INSTITUTE	**FACULTY OF PHARMACY**
PROGRAM	**BACHELOR OF PHARMACY**
SEMESTER	**8**
COURSE TITLE	**DIETARY SUPPLEMENTS AND NUTRACEUTICALS**
COURSE CODE	**13PH0812**
COURSE CREDITS	**4**

Objective:

1 This subject covers a foundational topic that is important for understanding the need and requirements of dietary supplements among different groups in the population.

Course Outcomes: After completion of this course, student will be able to:

1 Understand the need for supplements by the different groups of people to maintain a healthy life.

2 Understand the outcome of deficiencies in dietary supplements.

3 Appreciate the components in dietary supplements and their application.

4 Appreciate the regulatory and commercial aspects of dietary supplements including health claims.

Pre-requisite of course:--

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	1	0	75	15	10	0	0

Contents : Unit	Topics	Contact Hours
1	**Nutraceuticals** Nutraceuticals: Definitions of Functional Foods, Nutraceuticals and Dietary supplements. Classification of Nutraceuticals, Health problems and diseases that can be prevented or cured by Nutraceuticals i.e., weight control, diabetes, cancer, heart disease, stress, osteoarthritis, hypertension etc. Public health nutrition, maternal and child nutrition, nutrition and ageing, nutrition education in the community. Source, Name of marker compounds and their chemical nature, Medicinal uses and health benefits of following used as nutraceuticals/functional foods: Spirulina, Soyabean, Ginseng, Garlic, Broccoli, Gingko, Flaxseeds.	7

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Contents : Unit	Topics	Contact Hours
2	**Phytochemicals as nutraceuticals:** Phytochemicals as nutraceuticals: Occurrence and characteristic features (chemical nature medicinal benefits) of following a) Carotenoids- a and ß-Carotene, Lycopene, Xanthophylls, leutin b) Sulfides: Diallyl sulfides, Allyl trisulfide. c) Polyphenolics: Reservetrol d) Flavonoids- Rutin, Naringin, Quercetin, Anthocyanidins, catechins, Flavones e) Prebiotics / Probiotics: Fructo-oligosaccharides, Lactobacillus f) Phytoestrogens: Isoflavones, daidzein, Geebustin, lignans g) Tocopherols h) Proteins, vitamins, minerals, cereal, vegetables and beverages as functional foods: oats, wheat bran, rice bran, seafood, coffee, tea and the like.	15
3	**Introduction to free radicals** Introduction to free radicals: Free radicals, reactive oxygen species, production of free radicals in cells, damaging reactions of free radicals on lipids, proteins, carbohydrates, nucleic acids. b) Dietary fibres and complex carbohydrates as functional food ingredients.	7
4	**Diseases** Diseases: a) Free radicals in Diabetes mellitus, Inflammation, Ischemic reperfusion injury, Cancer, Atherosclerosis, Free radicals in brain metabolism and pathology, kidney damage, muscle damage. Free radicals' involvement in other disorders. Free radicals' theory of ageing. b) Antioxidants: Endogenous antioxidants - enzymatic and nonenzymatic antioxidant defence, Superoxide dismutase, Catalase, www.marwadiuniversity.ac.in Page 2 of 2 Glutathione peroxidase, Glutathione Vitamin C, Vitamin E, a- Lipoic acid, melatonin Synthetic antioxidants: Butylated hydroxy Toluene, Butylated hydroxy Anisole. c) Functional foods for chronic disease prevention.	10
5	**Environmental factors:** Environmental factors: Effect of processing, storage and interactions of various environmental factors on the potential of nutraceuticals. b) Regulatory Aspects; FSSAI, FDA, FPO, MPO, AGMARK. HACCP and GMPs on Food Safety. Adulteration of foods. c) Pharmacopeial Specifications for dietary supplements and nutraceuticals.	6
Total Hours		**45**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Tutorials** Tutorial 1, Tutorial 2, Tutorial 3, Tutorial 4, Tutorial 5, Tutorial 6, Tutorial 7, Tutorial 8, Tutorial 9, Tutorial 10, Tutorial 11, Tutorial 12, Tutorial 13, Tutorial 14, Tutorial 15	15
Total Hours		**15**

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Textbook :

1 Dietetics , by, Sri Lakshmi., 2007

References:

1 Role of dietary fibres and nutraceuticals in preventing diseases by K.T Agusti and P. Faizal: BS Publication.

2 Advanced Nutritional Therapies by Cooper. K.A., (1996).

3 The Food Pharmacy by Jean Carper, Simon & Schuster, UK Ltd., (1988).

4 Prescription for Nutritional Healing by James F. Balch and Phyllis A. Balch 2nd Ed., Avery Publishing Group, NY (1997).

5 G. Gibson and C. Williams Editors 2000 Functional foods Woodhead Publ. Co. London.

6 Goldberg, I. Functional Foods. 1994. Chapman and Hall, New York.

7 Labuza, T.P. 2000 Functional Foods and Dietary Supplements: Safety, Good Manufacturing Practice (GMPs) and Shelf-Life Testing in Essentials of Functional Foods M.K. Sachmidl and T.P. Labuza eds. Aspen Press.

8 Handbook of Nutraceuticals and Functional Foods, Third Edition (Modern Nutrition).

9 Shils, ME, Olson, JA, Shike, M. 1994 Modern Nutrition in Health and Disease. Eighth edition. Lea and Febiger.

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
20.00	30.00	25.00	15.00	10.00	0.00

Instructional Method:

1 The course delivery method will depend upon the requirement of content and the need of students. The teacher in addition to the conventional teaching method by the blackboard may also use any tools such as demonstration, role play, quiz, brainstorming, MOOCs etc.

2 The internal evaluation will be done based on continuous evaluation of students in the laboratory and classroom.

3 Students will use supplementary resources such as online videos, NPTEL videos, MOOCs/ e-courses, virtual laboratories.

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