SEMESTER S8

NUTRACEUTICALS AND FUNCTIONAL FOODS

Course Code	OEFTT833	CIE Marks	40
Teaching Hours/Week (L: T:P: R)	3 :0:0:0	ESE Marks	60
Credits	3	Exam Hours	2 Hrs. 30 Min.
Prerequisites (if any)	Nil	Course Type	Theory

Course Objectives:

1. This course will examine bioactive components of functional foods and nutraceuticals, their sources, chemistry, process technology, efficacy, safety and regulation.
2. Thorough knowledge and understanding of functional foods and nutraceuticals help the students to design innovative functional food products. An understanding on the health benefits of various nutraceuticals is emphasized.

SYLLABUS

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Module No.	Syllabus Description	Contact Hours
1	**Introduction to Nutraceuticals as Science** Historical overview to functional foods and nutraceuticals. Classification and future prospects of nutraceuticals. Sources of nutraceuticals, dietary supplements, fortified foods, phytochemicals. Zoo chemicals and microbes in food. Scope of nutraceuticals in food industry, national and global scenario. **Marketing, Safety, and Regulatory aspects of nutraceuticals and Functional Foods** Health claims, regulations, and safety issues – National and International. Research frontiers in functional foods, delivery of immunomodulators through functional foods. Concept of personalized medicine.	9
2	**Functional Foods** Conventional foods vs. Functional foods as well as nutraceuticals vs. pharmaceuticals. Introduction to biomarkers and food technology. Functional Lipids, Functional Carbohydrates from cereals, Functional Proteins.	9

	Nutrigenetics and Nutrigenomics. Probiotics, prebiotics and postbiotics, Functional beverages. Design a health drink suitable for diabetic patient.	
3	**Properties, structure, and function of various nutraceuticals.** Natural occurrence of certain phytochemicals - Dietary anti-oxidants and flavonoids, Glucosamine, Octacosanol, Lycopene, Solasodine, Capsaicin, Carnitine, Melatonin and Ornithine alpha ketoglutarate. Carotenoids, phytoestrogens, omega – 3 fatty acids. Role of anti-oxidants in cancer prevention.	**9**
4	**Food as medicines** Nutraceuticals bridging the gap between food and medicine - Nutraceuticals in treatment for cognitive decline, Arthritis, Bronchitis, circulatory problems, hypoglycemia, Nephrological disorders, Liver disorders, Osteoporosis, Psoriasis and Ulcers. Brief idea about some Nutraceutical rich supplements such as Bee pollen, Caffeine, Green tea, Curcumin, Lecithin, Mushroom extract, Cordyceps, Chlorophyll, Phycocyanin, Kelp and single cell protein from Spirulina.	**9**

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Course Assessment Method
(CIE: 40 marks, ESE: 60 marks)

Continuous Internal Evaluation Marks (CIE):

Attendance	Assignment/ Microproject	Internal Examination-1 (Written)	Internal Examination- 2 (Written)	Total
5	**15**	**10**	**10**	**40**

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 3 marks **(8x3 =24marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4x9 = 36 marks)**	**60**

Course Outcomes (COs)

At the end of the course students should be able to:

	Course Outcome	Bloom's Knowledge Level (KL)
CO1	Recall general knowledge on development of functional foods and nutraceuticals	**K1**
CO2	Select conventional foods and functional foods as well as nutraceuticals vs. pharmaceuticals	**K3**
CO3	Identify several natural ingredients used in the food preparation are important sources of nutraceuticals.	**K3**
CO4	Utilize potential health benefits of functional foods and know the basic physicochemical properties of various nutraceuticals.	**K3**

Note*: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create*

CO-PO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1		2		1	1					
CO2	2	2	2	2		2	2					
CO3	3	2	1			1	1					
CO4	2	3	3	1		1						

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Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Handbook of Nutraceuticals and Functional Foods	Robert E C Wildman, Robert Wildman,	Taylor C Wallace	Second edition (2006)
2	Functional Foods–Concept to Product	Gibson GR &William CM	Woodhead Publishing	(2000).CRC Press.
3	Functional Foods: designer Foods, Pharma Foods, nutraceuticals	Goldberg Israel	An Aspan publication	Chapman&Hall,NewYork,Lond (1994)

Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Functional Foods and Nutraceuticals	Aluko,Rotimi.	Springer-VerlagNew York Inc	(2012)
2	Natural Products: The Secondary Metabolites	Hanson, JamesR	Royal Society of Chemistry	(2003),
3	Functional Foods, Nutraceuticals and Natural Products: ConceptsandApplications	Vattem D. A, Maitin V.	DEStechPublications, Inc., PA, USA.	(2016),

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Video Links (NPTEL, SWAYAM…)	
Module No.	**Link ID**
1	https://youtu.be/Cnq0JFID7sA
2	https://youtu.be/R7BonXAiOE4
3	https://shorturl.at/MLGSK
4	https://rb.gy/nldgp9

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