

SEMESTER- 2nd

MAJOR/MINOR COURSE

Subject: Food Science and Technology

Title: FOOD MICROBIOLOGY AND FOOD CHEMISTRY-II **Code: BFS22C201**

CREDITS: (4 + 2) THEORY: 04 PRACTICAL: 02 CONTACT HOURS: 64 T + 64 L

Part-1 THEORY (4 CREDITS)

Course Objectives:

- *To acquaint the students with Microbial Spoilage of Foods*
- *To introduce students to industrial utilization of microorganisms in food processing.*
- *To learn about carbohydrates, proteins, vitamins..*
- *To procure knowledge about functional foods, and pigments present in foods*

Learning outcomes:

After completing the course, the students will be able to:

- *Know the major reactions behind food spoilage*
- *Understand underlying properties and reactions of various food components.*
- *Understand the role of functional foods and antioxidants in human health.*

UNIT – 1

(16 HOURS)

Microbial Spoilage of Foods

- Microbial spoilage of fresh foods-fruits, vegetables, cereals, pulses.
- Spoilage of meat and milk.
- Microbial spoilage of canned food
- Microbiological hazards associated with foods- Mycotoxins and their producing Microorganisms.

UNIT – 2

(16 HOURS)

Industrial Microbiology

- Industrial microbiology-scope and development
- Fermented food and their benefits: sauerkraut, yoghurt, cheese, miso, tempeh
- Industrial production of enzymes and single cell protein
- Probiotics and their health benefits

UNIT – 3

(16 HOURS)

Macronutrients & Micronutrients

- Carbohydrates: Chemistry, sources, properties and their nutritional significance
- Starch gelatinization and Retrogradation. Use of polysaccharides in food industry.

- Proteins: Chemistry, sources, properties, and industrial importance.
- Lipids: chemistry, properties & significance of MUFA and PUFA
- Vitamins deficiency diseases.

UNIT- 4

(16 HOURS)

Functional Foods and Pigments

- Functional foods: Definition & importance
- Dietary fibre and its role in disease prevention.
- Antioxidants and their role in disease prevention.
- Pigments: Myoglobin, chlorophyll and carotenoids. Sources and stability during processing.

Books recommended:

1. Food Chemistry by Meyer
2. Food and Nutrition by M. Swaminathan.
3. Food: Facts and Principles by ShakuntalaManay
4. Food Chemistry by O. R. Fennema.
5. Modern Food Microbiology by J. M. Jay.
6. Food microbiology by V. Ramesh
7. A Text Book of Microbiology by Dubey.
8. Food Processing Technology by P.J. Fellows

Part- 2: Laboratory course (Credits: 02)

Course Objectives:

- *To identify various microbial disorders of foods.*
- *To learn about the preparation of various fermented foods.*
- *To learn about the qualitative and quantitative determination of proteins*

Learning outcomes:

- *Accomplish the identification of common microbial disorders of foods.*
- *Accomplish the preparation of various fermented foods.*
- *Qualitative and quantitative determination of carbohydrates and proteins.*

1. Identification of common microbial disorders of foods-Black mold rot, Green mold rot, yeast growth, bread mold.
2. Spoilage of canned foods- cut out analysis of cans
3. Preparation of fermented products – Pickle, Yogurt.
4. Determination of moisture content.
5. Determination of crude fibre

6. Estimation of protein content.
7. Qualitative and quantitative tests of carbohydrates.

Books Recommended:

1. James G. Cappuccino, Natalie Sherman *Microbiology: A Laboratory Manual*
2. Maheshwari, D.K. *Practical Microbiology*
3. Gunasekaran, P. *Laboratory Manual in Microbiology*
4. Connie, M. Weaver & James, R. Daniel. *The Food Chemistry Laboratory*
5. Dennis D. Miller. *Food Chemistry: A Laboratory Manual*

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SEMESTER 1st

SKILL ENHANCEMENT COURSE

Subject: Food Science and Technology

Title: FOOD PROCESSING AND VALUE ADDITION

Code: BFS22S202

CREDITS: 04 THEORY: 02 PRACTICAL: 02

CONTACT HOURS: 32 T + 32 L

Course Objective:

- *To introduce students to different types of fruits and vegetables.*
- *To acquaint the students with nutritional significance of fruits and vegetables.*
- *To acquaint the students with Processing and of fruits and vegetables.*

Learning outcome:

After completing the course, the students will be able to:

- 1. Apply different techniques for shelf life enhancement of fruits and vegetables.*
- 2. Accomplish value added processing of fruits and vegetables.*

UNIT I

(16 hours)

- Introduction to Fruits and Vegetables
- Composition of fruits and vegetables
- Nutritional significance of fruits and vegetables
- Principles of fruits and vegetable preservation
- Methods of preservation- pasteurization, sterilization and dehydration.
- Canning- steps involved

UNIT II

(16 hours)

- Requirements for a small scale fruit and vegetable based processing plant
- Methods of preparation of jam, jellies (Apple, plum, peach).
- Preparation of Marmalades (Apple, plum, peach).
- Tomato products-Juice, paste, puree, sauce/ketchup, cocktail
- Pickles and causes of spoilage of pickles- Mixed vegetable pickle

Part- 2: Laboratory course (Credits: 02)

Course Objectives:

- *To determine proximate composition of Fruits and vegetables.*
- *To prepare syrups and brines of different concentrations.*
- *To prepare value added products of fruits and vegetables.*

Learning outcomes:

- *Accomplish the determination of chemical composition of fruits and vegetables.*
- *Learn about the preparation of syrups and brines of different concentrations.*
- *Accomplish the preparation of value added products of fruits and vegetables.*

1. Subjective evaluation of fruits and vegetable products
2. Determination of moisture content
3. Determination of total soluble solids
4. Determination of titrable acidity
5. Preparation of syrups and brines
6. Preparation of tomato ketchup
7. Preparation of apple juice, orange juice
8. Dehydration of fruits and vegetables
9. Canning of fruits and vegetable

Books Recommended:

1. Home scale preservation of fruits and vegetables-CFTRI Lab Manual.
2. The technology of Food preservation by Desrosier.
3. Food science by N. N .Potter.
4. Fruits vegetable products by Girdhari Lal, Siddhapa &Tandon.
5. Preservation of fruits & vegetables: Girdharilal,G.S.S. Siddapaand G.L..Tandon IARI New Delhi.
6. Fruit and vegetable preservation by Srivastava.
7. Post-harvest Technology of Fruits &Vegetables- L. R. Verma &V.K. Joshi.
8. Post-harvest management & processing of fruits and vegetables-Satish Kumar Sharma New India Publishing agency-New Delhi.
9. Food preservation principles and practices: Arti Sankhla ,Renu Mogra and Kusum Babel. Agrotech. Publishing Academy Udaipur-India.

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SEMESTER 1st

MULTIDISCIPLINARY

Subject: Food Science and Technology

Title: FOOD PRESERVATION

CREDITS: THEORY: 03

Code: BFS22M103

CONTACT HOURS: 48 T

Course Objectives:

- *To introduce the students to basic concepts of foods, their classification and quality parameters.*
- *To acquaint the students with various hazards associated with foods.*
- *To acquaint the students with various methods of food preservation.*

Learning outcome:

After completing the course, the students will be able to:

1. *Apply the scientific method to study the characteristics of foods and the problems associated thereof.*
2. *Apply different techniques of preservation for shelf-life extension of foods.*

Unit I: Introduction to Foods

(16 hours)

- Introduction to Food groups – Cereals, legumes, fruits, vegetables, milk, meat, spices, and plantation crops.
- Classification of foods on basis of pH, origin and shelf-life.
- Hazards in foods – physical, chemical and microbiological
- Different types of food spoilage – physical, biochemical and microbiological.
- Food quality – definition, consumer concept of quality.
- Quality control laboratory

Unit II: Thermal processing

(16 hours)

- High temperature processing – Pasteurization and Sterilization
- Canning – Principle and steps involved
- Low temperature processing – Refrigeration and Freezing.
- Different types of freezers, cryogenic freezers and thawing.

Unit III: Non-thermal processing**(16 hours)**

- Preservation of foods by sugar and salt
- Fermentation – principle, types and advantages
- Packaging of foods – Definition and functions
- Modified atmospheric packaging
- Controlled atmosphere storage

Books Recommended:

1. Food Science by N. N. Potter
2. Food: Facts and Principles by Shakuntala Manay
3. Food Chemistry by O. R. Fennema.
4. Food Processing Technology by P.J. Fellows
5. Physical principles of Food Preservation by M. Karel, O.R. Fenema and D.B. Lurd.
6. Food Packaging Science and Technology by D. S. Lee, K. L. Yam and L. Piergiovanni