

Government Degree College (Autonomous), Baramulla

SEMESTER- 4th

MAJOR/MINORCOURSE-I

Subject: Food Science and Technology

Title: Cereal and Bakery Technology

Code: BFS22C401

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 nutritional importance of cereals.*
- *To introduce students to the knowledge of cereal and Millet processing.*
- *To learn about the preparation of Bakery product.*

Learning outcomes:

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

- *Understand the properties of cereals and Millets.*
- *Understand the role of cereals and millets in human health.*
- *Know the about the formulation of various baked products.*

UNIT- 1

(16 HOURS)

- Current status of wheat production in the world.
- Structure and chemical composition of wheat grain, physical and chemical criteria of wheat quality.
- Wheat milling–Types, principle of modern wheat milling and its machinery.
- Structure of wheat proteins, and their role in baked products.
- Durum wheat–chemistry, quality and technology of pasta products.

UNIT- 2

(16 HOURS)

- Composition and structure of corn.
- Wet and dry milling of corn. Corn products and their uses.
- Rice grain structure and chemical composition.
- Milling of rice
- Parboiling of rice
- Rice products: Precooked rice, canned rice and expanded rice, rice breads and noodles; fermented rice

UNIT- 3

(16 HOURS)

- Bread making processes, development in bread making methods, role of ingredients in bread making.
- Preparation of Biscuits, Cookies and Crackers.
- Cake Making.

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- Quality evaluation of Bakery products.

UNIT- 4 (16 HOURS)

- Barley: Composition, structure and milling.
- Malting of barley.
- Oats: Composition, structure and milling.
- Millets: Types, structure and composition.
- Nutritional benefits of Millets.
- Value added products from Millets.

Part- 2: Laboratory course (Credits: 02)

1. Physicochemical tests of Cereal grains:
2. Physicochemical tests of wheat flour.
3. Parboiling of rice.
4. Cooking quality of rice: Percent gravel loss, water uptake ratio, cooking time.
5. Preparation of bread, cake, cookies and biscuits.
6. Preparation of cookies and biscuits.
7. Preparation of cake.
8. Determination of dough raising capacity by yeast.
9. Quality evaluation of baked products.
10. Visit to bakery/cereal processing Lab.

Books Recommended:

1. Bakery Science and Cereal Technology by NeelamKhetarpaul, GrewalRajbala, Jood Suresh
2. Kent's Cereal Technology by Kent
3. Basic Baking by S. C. Dubey
4. Bakery Products Science and Technologyby Weibiao Zhou and Y. H. Hui
5. Food Processing Technology by P.J. Fellows
6. The Technology of Food Preservation by Desrosier
7. Food Science by N.N. Potter

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SEMESTER- 4th

MAJOR

Subject: Food Science and Technology

Title: Principles and Methods of Processing

Code: BFS22C402

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 principles of food preservation.*
- *To introduce students to the methods of food preservation.*
- *To learn about the different food processing techniques.*

Learning outcomes:

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

- *Understand various methods of food processing.*
- *Learn about the diverse methods of food preservation.*
- *Accomplish the understanding of novel methods of food preservation.*

UNIT- 1

(16 HOURS)

- Status of Indian food industry.
- Classification of foods on the basis of shelf life, pH, origin.
- Principles and methods of food preservation.
- Food preservation and World food security.

UNIT- 2

(16 HOURS)

- Preservation by high temperature- Pasteurization, and sterilization.
- Heat exchangers.
- Canning - Principle, equipment and applications.
- Concept of D-value, F- value and Z-value.
- Preservation by low temperature: Refrigeration and freezing.
- Types of freezers.
- Intermediate moisture (IM) foods.

UNIT- 3

(16 HOURS)

- Membrane processing–Types of membranes, and applications.
- Preservation by reducing water activity of foods: concentration, drying and dehydration.
- Minimally processed foods
- Fermentation–Mechanism involved in food preservation.
- Factors affecting the food fermentation.
- Types of fermenters

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UNIT- 4 (16 HOURS)

- Microwave processing- Principle, equipment and applications.
- Irradiation–Mechanism and applications.
- Safety and wholesomeness of irradiated foods.
- Extrusion–Importance of extrusion, types of extruders and extruded products.
- Preservation by chemicals–Benzoate, sorbate, propionate, sulphur dioxide, anti-oxidants and natural agents
- Hurdle Technology and its importance in food industry.

Part- 2: Laboratory course (Credits: 02)

- Solar and mechanical drying of local fruits and vegetables.
- Estimation of rehydration ratio of dried fruits and vegetables.
- Evaluation of storage study of fresh fruits and vegetables under refrigerated and ambient conditions.
- Canning of fruits and vegetables.
- Test for adequacy of blanching.
- Test for adequacy of Pasteurization.
- Preparation of fermented products.
- Quality evaluation of fermented vegetable pickle
- Visit to a food processing unit.

Books Recommended:

1. Food Processing Technology by P. Fellows.
2. The Technology of Food Preservation by Desrosier.
3. Food Science by N.N. Potter.
4. Introduction to Food Science and Technology by Stewart.
5. Handbook of Food Preservation by M. ShafiurRahman.

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SEMESTER- 4th

MAJOR

Subject: Food Science and Technology

Title: Food Analytical Techniques

Code: BFS22C402

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 various techniques used for analysis of foods.*
- *To introduce students to Role of Food Analyst.*
- *To learn about the instrumentation used for food analysis.*

Learning outcomes:

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

- *Understand underlying principles of food analysis techniques.*
- *Accomplish the characterization of diverse foods.*
- *Know about the working and applications of instruments involved in food analysis.*

UNIT- 1

(16 HOURS)

- Role of Food Analyst
- Principles of different chromatographic techniques.
- Types of chromatographic techniques- Column, TLC, HPLC and Gas chromatography.
- HPLC - Principle, equipment, working and applications.
- Gas Chromatography - Principle, equipment, working and applications.

UNIT- 2

(16 HOURS)

- UV- Spectroscopy - Principle, working and applications.
- Mass Spectroscopy - Principle, working and applications.
- Nuclear magnetic Resonance (NMR) - Principle, and applications.
- Infrared Spectroscopy (FT-IR) - Principle, working and applications.
- Raman spectroscopy - Principle, and applications.
- Flame photometry - Principle, equipment, working and applications.

UNIT- 3

(16 HOURS)

- Tristimulus color system.
- Rheology –Farinograph, Amylograph, Rheometer.
- Texture Analyzer.
- Scanning Electron Microscopy.
- Atomic Force Microscopy.
- Transmission Electron Microscopy.

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UNIT- 4

(16 HOURS)

- Electrophoresis: Instrumentation, types and applications.
- Thermal Analysis – TGA and DSC
- Immunoassays and Nucleic acid based techniques: ELISA & PCR
- Particle size analysis (DLS): Principle, working and applications.
- X-Ray Diffractometry (XRD)

Part- 2: Laboratory course (Credits: 02)

- Color analysis of food samples by Hunter Color System
- Morphological and structural analysis of food samples by SEM
- Determination of crystallinity by XRD
- Determination of pasting properties of flour and starch samples by RVA
- Textural analysis of different food samples by texture analyzer.
- Visit to a Food Testing Laboratory.

Books Recommended:

1. Food Analysis by Pomeranz.
2. Food Analysis by S. Suzanne Nielsen.
3. Handbook of Advanced Chromatography /Mass Spectrometry Techniques by Michal Holcapek and Wm. Craig Byrdwell.
4. Food Analysis Theory & Practice, 4/ed. by Pomeranz&Meloan.
5. Advances in Food Analysis by Alessandra Gentili, Chiara Fanali.