



(Master of Science-Home Science) (Food Biotechnology)
(M.Sc.-H.Sc.) (Food Biotechnology) Semester (II)

Course Code	PH02CFBT54	Title of the Course	Food and Nutraceutical Chemistry
Total Credits of the Course	04	Hours per Week	04

Course Objectives:	<ol style="list-style-type: none">1. To gain knowledge regarding functional and nutraceutical properties of various food constituents2. To understand the effect of various chemical reactions on the constituents of foods3. To learn about the market strategies of functional foods and nutraceuticals
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Course Content		
Unit	Description	Weightage (%)
1.	<ol style="list-style-type: none">(a) Introduction to Nutraceuticals: Definitions, basis of claims for a compound as a nutraceutical, regulatory issues for nutraceuticals including CODEX, functional foods(b) Nutraceuticals and Diseases: Cardiovascular diseases, cancer, diabetes, hypercholesterolemia, obesity, joint pain, immune enhancement, age-related macular degeneration, endurance performance and mood disorders	15
2.	<ol style="list-style-type: none">(a) Basic aspects of Carbohydrate chemistry in brief.(b) Starch: Structure, gelatinization, enzymic conversion(c) Sugar: Sources, concepts of sweetness, solubility and crystallization phenomenon related to texture, sources of sugar-cane sugar, milk sugars etc(d) Other polysaccharides: Cellulose, pectins, other gums, cellulose derivatives, starch derivatives, fibers etc., details of structural configuration(e) Non-enzymatic browning reactions: Mechanism, advantages.(f) Prebiotics: Fibre, oligosaccharides, resistant starch etc. and their chemistry and health benefits(g) Nutraceutical properties of food Carbohydrates	25
3.	<ol style="list-style-type: none">(a) Basic aspects of Protein chemistry: Amide linkages, structure, essential and non-essential amino acids etc. Type of Proteins, isoelectric point, hydration, solubility, viscosity, gelation, texturization, emulsification and foaming(b) Cereals and pulses: Types of flour, baking qualities, batters, doughs, leavening agents, pulses - Protein composition, soaking changes etc(c) Meat: Structure, post mortem changes, changes during cooking (in	25





	<p>detail), tenderness etc</p> <p>(d) Egg: Colloids, emulsions, functions of eggs in cookery, changes during cooking, role in cake preparations, preparation of angel and sponge cakes</p> <p>(e) Nutraceutical properties of food Proteins and their health benefits</p>	
4.	<p>(a) Basic aspects of lipid chemistry, structure, type of Lipid, Fat-soluble pigments in brief with structure</p> <p>(b) Physical properties: Melting, crystallization, fractionation of fat, hydrogenation, inter-esterification, reversion and rancidity, fat sources, their characteristics</p> <p>(c) Chemistry of fat during heat treatment, degradation, darkening etc., cooking changes</p> <p>(d) Chemistry of fruits and vegetables: Pigments, changes in pigments during cooking and processing, enzymatic browning reactions, volatile acids in vegetables and effect during cooking</p> <p>(e) Food additives: Different types of food additives in detail</p> <p>(f) Nutraceutical properties of food Lipid and their health benefits</p>	25
5.	<p>(a) Health aspects of selected nutraceuticals: Polyphenols, lycopene, isoflavonoids, ω-fatty acids, prebiotics and probiotics, glucosamine, phytosterols etc..</p> <p>(b) Functional foods: Formulation of functional foods containing nutraceuticals, stability and analytical issues, and labelling issues</p>	10

Teaching-Learning Methodology	Classroom lectures (Blackboard/Power Point Presentations), Discussion on recent updates with related examples
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Discuss the relationship between chemical composition and structure of macro and micro constituents and their functions in foods.





2.	Describe the major chemical reactions that occur in foods during processing and storage.
3.	Describe the individual nutraceuticals for various health claims.

Suggested References

Sr. No.	References
1.	Fennema, O. R. (1985). <i>Food Chemistry</i> (Food Science and Technology Series, Vol 15) (Enlarged 2nd ed.). Marcel Dekker Inc.
2.	Meyer, L. M., Chopra, H. K., & Panesar, P. S. (2006). <i>Food Chemistry</i> . CBS Publishers & Distributors Pvt Ltd, India.

On-line resources to be used if available as reference material

On-line Resources

www.annualreviews.org/journal/Food

Food Chemistry, Elsevier

Journal of Food and Agricultural Chemistry, American Chemical Society (USA)

Food and Function, Royal Society of Chemistry

Current Nutraceutical, Bentham Science

Food Research International, Science Direct

Food Science and Nutrition, Wiley Blackwell Publishing

Nutrition and Food Science, Emerald Publishing

<https://epgp.inflibnet.ac.in/>

