

Category-V

DISCIPLINE SPECIFIC ELECTIVE COURSE
DSE-NHE-3: Recent Advances in Food and Nutrition

CREDIT DISTRIBUTION, ELIGIBILITY AND PREREQUISITES OF THE COURSE

| Course Title and Code | Credits | Credit distribution of the course | | | Eligibility Criteria | Prerequisite of the course |
|---------------------------------------|---------|-----------------------------------|----------|---------------------|----------------------|----------------------------|
| | | Lecture | Tutorial | Practical/ Practice | | |
| Recent advances in food and nutrition | 4 | 3 | 1 | 0 | XII Pass | Nil |

Learning Objectives

- To introduce students with the advances in food trends to fulfill developing health requirements.
- To equip them with knowledge of various recent advances in technologies in nutrition and food science.

Learning Outcomes

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

- Develop understanding of modern approach to types of diet, and advancement in high altitude and space foods.
- Understand the multidisciplinary approaches in enrichment of nutrition.
- Understand and explore technologies involved in preparation and preservation of processed and convenience foods.
- Understand and explore different advanced methods of processing, preservation and packaging materials.

SYLLABUS OF DSE-NHE-3

THEORY
(Credits 3; Hours 45)

UNIT I: Recent Advances in Food for Health

12 Hours

This unit will introduce diets and specified foods in order to attain desired health status by individuals

- Dietary approaches: Intermittent fasting, veganism, mediterranean diet, detox diet, gluten free diet, paleo diet, ketogenic diet, atkins diet, circadian rhythms diet.
- Recent advances with respect to functional foods, organic foods, nutraceuticals, dietary supplements, nutrigenomics, nutrigenetics, prebiotics, probiotics, synbiotics, postbiotics, high altitude and space foods.

UNIT II: Advanced Technologies to Enrich Nutrition

10 Hours

This unit will explain the multidisciplinary approach in enrichment of nutrition.

- Food fortification
- Food biotechnology: role, application and concerns for the following:
 - Genetically modified foods
 - Biofortification
- WHO guidelines for fortified foods
- FSSAI regulations/standards for fortified foods

UNIT III: Technological Advancement in Food Processing

15 Hours

This unit will introduce different technologies involved in preparation and preservation of processed and convenience foods.

- Concept, application, advantages and disadvantages of the following techniques /technologies:
 - Extrusion technology
 - Microencapsulation
 - Nanotechnology
 - Ohmic heating
 - High-power ultrasound (HPU)
 - Electrohydrodynamic drying
 - Pulsed electric field (PEF)
 - Manothermosonication
 - High-pressure processing (HPP)
 - Food printing

UNIT IV: Advances in Food Packaging

8 Hours

This unit will introduce the advancement in different methods of food packaging.

- Sustainable food packaging: edible packaging, bioplastics
- Controlled atmosphere packaging (CAP) and Modified atmosphere packaging (MAP)
- Active, smart and intelligent packaging

TUTORIALS (Credits 1; Hours 15)

Tutorial classes will involve:

1. Q&A sessions/ Group Discussions/ Problem Solving exercises with the Students
2. Presentation of project/ research activity by students
3. Any other scholastic work related to application of conceptual understanding of the subject
4. Evaluation and feedback by the teacher

ESSENTIAL/ RECOMMENDED READINGS

- Srilakshmi, B. (2022). *Food Science* (7th edition). New Age International (P) Ltd.
- Fellows, P. J. (2022). *Food processing technology: Principles and Practice* (5th edn.). Woodhead publishing.
- Anjana, A., & Shobha, A. U. (2021). *Textbook of human nutrition* (3rd edn.). Jaypee Brothers medical publishers.
- Rahman, M. S. (Ed.). (2007). *Handbook of Food Preservation*. (2nd edn.). CRC press.

SUGGESTED READINGS

- Suvendu, B. (Ed.). (2015). *Conventional and advanced food processing technologies*. Wiley Publishing.
- Bhesh, B., Fernanda, C. G., Min, Z., Sangeeta, P. (Eds.). (2019). *Fundamentals of 3D food printing and applications*. Academic press.
- Kit L.Y., & Dong S.L. (2012). *Emerging food packaging technologies: Principles and practice*. Woodhead publishing ltd.
- Sharvari, R., Sudiksha, H., Salil, M. & Ramesh, B. (2021). *Advancements in space food processing technologies*. *International Journal of Recent Scientific Research*, 12(06): 42033–42037.
- Food Safety and Standards Authority of India. (2018). *Food Safety and Standards (Fortification of Foods) Regulations*.
https://www.fssai.gov.in/upload/uploadfiles/files/Compendium_Food_Fortification_Regulations_30_09_2021.pdf (Accessed on 10 March 2023).
- World Health Organization. (2006). *Guidelines on food fortification with micronutrients*.
<https://www.who.int/publications/i/item/9241594012> (Accessed on 10 March 2023).

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