DISCIPLINE SPECIFIC ELECTIVE COURSE

DSE FT03 A: Food Fermentation Technology

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITE OF THE COURSE

Course title & code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Theory	Tutorial	Practical/ Practice		
Food Fermentation Technology	4	2	0	2	XII Pass with PCM/PCB	Nil

Learning Objectives

- To understand the concept and significance of fermentation
- To understand the principles of food fermentation technology
- To study the types of starters used in the food industry
- To study the production of various fermented foods

Learning Outcomes

- An understanding of the basic components of Food Fermentation Technology and their principles.
- An understanding of the concept of the different fermentation processes.
- Develop insight into common types of starters used in the Food Industry.
- Apply acquired skills in the production of various fermented foods.

SYLLABUS OF DSE FT 03

THEORY
Credits: 2; Hours: 30

UNIT I: Introduction to fermentation **10 Hours**

Unit description: This unit introduces the concept of fermentation as a process ,its basic requirements and types . It also covers the types of microbes required in the process resulting

in the formation of different products along with the emphasis on the significance of fermentation

Subtopics:

- Definition of Fermentation
- Types of fermentation process: submerged/solid state, Batch/continuous fermentation
- Requirements for the fermentation process
- Role of Starter cultures and their types commonly used in fermentation
- Importance of Fermentation

UNIT II: Fermentation Technology **10 Hours**

Unit description: This unit covers Food Fermentation Technology with a focus on fermenters and their operations. Both the concept of upstream and downstream processing will be taught along with coproduct recovery

Subtopics:

- Fermenter: design and its operation
- Measurement and control of fermentation
- Upstream processing- screening and identification of microorganisms, media preparation, multiplication of microbes
- Downstream processing -Recovery of fermentation products and conversion into commercially viable products, Co-product recovery, and valorization

UNIT III: Fermented Products **10** Hours

Unit description: This unit describes the fermentation process of various products and their classification with an emphasis on the Indian traditional fermented products.

Subtopics:

- Types of fermented products and their classification
- Fermentation of milk, vegetables, cereals
- Industrial Production of selected products -Baker's yeast, Cider, Vinegar, and Cheese
- Traditional Indian Fermented products

PRACTICAL
Credit: 2, Hours: 60

1. To study the design and operation of a lab scale fermenter
2. To study the sugar utilization patterns by microorganisms
3. To determine β-galactosidase activity of microorganisms
4. To perform Solid State Fermentation using byproducts as a substrate at lab scale.
5. To produce Baker's Yeast
6. To prepare Sauerkraut
7. To prepare Curd /Yogurt
8. To develop a fermented food/drink utilizing plant products or their by- products
9. To develop a fermented food/drink utilizing animal products or their by-products

Essential Readings

- Brian, J. Wood. (1997).*Microbiology of Fermented Foods*. Volume II and I. Elsevier Applied Science Publication.

- Joshi, V.K. & Pandey. A. (2009). *Biotechnology: Food Fermentation Microbiology, Biochemistry and Technology*. Volume I and II. Asiatech Publishers Inc.
- Stanbury, P.F., Whitekar A. and Hall (2013). *Principles of Fermentation Technology*. Reed Elsevier India Pvt.Ltd.

Suggested Readings

- Adams, M. & Moss, M. (2008). Food Microbiology. 2nd Edition. RSC Publishing.
- John, Garbutt. (1997).Essentials of Food Microbiology. Arnold International Students Edition.
- Arnold L. Demain & Julian E. Davis. Industrial Microbiology & Biotechnology, ASM Press. (2004).

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.

DISCIPLINE SPECIFIC CORE COURSE

DSE FT 03 B: Traditional Indian Foods

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITE OF THE COURSE

Course title & code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Theory	Tutorial	Practical/Practice		
TRADITIONAL INDIAN FOODS	4	2	0	2	XII Pass with PCM/PCB	NIL

Learning Objectives

- To understand the evolution, cultural, regional diversity and health benefits of traditional Indian foods.
- To understand the processing and preservation methods used for traditional Indian foods.

Learning Outcomes

After completing this course, students will be able to:

- Upon successful completion of this course students will gain knowledge of the diverse traditional Indian foods from the vedic times, states, regions, cultures and religion.
- The course aims to provide hands-on training to students in processing of different traditional Indian foods for setting enterprise, promotion of healthy forgotten traditional foods for research and development.

SYLLABUS OF DSE FT 06

THEORY
Credits 2 (30 Hours)

Unit 1 Introduction to Traditional Indian foods **15 Hours**

Unit Description: This unit will be covering the history and tradition of Indian foods from various cultures, regions and religions.

Subtopics:

- History of Indian Food Culture and Traditional Foods
- The journey of food from various Indian civilizations to Vedic period and modern era
- Categories of traditional foods of India: Traditional foods from different regions/states and different cultures and weaning foods in Indian tradition

- Concepts of Ayurvedic foods, classification of food based on Ayurveda: Grain based, fruits and vegetable based, milk-based traditional foods in Ayurvedic system.

UNIT II: Processing and preservation of traditional Indian foods 15 Hours

Unit Description: The unit will provide knowledge on the processing and preservation of traditional Indian foods

Subtopics:

- Ancient practices of food preservation: Dehydration, osmotic drying techniques
- Other Processing techniques used in preparation of traditional Indian foods

Practical
Credit : 2, Hours: 60

Unit I: Practicals based on literature survey of the traditional Indian foods including the ingredients used, processing and health benefits.

1. Students will make presentations on vedic foods of India
2. Presentation on regional/state wise traditional Indian foods

Unit II: Practicals based on processing and preservation techniques used in Traditional Indian foods

1. Preparation of regional traditional foods: Regional cuisine preparation
2. Functional traditional foods: Fermented foods (grain based/drinks), adjuncts (papad/chutney/pickle).
3. Ayurvedic food preparations: Fruits and vegetable based/milk and milk product-based (ghee/buttermilk) processing of traditional foods
4. Processing of a traditional Indian foods by osmotic dehydration/drying

Essential Readings

- Achaya, K.T. (1994). Indian Food: A Historical Companion. Oxford University Press.
- Sarkar, P., Dh, L. K., Dhumal, C., Panigrahi, S. S., & Choudhary, R. (2015). Traditional and ayurvedic foods of Indian origin. Journal of Ethnic Foods, 2(3), 97-109.
- Raghunathsuri. (2012). Bhojanakutuhalam (Translated from original by Scholar of I-AIM, Institute of Ayurveda and Integrative Medicine, Bangalore).
- Suri, R. Balakrishna, A. (2013). Bhojanakutuhalam, first ed. Divya Prakashan, Haridwar, pp.1-373.

Suggested Readings

- Singh, A., & Singh, R. K. (2007). Cultural significance and diversities of ethnic foods of Northeast India.
- Subbulakshmi, G and Subhadra, M. (2020). Nutrition in Traditional Therapeutic Nutrition. Daya Publishing House Vol. 1 and 2

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.