Government college for Women (Autonomous), Guntur

Department of Food Technology

Course Information Booklet

CONTENTS

HISTORY AND PRESENT STATUS OF THE DEPARTMENT :

- The department of Food Technology was established and started functioning from the academic year 2020-2021, under the guidance of the Principal of the college.
- The first batch students graduated in the year 2023.
- Till now the department is providing a quality education.
- The college became autonomous from the academic year 2014-15 with Choice Based Credit System (CBCS).
- From the academic year 2020-21 skill-oriented learning (Apprenticeship / Internship / On the job Training) was introduced by APSCHE with Community Survey Project, short term and long term internship in their curriculum, covering a total of 10 months exposure for students.

VISION AND MISSION OF THE DEPARTMENT

VISION

- *Extending quality education by promoting values & scientific temper among the students*

MISSION

- *Developing optimum academic environment.*
- *Preparing skill & value oriented graduates.*
- *Motivating students to pursue higher studies & for competitive exams*

Programmes offered by the Department

1. *Food Technology – Biochemistry – Microbiology - 411(Introduced during 2020-21)*

Faculty Details

Sl. No	Name (Guest Faculty)	Qualifications	Date of Joining in Degree Service	Date of Retirement
1.	Ms. P. Madhuri	M.Sc	14/07/2022	-

Program Specific Outcomes for Food Technology

At the completion of a Bachelor of Science degree in Food Technology, a graduate will be able to

PSO-1: Impart knowledge in various aspects of Food Technology through theory and practical knowledge.

PSO-2: To make the students familiar with food processing and preservation techniques along with packaging of plant, animal & dairy products and analyze the concepts of food safety and quality managements, food laws and regulations

PSO-3: Enable understanding and communication skills through various assignments and presentations. And gain knowledge about advanced technologies adapted in various food industries by physically visiting different food industries

Course structure for I - VI Semesters of Three major B. Sc. Food Technology

Year	Semester	Paper	Title of the course	Course code
I	I	1	Fundamentals of Food Technology & Sensory Evaluation - Theory	FT 407-1
			Fundamentals of Food Technology & Sensory Evaluation - Practical	FT 407-1P
	II	2	Food Preservation Technique- Theory	FT 407-2
			Food Preservation Technique- Practical	FT 407-2P
Community Service Project				
II	III	3	Food Chemistry & Technology of Food Preservation - Theory	FT 407-3
			Food Chemistry & Technology of Food Preservation - Practical	FT 407-3P
	IV	4	Technology of Milling, Pulses, Oil Seeds, Fruits & Vegetables- Theory	FT 407-4
			Technology of Milling, Pulses, Oil Seeds, Fruits & Vegetables- Practical	FT 407-4P
		5	Technology of Milk, Egg, Poultry, Meat & Fish - Theory	FT 407-5
			Technology of Milk, Egg, Poultry, Meat & Fish - Practical	FT 407-5P
Short term internship				
III	V	6A	Spices, Beverages and Food Quality - Theory	FT 407-6A
			Spices, Beverages and Food Quality- Practical	FT 407-6AP
		7A	Food Packaging & Food Laws- Theory	FT 407-7A
			Food Packaging & Food Laws- Practical	FT 407-7AP
		6B	Bakery Technology- Theory	FT 407-6B
			Bakery Technology- Practical	FT 407-6BP
		7B	Food Engineering & Food Plant Sanitation- Theory	FT 407-7B
			Food Engineering & Food Plant Sanitation- Practical	FT 407-7BP
	VI		Semester End Internship	

THREE MAJOR SYLLABUS

COURSE – III **SEMESTER – III**

Title: **FOOD CHEMISTRY & TECHNOLOGY OF FOOD PRESERVATION** Course Code: **FT 407-3**

Course Outcomes:

After the completion of the course, students will be able to:

- To evaluate the Technology of colloids in food
- To explain about food additives in food processing
- To understand Principles of high temperatures and low temperatures processing techniques in food preservation.
- To Understand Elementary concept of material handling in food industry

Unit I: Technology of colloids in food:

1.1 Characteristics of sols, colloidal sols, gels, pectin gels, stabilization of colloidalsystem, syneresis.

1.2 Emulsion: Properties of emulsions, formation of emulsion, emulsifying agents

1.3 Food foams, formation stability and destruction of foam, application of colloidalchemistry to food preparation.

Unit II: Food Additives:

2.1 Introduction, need of food additives in food processing.

2.2 Characteristics and classification of food additives –anti oxidant, emulsifying agent, chelating agents, thickening agents, humectants, coloring agent, non-nutritive sweeteners, anti-caking agents, leavening agent, glazing agent

2.3 Preservatives: class 1 and class 2 preservatives

Unit III: Food Processing Operations:

3.1 Changes in food during refrigerated storage and progressive freezing and injuriesduring chilling.

3.2 Freezing methods -direct and indirect freezer, still air sharp freezer, blast freezer,fluidized freezer, plate freezer, spiral freezer and cryogenic freezing.

3.3 Production of crystalline foods – sucrose and lactose

Unit IV: Thermal Processing of Foods:

4.1 Effect of heat on micro-organisms and Thermal death time

4.2 Principles of thermal processing, Sterilization, UHT, Aseptic Processing, commercialcanning operations and types of containers for thermally treated food products.

4.3 Mechanism of microwave heating and applications.

Unit V: Material handling & Separation processes:

5.1 Material handling- Elementary concept of material handling in food industry, equipment and functioning of belt conveyor, screw conveyor, bucket elevatorand pneumatic conveyor.

5.2 Separation processes - Principles and methods: distillation, extraction, filtration, sedimentation, sieving and centrifugation.

TITLE: FOOD CHEMISTRY & TECHNOLOGY OF FOOD PRESERVATION Code: FT 407-3P

List of experiments:

1. Application of colloidal chemistry in food preparation.
2. Shelf-life enhancement of food by chemical additive/preservative.
3. Preservation of food by the process of freezing.
4. Minimal Processing of food.
5. Blanching of fruits and vegetables.
6. Comparison of different Drying methods of food using Tray dryer/Microwave dryer/otherdryers.
7. Filtration & separation of food products.

Suggested Readings:

- Potter NH,1998, Food Science, CBS Publication, New Delhi
- Ramaswamy H and Marcotte M,2009, Food Processing Principles and Applications CRCPress
- Deman JM,2007, Principles of Food Chemistry, 3rdEd.Springer
- Manay NS and Shadaksharaswamy M,1987, Food-Facts and Principles, New Age International (P)Ltd. Publishers, New Delhi.

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COURSE – IV **SEMESTER – IV**

Title: TECHNOLOGY OF CEREALS, PULSES, OIL SEEDS, FRUITS & VEGETABLES

Course Code: FT 407-4

Course Outcomes:

After completion of this course, students will be able to:

- To elaborate various processing steps of major cereals & pulses after harvesting
- To compare different processing techniques to preserve fruits and vegetables
- To Asses various products like jams and jellies by using preservatives
- To understand extraction of oils from different oil seeds

Unit – I: Milling technology:

1.1 Rice – Physicochemical properties, milling, ageing of rice, utilization of byproducts.

1.2 Wheat-Types, milling, flour treatments (bleaching, maturing), flour for various purposes,Products and By-products.

1.3 Corn–Milling (wet & dry), cornflakes, corn flour.

1.4 Oats–Milling (oatmeal, oat flour & oat flakes)

1.5 Millets – Traditional & commercial milling (dry &wet).

Unit II: Pulses technology:

2.1 Processing- Soaking, Germination, Decortications, Fermentation and Cooking, Changesduring germination.

2.2 Milling- decutilating and splitting (dry and wet milling). Antinutritional factors, Factorsaffecting cooking time.

Unit III: Technology of Nuts & Oil seeds:

3.1 Oil seeds- soya bean and its products, olives, garden cress seeds

3.2 Processing of oils -sunflower seeds, coconut oil and ground nut oil

3.3 Extraction, refining, bleaching, deodorizing, hydrogenation of vanaspati, margarine.

3.4 Solvent extraction of edible oils

Unit IV: Processing of fruits:

4.1 Introduction, Processing of fruit juices, preservation of fruit juices, processing ofsquashes, nectars, concentrates and powder.

4.2 Jam: Constituents, selection of fruits, processing & technology.

4.3 Jelly: Essential constituents (Role of pectin, ratio), Theory of jelly formation,Processing & technology, defects in jelly.

4.4 Marmalade: Types, processing & technology, defects.

Unit V: Processing of Vegetables:

5.1 Tomato products: Selection of tomatoes, pulping& processing of tomato juice, tomato puree, paste, ketchup, sauce and soup.

5.2 Pickles: Processing, types, causes of spoilage in pickling.

5.3 Potato products: types of peeling for processing (abrasion peeling, lye peeling, steam peeling) and processing of potato chips & potato flour

Title: TECHNOLOGY OF CEREALS, PULSES, OIL SEEDS, FRUITS & VEGETABLES

Code: FT 407-4P

List of experiments:

1. Estimation of Potassium Bromate in flour.
2. Identification of different varieties of millets and cereals.
3. Qualitative analysis of oils & fats – Solubility with water, alcohol & chloroform, translucent spot test, Acrolein test, Baudouin test and hubles test.
4. Free fatty acid in different oil.
5. Iodine value for different oil.
6. Peroxide value of different oils & fats
7. Determination of total soluble solids from jams & jellies
8. Preparation and sensory evaluation of Jam.
9. Preparation and sensory evaluation of pickle.
10. Estimation of pH and acidity of products.

Suggested Reading:

- Marshall, Rice Science and Technology. 1994. Wadsworth Ed., MarcelDekker, New York.
- Manay, S. &Shadaksharaswami, M.2004. Foods: Facts and Principles, NewAge Publishers.
- Ranganna S.1986. Handbook of analysis and quality control for fruits and vegetables products, TataMcGraw-Hill publishing company limited,Second edition.
- Srivastava, R.P. and Kumar, S. 2006 Fruits and Vegetables Preservation- Principles and Practices.3rd Ed. International BookDistributingCo.
- Chakraverty. 1988. Post-Harvest Technology of Cereals, Pulses revised Ed.,Oxford

COURSE – V **SEMESTER – IV**
Title: TECHNOLOGY OF MILK, EGG, POULTRY, MEAT & FISH **Course Code: FT 407-5**

Course Outcomes:

After completion of this course, students will be able to:

- To develop various processing steps to produce different types of milk products
- To evaluate different processing techniques to increase shelf life of eggs & poultry
- To Give an insight to develop and to understand techniques used for increasing shelf-life of meat
- To demonstrate ancient preservative methods for fish

Unit – I: MILK:

1.1 Effect of heat on milk
1.2 Types of Milk- Skim Milk Toned Milk, Double Toned Milk, Concentrated Milk, Fortified Milk and Flavored Milk.
1.3 Milk products processing- Milk Powder, Cheese, Butter, Ghee, Ice Cream

Unit II: EGG:

2.1 Basic properties of egg: Functional characteristics of egg, Grading, spoilage, Storage, transportation of whole eggs.
2.2 Processing of eggs for liquid products (white, yolk & whole egg), egg powders- shell powders, Albumin powders, Yolk powders and whole egg powders, coating, foam mat drying.
2.3 The egg industry, its techniques of working & diseases and its prevention in poultry farms.

Unit III: POULTRY

3.1 Classification of poultry, processing of poultry- slaughtering, scalding, defeathering, evisceration, washing and chilling.
3.2 Preservation of poultry meat by thermal processes- Canning of Poultry Meat, Dehydration, Irradiation, and Meat Curing. RTE Meat Products.

Unit IV: MEAT

4.1 Post-mortem changes in meat, rigor mortis, enzymatic degradation of meat, Tenderizingmeat, ageing of meat.
4.2 Preservation of meat by Refrigeration and freezing,
4.3 Sausages-processing, types and defects. By-products: Importance, classification and uses.

Unit V: FISH

5.1 Drying and salting of fish, water activity and shelf-life, salting process, salting methods (brining, pickling, kench curing, Gaspe curing).
5.2 Preservation by smoking, smoke components, types of smoking
5.3 Preservation by canning, fish protein extract (FPE)
5.4 Spoilage of fish (microbial, physiological and chemical)

TITLE: TECHNOLOGY OF MILK, EGG, POULTRY, MEAT & FISH **Code: FT 407-5P**

List of experiments:

1. Preparation of Paneer from milk and measuring the quantity of Paneer.
2. Make a survey of different types of milk and milk products available in the market and note the nutritive value from the labels.
3. Estimation of fat and SNF in milk.
4. Freezing techniques of yolk/albumin.
5. Estimation of moisture content of meat.
6. Cut out analysis of canned meats.
7. Estimation of protein content of meat.
8. Quality evaluation of fish.
9. Identification of different varieties of fish.

Suggested Reading:

- Parkhurst&Mountney, Poultry Meat and Egg Production, CBS Publication, New Delhi,1997
- Stadelman WJ, Owen J Cotterill Egg Science and Technology, 4th Ed. CBS Publication New Delhi, 2002.
- Hall GM, Fish Processing Technology, VCH Publishers Inc., NY,1992.
- Food Science (2002) by B. Srilakshmi.

COURSE – VIA **SEMESTER – V**
Title: SPICES, BEVERAGES AND FOOD QUALITY **Course Code: FT 407-6A**

Course Outcomes:

After completion of this course, students will be able to:

- To estimate processing of beverages, active principles and their role present in spices
- To Understand different types of toxins
- Evaluating different types of sampling techniques
- To Analyze Food safety management system (FSMS) and Hazard Analysis Critical Control Point (HACCP)

Unit – I: SPICES AND CONDIMENTS:

1.1 Classification of spices based on origin and its active principles,
1.2 Major spices of India and their active principles and processing – black pepper, chilies, ginger, cardamom, turmeric.
1.3 Minor spices of India and their active principles – coriander, cinnamon, cloves, saffron, asafetida, Nut Meg and mace.
1.4 Technology of oleoresins and their application

Unit II: BEVERAGES

2.1 Classification- alcoholic & non-alcoholic, carbonated & non-carbonated.
2.2 Tea – types of tea, chemical constituents, harvesting and processing
2.3 Coffee – varieties, processing – bean processing, blending, roasting, grinding and brewing. caffeine
2.4 Cocoa – production , composition, processing, grading and chocolate processing
2.5 Beer & wine –raw material, production

Unit III: TOXICOLOGY:

3.1 Classification of toxins: Naturally occurring toxins in food, microbial toxins, Metallic and non-metallic toxins
3.2 Factors influencing toxicity: Concentration of the toxin, species, dose and time exposure, absorption level.

Unit IV: PLANT SANITATION AND SAMPLING:

4.1 Plant sanitation: Sanitation and its principles, risk assessment and management during food preparation.
4.2 Pest control, recall procedures, GMP, GLP, GHP.
4.3 Types of sampling –probability sampling (simple random, stratified random, systemic, cluster sampling) and non-probability sampling (purpose sampling, convenience, snowball, quota sampling)

Unit V: FOOD SAFETY AND HACCP

5.1 Food safety management system (FSMS) key role, principles of FSMS
5.2 Food adulteration and contamination, sources of food contamination

5.3 Contamination in Food- Physical, chemical (heavy metals, pesticide residues, antibiotics, veterinary drug residues, dioxins, environmental pollutants, radio nuclides, solvent residues, chemicals). Natural toxins

5.4 Hazard Analysis Critical Control Point (HACCP) Principles, HACCP plan, hazard identification, risk assessment

TITLE: SPICES, BEVERAGES AND FOOD QUALITY **Code: FT 407-6A P**

List of experiments:

1. Estimation of adulterants present in turmeric, and chili powder.
2. Identification of adulterants present in coffee, tea, and cinnamon.
3. Preparation of 3 types of beverages by using TEA powder.
4. Preparation of 3 types of beverages by using COFFEE powder
5. Collecting different types of cocoa products and identifying the percent of cocoa.
6. Identification of adulterants present in oil, ghee and honey.
7. Estimation of adulterants present in milk by starch Iodine test and tile test.
8. Estimation of Chemical Oxygen Demand (Demonstration).
9. Bacteriological analysis of water by MPN method.

Suggested Reading

1. Food Science (2002) by B. Srilakshmi.
2. Food Processing and Preservation (2010) by B.SivaShakar.
3. Food Processing and Preservation (2007) by G. Subbalakshmi.
4. Food preservation and processing (2007) by ManoranjanKalia.

COURSE – VIIA **SEMESTER – V**
Title: FOOD PACKAGING & FOOD LAWS **Course Code: FT 407-7A**

Course Outcomes:

After completion of this course, students will be able to:

- To understand food packaging functions & manufacturing of glass containers and paper material
- To estimate plastic and aluminum packaging as food packaging material
- To demonstrate active packaging material for food packaging
- To understand about food laws and regulations

Unit – I: Introduction to packaging:

1.1 Ancient packaging material and need of packaging,
1.2 Packaging functions: Attractiveness, protection, convenience, printability differentiability.
1.3 classification of packages- primary, secondary and tertiary packaging
1.4 Food supply and the protective role of packaging.

Unit II: Glass and Paper:

2.1 Manufacturing of glass containers- melting, container forming, design parameters andsurface treatments and their advantages and disadvantages of glass container
2.2 Paper and paperboard and its manufacture- stock preparation, sheet formation, pressing,drying, coating and finishing and their advantages and disadvantages, TETRAPACK

Unit III: Plastic and Aluminum:

3.1 PLASTIC: Manufacture of Plastic Packaging
3.2 Types of plastic used in packaging- Polyethylene, Polypropylene, PET, PVC
3.3 Aluminum containers, Aluminum foils and their advantages and disadvantages;

Unit IV: **Active Packaging**

4.1 Controlled atmospheric packaging, Modified atmospheric packaging and gases used in MAP,
4.2 Oxygen scavengers, moisture absorbers, temperature control packaging.
4.3 Shrink packaging- advantages and disadvantages
4.4 Retort pouches – applications, production of pouches

Unit V: Food Laws and Regulations

5.1 Packaging laws and Labelling laws (nutrition labelling, labelling provisions in existingfood laws, labelling GM foods).
5.2 Basic principles of AGMARK, APEDA, NABL
5.3 FSSAI ACT-objectives, general principles of food safety, implementation andenforcement of the act.

TITLE: FOOD PACKAGING & FOOD LAWS Code: FT 407-7P

List of experiments:

1. Testing of physical and mechanical properties of food packaging material.
2. Shelf life study of foods with different packaging material.
3. Identification of different packaging material.
4. Measurement of water absorption of paper and paper board.
5. Determination of WVTR of films.
6. Packaging practices for packing fruits and vegetables.
7. Shelf life study of different foods by packing in different packaging material and storing them in room temperature and low temperature.
8. Calculation of GSM

Suggested Reading:

- Food packaging and technology by RICHARD COLES
- Packing of food in glass containers by P.J GIRLING
- Plastics in food packaging by MARK J. KIRWAN and STRAWBRIDE
- Active packaging by BRIAN P.F. DAY
- Food Science (2002) by B. Srilakshmi