



ANNAMALAI UNIVERSITY

220 - B.Sc. Nutrition, Food Service Management and Dietetics
 Programme Structure and Scheme of Examination (under CBCS)
 (Applicable to the candidates admitted in Affiliated Colleges from
 the academic year 2022 -2023 onwards)

Course Code	Part	Study Components & Course Title	Hours /Week	Crediti	Maximum Marks		
					CI A	ES E	Total
SEMESTER – I							
22UTAML11	I	Language Course - I : Tamil/Other Languages	5	3	25	75	100
22UENGL12	II	English Course - I : Communicative English I	5	3	25	75	100
22UBOTC13	III	Core Course - I :Food Science	4	4	25	75	100
22UNFDC14		Core Course - II :Human Physiology	4	4	25	75	100
		Core Practical – I : Human Physiology Practical	3	-	-	-	-
		Allied - I : Paper – 1 : Nutritional Biochemistry	4	4	25	75	100
		Allied Practical – I : Nutritional Biochemistry Practical	3	-	-	-	-
22UENVS18	IV	Environmental Studies	2	2	25	75	100
Total			30	20			600
SEMESTER – II							
22UTAML21	I	Language Course - II : Tamil/Other Languages	5	3	25	75	100
22UENGL22	II	English Course - II : Communicative English II	5	3	25	75	100
22UNFDC23	III	Core Course – III : Human Nutrition	4	4	25	75	100
22UNFDP24		Core Practical – I : Human Physiology Practical	3	4	40	60	100
		Allied – II : Paper -2 :Food Product Development	4	4	25	75	100
		Allied Practical – I : Nutritional Biochemistry Practical	2	3	40	60	100
22UNFDE27		Internal Elective – I	3	3	25	75	100
22UVALE27	IV	Value Education	2	1	25	75	100
22USOFS28		Soft Skill	2	1	25	75	100
Total			30	26			900

INTERNAL ELECTIVE COURSES

22UNFDE27	Internal Elective – I	Sports Nutrition
		Women Health and Nutrition
		Nutraceutical and Nutrignomics

ALLIED COURSES

22UNFDA01	Theory	Nutritional Biochemistry
22UNFDAP1	Practical	Nutritional Biochemistry
22UNFDA02	Theory	Food Product Development and Marketing

SEMESTER:1 PART: III	22UBOTC13 FOOD SCIENCE	CREDIT:4 HOURS/WEEK 4
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COURSE OBJECTIVES

- 1) To know the role of food in health.
- 2) To enable students to obtain knowledge of different food groups and their contribution to nutrition.
- 3) To gain insights on the different methods of cooking and their advantages and disadvantages.
- 4) To apply knowledge on processing of different foods.
- 5) To gain experience in the preparation of foods with attention to the preservation of their nutritive value - oriented to Indian cooking.

Unit I: Introduction to Foods

Food definition, functions of food, food groups-: energy yielding foods, body building foods, protective foods, classification, five food groups, seven food groups, balanced diet- definition, planning of balance diet, Food Pyramid, Methods of cooking – Moist heat and dry heat methods, advantages and disadvantages.

Unit II: Cereals and Pulses

Cereals: Structure and nutritive value of rice and wheat, Gelatinization, Process of milling and malting -wheat, Rice, Gluten formation, Nutritive value of millets - ragi, bajra.

Pulses: Germination process, factors affecting cooking quality of pulses, composition, nutritive value, and its advantages in cookery, toxins in pulses.

Unit III: Vegetables and Fruits

Vegetables – Selection of vegetables, Nutritive value, Changes in nutritive value before and after cooking, Effect of cooking on the vegetable pigments. - chlorophyll, carotenoids, anthocyanin, anthoxanthin.

Fruits- Classification, nutritive value, ripening of fruits, Effect of browning and its prevention, Storage of fruits.

Unit IV: Milk and milk products, Flesh foods

Milk and Milk Products: Types of milk, pasteurization of milk, composition and nutritive value, milk products – cheese, paneer and khoa

Egg: Structure, composition and nutritive value, Qualitative determination of egg and its role in cookery.

Meat: Structure, composition and nutritive value of meat, cutting process of meat, cooking changes in meat, and tenderness of meat.

Poultry-classification, Nutritive value, Selection and cooking methods poultry.

Fish -selection of fish, Structure, composition and nutritive value.

Unit V: Fats And Oils, Sugars, Spices, Nuts And Oilseeds

Fats and Oils- composition of common fats and oils, smoking temperature, rancidity and role of fats and oils in cookery.

Sugar – Nutritive value, sugar related products, stages of sugar cookery, Crystallization, Factors affecting crystallization.

Beverages: classification, nutritive value - coffee, tea, cocoa, milk-based beverages, fruit juices and aerated beverages.

Spices and condiments – Types and use in Indian cookery, Medicinal value.

Nuts and Oilseeds – Types, Composition, Nutritive value, Role in Cookery.

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

- 1) The student will identify and explain nutrients in food and their specific functions
- 2) Knowledge on nutritive value, understand the cooking quality factors and develop skills in the preparation and storage of various products.
- 3) Knowledge on nutritional classification, understand the changes in pigments and acquire skills in preserving nutrients and pigments in the processing and storage of vegetables and fruits.
- 4) Determine the smoking point of any cooking oils and the stages of sugar cookery.
- 5) Assess the effect of addition of acid, fat, salt, water and sugar on the texture of flesh foods quality.

Textbooks

- 1) Srilakshmi, M., (2010). Food science, New Age International (P) Ltd., Publishers.
- 2) Swaminathan, M., (2005), Food Science, Chemistry and Experimental Foods, Bappco Publisher..
- 3) Sivasankar B, (2002) Food Processing and Preservation, Prentice-Hall of India Private Limited, New Delhi.
- 4) Potter, Norman N., and Joseph H. (2012). Hotchkiss. *Food science*. Springer Science & Business Media.
- 5) Manay S and Swamy S, (2001). Food Facts and Principles, New Age International (P) Ltd Publishers, New Delhi.

Supplementary Readings

- 1) Brown. A. (2000). Understanding Food, Wadsworth, Thomson Learning Publications,
- 2) Mehas, K.Y., and Rodgers, S. L., (2000). Food Science and You. McMillan McGraw Hill CCompany.
- 3) Paul, P.C., and Palmer, H. H., (2000). Food Theory and Applications. John Wiley and Sons, New York, Revised Edition.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5
C01	2				
C02		2			
C03			2		
C04				2	
C05					2

SEMESTER: 1 PART:III	22UNFDC14 HUMAN PHYSIOLOGY	CREDIT:4 HOURS/ WEEK 4
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COURSE OBJECTIVES

To enable students to understand the structure and physiology of various organs in the body.

- 1) To impart knowledge on blood components and Gastro intestinal secretions.
- 2) To categorize the functions of various systems in our body
- 3) To help students to obtain a better understanding of the principles of nutrition and dietetics through the study of physiology.

Unit I: Cell Components and Digestive system

Cell – cell functions. cell structure, and functions - Regulation of cell multiplication. Digestive system – Review of structure and function of various parts in the gastrointestinal tract in brief. Role of liver, pancreas, gall bladder and their dysfunction. Role of specific hormones associated in GI tract.

Unit II: Respiratory system Hours

Review of structure and functions. Role of lungs in the exchange and transport of gases. Respiratory volumes.

Unit III: Circulatory system and Excretion organ

Circulatory system – Composition of blood – the structure of the heart and its working mechanism – conduction of heartbeat. Excretion organ – general organization (including the structure of kidney, nephron, mechanism of urine formation).

Unit IV: Endocrine system

Anatomy and physiological functions of endocrine glands: Hormones - Mode of action - Pituitary, Adrenal, Thyroid, Parathyroid, Sex glands, and Pancreas. Hypo and Hyper activities of the glands.

Reproduction System

structure, physiological functions of male and female reproductive organs, menstrual and ovarian cycle, spermatogenesis, contraceptives, infertility and its recent developments, Rh factor.

Unit V: Nervous system

Review of CNS & ANS, the function of neuron, conduction of nerve impulse, synapse, the role of neurotransmitters. The blood-brain barrier, CSF. Hypothalamus and its role in various body functions –sleep, memory, and obesity.

Sense organs:

Review of structure and function skin, eye, ear, nose, and tongue in the perception of stimuli.

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about:

- 1) Understand the structure and functions of the various organ systems of the body.
- 2) Compare the digestive and excretory system and infer the mechanisms of digestion and excretion in human beings.
- 3) Relate the structure with functions of the tissues and organs.
- 4) Comprehend the mechanism of action of organs.
- 5) Discuss the role of hormones and functions of human reproductive system.

Textbooks

- 1) Guyton AC & Hall JE, Textbook of Medical Physiology, 10th Edition, Harcourt Asia P. Ltd Singapore, 2001
- 2) Sembulingam, Kirma, and Prema Sembulingam. Essentials of medical physiology. JP Medical Ltd, 2012.
- 3) Chatterjee CC, Human Physiology, Volume I, 11th Edition, CBS Publishers, New Delhi, 2016.
- 4) Sathya P and Devanand V, Textbook of Physiology, First edition, CBS Publishers and Distributors Pvt Ltd, New Delhi, 2013.

Supplementary Readings

- 1) Subrahmanyam, Sarada, K. Madhavan kutty, and H. D. Singh. *Textbook of human physiology*. S. Chand Publishing, 1987.
- 2) Boron WF and Boulpaep EL, Medical Physiology, II edition, Saunders Elsevier, 2009
- 3) Marieb EN, Human Anatomy and Physiology, VI edition, Pearson edition, 2004
- 4) Tortora. G&Grabowski, S.R. Principles of Anatomy & Physiology, 10th Edition, John Wiley & Sons, USA, 2003

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5
CO1	2				
CO2		2			
CO3			2		
CO4				2	
CO5					2

SEMESTER: I PART:III	COURSE CODE 22UNFDC15 HUMAN PHYSIOLOGY PRACTICAL	CREDIT:0 HOURS/WEEK 3
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UNIT-I: CELL-TISSUES

Microscopic study of Tissues-Epithelial,connective,muscular and nervoust issue

UNIT-II: BLOOD, HEART AND CIRCULATION

- 1) Determination of blood ccount.
- 2) Determination of Blood Grouping.
- 3) Determination of heart rate and pulse rate
- 4) Recording of blood pressure
- 5) Estimation of hemoglobin content
- 6) Determination of blood group

UNIT-III: RESPIRATORYANDNERVOUSSYSTEM

- 1) Structure of Lung and brain
- 2) Microscopic study of muscular and nervous tissue

UNIT-IV: DIGESTIVESYSTEM&EXCRETORYSYSTEM

Structure of Liver, Pancreas, Stomach, kidney

UNIT-V: ENDOCRINE AND REPRODUCTIVE SYSTEM

- 1) Endocrine Glands–Thyroid, Pituitary, Adrenal and Pancreas.
- 2) Structure of Ovary and Testis

COURSE OUTCOMES

Upon successful completion, students will have the knowledge and skills to:

- 1) Describe the structure of major human organs and explain their role in the maintenance of healthy individuals.
- 2) Explain the interplay between different organ systems and how organs and cells interaction
- 3) To maintain biological equilibrium in the face of a variable and changing environment.
- 4) Interpret and draw inferences from experimental measures of physiological function including electrocardiograms and spirometer read-outs.
- 5) Apply experimental design skills to understanding population responses and interpreting quantitative data

Text book

- 1) Gary.A Thibodeau and Kelvin.T. Patlon, Anthony's TextBook of Anatomy and Physiology, Seventeenth edition, Mosby Publications, Indiana Print, 2004.
- 2) Anne Waugh and Allison Grant Ross and Wilson Anatomy and Physiology in Health and Illness Elsevier Publication, Ninth Edition, 2005.
- 3) Guyton,A.C, TextBook of Medical Physiology, 4th Edition, W.B.Saunders Co. Philadelphia, 1996.

Supplementary Readings

- 1) Waugh A and Grant A. (2012) Ross and Wilson Anatomy and Physiology in Health and Illness. 11th ed. Churchill and Livingstone, Elsevier
- 2) Vander, A. J., Sherman, J. H. and Luciano, D. S. (1994) Human Physiology the Mechanisms of Body Functions. 2nd ed. TMH Publishing Co., Ltd., Boston.
- 3) Creager, J. G. (1992). Human Anatomy and Physiology. 2nd ed. WMC Brown Publishers, England.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5
C01	2				
C02		2			
C03			2		
C04				2	
C05					2

SEMESTER – II

SEMESTER: II PART:III	COURSE CODE 22UNFDC23 HUMAN NUTRITION	CREDIT:4 HOURS/WEEK 4
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COURSE OBJECTIVES

- 1) Impart the concept of health and nutrition.
- 2) Learn about macro and micro nutrients
- 3) Recognize the various communicable and non-communicable diseases
- 4) Recommend the nutrition management process in disease condition.

Unit I Basic concept of health:

Definition, the importance of health, malnutrition: undernutrition, overnutrition, factors associated with malnutrition: prevalence, dietary recommendations, RDA- ICMR.

Functions of food: food groups, classification of food groups. Interaction between food and health: Role of food in health promotion.

Unit-II Macronutrients

Nutrients: definition, classification, macronutrients: Carbohydrates: functions, requirements, food sources, deficiencies, and recommended intake.

Proteins: functions, requirements, food sources, deficiencies, and recommended intake.

Fats: functions, requirements, food sources, deficiencies, and recommended intake.

Unit III Micronutrients Vitamins and minerals:

Fat-soluble vitamins: functions, requirements, food sources, deficiencies and recommended intake. Water-soluble vitamins: functions, requirements, food sources, deficiencies, and recommended intake.

Macro minerals: functions, requirements, food sources, deficiencies, and recommended intake. Micro minerals: functions, requirements, food sources, deficiencies, and recommended intake.

Unit IV Life cycle nutrition:

Nutritional needs, nutritional deficiencies, RDA and dietary measures. Infancy, Pre-school, School going, Pregnancy, Lactation, Adulthood and old age

Unit V Communicable and Non-Communicable diseases

Communicable and non-communicable diseases: causes, symptoms, risk factors, consequences, dietary management. Prevalence, Source of infection, Vaccination schedule, Preventive measures. Communicable diseases: Typhoid, tuberculosis, cholera, chicken box, hepatitis, SARS, and covid-19. Non-communicable diseases: Hypertension, CVD, cancer, renal disorders, liver disorders.

COURSE OUTCOMES:

On successful completion of the course, the learners should be able to outline the concept of nutrition, nutritional status, role of nutrients in human body.

- 1) Explain the factors affecting nutrition, sources and deficiency of various nutrients.
- 2) Identify the methods of determining energy value of foods and the role of various nutrients in human health.
- 3) Analyze the classifications, functions, digestion, and absorption of various nutrients.
- 4) Interpret the role of micro and macro nutrients in human health.
- 5) Explain different types of communicable and non-communicable diseases.

Text books

- 1) Srilakshmi B. (2011). Dietetics, sixth edition, New age Publishing Press, New Delhi,
- 2) Stacy N, (2005). William's Basic Nutrition and Diet Therapy, 12th edition, Elsevier publications, UK.
- 3) Gopalan C., and Vijayaragavan K., (1971). Nutrition, Atlas of India ICMR, New Delhi.
- 4) Krause M.V., and Mahan, (1984). Food, Nutrition and Diet Therapy E.B., Saunders Co., Philadelphia, VII edition.
- 5) Swaminathan M., (2009). The Advanced Text Book on Food and Nutrition, Vol.2., The Bangalore printing and publishing co-limited, Bangalore.

Supplementary Readings

- 1) Barasi, Mary. (2003) Human nutrition: a health perspective. CRC Press,
- 2) Roday S. (2007). Food Science and Nutrition, Oxford university press, New Delhi,2007
- 3) Mahan LK, Stump SE, and Raymond JL, (2012). Krause's Food and Nutrition Care Process, 13th Edition, Elsevier Saunders, Missouri.
- 4) Robinson CH.(2010).Normal and Therapeutic nutrition, Oxford and IBH publishing company, Bombay.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5
CO1	3				
CO2		2			
CO3			2		
CO4				2	
CO5					2

SEMESTER: II PART:III	COURSE CODE 22UNFDC24 HUMAN PHYSIOLOGY PRACTICAL	CREDIT:4 HOURS/WEEK 3
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UNIT-I: CELL-TISSUES

Microscopic study of Tissues-Epithelial,connective,muscular and nervoustissue

UNIT-II: BLOOD, HEART AND CIRCULATION

- 1) Determination of blood count.
- 2) Determination of Blood Grouping.
- 3) Determination of heart rate and pulse rate
- 4) Recording of blood pressure
- 5) Estimation of hemoglobin content
- 6) Determination of blood group

UNIT-III: RESPIRATORYANDNERVOUSSYSTEM

- 1) Structure of Lung and brain
- 2) Microscopic study of muscular and nervous tissue

UNIT-IV: DIGESTIVESYSTEM&EXCRETORYSYSTEM

Structure of Liver, Pancreas, Stomach, kidney

UNIT-V: ENDOCRINE AND REPRODUCTIVE SYSTEM

- 1) Endocrine Glands–Thyroid, Pituitary, Adrenal and Pancreas.
- 2) Structure of Ovary and Testis

COURSE OUTCOMES

Upon successful completion, students will have the knowledge and skills to:

- 1) Describe the structure of major human organs and explain their role in the maintenance of healthy individuals.
- 2) Explain the interplay between different organ systems and how organs and cells interaction
- 3) To maintain biological equilibrium in the face of a variable and changing environment.
- 4) Interpret and draw inferences from experimental measures of physiological function including electrocardiograms and spirometer read-outs.
- 5) Apply experimental design skills to understanding population responses and interpreting quantitative data

Text book**Supplementary Readings**

- 1) Waugh A and Grant A. (2012) Ross and Wilson Anatomy and Physiology in Health and Illness. 11th ed. Churchill and Livingstone, Elsevier
- 2) Vander, A. J., Sherman, J. H. and Luciano, D. S. (1994) Human Physiology the Mechanisms of Body Functions. 2nd ed. TMH Publishing Co., Ltd., Boston.
- 3) Creager, J. G. (1992). Human Anatomy and Physiology. 2nd ed. WMC Brown Publishers, England.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5
CO1	2				
CO2		2			
CO3			2		
CO4				2	
CO5					3

ELECTIVE – I

SEMESTER: II	22UNFDE27	CREDIT:3
PART:	SPORTS NUTRITION	HOURS/WEEK 3

COURSE OBJECTIVES

- 1) To acquaint students with the structure, function and interaction of nutrients and the concept of energy to maintain optimal health and fitness.
- 2) Describe specific adaptations, advantages and precautions of various modes of training for physically active individual across the lifespan (e.g., pediatric to geriatric) and people with special needs
- 3) To gain understanding of the various supplements and drugs used in sports and the nodal bodies for controlling doping.
- 4) To understand the physiological adaptation and metabolic changes during exercise at varying intensities.

Unit I: Introduction to sports nutrition-

Diet and exercise for lifelong fitness and health, Energy systems and exercise, Role of Carbohydrates, Proteins, Fats and Minerals in Nutrition, Fluids and electrolytes, Body Composition.

Unit II: Exercise issue related to adults, geriatric and women's -

Risks of Exercise in adolescents and elderly-Need and Importance of Exercise in Healthy Elderly –Strength training for children/ older adults and women - Strength Training for children - Strength training for older adults, Limitations faced by female population on doing physical activities- Pregnancy Strength training for females - Weight Training Guidelines for Pregnant women.

Unit III: Athletes with nutritional related disorders-

Diabetes, Cardiovascular disease, Osteoporosis, Sports anemia- Definition and description; Causes and consequences; Physiological effects of exercise; Pathophysiology; Medical Nutrition Therapy. Pre and post event carbohydrate loading and fluids, Insulin adjustments for athletes with type-1 diabete

Unit IV: Dietary supplements-Definition and classifications;

Ergogenic aids: Definitions and Classifications. World anti-doping agency and National Anti-doping agency (NADA), Formation, History and Standards; List of prohibited substances and Drugs. CHO Supplements: Carbo loading, Sports Drinks, Bars and Gels.

Unit V: Exercise Physiology-

Definitions of terminologies (Work, Power, speed, strength, efficiency etc.) Types of exercise (aerobic and anaerobic) and limiting factors, Exercise intensity and duration. Physiological and metabolic adaptations to training; Muscle hypertrophy and performance, Endurance versus resistance training and performance, Training adaptations and maladaptation and detraining.

COURSE OUTCOMES

- 1) Understands the exercise issues related to Adolescence, Older adults and Females
- 2) Understand the nutritional requirements for Special groups and Dietary needs.
- 3) Understand the evolution of ergogenic aids or drugs among athletes and government regulations.
- 4) Understand the basics of Exercise Physiology.
- 5) Understand the Skeletal muscle and neuromuscular system

Text Books

- 1) Dianne S. Ward, Ruth P. Saunders, Russell R. Pate, Physical Activity Interventions in Children and Adolescents, Human Kinetics Publishers.
- 2) Burke, Louise, and Vicki Deakin. (2015). Clinical sports nutrition. McGraw-Hill
- 3) Antonio, J., & Stout, J. R. (2002). Supplements for endurance athletes. Human Kinetics.
- 4) Raven, P., Wasserman, D., Squires, W., & Murray, T. (2012). Exercise Physiology: An Integrated approach. Nelson Education.

Supplementary Readings

- 1) Deepak Jain , Physical and Drill Training for Children, Human Kinetics Publishers.
- 2) Marie Dunford. (2017) Nutrition for Sport and Exercise.
- 3) Cooper, C. E. (2008). Drugs and ergogenic aids to improve sport performance. Essays in biochemistry, 44,1-10.
- 4) Farrell, P. A., Joyner, M., &Caiozzo, V. (2011). ACSM's advanced exercise physiology.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5
CO1	2				
CO2		3			
CO3			2		
CO4				2	
CO5					2

SEMESTER: II	22UNFDE27	CREDIT:3
PART:III	WOMEN'S HEALTH NUTRITION	HOURS/WEEK 3

COURSE OBJECTIVES

- 1) This Course will include an analysis of health issues which concern women throughout the life cycle.
- 2) It will create awareness about the importance of Nutrition and Health to improve the quality of life for women in particular.
- 3) To understand the functions and role of nutrients, their requirements and the effect of deficiency and excess

Unit I: Women's Health and sexuality

Socio-cultural and economic determinants of Women's Health and sexuality.
Female Anatomy- Reproductive organs.

Unit II: Reproductive Health

Concept – Definition, Menarche, Menstruation, pregnancy, child birth, pre-menstrual syndrome and menstrual disorder. Pregnancy- Ailment related to pregnancy; Anemia, Unwanted pregnancy – sex determination tests & termination of pregnancy; abortion, MTP Act, delivery, Menopause. genitor-urinary tract infection, AIDS, STD, impact on women. Adoption of Family Planning a gender dimension.

Unit III: Importance on Nutrition for adolescent girls and women

International guidelines on maternal nutrition, Assessment of Nutritional status- Anthropometric indicators, Biochemical indicators and Dietary assessments.

Unit IV: Nutritional vulnerability of women and adolescent girls

Vulnerability by type of malnutrition, Factors influencing nutritional vulnerability, Increased nutritional requirements and reduced intakes.

Unit V: Health-related interventions

Maternal mental health and psychosocial support, Breastfeeding care and support, Integration of nutrition services within the health system.

COURSE OUTCOMES

- 1) The student will be able to apply basic nutrition knowledge in making foods choices and obtaining an adequate diet.
- 2) The student will understand the functions and role of macronutrients, their requirements and the effect of deficiency and excess.
- 3) The student will gain knowledge about energy requirements and the Recommended Dietary Allowances
- 4) Develop knowledge on integration on nutrition service within the health system
- 5) Acquire knowledge on role of nutrient in maintaining health and preventing various diseases.

Text Books

- 1) Das Gupta Monica & Krishnan T.N. "Women and Health". Oxford, New Delhi. (1998)
- 2) Mohan Rao (Ed). "The Unheard Scream: Reproductive Health and Women's Rights in India". Zubaan, New Delhi. (2004)
- 3) Antia F.P., Philip Abraham, Clinical Dietetics and Nutrition, Oxford University Press; 4 th edition.

Supplementary Readings

- 1) Passmore R. and Davidson S. (1986) Human nutrition and Dietitics. Liming stone publishers.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5
C01	2				
C02		2			
C03			2		
C04				3	
C05					3

SEMESTER:II	22UNFDE27	CREDIT: 3
PART:	NUTRACEUTICALS AND NUTRIGENOMICS	HOURS/WEEK 3

COURSE OBJECTIVES

- 1) Learn to define Nutraceuticals and nutrigenomics.
- 2) Understand the role of dietary supplements and nutraceuticals in health and disease.
- 3) Knowledge to classify the probiotics and prebiotics.
- 4) Acquire knowledge for the application of nutrigenomics in health and disease.

Unit I: Definition and history

Definition of functional and traditional foods, nutraceuticals, designer foods and pharma foods, history of functional foods, components of functional foods, foods containing nutraceuticals and classification of nutraceuticals - based on plant sources, mechanism of action and chemical nature

Unit II: Categorization of Nutraceuticals Classification

Based on food source, mechanism of action and chemical nature-isoprenoid, phenolic substances, fatty acids and structural lipids, terpenoids – saponins, tocotrienols and simple terpenes, carbohydrates and amino acid based derivatives, isoflavones.

Unit III: Dietary supplements and role in human

Concept of dietary supplements, sources and functions .Human gastrointestinal tract and its microbiota, functions, concept of probiotic, prebiotics and symbiotics; applications of probiotics in human nutrition

Unit IV: Definition of nutrigenomic and Concepts

Definition of nutrigenomics, gene expression - transcription, translation, post translational modification, nutrition in the omics era- elementary concepts on epigenetics, transcriptomics, proteomics, metabolomics;

Unit V: Nutrients and Gene expression

Nutrient control of gene expression - amino acids, nucleotides, basic concepts of nutrigenomics and complex diseases - diabetes, cancer and obesity. Genetic variation and nutritional implications.

COURSE OUTCOMES

- 1) Understand the developments in the field of nutraceuticals and nutrigenomics
- 2) Comprehend the components of functional foods and foods containing of \ nutraceuticals
- 3) Know the role of probiotics and prebiotics in human health
- 4) Promote nutrigenomics in preventing life style disease
- 5) Gain knowledge on gene expression.

TEXT BOOKS

- 1) Mahtab, S, Bamji, Kamala Krishnasamy, G.N.V. Brahman, Text Book of Human Nutrition, Third Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi, 2009.
- 2) Srilakshmi, B. Second Edition, Food Science, New Age International (P) Limited Publishers, New Delhi, 2010.
- 3) Simopoulus, A.P. and Ordovas, K.J.M., 2004, Nutrigenetics and Nutrigenomics, Vol. 93, Karger, Switzerland.

SUPPLEMENTARY READING

- 1) Watson, David, H., 2003, Performance Functional Foods, CRC Press, Wood Head Publishing Ltd., England
- 2) Narasinga Rao, B.S., 2005, Nutrition Research in India - A Country Report, Published by INSA, New Delhi.
- 3) 3.Webb, G.P., 2006, Dietary Supplementations and Functional Foods, Blackwell Publishing Ltd., New York.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5
CO1	2				
CO2		3			
CO3			2		
CO4				2	
CO5					2