THE AMERICAN COLLEGE- MADURAI
DEPARTMENT OF FOOD SCIENCE
Choice Based Credit System
Program for B.Sc. – Food Science and Nutrition (2017 onwards)

Sem	Part	Course No	Course Title	Hrs	Credits	Marks
I	**I**	XXX 0000	Tamil/French/Hindi	3	2	30
I	**II**	ENS 1201	Conversational Skills	3	2	30
I	**III-C**	FSN 1511	Food Science	5	5	75
I	**III-C**	FSN 1413	Lab in Food Science	4	4	60
I	**III-C**	FSN 1415	Nutrition Science	4	4	60
I	**III-S**	FSN 1401	Human Physiology	5	4	60
I	**IV-E**	XXX 0000	Non Major Elective –I	3	2	30
I	**IV-LS**	XXX 0000	Life Skill –I	3	2	30
I	**V**	XXX 0000	Extension Activity (NSS/SLP/PED)			
			Total	**30**	**25**	**375**
II	**I**	XXX 0000	Tamil/French/Hindi	3	2	30
II	**II**	ENS 1202	Reading & Writing Skills	3	2	30
II	**III-C**	FSN 1512	Nutritional Biochemistry	5	5	75
II	**III-C**	FSN 1414	Lab in Nutritional Biochemistry	4	4	60
II	**III-C**	FSN 1416	Food Microbiology	4	4	60
II	**III-S**	FSN 1402	Dietetics	5	4	60
II	**IV-E**	XXX 0000	Non-Major Elective –II	3	2	30
II	**IV-LS**	XXX 0000	Life Skill – II	3	2	30
II	**V**	XXX 0000	Extension Activity (NSS/SLP/PED)		1	
			Total	**30**	**25+1**	**375/390**
III	**I**	XXX 0000	Tamil/French/Hindi	3	2	30
III	**II**	ENS 2201	Study Skills	3	2	30
III	**III-C**	FSN 2517	Food Chemistry	5	5	75
III	**III-C**	FSN 2519	Food Processing – I	5	5	75
III	**III-C**	FSN 2411	Lab in Food Processing	4	4	60
III	**III-C**	FSN 2513	Food Service Management	5	5	75
III	**III-S**	FSN 2403	Child development	5	4	60
III	**V**	XXX 0000	Extension Activity – NSS/SLP/PED			
			Total	**30**	**27**	**405**

FSN 2

Sem	Part	Course No	Course Title	Hrs	Credits	Marks
IV	I	XXX 0000	Tamil/French/Hindi	3	2	30
IV	II	ENS 2202	Career Skills	3	2	30
IV	III-C	FSN 2510	Therapeutic Nutrition-I	5	5	75
IV	III-C	FSN 2412	Lab in Therapeutic Nutrition-I	4	4	60
IV	III-C	FSN 2514	Food Processing - II	5	5	75
IV	III-C	FSN 2516	Food packaging	5	5	75
IV	III-S	FSN 2404	Functional foods and Nutraceuticals	5	4	60
IV	V	XXX 0000	Extension Activity NSS/SLP/PED	- -	1	15
			Total	**30**	**27+1**	**405/420**
V	III-C	FSN 3615	Therapeutic Nutrition – II	6	6	90
V	III-C	FSN 3517	Lab in Therapeutic Nutrition– II	5	5	75
V	III-C	FSN 3619	Food Biotechnology	6	6	90
V	III-C	FSN 3621	Baking and Confectionary	6	6	90
V	IV-LS	XXX 0000	Life Skill –III	3	2	30
V	ES	FSN 3200	Environmental Studies	4	2	30
			Total	**30**	**27**	**405**
VI	III-C	FSN 3618	Food safety and Quality control6		6	90
VI	III-C	FSN 3520	Mini Project	5	5	75
VI	III-C	FSN 3622	Health and Fitness	6	6	90
VI	III-C	FSN 3624	Public Health Nutrition	6	6	90
VI	IV-LS	XXX 0000	Life Skill – IV	3	2	30
VI	V-VE	XXX 0000	Value education	4	2	30
			Total	**30**	**27**	**405**
			GRAND TOTAL	**180**	**158+2**	**2370/2400**

C - Core Courses **NME - Non - Major Elective** **LS - Life Skill**

S – Supportive Courses **VE- Value Education** **ES- Environmental Studies**

Courses offered by the Department of Food sciences to Non-Major Students

Part III Supportive

SEM	Course No.	Course Title	Hrs.	Cr	Marks
I	FSN 1404	Human Physiology	**5**	**4**	**60**
II	FSN 1402	Human Nutrition	**5**	**4**	**60**
III	FSN 2403	Child Development	**5**	**4**	**60**
IV	FSN 2404	Functional foods and Nutraceuticals	**5**	**4**	**60**
Total			**20**	**12**	**240**

Part IV Life skill course

SEM	Course No.	Course Title	Hrs.	Cr	Marks
I	FSN 1201	Home Food Catering	**3**	**2**	**30**
II	FSN 1202	Ethnic Foods	**3**	**2**	**30**
V	FSN 3203	Obesity Management	**3**	**2**	**30**
VI	FSN 3204	Food additives	**3**	**2**	**30**
Total			**12**	**8**	**120**

Part IV Non-Major Electives

SEM	Course No.	Course Title	Hrs.	Cr	Marks
I	FSN 1211	Basic Nutrition	**3**	**2**	**30**
II	FSN 1212	Diet and Disease	**3**	**2**	**30**
Total			**6**	**4**	**60**

FSN 4

FSN 1511 FOOD SCIENCE (5hrs/wk) (5cr)

This is a foundational course for students to obtain knowledge on different food groups and their nutritive value, this course helps to understand the scientific principles underlying in food preparation and it also develops skills and techniques in food preparation with conservation of nutrients and palatability using cooking methods generally employed.

OBJECTIVES:

To help them study the different methods of cooking and their advantages and disadvantages.

Togain experience in the preparation of foods with attention to the preservation of their nutritive value - oriented to Indian cooking.
To help them understand the scientific principles governing the acceptability of food preparations.
To understand biochemical reactions taking place in the body and their relationship to nutrition.
To familiarize the students to various equipment packaging & manufacturing useful in the industry.

UNIT -I Introduction to foods: Food - Definition, Functions, classification of foods, Food groups -Basic Four, Basic Five and Basic Seven, Food pyramid. Cooking - Definition**,** objectives, preliminary preparation of food, Methods of cooking - Moist heat and Dry heat methods, advantages and disadvantages. Micro-wave cooking, Solar cooking - advantages and disadvantages.

UNIT -II Cereals and pulses: Cereals - wheat and rice - structure, composition and Nutritive value -milling - by products of wheat and rice, parboiling - methods, advantages, Effect of cooking on the nutritive value of cereals, Gelatinisation, Dextrinization, gluten formation. Millets - Ragi, Bajra, Italian millet, Varagu,Samai-Composition, Nutritive value. Pulses - Composition and Nutritive value, Germination, Effect of cooking on pulses, factors affecting cooking quality of pulses, role of pulses in cookery.

UNIT-IIIVegetables, Fruits and Milk: Classification, Composition and Nutritive value, Conservation ofnutrients during cooking, role of vegetables in cookery, pigments in fruits and vegetables and effect of cooking on pigments. Milk - composition and Nutritive value, physical properties of milk, Different types of milk and milk products, role of milk and milk products in cookery.

UNIT - IV Flesh foods: Meat - Classes of meat, composition and Nutritive value, methods of cooking andits effects Post mortem changes, ageing of meat, tenderising meat. Fish - Classification, composition and Nutritive value, selection criteria, Methods of cooking and its effects. Poultry - Classification, composition and nutritive value, Principles and methods of cooking poultry. Eggs - Structure composition and nutritive value, role of egg in cookery, evaluation of egg quality, effect of cooking and factors affecting coagulation.

UNIT -V Fats& Oils, Sugars, Spices, Nuts & Oilseeds: Composition & nutritive value, Types of fats andoils, Hydrogenation, role of fat in cookery, effect of heating, factors affecting absorption of fats, smoking point Rancidity-Types, Prevention. Sugar: Nutritive value, properties**,** Types of sugars, stages in sugar cookery, sugar and related products. Spices: Functions, role of spices in cookery, Types, Nutritive value, Uses and abuses. Nuts & Oilseeds: Types, Composition Nutritive value, role of nuts and oil seeds in cookery.

Text Books:

Srilakshmi B (2005) Dietetics. New Age International Publishers, New Delhi.

Swaminathan M (1979) Food Science and Experimental foods. Ganesh and Co, Madras.

Mudambi SR and Rao SM (1986) Food Science. Wiley Eastern Ltd. New Delhi.

References:

Bennion M and Hughes D (1975) Introductory Foods. Macmillan Publishing Co. Inc. New york.

Brich CG, Spencer M and Cancerron AG (1977) Food Science. Pergamon Press, New York.

Gopalan C, Ramasastri PN and Balasubramanian SC (1977) Nutritive value of Indian Foods. National Institute of Nutrition, Hyderabad.

FSN 6

FSN 1413 LAB IN FOOD SCIENCE (4hrs/wk) (4cr)

This course is aimed to create awareness on the effect of various cooking methods on different food groups and it also helps to understand the various methods of sensory analysis.

OBJECTIVES:

To understand the basic principles of sensory analysis.
To know the methods and principles involved in cooking.
To learn the selection, purchase and storage of foods.
To know about various adulterants and the methods of detecting them.
To learn the prevailing food, hygiene and sanitation of foods.

Technique in measurement of different food stuffs - use of standard measuring cups and spoons.
Different recipes from cereals, pulses, vegetables, fruits, fleshy foods, egg, milk and milk products.
Cereals - Examination of different starch granules, Gelatinisation, Dextrinisation.
Beverages - preparation of stimulating, nourishing and refreshing beverages.
Pulses - Effect of hard and soft water, alkali, cooking time of grams and dahls.
Vegetables - Effect of acids, alkali, steaming and pressure cooking on the different pigments andacceptability of vegetables.
Fruits - Study of different methods of preventing enzymatic browning of cut fruits, pectin content of fruits.
Sugars - Stages of sugar cookery.

Text Book:

1. Jamesen SK (1998) Food Science Laboratory Manual. Purdue University.

FSN 1415 NUTRITION SCIENCE (4hrs/wk) (4cr)

This course enables the students to gain basic knowledge of the different nutrients and their role in maintaining health of the community and it also develop skills in qualitative analysis and quantitative estimation of nutrients.

OBJECTIVES:

To understanding the meaning of Nutrition
To understanding the role of Nutrition in human life
To increasing the ability to overcome Deficiency
To understand the vital link between nutrition and health
To gain knowledge on functions, metabolism and effects of deficiency of nutrients

UNIT-I Concept of nutrition: Definitions - Nutrition, Health, Malnutrition, Nutritional status,Balanced diet, Under nutrition & over nutrition, Nutrients - classification of nutrients relation of food and health. RDA - Definition, factors, methods used for deriving RDA, Reference man and woman - Definition. Energy - Definition, units of measurement, determination of energy value of foods, physiological fuel value. Total energy requirement - Factorial method, experimental determination, Thermic effect of food - factors. BMR - Definition, measurement, factors.

UNIT-II Carbohydrates: Definition, classification, digestion, absorption and metabolism. Functions,deficiency, requirement and sources. Dietary fiber - Definition, classification, physiological effects, role of fiber in human nutrition, sources.

UNIT-III Proteins and Lipids: Definition, classification of proteins and amino acids, functions ofproteins, sources, and requirements, deficiency, Digestion absorption and metabolism, quality of proteins. Lipids - Definition, classification, functions, sources, requirements, deficiency, digestion, absorption and metabolism of fats.

UNIT-IV Minerals: Definition, classification, functions, Sources, deficiency of calcium, Sodium,phosphorus, Iron, Zinc, Iodine, fluorine, magnesium, potassium

UNIT-V Vitamins: Definition, classification, functions, Sources, deficiency of vitamins A,D,E,K,C,B1,B2,Niacin, folic acid, pyridoxine, B12.

Text Books:

Mudambi SR, Rajagopal MV (1997) Fundamentals of Foods and Nutrition. Third Edition. New Age International (P) Ltd, Publishers, New Delhi.

Srilakshmi B (2004) Nutrition Science, New Age International (P) Ltd, Publishers. New Delhi.

Swaminathan M (1999) Essential of Food and Nutrition. Vol I and II, Beppo publications, Madras.

References:

Kango M (2005) Normal nutrition, curing diseases through diet. Third Edition CBS Publications, New Delhi.

Paul S (2003) Text book of Bio-Nutrition, Fundamental and Management. RBSA Publishers, Rajasthan.

Williams SR (2000) Nutrition and Diet Therapy. Sixth Edition. C.V. Melskey Publications,USA

FSN 8

FSN 1401 HUMAN PHYSIOLOGY (5hrs/wk) (5cr)

This course helps the students to understand the structure and basic physiology of various organs of the body. The students will obtain better understanding of the principles of Foods and Nutrition through the study of physiology.

OBJECTIVES:

To understand the basic structure and functions of human body.
To create awareness about common diseases/ disorders affecting each system.
To advance their understanding of some of the relevant issues and topics of human physiology.
To understand the integrated function of all systems and the grounding of nutritional science in Physiology.
To understand alterations of structure and function in various organs and systems in disease conditions.

UNIT-I Digestive System and Excretory System: structure and functions of digestive system, process of digestion and absorption, Saliva - composition, function. Bile - composition, function. structure and function of kidney, nephron – composition of urine, mechanism of urine formation,Micturition.

UNIT-II Blood and Cardiovascular System: Blood – composition - RBC, WBC, platelets – functions of blood, clotting mechanism, blood groups. Heart - structure and functions, cardiac muscle, cardiac output, heart rate, heart sounds.

UNIT-III Respiratory System: Respiratory organs - structure, functions,mechanism of respiration, lung volumes, types of breathing , artificial methods of breathing – mouth to mouth, Eve's rocking method.

UNIT-IV Nervous System and Sense Organs: Nervous system - structure, functions of neuron, brain, spinal cord. Sense organs - structure and functions of eye, ear and skin.

UNIT-V Reproductive and Endocrine System: Structure and function of male and female reproductive organs, menstrual cycle, conception and contraception. Endocrine System - Structure and functions of thyroid, parathyroid, adrenal and pituitary glands.

Text Books:

Chatterjee CC (1988) Text Book of Medical Physiology. W B Sounder's Co. London.
S.Subramanian and S.M.Kutty (1971) Text Book of Physiology, Orient Longman.
Elaine N and Marie RN (1997) Human Anatomy and Physiology. Addison Wesley Longman, Inc., UK.
Ahuja(2001)Textbook of Physiology, CBS Publishers,New Delhi.

References:

Ganong (1995) Review of Medical physiology. Prentice Hall international, London.
Muthaiya N. M (2006) Human Physiology, 4th Edition, Jaypee Brothers Medical Publishers Ltd, New Delhi.
Guyton,A.C(2009):FunctionoftheHumanbody,4thEdition,W.B.SandersCompany, Philadephia.
Guyton,A.C, and Hall., J.B (2010)Text Book of Medical Physiology, Ninth Edition, W.B. Sanders company, Prime Books (Pvt.) Ltd., Bangalore.

FSN 1512 NUTRITIONAL BIOCHEMISTRY (5hrs/wk)(5cr)

This course will foster understanding on the basis of nutrition and the effects of varied nutrition, it further provides knowledge on the effect of diet on health and the functions of biological systems in relation to Nutritional biochemistry.

OBJECTIVES:

To augment the biochemistry knowledge acquired at the undergraduate level.
To understand the mechanisms adopted by the human body for regulation of metabolic pathways.
To get an insight into interrelationships between various metabolic pathways.
To understand the principles and use of Instruments used for biochemical analysis.
To become proficient for specialization in nutrition.

UNIT - I Introduction to Biochemistry: Definition, objectives, scope and inter relationship betweenbiochemistry and other biological science.

UNIT - II Enzymes: Definition - types - classification - specificity - Isozymes - Coenzymes -Enzymekinetics - Factors affecting enzyme action - Enzyme inhibition.

UNIT - III Intermediary metabolism: Carbohydrate metabolism, Glycolysis, TCA cycle and energygeneration, gluconeogenesis, glycogenesis, glycogenolysis, blood sugar regulation.

UNIT - IV Lipids and proteins: Oxidation and biosynthesis of fatty acids (saturated and mono-unsaturated): Synthesis and utilization of ketone bodies, Ketosis, fatty livers. Proteins - General reaction of amino acid metabolism, urea cycle. Lipoproteins: Types, composition, role and significance in disease

UNIT - V Introduction to Nucleic acids: Structure, replication, transcription, genetic code elementary knowledge of biosynthesis of proteins.

Text Books:

Murray R K, Grannen DK, Mayes PA and Rodwell VW (2012) Harper's Illustrated Biochemistry. Twenty Ninth Edition, Lange Medical Book, Mc Graw Hill Edition.
Lehninger AC, Nelson DL and Cox MM (2001) Principles of Biochemistry. Fourth Edition, W.H. Freeman Company, USA.

References:

Voet D (2004) Biochemistry. Third Edition, John Wiley & Sons Inc. USA.
Berg JM, Tymoczko JL, Stryer L (2011) Biochemistry. International Edition, Seventh Edition, W.H. Freeman publishing & Co.USA.

FSN 10

FSN 1414 LAB IN NUTRITIONAL BIOCHEMISTRY (4hrs/wk)(4cr)

This course emphasizes the clinical significance and understanding of the basic concepts and enables the students to get practical experience in lab and clinical nutrition.

OBJECTIVES:

To understand the use of colorimetry in biochemical estimations.
To detect the purity of samples by using biochemical techniques.
To understand various methods of quantitative estimations of biomolecules.
To learn the basic analytical techniques.
To get practical experience in the Laboratory and develop the skills to undertake research work.

Identification of carbohydrates (Qualitative,quantitativetests)

Identification of proteins (Qualitative Tests)

Estimation of glucose in urine by Benedict's methods

Urine analysis - normal & abnormal constituents of urine.

Blood glucose estimation.

Text books

Miller DD (2014) Food chemistry: a laboratory manual. First Edition, John Wiley & Sons.USA

Plummer DT (1996) An introduction to Practical Biochemistry. Tata McGraw Hill, New Delhi.

References

Conn EE and Stump PK (1981) Outlines of Biochemistry. Wiley Eastern (P) Ltd., New Delhi.

Linder MC (1991) Nutritional Biochemistry and Metabolism: with clinical applications. Second Edition, Appleton and Lange. New York,

FSN 1416 FOOD MICROBIOLOGY (4hrs/wk) (4cr)

The goal of teaching this course to students is to gain knowledge about the role of micro-organisms in health and disease, understand the role of micro-organisms in spoilage of various foods and its role in relation to food and food preservation.

OBJECTIVES:

To understand the nature of microorganisms involved in food spoilage, food infections and intoxications and also those used in food biotechnology (food fermentation and various food processing industries)

To gain knowledge of principles of various techniques used in the prevention and control of the microorganisms in foods.

To gain an insight of the types and role of micro-organisms affecting man and the environment.

To understand criteria for microbiological safety in various foods operations to avoid public health hazards due to food contamination.
To gain knowledge of micro-organisms in relation to food and food preservation.

UNIT-I History and scope of food microbiology: Contributions of Louis Pasteur - - Fermentation - Pasteurization Role of microbiologist in food industries - Scope of food microbiology.

UNIT-II Food as a substrate for microorganism: Hydrogen ion concentration, Moisture requirement,Nutrient content - inhibitory substances of biological structure, combined effects of factors affecting growth. Role of microorganism in food microbiology.

UNIT-III Contamination and spoilage of foods: Principles of food spoilage - microbiological, physicaland biological factors - contamination, preservation and spoilage of cereal and cereal products, baked products, Fruits and vegetables and their products, Fleshy food, Milk and Milk products.

UNIT-IV Food infections and food borne diseases: Microbial food poisoning - Staphylococci,Salmonella, clostridium botulinum. Measures to prevent microbial food poisoning. Food infections - Food borne diseases - Dysentery diarrhoea, Typhoid, Cholera.

UNIT-V Fermented food products: Fermentation - aerobic respiration, anaerobic respiration, productsof fermentation - Bread, Malt Beverages, Wine, Distil liquor, Vinegar, Fermented Vegetables and dairy products.

FSN 12

Text Books:

Frazier WC and West off DC (2013) Food Microbiology. Fifth Edition, McGraw Hill Education(India) Pt. Ltd., New Delhi.

Adams MR and Moss MO (1991) Food Microbiology. The Royal society and chemistry,Cambridge.

References:

Banwart GJ (1989) Basic Food Microbiology. Second Edition, Chapman and Hall, New York.
Pelczar MJ, Chan ECS and Kreigh NR (2000) Microbiology. Eighth Edition, Tata McGraw Hill,New Delhi.
Willey UM, Sherwood LM and WoolvertonCJ(2011) Prescott's Microbiology. Eighth Edition, Mc Graw-Hill International.USA.

FSN 1402 DIETETICS (5hrs/wk) (5cr)

This course helps the students to have basic understanding on the nutritional needs from birth to adolescence and old age; it provides necessary theoretical background for the field of child guidance. Acquaint them about the needs of guidance and counselling at various stages of development.

OBJECTIVES:

Understand the role of nutrition in different stages of life cycle.
Gain experience in Planning menu for different stages.
Gain knowledge about the method of assessment of nutritional status of a community.
Students develop an understanding of self in relation to family and society.
They understand their roles and responsibilities as productive individuals, as members of family, community and society.

UNIT-I Nutrition in pregnancy: Food and nutrient requirements, physiological changes duringpregnancy, developmental stages of the embryo, physiological cost of pregnancy and complications in pregnancy. Nutrition in lactation - Food and nutrient requirements, physiology of lactation, composition of breast milk, influence of mother's diet on the quality and quantity of milk production and breastfeeding practices.

UNIT-II Nutrition during infancy: Food and nutrient requirements, weaning, types of weaning foodsand supplementary foods, changes in growth pattern - height and weight. Nutrition during preschool age - Food and nutrient requirements, eating habits and behavior, growth, factors inhibiting growth and increment in height and weight.

UNIT-III Nutrition during school-going age: Food and nutrient requirements, factors affecting eatinghabits, school lunch and mid-day meal program.

UNIT-IV Nutrition in adolescence and adult: Food and nutrient requirements, changes in growthpattern, puberty, menarche, changes in food habits, nutritional disorders, psychological and peer group pressure on eating habits. Nutrition in adulthood- Food and nutrient requirements, changes in consumption pattern: physical, mental and social changes influencing meal pattern.

UNIT-V Nutrition in old age: Food and nutrient requirements, physical, physiological, biological andpsychological changes influencing meal pattern.

Text Books:

Srilakshmi B. (2018) Dietetics, New Age International (P) Ltd, Publishers.Delhi.
Swaminathan M (1985) Advanced Text Book on Food and Nutrition. Vol.II. BAPPOO, No.88, Mysore Road, Bangalore.
Robinson CH, Lawber MR, Chenoweth WL and Garwick AE (1986) Normal and Therapeutic Nutrition. Seventh Edition, Mc Millan Publishing company, New York.

References:

Whiteny EN and Cataldo CB (1983) Understanding normal and clinical Nutrition. West Publishing Company, New York.
Krause MV and Mohan LK (1984) Food, Nutrition and Diet Therapy. W.B. Saunders company, Philadelphia.
Passmore R and East Wood MA (1987) Human Nutrition and Dietetics. English Language Book Society/Chruchill, Livingstone.

FSN 1201 HOME FOOD CATERING (3hrs/wk) (2cr)
(Life Skill Course)

This course will provide the students to face the challenges of the food industry and provide theoretical knowledge along with practical skill for proper motivation to build a career in the Hotel industry.

OBJECTIVES:

To Gain knowledge about various types of food services.
Gain knowledge about the Principles and functions of Management.

To understand about personnel Management, financial management and legal aspects of catering.
To realise the importance of sanitation and hygiene in food service institutions.

UNIT-I Food production: Menu planning - Importance - Factors affecting menu planning, differentkinds of food service units - Food Purchase and Storage. Quantity Food Production- Standardization of recipes, quantity food preparation techniques, recipe adjustments and portion control. Hygiene and Sanitation.

FSN 14

UNIT-II Kitchen organization and layout: General layout of kitchen in various organizations - receiving and preparation area - storage area- cooking areas - service and washing areas - obtaining supplies.

UNIT-III Resources management: Mone**y**-Manpower-Tim**e**-Facilities and equipment-Utilities.

UNIT-IV Sanitation and safety: Sanitation of plant, kitchen, hygiene, personal hygiene, garbagedisposal, pest control - Health and safety at work, causes and types of accidents, accordance and applications

UNIT -V Planning of a Food Service Unit: Preliminary Planning-Survey of types of units, identifyingclientele, menu operations and delivery. Planning the set up-Identifying resources, developing Project plan, determining investments.

Text Books:

Bessie WB and Lavelle W (1988) Food Service in Institutions. Sixth Edition. Macmillian Publishing Company New York.

Mohini S (2005) Institution Food Management. New Age International Publishers. New Delhi.

References:

Thangam Philip (2008) Modern Cookery for Teaching and Trade. Part I & II Orient Longman, Chennai.

Taneja S and Gupta SL (2001) Entrepreneurship Development. Galgotia Publishing, Delhi.

FSN 1202 ETHNIC FOODS (3hrs/wk) (2cr)
(Life Skill Course)

This course deals with the nutritional, social, cultural, economic and health effects of traditional foods.

OBJECTIVES:

To understand the historical perspective of nutrient requirements.

To learn to critically evaluate the methodology and derivation of requirements for specific macronutrients.

To appreciate importance of nutrition immunity interactions and their implications.

To learn various measures for enhancing nutritional quality of diets.

To stay updated with emerging concepts in nutrition.

UNIT-I Traditional food style: History–Concept and Principles of Traditional Foods–Benefits andnutritional content of Traditional Foods.

UNIT-II Traditionally fermented foods: Unsweetened yogurt, kefir, dahi, lassi, shrikhand, miso, kimchi,kombucha, tempeh, pickles and sauerkraut – processing methods, nutritional benefits and therapeutic uses

UNIT-III Healthy aspects of traditionally foods: National health benefits - impacts of consuming traditional foods.

UNIT-IV Traditional methods of cooking and preservation: Introduction - cooking techniques -conventional cooking - dry cooking - wet cooking - thermal processing – effect of time and temperature - equipments.

UNIT-V Traditionally fermented fruits and vegetables: Cucumber, onion, olives, carrot, caper berries,pickled garlic - safety and regulations.

Text book:

Kristbergsson K and Oliveira J (2016) Traditional foods: General and Consumer Aspects. Springer, New York.

References:

Pathak YV, (2011) Handbook of Nutraceuticals,Volume 2, CRC Press.USA
Prakash V and Belloso OM (2015) Regulating safety of traditional and ethnic foods. AcademicPress, Elsevier, USA.

FSN 1211 BASIC NUTRITION (3hrs/wk)(2cr)
(Non-Major Elective)

This course provides an overview of the major macronutrients relevant to human health. They gain knowledge on dietary sources, intake levels, physiological role, and requirement of major nutrients on human body. They also attain knowledge about major nutrition-related deficiency conditions.

OBJECTIVES:

Understand the relationship between nutrition and human well being

Know and understand the functions, importance of all nutrients for different age group and special group.
Understand critical periods in growth and development and impact of malnutrition on it.
Understand the demographic transition and its implications on the quality of life.

Learn to critically evaluate the methodology and derivation of requirements for specific micronutrients.

FSN 16

UNIT-I Introduction to nutrition: Definition of nutrition- food, health, nutritional status, malnutrition, over nutrition, under nutrition, functions of food, balanced diet, food pyramid, ICMR Basic five food groups.

UNIT-II Macro nutrients: carbohydrates-composition, classification, functions, food sources. Dietary fibre-Functions, food sources, Deficiency. Lipids and fats- definition, composition, classification, functions, Deficiency, sources-Proteins, Definition, composition, classification, functions, deficiency, sources.

UNIT-III Micronutrients: vitamins-, definition, classification,functions of vitamins Nomenclature, functions, deficiency& sources of vitamins A, D, E, K Nomenclature, functions, deficiency& sources of vitamins B1, B2, B3, folic acid, B6, B12

UNIT-IV Minerals: definition, functions and classification, Nomenclature, functions, deficiency sources of calcium, Iron, Zinc, phosphorus, iodine, fluorine, sodium

UNIT-V Water: Distribution of water & electrolytes, functions, requirements, sources, water balance, water depletion, water excess.

Text Books:

Mudambi SR and Rajagopal MV (1997) Fundamentals of Foods and Nutrition. New Age International (P) Ltd, Publishers.Delhi.

Srilakshmi B (2004) Nutrition Science. New Age International (P) Ltd, Publishers. Delhi.

Swaminathan M (1999) Essential of Food and Nutrition. Vol I and II, Bappco publications, Madras.

References:

Kango M (2005) Normal Nutrition, Curing diseases through diet. First Edition CBS Publications. Delhi.

Paul S (2003) Text Book of Bio-Nutrition, Fundamental and Management. RBSA Publishers.

Williams SR (2000) Nutrition and Diet Therapy. Sixth Edition C.V. Melskey Co. Delhi

FSN 1212 **DIET AND DISEASE** **(3hrs/wk) (2cr)**
(Non-Major Elective)

This course imparts knowledge in the field of clinical nutrition to make appropriate dietary modifications for various disease conditions based on the pathophysiology. They develop capacity and aptitude in taking up dietetics as a profession by understanding the consequences of nutritional problems in the society to create awareness on community nutrition-based programmes.

OBJECTIVES:

To Understand causative factors and metabolic changes in various disease/disorders
To Gain knowledge of the principles of diet therapy and dietary counselling
To Understand the rationale of prevention of various diseases/disorders
To Plan and prepare suitable therapeutic diets based on patient needs for various diseases/disorders
To Prepare special therapeutic / health foods.

UNIT-I Therapeutic diets: Introduction- routine hospital diet - clear fluid, full - liquid and soft diets,pre and post-operative diet. Regular normal diet. Special feeding methods -tube feeding - types of food - food requirements- parental feeding.TPN formula for children, adolescents.

UNIT-II Diet in obesity and underweight: Introduction-aetiology-types, complication. Regionaldistribution of adipose tissues - treatment-diet therapy. Principles of dietetic management. Limitation of underweight - aetiology dietary modifications.

UNIT -III Diet in fever: Types - causes - metabolic changes -dietary modifications. Typhoid-malaria,tuberculosis - symptoms-causes, principles of diet- dietary managements.

UNIT-IV Diet in diabetes mellitus: introduction-symptoms-diagnosis- types-nutritional care-mealdistribution-changes - exchange list-control of diabetes-complications.

UNIT- V Diet in cardiovascular disease: Introduction - risk factors - nutritional plan-meal planning-heart and blood vessel diseases.

Text Books:

Garrrow JS, James W PT and Ralph A (2000) Human Nutrition and Dietetics. Tenth Edition,Churchill Livingston, London.

Bamji MS andReddy V (1998) Text Book of Human Nutrition ford. IBH Publishing Co. Ltd New Delhi.

References:

Antia P and Abraham P (1998) Clinical Dietetics and Nutrition, 2nd edition, Oxford University Press. New York.

Guthrie HA and Picciano M F (1995) Human Nutrition. Mosby, St. Louis Missionary, England.

Sharon M (1994) Complete Nutrition. Avery publishing group, New York.

Robinson CH and Lawler MR (1990) Normal and Therapeutic Nutrition, Seventeenth Edition,MacMilanPublishers,London.

FSN 18

FSN 2517 FOOD CHEMISTRY (5hrs/wk) (5cr)

Enable students to gain knowledge on the composition and chemistry of foods in relation to food processing and quality of physical, chemical and nutritional properties of major and minor food components of the functional properties of food components and their applications.

Unit-II Fruits and vegetables: Plant, anatomy, composition Enzymes in fruits and, vegetables. Flavor constituents, plant phenolics, pigments, post-harvest changes. Texture of fruits and vegetables. Effects of storage, processing and preservation.

Unit-I Cereals and legumes: Structure, composition, processing, Changes during Moist heat dry heat method.Toxic constituents. Nut and oil seeds: Composition, oil extraction and by-products. Nut and oil seeds: Protein concentrates: Hydrolysates and textured vegetable proteins, milk Protein concentrates: substitutes.

Unit-III Spices and condiments: Composition, flavoring extracts - Natural and synthetic. Processed foods: Jams, jellies, squashes, pickles, dehydrated products. Beverages: Synthetic and natural, alcoholic and non-alcoholic, carbonated and non-carbonated, coffee, tea, cocoa, malted drinks.

Unit-IV Meat and poultry: Muscle composition, characteristics and structure. Postmortem changes processing, preservation and their effects. Heat induced changes in meat variables in meat preparation, Tenderizing treatments, and meat products.

Unit-V Eggs: Structure and composition, changes during storage. Functional properties of eggs, use in cookery. Egg processing, low cholesterol egg substitutes. Fish and sea foods: Fish and sea foods: Types and composition, storage and changes during storage, changes during processing, by-product and newer products.

Text Books:

Charley, H. (1982) Food Science (2nd edition), John Wiley and Sons, New York.
Potter, N. and Hotchkiss, J.H. (1996) Food Science, Fifth edition, CBS Publishers and Distributors, New Delhi.

References:

Belitz, H.D. and Grosch, W. (1999) Food Chemistry (2nd edition), Springer, New York.
Hartel, Richard W, Heldman, Dennis R (1998). Principles of Food Processing, An Aspan publications, Aspan Publishers, geithersberg, Maryland.
Cherry, R.J. (1981) Protein Functionality in Food. American Chemical Society, Washington D.C.

FSN 2519 FOOD PROCESSING – I (5hrs/wk) (5cr)

This course focuses on fundamentals of processing, nature, harvesting, and storage conditions of varying food products. The students gain knowledge in the various methods used for preservation of food products. This provides comprehensive coverage on processing and preservation aspects of food science that include chemical, microbiological and technological processes.

Unit-I:Processing of foods: Primary, secondary and tertiary processing, historical perspective, traditional technologies used in food processing. Effects of processing on components, properties and nutritional value of foods.

Unit-II:Cereals and pulses: Milling of wheat - extraction of flour, refined wheat flour and pasta products Milling of rice – parboiled rice, rice based instant food Processing of corn, barley and millets – pearling, flaking and puffing, corn starch products, Malting-Pulses – Red gram, Bengal gram, black gram, green gram, soy-based products, Decortication and dhal milling, elimination of toxic factors, fermentation and germination

Unit-III:Milk and milk products: Collection, Standardization, pasteurization, homogenization, UHT processing, manufacture of paneer, khoa, curd, yogurt, cream, butter, cheese, ghee, flavoured milk, ice creams, dehydrated milk products

Unit-IV:Fruits and vegetables: Harvesting, physiological and bio chemical changes during ripening, handling and storage, general methods of processing - extraction and pulping, raw material and product specifications and standards.

Unit-V: **Meat, poultry, fish and egg:** Ageing and tenderizing, curing, smoking and freezing of meat, fresh storage of meat. Meat based products: sausages, salami, bacon. Fish: Dry fish - Tuna Fish Canning - Fish processing and storage, pickling. Egg: storage, frozen egg, dehydrated egg powder.

Unit-VI:Others: nuts and oil seeds – pressing, solvent extraction, purification – degumming, refining, bleaching, deodorizing. Hydrogenation – margarines, shortenings. Spices – processing and extraction of essential oils and colors, storage and preservation. Tea, coffee and cocoa – Processing and storage

Text Books:

Desrosier N W and Desrosier J N (1987) The Technology of Food Preservation, 4thEdition, CBS, New Delhi.

Fellows P J (2000) Food Processing Technology: Principles and Practice 2nd edition CRC Woodhead Publishing Ltd., Cambridge.USA

References:

Khetarpaul Neelam (2005) Food Processing and Preservation, Daya Publications, New Delhi.

Salunke D K and Kadam S (1995) Hand book of Food Science and Technology - production, composition, storage and processing, Marcel Dekker INC, New York.

Sivasankar B (2002) Food Processing & Preservation, Prentice Hall, India.

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FSN 2511 LAB IN FOOD PROCESSING – I (4hrs/wk) (4cr)

This course is to make the student familiar with the principles and methods of food preservation and understand about the various preservatives and their use in food.

Natural / Artificial Preservation
Preparation of brix solution and checking by hand refractometer.
Different methods of Food preservation – Drying, Freezing, Frying, canning, bottling.
Preparation of pickles, Sauce, Jam, jelly, puree, squash etc.
Estimation of Chemical Oxygen Demand (Demonstration).
Preservation by fermentation- Wine, Vinegar.
Visit to canning industry and dairy firm etc.
Canning of foods.

Text Books:

Fellows P J (2002) Food Processing Technology. Principles and Practices, 2nd Edition, Woodland Publishing Ltd, Cambridge, England.
Avantina Sharma (2006) Text Book of Food Science and Technology, International Book, Distributing Co, Lucknow, Utter Pradesh.
Sivasankar (2005) Food Processing and Preservation, Prentice hall of India Pvt Ltd, New Delhi.

References:

Potter, N. (1998) Food Science, Fifth Edition, CBS Publication, New Delhi.
Ramaswamy H and Marcotte M (2009) Food Processing Principles and Applications, CRC Press.USA
Manay NS and Shadaksharaswamy M, (1987) Food-Facts and Principles, New Age International (P) Ltd. Publishers, New Delhi.

FSN 2513 FOOD SERVICE MANAGEMENT (5hrs/wk) (5cr)

This course gives a comprehensive understanding of the basic principles of management in food service units. It helps to accept responsibilities in catering establishment and hospitals and paves a way for becoming a conscientious caterer and food service administrator. The major aim is to develop skills in setting up food service units.

Unit-I:Food Service Industry: Definition and scope of Food Industries – classification of Commercial and Non-commercial food service and welfare food service institutions.

Unit-II:Principles and Functions of Management: Management Definition, principles and functions of management Organization – Types and theories of organisation. Tools of management.

Staffing Manpower Planning Labour sources, Selection, Recruitment and training wages, salaries, incentives, promotion demotion, transfer, dismissal. Managerial Problems of Food Service Unit. Directing and direction, leadership, delegation and controlling decentralization, centralization, supervision, human relation industry, authority and responsibility, motivation, communication evaluation techniques. Leadership styles and qualities.

Unit-III:Developing of Kitchen Plant: Flow of work, characteristics of a typical food service layout, layout of food plants-space allocation for the various areas and flow of traffic through receiving, storage, preparation, service and dish washing areas; arrangements of equipment's in work centers, optimum working heights.

Unit-IV:Equipment in Food Service: Classification of equipment, factors affecting selection of equipments-electrical and nonelectrical equipment for food storage, preparation, service and dishwashing Base materials and insulating materials

Unit-V:Sanitation and Safety: Sanitation of plant, kitchen, hygiene, personal hygiene, garbage disposal pest control - Health and safety at work, causes and types of accidents, accordance and applications

Text Books:

Mohini Sethi and SurjetMalhan, (1987). Catering Management, "An Integrated Approach. Wiley Eastern Ltd, India.

West. B.B. Wood L., Harger, V.F (1977) Food Service Institutions, JohnWiley and sons, Inc.

NewYork, V Ed. 2. Shukla. M.C. (1982) Business Organization and Management S. Chand and Co., Ltd., Ramnagar, New Delhi.

References:

Nathaniel, R. S. (1991) Catering Management for Hotel Restaurants and Institute, Surjeet Pub. Delhi.

P.N. Reddy, S.S. Gulshan. Principles of Business Organization and Management. Eurasia Publishing House, Ramnagar New Delhi.

West. B.B. Wood L., Harger, V.F. (1977) Food Service Institutions, JohnWiley and sons, Inc., NewYork.

FSN 2403 CHILD DEVELOPMENT (5hrs/wk) (4cr)

This course helps the students to understand human development (both normal and exceptional) to guide effectively. They have complete knowledge about the behaviour pattern of the individual and various factors influencing them.

Unit-I:Growth and Development: Principles of development - continuous, sequential, specific responses, different rates. Stages of growth and development. The nutrition - smoking - alcohol consumption - drugs - age of mother-neonatal stage. The characteristics- Infancy Stage, Early childhood years, Late childhood, adolescence, Early adulthood, Middle age, Old age.

Unit-II:Theory of Development: Psychodynamic Theory - Psycho analytic theory - Erick Erickson psycho - socio theory - Learning Theory - Social Learning Theory - Kohlberg's moral reasoning theory - Life span and life cycle theories- Bronfenbrenner's theory.

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Unit-III:Child Rearing Practices: Authoritarian pattern -Permissive pattern - Democratic pattern. Development problems, Emotional and behavioural problems - Issues and Concerns, Mental retardation.

Unit-IV:Early Childhood Care & Education: Degrees of Mental Retardation. Learning Disabilities. Behavioural Difficulties, Functional Factors, Speech and Language Disorders, Visual Impairment, Giftedness.

Unit-V: Adolescent and Care: Problems of adolescent development, Treatment and Preventions, Guidance and Counselling.Maturation,Major group cycle, Emotional disturbance, Peer group influence, Psychological Significances.

Text Books:

Devadass R. and P, Jaya N (1996) A Text Book on Child Development, Macmillan Indian Ltd., Delhi.

Parikh S, and Sudarshan R (1993) Human Development and Structural Adjustment, UNPP, Delhi.

Mussen et al (1990) Child Development and personality, Harper and Row publishers, New York.

References:

Suriakanthi.A (1991) Child Development, 2nd edition, Kavitha publications, Chennai.

Papalia, D.E and Olds, S.W. (2005) Human Development, Tata Mc.Graw Hill Company, New York.

Suriakanthi,A (1992) A Handbook on Human Development, Gandhigram Rural University, Gandhi gram, Dindigul.

FSN 2510 THERAPEUTIC NUTRITION (5hrs/wk) (5cr)

The prime objective of this course is to provide an exposure on the study of aetiology, symptoms and medical nutrition therapy in various diseases. They easily learn the method to plan and prepare diet for various diseases.

Unit-I:Therapeutic diets: Definition - Introduction - Types - routine hospital diet - clear fluid, full - liquid and soft diets, Pre and Post-operative diet. Regular normal diet. Special feeding methods-tube feeding - types of food- food requirements- parental feeding. TPN formula for children, adolescents.

Unit-II:Diet in Obesity &Underweight: Aetiology, symptoms,medical nutrition therapy for obesity and underweight.

Unit-III:Diet in Gastrointestinal Disease: Aetiology, symptoms and medical nutrition therapy for Oesophagitis, Dyspepsia, Gastritis, Peptic ulcer, Constipation, Diarrhea,

Unit-IV: Diet in Diabetes Mellitus: Types, aetiology, Symptoms, factors affecting normal blood sugar level, Diagnosis, Dietary modifications, food exchange system, Glycaemic Index, Glycaemic load, Complications of diabetes.

Unit-V:Diet in Cardiovascular Diseases: Aetiology, symptoms, risk factors - Atherosclerosis and Hypercholesterolemia.
Hypertension – Aetiology, symptoms,medical nutrition therapy.

Text Books:

Srilakshmi, B. (2018). Dietetics, New Age International Publishers, New Delhi
Bamji M.S. and Vinodini Reddy (1998) Text Book of Human Nutrition, ford and IBH Publishing Co. Ltd New Delhi.
Mohan K. L. and Krause M.V (2002), 2nd edition Food, Nutrition and Diet Therapy, W.S. Suders Co, Philadelphia.
Antia P. (2001) Clinical Dietetics and Nutrition, 4th edition, Oxford University Press.UK
Guthrie H. A, Picciano M. F (1995), Human Nutrition, Mosby, St. Louis Missionery.

References:

Sharon,M. (1994) Complete Nutrition, Avery publishing group. New York.
Garrrow J.S, James W. P.T. and Ralph A, (2000) Human Nutrition and Dietetics, 10th edition, Churchill Livingston, London.
Robinson C.H, Lawler M.R, Cheweth W.L and Gaswick A.E (1990) Normal and Therapeutic Nutrition, Seventeenth Edition, Mac Milan Publishers. New York.

FSN 2412 LAB IN THERAPEUTIC NUTRITION (4hrs/wk.) (4cr)

This course emphasizes skill development in planning therapeutic diets using food exchange lists. It provides greater exposure to dietetic practices followed in Indian hospitals.

Planning of routine hospital diet: Clear fluid diet, Full fluid diet, Soft diet,
Planning of diet in Underweight & Obesity: High calorie and low-calorie diet, High residue and low residue diet.
Planning of diet in Gastrointestinal diseases: Peptic ulcer, ORS
Planning of diet in Diabetes Mellitus
Planning of diet in Cardiovascular Disease & Hypertension: Low sodium diet

Text Books:

Bhala S.M.L, Bhatia N, Gopinath (1983). Diet Manual for heart patient, CTC, AHMS, New Delhi.
Gibney M.J, Elia, M Ljingquist. O (2005), Clinical Nutrition, Blackwell Science Publishing Co. USA.

References:

Robinson C.H and Winely E.S, (1984) Basic Nutrition and Diet Therapy 5th ed, Macmillian Pub. Co. New York.
Swaminathan, M (2002) Food and Nutrition, Volume I, The Bangalore Printing and Publishing Company. Bangalore.

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FSN 2514 FOOD PROCESSING –II (5hrs/wk) (5cr)

This course equips the students to study the importance of microorganisms in food preservation and introduces the basics of various food processing and preservation technologies. This course helps the students to contribute proper utilization of food and to prevent wastage.

Unit-I:Importance of food processing: Methods of processing cereals - wheat, rice, maize, pulses. Processing of fruits and vegetables - meat - fish - poultry - egg. Processing of oil seeds. processing of milk and milk products. Processing of condiments and spices - Beverages, tea, coffee and cocoa.

Unit-II:Food preservation by low temperature: freezing and refrigeration: Introduction to refrigeration - cool storage - freezing – definition - principle of freezing - freezing curve - changes occurring during freezing - types of freezing - slow freezing, quick freezing. introduction to thawing, changes during thawing and its effect on food.

Unit-III:Food preservation by high temperature: Thermal Processing- Commercial heat preservation methods - Sterilization, commercial sterilization, Pasteurization, and Canning – bottling.

Unit-IV:Food preservation by moisture control drying and dehydration: Definition of drying - preservation, sun drying - dehydration (i.e. mechanical drying), heat and mass transfer, factors affecting rate of drying - normal drying curve - names of types of driers used in the food industry. Evaporation – Definition, factors affecting evaporation, names of evaporators used in food industry.

Unit-V:Food preservation by irradiation: Introduction - units of radiation - kinds of ionizing radiations used in food irradiation- mechanism of action - uses of radiation processing in food industry.

Text Books:

Potter NN (2013) Food science. CBS Publishers and Distributors, New Delhi.
Brennan JG and Grandison AS (2012) Food processing handbook. Second Edition, John Wiley.USA

References:

Manoranjan Kalia (2014)Food Quality Management Second Edition, Aggrotech Publishing Academy, Udaipur.
Walter A. Mercer, (1988) Advances in Food Research First Edition, Academic Press,University of California, U.S.A.
Potter N (1995) Food Technology, 5th Edition, Cornell University, Ithaca, New York.

FSN 2516 **FOOD PACKAGING** **(5hrs/wk) (5cr)**

This course deals with the functions of packaging along with the influence of various factors on food and different packaging materials like cans, bottles, flexible films etc. and helps to study about the various methods of packaging to improve the shelf life of the products. This course especially emphasizes on the equipment used for packaging and applications during transportation.

Unit-I:Food packaging: Definition, functions of packaging materials for different foods, characteristics of packaging material. Food packages – bags, pouches, wrappers, tetra packs.

Unit-II:Types ofPackages: Introduction, purpose, requirements, types of containers. Modern Packaging Materials and Forms: Glass containers, metal cans, composite containers, aerosol containers, rigid plastic packages, semirigid packaging, flexible packaging.

Unit-III:Packaging of finished goods: Weighing, filling, scaling, wrapping, cartooning, labeling, marking and trapping. Labeling: Standards, purpose, description types of labels, labeling regulation barcode, nutrition labeling, health claims, mandatory labeling provision.

Unit-IV:Packages of dehydrated products: Orientation, metallization, co-extrusion of multilayer films, stretch, package forms and techniques. Aspectic packaging, retortable containers, modified and controlled atmosphere packaging, skin, strink and cling film packaging, micro-oven able containers, other package forms and components of plastics.

Unit-V:Packages of radiation stabilized foods: Introduction, rigid containers, flexible containers, general methods for establishing radiation stabilization. Radiation measurement of radiations. Biodegradable packaging material - biopolymer based edible firm.

Text Books:

Vijaya Khader (2001) Text book of Food Science and Technology, Indian Council of Agricultural Research, New Delhi.

Stainley Sacharous. Roger C Griffin (1972) Principles of Food Packaging, 2nd Edition AVI Publishers Co. Westport.

F.A. and Paine. H.Y. Leonard Hill (1987) A hand book of Food Packaging. Blackie Sons Ltd., London.

Sacharows.S. (1976) Handbook of packaging materials, AVI Publishers Co., Westport.

Reference Books:

NIIR Board (2004) Food Packaging Technology Handbook National Institute of Industrial Research, New Delhi.

Frank A. Paine and Heather Y.Paine (1983) A Hand Book of Food Packaging, Leonard Hill Publications (Blackie and sons).UK

O.G.Pirenger and A.L.Baver (2000) Plastic Packaging Materials for Food, Wiley VCH, GmbH, Germany.

Shirly V. Vangrade and Morgy Woodburn, Food Preservation and Safety Surabhi Publications, Jaipur India.

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FSN 2404 FUNCTIONAL FOODS AND NUTRACEUTICALS (5hrs/wk) (4cr)

This course gives comprehensive understanding of different nutraceuticals and functional foods and students will understand the potential of various functional foods in promoting human health.

Unit-IIntroduction: Background, status of nutraceuticals and functional food market, definitions, difference between functional foods and nutraceuticals.

Unit-IIFunctional Foods& Nutraceutical ofPlant Origin: Sources – Bio active compounds – Potential Health benefits.

Unit-IIIFunctional Foods& Nutraceutical ofAnimal Origin: Sources – Bio active compounds – Potential Health benefits

Unit-IVFunctional Foods& Nutraceutical of Microbial Origin:Prebiotics, Probiotics and Symbiotic -role in disease prevention – health promotion.

Unit-VLegal Aspects: Safety, Consumer acceptance and assessment of health claims, labelling, Consumer acceptability and marketing - regulatory issues related to nutraceuticals and functional foods.

Text Books:

Wildman REC (2001) Handbook of Nutraceutical and Functional Foods, CRC Press, USA.
Ghosh D et al, (2012) Innovations in Healthy and Functional Foods, CRC Press, USA.

References:

1. Pathak YV (2011) Handbook of nutraceuticals Volume 2, CRC Press, USA.

FSN 3615 THERAPEUTIC NUTRITION – II (6hrs/wk) (6cr)

This course imparts knowledge in the field of clinical nutrition to make appropriate dietary modifications for various disease conditions based on the pathophysiology. They develop capacity and aptitude in taking up dietetics as a profession by understanding the consequences of nutritional problems in the society to create awareness on community nutrition-based programmes.

Unit-I:Diet in Liver: Hepatitis - aetiology - Symptoms - Dietary Management.
Cirrhosis of Liver - aetiology - Symptoms - Dietary Management. Jaundice - aetiology - Symptoms - Dietary Management

Unit-II:Diet ingout - Aetiology - Symptoms –Medical Nutritional Therapy

Unit-III: Diet in kidney disease: Nephritis- aetiology - Symptoms - Dietary Management. Nephrosis - Aetiology - Symptoms - Dietary Management. Kidney Stones - Prevention - Dietary Modification.

Unit-IV: **Diet in cancer&AIDS:**Aetiology - Symptoms - Dietary Management-nutritional

Unit-V:The Dietitian: Introduction- Classification - Code of Ethics - Responsibilities - Assessment and diet planning - Diet Counselling and Nutrition Education.

Text Books:

Bamji M.S. and Vinodini Reddy (1998) Text Book of Human Nutrition, Ford and IBH Publishing Co. Ltd New Delhi.

Mohan K. L. and Krause M.V (2002) Food, Nutrition and Diet Therapy, 2nd edition W.S. Suders Co, Philadelphia.

References :

Guthrie H. A, Picciano M. F (1995) Human Nutrition, St. Louis, MO: Mosby-Year Book.

Sharon,M (1994), Complete Nutrition, Avery publishing group, New York.

Garrrow J.S James W. P.T. and Ralph A (2000) Human Nutrition and Dietetics, 10th edition, Churchill Livingston, London.

Robinson C.H, et.al., (1990) Normal and Therapeutic Nutrition, Seventeenth Edition, Mac Milan Publishers.USA.

FSN 3517 LAB IN THERAPEUTIC NUTRITION – II (5hrs/wk) (5cr)

This course understands the history of nutritional sciences to gain knowledge about the principles of meal planning, diet therapy, therapeutic diets and nutrition support. They also learn about multi-disciplinary approach to medical nutrition therapy and the role of clinical nutritionist in health care team. They develop an aptitude for taking dietetics as a profession.

Planning and preparation of Diets for the following diseases:

Meal planning for Liver disease -Hepatitis, Cirrhosis
Meal planning forGout
Meal planning for kidneydisease - Nephrosis, Nephritis
Meal planning for Cancer and AIDS.

Text Books:

Anderson, L et.al., Nutrition in Health and Disease, Seventh edition, J.B. Lipincott& Co. Philadelphia.

Anita F. P.(2002) Clinical Dietetics and Nutrition, Fourth Edition, Oxford University Press, Delhi.

Mahan, L. K. and Arlin, M. T (1972) Kranse's Food, Nutrition and Diet Therapy. 8th edition, W. B. Saunders Company, London.

References:

Robinson. C.H. et.al., (1986) Normal and Therapeutic Nutrition, Seventh edition, Mac Milian Publishing Co.USA

Raheena, B (2009) A Textbook of Food, Nutrition and Dietetics, Sterling Publishers, New Delhi.

Joshi, S. A (1998) Nutrition and Dietetics, Fourth edition, Tata McGraw Hill Publications, New Delhi.

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FSN 3619 FOOD BIOTECHNOLOGY (6hrs/wk) (6cr)

This course helps to enable the students to understand the basic principles of biotechnology and application of the knowledge of biotechnology for the development of new food products.

Unit-I:Introduction to biotechnology: Genetically modified foods-Definition, examples of GM foods, advantages, disadvantages and safety aspects of foods produced by genetic engineering.

Unit-II: Food fermentation: Concept of microbial fermentation; fermentation process: Dual and multiple fermentation, continuous fermentation and batch fermentation; factors controlling fermentation.

Unit-III:Fermented food products: Beer, wine, vinegar, sauerkraut, tempeh, soya sauce, cheese and bread Preparation.

Unit-IV:Enzymes in food processing industries: Principles of enzyme immobilization: Types of immobilization techniques and their importance; Immobilized enzymes in food processing.

Unit-V:Biotechnology for Food Production: History, developments, current status of transgenic crops -Crop improvement and enhanced agronomic performance- Food products with enhanced shelf-life, processing and functional quality- Nutritional enhancement-macro and micro-nutrients.

Text Books:

Mary, k. et.al., (2000) Essentials of functional foods, Culinary and Hospitality Industry Publication Services.

Israel Goldberg (2001) Functional foods, Pharma foods and Nutraceuticals, Culinary and hospitality Industry Publication Services.

Robert Easy Wildman (2001) Handbook of Nutraceuticals and functional foods, Culinary and Hospitality Industry Publication Services.

References:

Owen Pward (1989) Fermentation Biotechnology Principles, Processes and Products, Prentice H New Jersey.

Dubey, R.C (2001) Text Book of Biotechnology, S.Chand and Co. Ltd, New Delhi.

Frazier and West Hoff (1996) Food Microbiology, Tata Mc Graw Hill Publishing Company Ltd, New Delhi.

FSN 3621 FOOD SAFETY AND QUALITY CONTROL (6hrs/wk) (6cr)

This course enables students to gain knowledge on food safety and food laws and study about quality control and common food standards.

Unit-I:Food safety: Meaning of food safety Importance of Food: Quality and safety for developing countries. Patent: Definition, requirements, patent law in India, administrator, need for patent system, advantages, precautions to be taken by applicants, patent procedures, non-patentable. Food Hazards: Physical, Chemical, Biological hazards associated with food types. Effect of processing and storage on microbial safety.

Unit-II:Quality control: Objectives, Importance, functions of quality control, stages of quality control in food industry. Food Quality Assurance: Design of company quality assurance program, Microbiological concerns. Managing quality in supply chain and marketing of food products.

Unit-III:Food adulteration: Adulteration of food - common adulterants and tests to detect common adulterants. Cereals and products - bread, biscuits, cakes products. Fruits Products: Jam, juices, squashes, ketchup, sauce. Oils and Fats: Coconut oil, groundnut oil, palm oil, sunflower oil, Vanaspati. Milk and Products: Skimmed milk powder, partly skimmed milk powder, condensed sweetened milk. Other products - coffee, tea, sugar, honey, toffees.

Unit-IV:Hygiene and Sanitary Practices: Personal Hygiene - Health Requirements - Location and Surroundings of Food Industry - Slaughter House - Good Manufacturing Practices - Good Food Hygiene Practices - Storage.

Unit-V:National and International laws: FAO/WHO, FSSAI Codex Alimentarius commission, fair average quality (FAQ) specification for food grains, ISO 22000 series. HACCP: Background, current status, structured approach, principles, benefits and limitation. Consumer Protection Act (CPA).

Text Books:

Sather A.Y (1999) A first course in food analysis, New Age Publications, New Delhi.
Potter N and Joseph.H (1996) Food Science CBS Publishers, New Delhi.
M.Swaminathan (1995) Food Science, Chemistry and Experimental Foods, The Bangalore Printing & Publishing Co. Ltd, Bangalore.

References :

The Bureau of Indian Standards Act, 1986
Desrosier and Desrosier (1999) Technology of food preservation,4th edition, CBS Publishers. New Delhi.

FSN 30

FSN 3618 BAKERY AND CONFECTIONARY (6hrs/wk) (6cr)

This course provides the opportunity for the students to study and understand the fundamentals of baking and learn the technologies behind bakery products. The main aim is to understand industry trends.

Unit-IBakery industry: Current status, growth rate, and economic importance of Bakery Industry in India. Product types, nutritional quality and safety of products, pertinent standards & regulations.

Unit-IIBread, buns and pizza base: Ingredients & processes for breads, buns, pizza base, Equipments used, product quality characteristics, faults and corrective measures. Cakes - Ingredients and processes for cakes, Equipments used, product quality characteristics, faults and corrective measures. Different types of icings.

Unit-IIIBiscuits, cookies and crackers: Ingredients & processes, Equipments used, product quality characteristics, faults and corrective measures.

Unit-IVModified bakery products: Modification of bakery products for people with special nutritional requirements e.g. high fiber, low sugar, low fat, gluten free bakery products.

Unit-VBreakfast cereals, macaroni products and malt: Production and quality of breakfast cereals, macaroni products and malt.

Text Books:

Dubey, S.C (2007) Basic Baking 5th edition. Chanakya Mudrak Pvt. Ltd. New Delhi.

Raina et.al. (2003) Basic Food Preparation-A complete Manual. 3rd edition, Orient Longman Pvt. Ltd. USA.

Manay, S and Shadaksharaswami, M. (2004) Foods: Facts and Principles, New Age Publishers. New Delhi.

Barndt R. L. (1993) Fat & Calorie – Modified Bakery Products, Springer USA.

References:

Samuel A. Matz (1999). Bakery Technology and Engineering, PAN-TECH International Incorporated ltd., Taiwan.

FaridiFaubion (1997). Dough Rheology and Baked Product Texture, CBS Publications. New Delhi.

Samuel A. Matz (1992). Cookies & Cracker Technology, Van Nostrand Reinhold.USA

FSN 3622 HEALTH AND FITNESS (6hrs/wk) (6cr)

This course enables the students to learn about the terms related to health and fitness and to comprehend the interaction between fitness and nutrition.

Unit-I:Health: Concept of Health, changing concepts definitions of health, dimensions of health, concept of wellbeing, spectrum of health, determinants of health, ecology of health, right to health, responsibility for health, indicators of health.

Unit-II:Exercise and health related fitness: Health related fitness, health promotion, physical activity for health benefits. Sports related fitness: Role of nutrition in sports, nutrition to athletic performance.

Unit-III:Body weight and composition for health and sports: Ideal body weight, values and limitations of the BMI, composition of the body, Diet during training, prior to competition, during Dietary supplements after competition for sports.

Unit-IV:Exercise performance: Energy expenditure during physical activity, carbohydrate metabolism and performance, fat metabolism and performance, effect of exercise on protein requirements, physique and sports performance.

Unit-V:Exercise programmes: Resistance exercise training, aerobic exercise, types of exercise, effective for weight contrast, - dieting or exercise, weight reduction programme for young athletes.

Text books:

K. Park, (1997) Test book of Preventive and Social Medicine, Fifteenth edition, MIS BanarsidasBhano Publishers, Jabalpur.

Melvin H.Williams (2005) Nutrition for Health, fitness and Sports, Seventh edition, MC Graw Hill international Edition, USA

MichealJ.et.al., (2004) Nutrition and Metabolism, Blackwell Publishing Company, Bangalore.

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FSN 3624 PUBLIC HEALTH NUTRITION (6hrs/wk.)

The course is designed to enable the students to understand the importance of nutrition in national progress and the significance of assessment of nutritional status. The course also aims to recognize the solutions to overcome problems of malnutrition in the community and the role of national and international agencies in this area.

Unit-I:Nutrition and Health in National Development: Malnutrition- meaning. factors contributing to malnutrition, over nutrition. Nutritional disorders- Epidemiology, clinical features, prevention and dietary treatment for Protein Energy malnutrition, nutritional anaemias & vitamin deficiency disorders. Methods of assessing nutritional status: Sampling techniques, Identifications of risk groups, Direct assessment - Diet surveys, anthropometric, clinical and biochemical estimation, Indirect assessment- Food balance sheet, ecological parameters and vital statistics.

Unit-II:Improvement of nutrition of a community: Modern methods of improvement or nutritional quality of food, food fortification, enrichment and nutrient supplementations. Nutrition education themes and messages in nutrition and health, Antenatal and postnatal care.

Unit-III:Nutritional and infection relationship: Immunization and its importance, Food borne infection and intoxication diseases, foods involved, methods of prevention, Infestation of food borne diseases, Outbreak, Prevention signs and control of infection.

Unit-IV:National and International agencies in uplifting the nutritional status: WHO, UNICEF, CARE, ICMR, ICAR, CSIR, CFTRI. Various nutrition related welfare programmes, ICDS, SLP, MOM, and others (in brief).

Unit-V:Community nutrition programme planning: Identification of problem, analysis of causes, resources constraints, selection of interventions, setting a strategy, implementations and evaluation of the programme.

Text Books:

Dandiya, P.C, and Zafer, Z.Y.(2003) Health education and community pharmacy, Vallabh Prakashan Printers, New Delhi.

Khader, V. (2003) Foods,Nutrition and Health, Kalyani Publishers, New Delhi.

Park. K, (2005) Park's Textbook of Preventive and Social Medicine, 18th edition, BanarsidasBhanot Publishers, Jabalpur.

Reddy, R.S. (1998) Nutrition Education, Commonwealth Publishers, New Delhi.

References:

Bamji, M.S, Rao, N.P and Reddy, V. (2003), Textbook of Human Nutrition, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.

Srilakshmi, B. (2004) Nutrition Science, New Age International Pvt. Ltd, New Delhi.

Gibney, M.J, Margetts, B.M, Kearney, J.M and Arab, L. (2005). Public Health Nutrition, Blackwell Publishing, USA.

Ramachandran, L. and Dharmalingam, T. (2005) Health Education, Vikas Publishing House Pvt. Ltd., New Delhi.

FSN 3203 **OBESITY MANAGEMENT** **(3hrs/wk) (2cr)**
(Life Skill Course)

This course describes the health risks and problems associated with obesity. It differentiates the theories of obesity through which the students will learn the role of nutrition/diet in the treatment of obesity. The need of physical activity and exercise are also stressed in this paper. The behavioral theory also applies to weight loss.

Unit-I:Introduction to obesity: Introduction, aetiology, genetic factors-age, sex, eating habits, physical activity, stress, endocrine factors-trauma, prosperity and civilisation. Physiology of obesity.

Unit-II:Theory of obesity: Fat cell theory, set point theory, Leptin. Regional distribution of adipose tissues, metabolic changes,

Unit-III:Assessment: Body weight Measurement-body mass index (BMI)- waist circumference-Measurement of body fat. Ponderal index, waist- hip ratio.

Unit-IV:Treatment: Diet therapy, principles of dietetic management - glycaemic index physical exercise, stress management, pharmaco therapy, behaviour therapy, weight loss surgery.

Unit-V:New trends in nutrition: Introduction-health-specific meals. Fast food-junk foods. Convenience foods-types.

Text Books:

Srilakshmi, B. (2005). Dietetics, New Age International Publishers, New Delhi
Swaminathan. M (1979) Food Science and Experimental foods. Ganesh and Co, Madras.
SunetraRoday(2007) Food Science and Nutrition,2nd edition, oxford higher education publishers. New Delhi.

References:

Bamji, M.S, Rao, N.P and Reddy, V. (2003), Textbook of Human Nutrition, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
Srilakshmi, B. (2004), Nutrition Science, New Age International Pvt. Ltd, New Delhi.
Gibney, M.J, Margetts, B.M, Kearney, J.M and Arab, L. (2005). Public Health Nutrition, Blackwell Publishing, USA.

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FSN 3204 **FOOD ADDITIVES** **(3hrs/wk) (2cr)**

(Life Skill Course)

The students will attain an in depth understanding of the Chemical additives added to a food, importance of additives in maintaining or improving food quality, to know the limits of addition as prescribed by FAO/WHO and PFA and develop knowledge on newer additives with improved safety standards.

Unit I:Food additives: definitions, classification and functions, need for food additives application, safety concerns, regulatory issues in India – Leavening agent, Humectants and Acidulants, pH Control agents, Buffering Salt, Anticaking agents.

Unit II:Colouring agents: natural colorants, applications and levels of use, Artificial Colorants sources, applications and levels of use, misbranded colors, color stabilization.

Unit III:Flavouring agents: flavors - natural and synthetic flavors, flavor enhancers, flavor stabilization, flavor encapsulation, Emulsifiers

Unit IV:Sweeteners: natural and artificial sweeteners, nutritive and non-nutritive sweeteners, properties and uses of saccharin, acesulfame-K, aspartame, corn sweeteners, invert sugar sucrose and sugar alcohols (polyols) as sweeteners in food products.

Unit-V:Contaminants and Regulations: Contamination in Food - Physical, chemical (heavy metals, pesticide residues, antibiotics, veterinary drug residues, dioxins, environmental pollutants, radionuclides, solvent residues, chemicals Natural toxins. Food Laws and Regulations- Codex, HACCP, ISO, FSSAI etc.

Text Books:

Food additives by Brannen A.L., Davidson P.M., Salminen S. and Thorngate J.H. Second Edition, Revised and Expanded. Marcel dekker Inc. USA, 2002.
Handbook of Food additives by Thomas Furia,
Watson, D.H. (1998) Natural Toxicants in Food, CRC Press, USA.

References:

Duffus, J.H., and Worth, H.G. J. (2006) Fundamental Toxicology, The Royal Society of Chemistry.UK.
Stine, K.E., and Brown, T.M. (2006) Principles of Toxicology, CRC Press. USA.
Tönu, P. (2007) Principles of Food Toxicology. CRC Press, USA.