g. Free fatty acids in fats and oils
h. Determination of Reducing and Total Sugars [Volumetric Method].
i. Determination of Vitamin C [Volumetric]
j. Estimation of Rehydration Ratio and Peroxidase test in Dehydrated Vegetables
k. Sensory Testing
l. Demonstration: Determination of Equilibrium Relative Humidity and a_w.
m. Demonstration of filtration, distillation and centrifugation as some separation techniques.

Food Microbiology: Practical - 2

Introduction to Lab Practices: Glass usage, care, washing, sanitation and hygiene practices for rooms, work surface, articles, personnel etc.

A. **Preparatory Techniques**
   a. Media formulation, preparation, Methods of Sterilization – Steam sterilization, intermittent steaming, dry hot air, etc.
   b. Handling of bacteria, yeasts and fungi and pure culture techniques, aerobic and anaerobic systems, inoculation techniques.

B. **Microbial Diagnostics**
   a. Visual examination of growth, description of colony morphology, turbidity measure by colorimetry.
   b. Staining techniques, Microscopic examination :
   c. Identification procedures : With pure cultures of *Bacillus sp., Staphylococcus, Clostridium, Lactobacillus,* C*orynebacterium, E. coli, Streptococcus, Salmonella, Leuconostoc, etc.,* AND Yeasts and Moulds.
   d. Enumeration and estimation of growth of microorganisms dilution and plating, CEU counting, MPN, microbial indices of food quality, Spiral plating and DEFT

C. Hygiene/sanitation in food processing

Examination of microorganisms from floors, equipment, plants, machineries etc. Use of disinfectants, Food Handling and Food Safety.

D. Food sampling and analysis:

Sample collection (BIS method), importance ofreplicates, sample weighing, slurry preparation, pre-incubations, serial dilution and plating for standard plate counts, coliforms, yeasts and moulds and pathogens, enumeration, reporting.

E. Analysis of foods :

Fresh /Processed and comparison with ASC/BIS/otherstandards.

Reference books:

1. Food Analysis: Theory and Practice 3rd Edition Pomeraz, Y. and MeLoari, C.E. 2008 CBS publishers and Distributor, New Delhi.
2. Modern Food Microbiology 4th Edition James, M.J.2005 CBS Publisher, New Delhi
3. Food Microbiology 5th Ed Frazier, W.C. 2014 McGraw Hill Inc., New York
4. Hand Book of Analysis and Quality Control Fir Fruit and Vegetable Product 2nd Edition S Ranganna1997 McGraw Hill Education Pvt.Ltd
5. Food Microbiology M.R.Adams& M.O.Moss 2015
6. Hand Book of Media Stains and Reagents in Microbiology 1st Edition A.M. Deshmush 2007 Oxford University Press.