

GENERIC ELECTIVE COURSE
GE FT01- Food Science and Nutrition

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of thecourse (if any)
		Lecture	Tutorial	Practical		
Food Science and Nutrition	4	3	0	1	Grade XII Pass	

Learning Objectives

1. To equip students with a comprehensive understanding of the composition of foods, exploring both their functional roles and the chemical changes that occur during food processing.
2. To provide the knowledge of nutrients, their functions and associated deficiency diseases or metabolic disorders.

Learning Outcomes

Students will be able to:

1. Acquire a comprehensive understanding of the chemical and physical properties of food and their impact on food processing.
2. Acquire an understanding of food composition and nutrition.
3. Understand healthy diets, importance of nutritional labelling and effect of cooking on nutritive value of foods.

SYLLABUS

THEORY
(Credits 3; Hours 45)

Unit I- Introduction to Food science and Nutrition

15 hours

The unit will provide an understanding of food components, their important reactions in foods and nutritional value.

Understanding Food Science, Food technology, Nutrition

Food composition:

- Carbohydrates- structure, classification, examples, sources, functions in body, deficiency, important reactions in food- dextrinization, Non-enzymatic browning, gelatinization
- Lipids- structure, classification, examples, types of fatty acids, sources of fats, functions in body, deficiency, important functions in food- plasticity, rancidity, shortening, emulsion.
- Protein- structure, examples, sources, functions in body, important processes in food- denaturation, role in browning.
- Vitamins- Fat and water soluble vitamins (thiamine, riboflavin, niacin, folic acid, B₁₂ and Ascorbic acid)- sources, general role in body (2-3 important functions of each), names of deficiency diseases and their brief explanation.
- Minerals- Macro and micro minerals- Iron, calcium, iodine, zinc- sources, general role in body (including 2-3 important functions of each), names of deficiency diseases and their brief explanation.
- Non-nutrient components- Pigments, polyphenols, role in disease prevention. Examples: Role in food- colour, enzymatic browning.

Unit II- Plant and animal based foods based foods

20 hours

The unit will help develop an understanding of plant and animal based foods and their importance in food processing.

- Cereals- composition, names of major cereals, millets, pseudo cereals, cereal products- examples of baked products, role of wheat in gluten formation, examples of ready to eat and traditional breakfast cereals and cereal products.
- Pulses- Composition and examples, names of toxic constituents, methods of processing of pulses, examples of pulse based fermented foods
- Fruits and vegetables- composition, enzymatic browning, ripening, climacteric and non-climacteric fruits.
- Vegetable Oils- Sources, refining of oils, hydrogenation
- Meat- Types, composition, marbling, characteristics of fresh meat, rigor mortis, ageing, animal fats- lard and tallow
- Fish- Types, characteristics of fresh fish, fish spoilage.
- Egg- Composition, characteristics of fresh egg, evaluation of egg quality, egg spoilage.
- Milk- Composition, types of market milk- toned, full cream, homogenized milk, flavoured milk. Pasteurization-importance and methods. Milk products- examples

Unit III- Healthy Diets

5 hours

The unit will help in developing an understanding of balanced diets, nutritional labelling, effect of cooking on nutritional value of food and association between food and lifestyle disorders.

- Balanced diets- Concept of Recommended dietary allowance and Estimated Average Requirements, food groups, relationship between food and lifestyle disorders, understanding malnutrition.
- Nutritional labelling- Concept, understanding a nutrition label
- Methods of cooking- Examples, effect of methods of cooking on food and nutrients, minimising cooking losses.

PRACTICAL
(Credit-1, Hours-15)

- Non enzymatic browning in flours and sugars.
- Enzymatic browning in fruits and vegetables.
- Gelatinization of starch.
- Gluten formation in flours.
- Egg equality inspection.
- Germination of pulses.
- Platform tests of milk.
- Identification of food sources for important nutrients using food composition tables.
- Critical analysis of nutritional labelling of food products.
- Preparation of snacks using different cooking methods.

Essential Readings

1. Bawa. A.S., Chauhan, O.P, Raju. P.S. (2013) ed. Food Science. New India Publishing Agency.
2. Potter, N.N., & Hotchkiss, J.H. (2012). Food Science. Springer Science and Business Media.
3. Rodey, S. (2018). Food science and Nutrition. Oxford University press. 4th edition.
4. Srilakshmi, B. (2018). Food Science. New Age Publishers. 7th edition.
5. Byrd-Bredbenner, C., Moe, G., Beshgetoor, D. & Bernning, J. (2002). Wardlaw's Perspectives in Nutrition, International Edition, 12th edition, New York:McGrow-Hill 29.
6. Chadha,R. and Mathur, P. eds. (2015). Nutrition: A Lifecycle Approach. Hyderabad, Orient Blackswan.
7. Longvah, T., Ananthan, R., Bhaskarachary K. and Venkaiah, K. (2017). Indian Food Composition Tables. Hyderabad: National Institute of Nutrition, Indian Council of Medical Research, Department of Health Research, Ministry of Health and Family Welfare, Government of India.

Suggested Readings

1. Rao, E.S. (2019). Fundamentals of Food Technology and Preservation, Variety Books, New Delhi.
2. De, Sukumar. (2007). Outline of Dairy Technology. Oxford University Press.
3. Kent, N.L. (2018). Kent's Technology of Cereals: An introduction for students of food science and agriculture. Elsevier. 5th edition.
4. Manay, N.S., & Shadaksharaswamy, M. (2008). Food- Facts and Principles, 3rd Edition. New Age International (P) Ltd. Publishers, New Delhi.
5. Rekhi, T., and Yadav, H.(2014). Fundamentals of Food and Nutrition. New Delhi: Elite Publishing House Pvt. Ltd.
6. Stewart, G.F., & Amerine, M.A. (2012). Introduction to Food Science and Technology. Elsevier. 2nd Edition.