

THE GANDHIGRAM RURAL INSTITUTE –DEEMED TO BE UNIVERSITY

**MINISTRY OF EDUCATION (SHIKSHA MANTRALAYA), GOI
ACCREDITED BY NAAC WITH ‘A’ GRADE (3rd Cycle)**

**GANDHIGRAM - 624302,
DINDIGUL DISTRICT, TAMIL NADU**

DEPARTMENT OF HOME SCIENCE



**M.Sc. FOOD SCIENCE AND NUTRITION
SYLLABUS
(With effect from September 2021)**

**DEPARTMENT OF HOME SCIENCE
SCHOOL OF SCIENCES
GRI (DU), GANDHIGRAM -624302
SEPTEMBER**

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PEO 1	Create knowledgeable, skilful and competent workforce to manage available resources at family/community to establish holistic society.
PEO 2	Equip the learners with scientific knowledge in food handling, processing, quality control and assurance
PEO 3	Acquire skills required for menu planning, preparation of normal and therapeutic diet
PEO 4	Practice the profession with a set code of ethics and values

PROGRAMME OUTCOME (PO)

PO 1	Acquire indepth knowledge in areas of food science, biochemistry and food microbiology
PO 2	Gain analytical skills in the field of Food Science and Nutrition
PO 3	Enable the students to learn the methods of assessing human nutritional requirements, nutritional assessment and diet planning
PO 4	Analyse and evaluate the quality of food ingredient (s) and processed products in compliance with food laws and standards
PO 5	Formulate diet to meet the nutrient requirements of the individuals at normal, ill, critical and emergency conditions.
PO 6	Disseminate food and nutrition information effectively to the general public
PO 7	Acquire skills to undertake systematic research in the area of food science and nutrition
PO 8	Understand the applications of nutritional sciences in clinical interventions, communication for health promotion, food service management, food science and processing
PO 9	Conduct awareness programmes to address nutrition related health issues and devise strategies to combat nutritional disorders/diseases.
PO 10	Practice nutrition care in collaboration with other health-care providers in interdisciplinary settings within the bounds of ethical, legal, and professional practice standards.

PROGRAMME SPECIFIC OUTCOME (PSO)

PSO 1	Apply the basic principles of food science and nutritional sciences for the welfare of the community
PSO 2	Critically evaluate the problems prevailing in community and food industry
PSO 3	Extend the knowledge gained in Food Science, Food Processing, Dietetics and Nutrition to address the problems
PSO 4	Design projects in formulation of new food products of therapeutic importance and supplements for well being
PSO 5	Enable to pursue Higher education and Research in the area of Food Science and Nutrition
PSO 6	Acquire skills to establish startups related to food products, diet kitchens and Food Business Organizations
PSO 7	Apply the knowledge gained from the domain areas for clinical intervention, diet planning and communication for health promotion, food service management and food processing and preservation

**M.Sc. FOOD SCIENCE AND NUTRITION
SCHEME OF INSTRUCTION AND EVALUATION**

S.NO	Course Code	Title of the Paper	Credits	Contact Hours			Max. Marks		
				T	P	Total	CFA	ESE	Total
I SEMESTER									
1.1	21FSNP0101	Applied Physiology	4	4	0	4	40	60	100
1.2	21FSNP0102	Nutritional Biochemistry	4	4	0	4	40	60	100
1.3	21FSNP0103	Applied Physiology and Nutritional Biochemistry practicals	2	0	4	4	60	40	100
1.4	21FSNP0104	Advanced Food Science	4	4	0	4	40	60	100
1.5	21FSNP0105	Advanced Nutrition	4	4	0	4	40	60	100
1.6	21FSNP0106	Advanced Food Science and Nutrition Practicals	2	0	4	4	60	40	100
1.7	21FSNP0107	Field visit/Industrial visit	2	-	-	-	50	-	50
1.8		Gandhi in Everyday Life	2	2	-	2	50	-	50
		Total	24	18	8	26			700
II SEMESTER									
2.1		Research Methods and Statistics	4	4	0	4	40	60	100
2.2	21FSNP0208	Food Microbiology and Safety	4	4	0	4	40	60	100
2.3	21FSNP0209	Food Processing Technology	4	4	0	4	40	60	100
2.5	21FSNP0210	Food Processing Technology Practical	2	0	4	4	60	40	100
2.4	21FSNP0211	Nutrition through Lifecycle	3	3	0	3	40	60	100
2.6	21FSNP02GX	Generic Electives	3	3	0	3	40	60	100
2.7		Communication & Soft skills	2	2	-	2	50	-	50
2.8	21FSNP0212	Summer Internship/Mini Project*	2	-	-	2	50	-	50
		Total	24	20	4	26			700
III SEMESTER									
3.1	21FSNP0313	Therapeutic Nutrition	4	4	0	4	40	60	100
3.2	21FSNP0314	Therapeutic Nutrition Practicals	2	0	4	4	60	40	100
3.3	21FSNP0315	Food Product Development and marketing	4	4	0	4	40	60	100
3.4	21FSNP0316	Food Product Development and marketing Practical	2	0	4	4	60	40	100
3.5	21FSNP0317	Nutrition in critical care	4	4	0	4	40	60	100
3.6	21FSNP03DX	Discipline Centric Electives	3	3	0	3	40	60	100
3.7	21FSNP03MX	Modular Course	2	2	0	2	50	-	50
3.8	21EXNP03V1	Village Placement Programme	2	-	-	-	50	-	50
		Total	22	17	8				700
IV SEMESTER									
4.1	21FSNP03MY	Modular Course	2	2	0	2	50		50
4.2	21FSNP0418	Public Health Nutrition	4	4	0	4	40	60	100
4.3	21FSNP0419	Functional Foods and Nutraceuticals	4	4	0	4	40	60	100
4.4	21FSNP0420	Internship –II**	4	-	-	4	100	-	100
4.5	21FSNP0421	Dissertation	6	0	12	12	75	75+50	200
4.6	21FSNP0422	Ethics in Food and Nutrition Research	4	4	0	4			
		Total	24	14	12	30			

*IISemesterBreak, **IV SemesterBreak

Gross Total of I +II + III+ IV Semester credits= 24+24+22+24=94

ii. Modular Courses

S.No	Course Code	Course Title	Credits	Contact Hours	CFA	ESE	Total
1	21FSNP03M1	Food Dehydration	2	2	50	-	50
2	21FSNP03M2	Computer Applications in Nutritional Sciences	2	2	50	-	50
3	21FSNP04M3	Nutrition Counselling	2	2	50	-	50
4	21FSNP04M1	Fitness Nutrition	2	2	50	-	50
5	21FSNP04M2	Nutritional Assessment	2	2	50	-	50
6	21FSNP03M3	Food Quality Evaluation	2	2	50	-	50

iii. a. Discipline Specific Elective Courses

S.No	Course Code	Title of the course	Credits	Contact Hours	CFA	ESE	Total
1	21FSNP03D1	Instruments for Food Analysis	3	3	40	60	100
2	21FSNP03D2	Nutrigenomics & Nutrigenetics	3	3	40	60	100
3	21FSNP03D3	Family and Community Science	3	3	40	60	100
4	21FSNP03D4	Food Service Management	3	3	40	60	100
5	21FSNP03D5	Food Toxicology	3	3	40	60	100
6	21FSNP03D6	Food Quality Control and Assurance	3	3	40	60	100
MOOC/NPTEL COURSES CAN BE OPTED BY THE STUDENT							

iii. b. Generic Elective Courses

S.No	Course Code	Title of the course	Credits	Contact Hours	CFA	ESE	Total
1	21FSNP02G1	Culinary Nutrition	3	3	40	60	100
2	21FSNP02G2	Nutrition for Health	3	3	40	60	100
3	21FSNP02G3	Food Preservation	3	3	40	60	100
4	21FSNP02G4	Nutrition Therapy in Non-Communicable Diseases	3	3	40	60	100

VALUE ADDED COURSES

S.No	Course Code	Title of the course	Credits	Contact Hours	CFA	ESE	Total
1	21FSNP0VA1	Designing of Diet	2		50	-	50
2	21FSNP0VA2	Art of Baking	2		50	-	50
3	21FSNP0VA3	Food Preservation	2		50	-	50
4	21FSNP0VA4	Food Laws and Adulteration	2		50	-	50

iv)MajorCourses

S.No.	Coursecode	CourseTitle	Credits		Total
			T	P	
1.	21FSNP0101	AppliedPhysiology	4	0	4
2.	21FSNP0102	NutritionalBiochemistry	4	0	4
3.	21FSNP0103	AppliedPhysiologyandNutritionalBiochemistryPracticals	0	2	2
4.	21FSNP0104	AdvancedFoodScience	4	0	4
5.	21FSNP0105	AdvancedNutrition	4	0	4
6.	21FSNP0106	AdvancedFoodScienceandNutritionPracticals	0	2	2
7.	21FSNP0208	FoodMicrobiologyandSafety	4	0	4
8.	21FSNP0209	FoodProcessingTechnology	4	0	4
9.	21FSNP0210	FoodProcessingTechnologyPracticals	0	2	2
10.	21FSNP0211	NutritionthroughLifecycle	3	0	3
11.	21FSNP0313	TherapeuticNutrition	4	0	4
12.	21FSNP0314	TherapeuticNutritionPracticals	0	2	2
13.	21FSNP0315	FoodProductDevelopment andMarketing	4	0	4
14.	21FSNP0316	FoodProductDevelopmentandMarketingPracticals	0	2	2
15.	21FSNP0317	NutritioninCriticalCare	4	0	4
16.	21FSNP0418	PublicHealthNutrition	4	0	4
17.	21FSNP0419	FunctionalFoodsandNutraceuticals	4	0	4
18.		ResearchMethodsandStatistics	4	0	4
19.	21FSNPO107	Fieldvisit/Industrialvisit	-	-	2
20.	21FSNP0212	SummerInternship-I/MiniProject*	-	-	2
21.	21FSNP0420	Internship-II**	-	-	4
Total=			51	10	69

CORE PAPER- APPLIED PHYSIOLOGY

Code:21FSNP0101 Credits: T4+P0 Hours/week:4Marks: 100

Learning Objectives: To

1. Understand the structure and functions of systems in human body.
2. Acquire knowledge on the integrated function of all systems and disease conditions.

Learning Outcomes:

On successful completion of this course the student will be able to:

- ✓ Address the structure and functions of systems in human body.
- ✓ Integrate the functions of all the systems and disease conditions.

Course Content

UNIT I

Cell structure and function: A review of levels of cellular organization and functions: organelles, tissues, organs and systems. Cell membrane, transport across cell membrane and intercellular communication. Structure and function of bone, cartilage and connective tissue.

Digestive system: Review of structure and function (brief). Role of liver, gall bladder, pancreas and their functions in absorption. Regulation of nutrient intake and food selection. Meal related gastric secretion- Cephalic, Gastric, Inhibitory, Gastric emptying and regulation

UNIT II

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

Excretory system: Review of structure and functions. Nephron-Structure and functions. Urine formation. Role of kidney in maintaining pH of blood. Water - acid base balance, diuretics. Skin and its structure, regulation of body temperature.

UNIT III

Circulatory system: Structure and functions of heart and blood vessels. Blood: Composition- plasma, blood cells, haemoglobin, blood clotting

process. Heart: Beat initiation, conduction and regulation. Cardiac cycle
E.C.G. & its interpretation, Heart rate & regulation, physiology of circulation.
Lymphatic system.

Erythropoiesis-Role of various hormones in controlling Erythropoiesis.
Pathophysiology- Anemias, Iron deficiency anemia, etiology and
classification. Castle's experiment- Pernicious anemia, causative factors,
extrinsic, intrinsic factors. Folic acid and B12 deficiency methylation,
megaloblastic anemia, clinical features, prevention of B12 deficiency. Patho-
physiology of Jaundice

Immune system: Cell mediated and humoral immunity. Activation of WBC and
production of antibodies. Role in inflammation and defense. Effects of Vitamins on
immune response. Cell mediated and humoral immunity – impact of malnourishment
and auto immune disease.

UNIT IV

Endocrine system: Endocrine glands – Pituitary, thyroid, adrenals, pancreas-
hormones of endocrine glands-its functions and role. Disorders of endocrine glands.

Reproductive system: General anatomy of female and male reproductive system.
Menstrual cycle, spermatogenesis, Oogenesis, process of reproduction, Pregnancy
and parturition.) Mammary glands- structure and lactation. Physiological changes in
Menopause. Role of hormones, home based nutrition to combat menopause.

UNIT V

Nervous system: Review of CNS & ANS, function of neuron, conduction of nerve
impulse, synapse, role of neurotransmitters. 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
perception of stimuli.

Text Books:

1. Sarada Subramanyam, Madhavankutty . K and Singh .H.D (2001). Textbook of
Human Physiology, S.Chand & company Ltd, New Delhi.
2. Pal G.K and Pal Pravati (2016) Comprehensive Textbook Of Medical Physiology
(2 Vols) Publisher: Jaypee Brothers Medical Pub (P) Ltd.) ISBN: 5551234080758
3. Evlync. Pearce, (1997). Anatomy and Physiology for nurses, 16th Edition, New Delhi.
Jaypee Brothers.

4. Mariakuttikan A, Arumugam N (2010). Animal Physiology, SarasPublications.
5. K.Sembulingam and Premasembulingam (2012).Essential of Medical Physiology,6th Edition,JaypeeBrohers Medical Publishers (p)Ltd.
6. Ganong W.F.(2003)-Review of Medical Physiology.21st ed. McGraw Hill.
7. Moran Campell E.J., Dickinson, C.J., Slater, J.D., Edwards, C.R.W. and sikora, k.(1984):ClinicalPhysiology,5thEdition,ELBS,BlackwellScientificPublications.
8. Guyton, A.C,(1985): Function of the Human body, 4th Edition , W.B. Sanders Company,Philadephia.
9. Guyton,A.C,andHall,J.B.(2020):TextBookofMedicalPhysiology, 3rd edition; Elsevier Health Science
10. Wilson, K.J.W. and Waugh, A. (1996): Ross and Wilson Anatomy and Physiology in Health and Illness, 8th Edition, ChurchillLivingstone.
11. McArdle, W.D., Katch, F.I. and Katch, V.L. (1996): Exercise Physiology. Energy, NutritionandHumanperformance,4thEdition,Williamsandwilkins,Baltimore.
12. Jain A. K (2014) Human Physiology for BDS(5th Edition), \Publisher: Avichal PublishingCompany;ISBN:9788177394337

CORE PAPER - NUTRITIONAL BIOCHEMISTRY

Code: 21FSNP0102

Credits:T3+P0

Hours/Week:3

Marks: 100

Learning Objectives:To

1. understand the mechanisms adopted by human body for regulation of metabolic pathways
2. gain an insight into interrelationships between various nutrients metabolic pathways.

Learning Outcomes

on successful completion of these units, students are expected :

- ✓ To describe the concepts and chemistry of major nutrients
- ✓ To explain the macronutrient and nucleic metabolism and its bioenergetics
- ✓ To understand the role of antioxidants in prevention of degenerative diseases

UNIT – I

Biomolecules An overview of bio-macromolecules: **carbohydrates, lipids, amino acids, proteins and nucleic acids**. Definition, classification, structure and properties of glycoproteins and proteoglycans. Disorders of carbohydrate, lipid and amino acid metabolism.

Plasma proteins – classification, types, nature, properties and functions.

Enzymes: General properties, classification, co-enzymes and co-factors, kinetics of enzymes. Enzyme activation, inhibition, regulation, enzyme specificity, mechanism of action, multienzyme systems, isoenzymes, allosteric enzymes, and purification of enzymes. Application of enzymes in diagnostics (SGPT, SGOT, Creatine kinase & Alkaline phosphatase)

UNIT - II

Metabolism of major nutrients and its bioenergetics: carbohydrates– glycolysis, gluconeogenesis, citric acid cycle, hexose monophosphate pathway and their regulation and electron transport chain

Fat: Synthesis of fatty acids, phospholipids and cholesterol and β -oxidation of fatty acids, ketogenesis.

Protein metabolism- protein biosynthesis

UNIT- III

Nucleic acids chemistry and metabolism of nucleic acids: definition, components, nucleosides, nucleotides, structure of DNA and RNA, types of RNA, replication, transcription, Review of structure and composition of nucleic acids. **Purine and pyrimidine** – synthesis and breakdown. nucleic acids – DNA replication and transcription, DNA repair systems, Genetic mutation, regulation of gene expression.

UNIT IV

Hormones – regulation of endocrine system, classification of hormones according to their mechanism of action, mechanism of action of hormones Insulin and thyroxine **Minerals** – biological role of minerals.- Iron, Iodine, copper, cobalt, molybdenum, zinc, calcium, phosphorus and selenium. Detoxification and xenobiotics– metabolism of foreign compounds

UNIT - V

Free Radicals and Antioxidants– Definition, classification of antioxidants, generation of free radicals and role of antioxidants in prevention of degenerative disorders (cancer, CVD and Diabetes Mellitus).

References

1. Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W.(2000): 25th Ed. Harpers Biochemistry. Macmillan worth publishers.
2. Nelson, D.L. and Cox, M.M.(2000): 3rd Ed. Lehninger's principles of Biochemistry, Macmillan worth publishers.
3. Delvin, T.M.(1997): 4th Ed. Text Book of Biochemistry with clinical correlations, Wiley Liss Inc.
4. Stryer, L. (1998): 4th Ed. Biochemistry, WH Freeman and Co.
5. Conn, E.E., Stumpf, P.K., Bruening, G. NS Doi, R.H.(2001): 5th Ed. Outlines of Biochemistry, John Wiley and Sons.
6. Voet, D. Voet, J.G and pratt, C.W.(1999): Fundamentals of Biochemistry
7. Oser, B.L.,(1965) 14th ed. Hawk's Physiological Chemistry. Tata McGraw Hill Publishing Co. Ltd
8. Tietz, N.W. (1976) Fundamentals of Clinical Chemistry. WB Saunders Co.
9. [U. Satyanarayan](#)(2019). Biochemistry, 5th edition, New Central Book Agency (pvt) ltd,.

**CORE PAPER –APPLIED PHYSIOLOGY AND NUTRITIONAL BIOCHEMISTRY
PRACTICAL**

Code:21FSNP0103

Credits:T0+P2

Hours/Week:4

Marks: 100

Learning Objectives:To

1. understand the methods used for studying the physiological functions of the body
2. impart knowledge on analyses of selected constituent in blood and urine sample

Learning Outcomes:

On successful completion of these units, students are expected to :

- ✓ Comprehend the structure and function of the various organs of the body
- ✓ acquire the skill in collection of blood and urine samples for testing
- ✓ To develop the skill in handling analytical equipments
- ✓ To perform blood and urine analysis and also interpret the condition of the individuals based on the biochemical changes.

Experiment-I

1. Measurement of Pulse, BP and Oxygen Saturation
2. Study of permanent slides of GI organs
3. Estimation of Total Red Blood Cell count, White Blood Cell count
4. Blood grouping
5. Determination of Bleeding time
6. Determination of bleeding time
7. Estimation of haemoglobin
8. Recording of BP at rest and after exercise
9. Reading and interpretation of ECG

Experiment- II

1. Methods of collection of blood. Separation of serum and plasma
2. Estimation of glucose
3. Estimation of serum creatinine
4. Estimation of serum bilirubin
5. Estimation of serum albumin

6. Estimation of serumcholesterol
7. Estimation of serumurea
8. Estimation of total protein, AGRatio,
9. Estimation of SGPT /SGOT
10. Estimation of serum alkaline phosphatase or acidphosphatases

Experiment - III

1. Qualitative analysis of urine sugar, albumin, ketone bodies and bilesalts
2. Determination of Urine PH, Specific gravity
3. Estimation of Urine–Sugar, Albumin,Bilesalts,Calcium,Creatinine,Uriea and Uric acid

References

1. Ganong W.F.(2003)-Review of Medical Physiology.21st ed. McGraw Hill.
2. Guyton A.C. and Hall J.E.(2000)Textbook of Medical Physiology.10th ed. India: Harcourt Asia..
3. Tortora G.J and Grabowski S.R.(2000) Principles of Anatomy and Physiology.9th ed. John Wiley and Sons.Inc.
4. West J.B.(1996): Physiological Basis of Medical Practice.12th Edition. B. I. Waverly Pvt. Ltd.
5. H. Varley,GowenLock.A.H, Willian Heinemann :Practical Clinical Biochemistry , Medical books CBS publishers and Distributors Ltd, 5thEdition
6. Raphel : Lynch’s medical laboratory technology :, W B Saunders Copublication
7. Wootten: Micro analysis in Medical Biochemistry –Outline of Biochemistry - Coon andstump
8. J.Ochei and A. Kolhatkar:Medical laboratory science theory and practice, Tata MC Graw Hill publication, 4th Edition,2008.
9. Medical Laboratory Technology, , Tata MC Graw HillPublishers,1988.
10. Ramniksood :Text book of medical Laboratory technology, JAYPEE publisher,2006.
11. Manual of Medical Laboratory Techniques, , JAYPEE Publisher, 1st Edition,2008.
12. Ramakrishnan S, Sulochana K.N, Shankara S, M.K Ganesh, A Hemavathi: Laboratory Manual for practical Biochemistry, , JAYPEE publisher, 1st Edition, 2008.
13. [V.H.Talib](#):HandbookMedicalLaboratoryTechnology,CBSPublishers&Distributors (Dec 12008)

CORE PAPER - ADVANCED FOOD SCIENCE

Code:21FSNP0104 Credits:T3+P0

Hours/Week:4

Marks: 100

Learning Objectives:To

1. familiarize the students with changes occurring in various foodstuffs as a result of processing and cooking
2. enable the students to use the theoretical knowledge in various applications and food preparations.

Learning Outcomes:

On successful completion of this course the student will be able to apply:

- ✓ The characteristics and behaviour of food constituents during processing
- ✓ The changes in physiochemical and functional properties of food constituents due to processing

Course Content

UNIT I

Constituents of Foods: Structure and properties of water and ice; Types of water; Sorption phenomena; Water solution interactions; Phase transition of foods containing water; heat transfer during processing; relationship between viscosity and temperature; Water activity and food spoilage; Food dispersion: Colloidal system, and rheology of food dispersions; Structure, formation and stability of gels, sols, emulsion and foams.

UNIT II

Polysaccharides, Sugars and Sweeteners: Structure and composition of starch; Properties and characteristics of food starches; Effect of heat on food starch properties and the factors influencing gelatinization and dextrinisation changes; Modified food starches; Structure, composition and characteristics of non-starch polysaccharides such as cellulose, hemicellulose, pectin and gums; Role of starch and non-starch polysaccharides in food and industrial applications; Properties of sugars and sweeteners: Sugars, syrups, sugar alcohols, potent sweeteners, sugar products; Role of sweetener in food products.

UNIT III

Proteins and Enzymes: Amino acid - types and their properties; Structure and composition of proteins; Classification and properties of proteins; Effect of heat on physio-chemical properties of proteins; Role of proteins in food products; Texturized vegetable protein, protein concentrate and isolates preparation methods; Enzymes: Classification and its nature; Mechanism of action; Factors influencing enzyme activity; Role of enzymes in food products; Immobilized enzymes and its application in food industries.

UNIT IV

Fat/Oil: Structure and composition of fat; properties of fat, Oil composition and the properties; Methods to determine the quality of fat/oil; Quality changes in fat/oil during storage and prevention of fat spoilage; Role of fat/oil in food products; Fat substitutes. role of food lipids in flavor, physiological effects of Lipids.

UNIT V

Food Colours and Flavours: Pigments classification, structure and properties; Effects of processing on stability of pigments in foods and the factors influencing stability of colours in foods; Role of colours in food products; Flavors: Taste and nonspecific saporous sensations, Flavour compounds in vegetables, fruits and spices; role of flavours in food. Effect of processing on food flavours and the concept of microencapsulation

References

1. Srilakshmi, B. (2018). Food Science, Eleventh edition, New Age International (P) Ltd., Publishers, New Delhi.
2. Desrosier, N.W. and James N. (2007). Technology of food preservation. AVI Publishers.
3. Potter, N. and Hotch Kiss, J.H. (2007): Food Science, Fifth edition, CBS Publishers and Distributors, New Delhi
4. Julians, B.O. (1985). Rice Chemistry and Technology, 2nd edition, American Association Chemists, St. Paul Mimesota, USA.
5. Charley, H. (1982). Food Science, 2nd edition, John Wiley & Sons, New York.
6. Arthey, D. and Ashurst, P.R. (1996). Fruit Processing, Blackie Academic & Professional, London
7. Meyer, L.H. 1974. Food Chemistry, AVI Publishing Co. Inc,
8. Manay, S. and Shadaksharamasamy, Food: Facts and Principles, New Age International (P) Publishers, New Delhi.

Advanced Nutrition

Code: 21FSNP0105

Credits: T3+P0

Pd/Wk: 4

Marks: 100

Learning Objectives: To

1. highlight the physiological and metabolic role of nutrients and their relationship to human health and wellbeing.
2. understand the health problems associated with nutrients deficiency or toxicity
3. plan and prepare the nutritional challenges during travel to extreme conditions such as hot, cold, high altitude and space.

Learning Outcomes:

On successful completion of the course, the student would know

- Acute and chronic nutritional problems
- physiological changes in human body during exposure to extreme climatic conditions
- the role and importance of nutrition management in exercise and sport performance
- the coping mechanism of human body during high altitude and sea travel
- the preparedness and nutrition management during emergencies

Course content

UNIT I

Macro nutrients:

Energy: Energy requirements of individuals and groups: RDA, principles and the methods used for RDA measurement. Concept of energy balance, energy input and expenditure; Measurement of energy input and expenditure; factors influencing energy expenditure.

Carbohydrate, Protein, Lipid & Dietary fibre: Physiological functions, digestion, absorption, metabolism and utilization, food sources, requirements.

Water: Physiological functions, digestion, absorption, metabolism and utilization, food sources, requirements.

UNIT II Micronutrients

Vitamins: Physiological functions, digestion, absorption, metabolism and utilization, food sources, requirements, deficiency and toxicity.

Minerals: Physiological functions, digestion, absorption, metabolism and utilization, food sources, requirements, deficiency and toxicity.

UNIT III Exercise and Sports Nutrition

Meaning of exercise and physical activity, type of activities, effect of physical activity and exercise on body system; energy systems during exercise; Energy cost of exercise; Nutrition management during exercise.

Sports Nutrition: Need and scope of sports nutrition; Preparation for competition such as pregame meal, meal during game and post game meal; Concept of carbohydrate loading and the methods of carbohydrate loading; Nutrition management during sports/game; Ergogenic aids in sports.

UNIT IV: High altitude and space nutrition

Physiological changes due to high altitude; Acclimatization process; Altitude sickness and related health problems; Nutrient requirements and dietary management of mountaineers.

Space Nutrition: Need and scope for space travel; History of space travel; Physiological changes in astronauts; Nutrient requirement and dietary management during space travel.

UNIT V: Emergency nutrition

Nutrition in Emergencies: Need and importance; Types of emergency situations such as natural and manmade; Nutritional and health problems in emergencies; Control of communicable diseases through sanitation and immunization; Food distribution strategies; Nutrient requirement and dietary management during emergencies.

References:

1. Mahtab, S, Bamji, Kamala Krishnasamy, Brahman, G.N.V. (2019). *Text Book of Human Nutrition*, Fourth Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi.
2. Srilakshmi (2017). *Nutrition Science*. 6th edition, New Age International Pvt. Ltd, New Delhi.
3. Mahan L K and Escott – Stump S (2004). *Krause's Food Nutrition and Diet Therapy* 10th Ed WB Saunders Ltd
4. Shills, M.E., Olson, J., Shike, M. and Roos, C. (2005): *Modern Nutrition in Health and Disease*. 10th Edition .Williams and Williams. A. Beverly Co. London.
5. Ira Wolinsky (Ed) (2003): *Nutrition in Exercise and Sports*, 3rd Edition, CRC Press
6. Parizkova, J. *Nutrition, physical activity and health in early life*, Ed. Wolinsky, I. CRC Press
7. Goyet Fish, V., Seaman, J. and Geijer, U. (2008): *The Management of Nutritional Emergencies in Large Populations*, World Health Organisation, Geneva
8. WHO. (1997). *Applied health research priorities in complex emergencies*, Geneva
9. Young, H. and Jaspars, S. (1995). *Nutrition matters: People, food and famine*, Intermediate Technology Publications, London.
10. UNHCR. (1999). *UNHCR Handbook of emergencies*, 2nd edition, Geneva. UNHCR

CORE ADVANCED FOOD SCIENCE & NUTRITION - PRACTICAL

Code:21FSNP0106

Credits:T0+P2

Hours/Week:4

Marks: 100

Learning Objectives:To

1. understand the science behind cookery
2. explore the concept of food analysis

Learning Outcomes :

On successful completion of this course the student will be able to:

- ✓ Do various testing methods for determination of food constituents
- ✓ Know the influence of processing conditions on physiochemical properties of food constituents

Course contents:

ADVANCED FOOD SCIENCE

1. Effect of solutes on boiling point and freezing point of water
2. Effects of types of water on characteristics of cooked vegetables, pulses and cereals
3. Microscopic examination of plant starches and study the gelatinization on starch
4. Sugar cookery and the factors influencing the stages of sugar cookery
5. Physiochemical and functional properties of proteins
6. Preparation of protein concentrate/isolate
7. Role of fats in cookery as shortening agents in bakery products
8. Influence of heat on physicochemical properties of oil
9. Effect of acid, salt, alkali, heat and enzymes on pigments
10. Prevention of enzymatic browning reactions in cut fruits and vegetables

ADVANCED NUTRITION

1. Determination of energy value of foods by using bomb calorimeter
2. Estimation of energy requirements of an individual by factorial approach
3. Qualitative tests for determination of carbohydrate
4. Estimation of crude and dietary fibre content of the foods
5. Qualitative tests for protein
6. Estimation of protein content of foods by kjeldhal method
7. Estimation of crude fat content of foods by soxhlet method
8. Determination of vitamin C content of the foods
9. Estimation of dry matter content of the foods
10. Qualitative tests for determination of phytochemicals
11. Determination of antioxidant activity of foods

References

1. Srilakshmi (2017). Nutrition Science. 6th edition, New Age International Pvt. Ltd, New Delhi.
2. Shills, M.E., Olson, J., Shike, M. and Roos, C. (2005): Modern Nutrition in Health and Disease. 10th Edition .Williams and Williams. A. Beverly Co. London.
3. Mahan L K and Escott – Stump S (2004). Krause's Food Nutrition and Diet Therapy 10th Ed WB Saunders Ltd
4. SreeDevi.V. (1997). Nutrition Education. Discovery Publishing House, New Delhi.
5. Mahtab, S, Bamji, Kamala Krishnasamy, Brahmam, G.N.V. (2019). *Text Book of Human Nutrition*, Fourth Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi.

MSCFSN GRI

CORE PAPER- FOOD MICROBIOLOGY AND SAFETY

Code: 21FSNP0207

Credits:T3+P1

Hours/Week:4

Marks: 100 Learning C

1. Gain deeper knowledge of role of microorganism in humans and environment
2. Understand the role of microbes in food, health and disease.
3. Study the Microbes in relation to food spoilage, food borne diseases and food preservation.
4. Understand the concept microbiological safety in various food operations.

Learning Outcomes:

On successful completion of this course the student will be able:

- ✓ Explain the interactions between microorganisms and food environment, and factors influencing their growth and survival.
- ✓ Describe the characteristics of food borne, water borne and spoilage microorganisms, and methods for their isolation, detection and identification.
- ✓ Explain the effects of fermentation in food production and how it influences the microbiological quality and status of the food product.
- ✓ Correlate the importance of microbial safety in various food operations.

UNIT I

Introduction to Microbes in Foods: Bacteria, fungi, algae and yeast-their primary source in foods, morphology, cultural characteristics and biochemical activities. Factors affecting the growth of microorganisms in food; intrinsic and extrinsic parameters that affect microbial growth.

UNIT II

Microbes in foods- Contamination, preservation and spoilage of cereal and cereal products-flour, bread, pasta and Ready to use batters and doughs,

Vegetables and fruit products-contamination, preservation and spoilage of dehydrated, canned fruits and vegetables.

Meat and meat products- Contamination, preservation and spoilage of meat and meat products-sausages and dried beef, ham, poultry, meat pickles, sea foods(pickling of fish).

Milk and Egg products-butter, cheese, evaporated and condensed milk, curd. Eggs-dried eggs.

UNIT III

Beneficial role of food microbes : Fermentation meaning, advantages and limitations; Importance of microbes in food industry, prebiotics and probiotics, Single cell proteins Fermented food products from cereals, pulses, fruits and vegetables, milk and meat products, egg, fish and poultry etc.

Unit- IV

Food Borne Microbial Diseases: Public health hazards, Food borne infections and intoxications,

Symptoms, mode of transmission and methods of prevention, Emerging food pathogens.

Method of isolation and detection of microorganisms in food- Conventional methods, Rapid methods and Immunological methods, Microbiological evaluation criteria for various food products, Sampling plans and reporting procedures of risk.

UNIT V

Food Safety: Need and importance of food safety in food industries; Factors affecting food safety; Role of kitchen-hygiene, employee health and food plant hygiene in prevention of food spoilage and contamination; Regulatory authorities at local, district and national levels ensuring food safety in food industries. Indicator micro-organisms Concept of Food Safety Management System, GHP and GMP, HACCP, ISO 22000, Food Laws, Regulations and Standards.

x

Related Experience

1. Sterilization and Disinfection
2. Simple staining and Differential staining
3. Pure Culture Technique and Standard Plate Count Method
4. Microbiological Analysis For Water (Most Probable Number), Milk (Methylene Blue Reduction Test) , Curd and probiotic count.
5. Zone of Inhibition technique
6. Visit to a food microbiology laboratory

References:

1. Frazier, W.C. & Westoff, D.C. (2013). Food Microbiology. 5th Edition. Tata McGrawHill Publishing Co. Ltd. Garbutt, J. (1997). Essentials of Food Microbiology. Arnold London.
2. Jay, J.M., Loessner, D.A. & Martin, J. (2006). Modern Food Microbiology. 7th Edition. Springer Banwart, G.J. (2004). Basic Food Microbiology. 2 nd Edition. CBS Publishers and Distributors, India.
3. Pelczar, M.J., Chan, E.C.S., Krieg, N. (1993). Microbiology. 5th Edition. Tata McGrawHill Publishing Co. Ltd.

4. Prescott, L.M., Harley, J.P. & Klein, D.A. (2017). Microbiology. 10th Edition. Tata McGraw-Hill Publishing Co. Ltd. Mathur, P. (2018). Food Safety and Quality Control. 1st Edition. Orient Blackswan Private Ltd. India.
5. Forsythe, J.S. (2011). The Microbiology of Safe Food. 2nd Edition. Wiley-Blackwell Publishing.
6. Ravishankar, R. & Jamuna, B. (2015). Microbial Food Safety and Food Preservation. CRC Press, Boca Raton.
7. Manual of Methods of Analysis of Foods- Microbiological Testing. (2012). Lab Manual 14. FSSAI, GoI, New Delhi.
8. Dr. K. Vijaya Ramesh (2007). Food Microbiology. MJP Publishers, Chennai

Food Processing Technology

Code: 21FSNP0209

Credits: T3+P0

Pd/Wk: 4

Marks: 100

Learning Objectives:

Enable the students to

1. understand the science behind processing of foods and its impact on nutritive value of foods
2. provide in-depth knowledge on production of processed food products and the waste utilization techniques
3. understand the changes in physicochemical properties of foods due to processing conditions.

Learning Outcomes:

On successful completion of the course, the student would know

- the concepts and principles of food processing
- the processed food products from plant and animal sources and the production method
- the by-products from food processing and its utilization

Course content

Unit I Cereal Processing and Technology:

Structure, composition and nutritive value of cereal grains such as rice, wheat, maize, barley, oats and rye; Processing and milling of rice, wheat, maize, barley, oats and rye;

Millets: Structure, composition and nutritive value and processing of millets; Cereal Products of rice, wheat and maize; By products utilization; breakfast cereals and extrusion;

Effect of processing on nutritive value of cereals; changes in physiochemical properties of cereal starch and protein due to processing.

UNIT II Pulse Processing and Technology:

Structure, composition and nutritive value of pulses; processing of pulses; Pulse products: Dals, flours, texturized vegetable protein, protein concentrates, isolates and hydrolysates; Byproducts utilization;

Effect of processing on nutritive value and physiochemical properties of pulses.

Nuts and Oil Seeds Processing and Technology: Structure, composition and nutritive value of nuts and oilseeds; Oil extraction methods and refining process; byproducts utilization; Refined vegetable oil quality; Effect of processing on nutritive value and physiochemical properties of vegetable oils

UNIT III

Vegetables Processing and Technology:

Structure, composition and nutritive value of vegetables; post harvest changes in vegetables and storage; Preliminary processing of vegetables;

Vegetable products: Fermented and nonfermented and its shelf life; Vegetable waste utilization; Effect of processing on nutritive value and physiochemical properties of vegetables.

Fruits Processing and Technology: Structure, composition and nutritive value of fruits; post harvest changes in fruits and its storage; Concept of maturity, ripening and senescence; Fruit products: fermented and nonfermented; Effect of processing on nutritive value and physiochemical properties of fruits; Fruit waste utilization.

UNIT IV

Milk Processing and Technology:

Milk types, composition, physiochemical properties; Milk processing and its storage; Effects of processing on nutritive value and physicochemical properties of milk; Milk products: Fermented and non-fermented.

Egg Processing and Technology: Structure, composition and nutritive value of eggs; Egg quality evaluation methods; Egg processing and storage; Effect of processing on nutritive value and physiochemical properties of eggs; Egg products and its functionality.

UNIT V Meat Processing and Technology:

Meat types, structure, composition and nutritive value; Post mortem changes in meat; Meat processing and storage; Ageing and tenderization of meat;

Poultry: Muscle composition and nutritive value; Processing and storage of poultry meat; Preservation methods for poultry;

Fish composition and nutritive value; Selection criteria for fish; Processing and storage;

Meat products: Fermented and nonfermented; Byproducts utilization; Effect of processing on nutritive value and physiochemical properties of meat, poultry and fish.

References

1. Potter, N. and Hotch Kiss, J.H. (2007): Food Science, Fifth edition, CBS Publishers and Distributors, New Delhi
2. Julians, B.O. (1985). Rice Chemistry and Technology, 2nd edition, American Association Chemists, St. Paul Mimesota, USA.
3. Charley, H. (1982). Food Science, 2nd edition, John Wiley & Sons, New York.
4. Gould, G.W. (1995). New Methods of Food Preservation, Blackie Academic and Professional, London
5. Arthey, D. and Ashurst, P.R. (1996). Fruit Processing, Blackie Academic & Professional, London
6. Desrosier, N.W. and James N. (2007). Technology of food preservation. AVI Publishers.
7. Srilakshmi, B. 2005. Food Science, New Age International (P) Ltd., Publishers, New Delhi.

Food Processing Technology Practicals

Code:21FSNP0210 Credits: T0+P2

Pd/Wk: 4

Marks: 100

Practical

1. Market survey on processed foods available in the market
2. Preparation of cereal flours and determine its quality
3. Testing of wheat flour quality
4. Preparation of cereal based bakery products
5. Malting of cereals and pulses and evaluation of its quality
6. Extraction of vegetable pigment by solvent method
7. Minimal processing of fruits and vegetables
8. Drying of fruits and vegetables
9. Preparation of jam, squash, jelly
10. Preparation of flavoured milk
11. Preparation of panner
12. Preparation of ice creams
13. Evaluation of Egg quality
14. Visit to food processing industries

References

1. Srilakshmi, B. 2005. Food Science, New Age International (P) Ltd., Publishers, New Delhi.
2. Potter, N. and Hotch Kiss, J.H. (1996): Food Science, Fifth edition, CBS Publishers and Distributors, New Delhi
3. Julians, B.O. (1985). Rice Chemistry and Technology, 2nd edition, American Association Chemists, St. Paul Mimesota, USA.
4. Charley, H. (1982). Food Science, 2nd edition, John Wiley & Sons, New York.
5. Gould, G.W. (1995). New Methods of Food Preservation, Blackie Academic and Professional, London
6. Arthey, D. and Ashurst, P.R. (1996). Fruit Processing, Blackie Academic & Professional, Londo

CORE PAPER: NUTRITION THROUGH LIFE CYCLE

Code: 21FSNP0211

Credits:3 +0

Period/Week :3

Marks: 100

Learning Objectives:To

1. understand the nutrition requirements
2. understand the role of nutrition in difference stages of life cycle and meal planning

Learning Outcomes :

- Determine nutrient requirements/needs of individuals at different stages of life.
- Discuss the major nutrition related concerns at each stage of life.

Contents:

UNIT – I Nutrient in Pregnancy and Lactation

Nutritional status and general health, Physiological changes in pregnancy, Foetal under nutrition and consequences,Energy and calorie relationship in pregnancy weight gain ,Protein, vitamins and mineral nutrition in pregnancy ,Physiological adjustments during lactation, Diet of lactating women and nutritional requirements.

UNIT – II Nutrition during for infancy

Physiologic development, nutrient requirements composition of human milk and cows milk, Anti infective factors, formula preparation, weaning, supplementary and complementary feeding, growth monitoring, feeding and BW and premature infants.

UNIT – III Nutrition during preschool, children

Growth and development during preschool, children, adolescent, nutritional requirements, factors influencing food intake, nutritional concerns – PEM, Anemia, Dental caries, obesity, anorexia and bulimia

UNIT – IV Nutrition in adolescent and adult

Nutrition requirements during adolescent and adult age, physical activity and energy relationship, factors influencing food intake, nutritional concerns – Anemia, obesity, anorexia and bulimia

UNIT – V Nutrition in old age

Nutrition requirements during old age, physical activity and energy relationship, theories of aging, physiologic changes, nutritional needs, nutrition concerns – dysphagia and senility disorders, community nutrition programme for oldage.

References

1. Mahtab, S, Bamji, Kamala Krishnasamy, Brahmam, G.N.V. (2019). *Text Book of Human Nutrition*, Fourth Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi.
2. B. Srilakshmi,(2014) *Dietetics*, 7thedition,New Age international Private Ltd
3. 2. Antia .P.(1989) *Clinical Nutrition and Dietetics*, Oxford University, Mumbai.
4. Mahan, L.K. and Escott-Stump, S. (2007): *Krause's Food Nutrition and Diet Therapy*,12thEdition, W.B. Saunders Ltd.
5. Mayrice. E. Shills, James, A.Olsen, Moshe Shihe, (2012) *Modern Nutrition on Health and Disease*, Vol.1 & 2, 11th edition, Lea and Pediger, Philadelphia.
6. Davidson. S.S. Passmore, ,Martin A. Eastwood. F. (1989)*Human Nutrition and Dietetics*, 9th Edition F & S Lingstons Edinburgh and London
7. Longvah, T, Ananthan, R, Bhaskarachary, K, Venkaiah, K. (2017). *Indian Food Composition Tables (IFCT)*, Indian Council of Medical Research, National Institute of Nutrition, Hyderabad.
8. *Recommended Dietary Allowances and Estimated Average Requirements Nutrient Requirements for Indians – 2020. A Report of the Expert Group Indian Council of Medical Research National Institute of Nutrition.NIN,Hyderabad*

Summer Internship/Mini Project

Code: 21FSNP0212 Credits:2 +0 Period/Week :
Marks: 50

Learning Objectives

1. Acquire skills required to work in a food industry/hospital dietary department/fitness centres and others
2. Develop skills to conduct mini research and learn to document and report the findings

Course outline

Students will be given an option of doing either A) Summer internship at a hospital /fitness centers/ food industry

(or)

Mini Project work in a chosen area of their discipline/ field of study. The research will be an original work with plagiarism check and ethical clearance if required.

Students will undergo the project or internship in the semester break. The students should prepare a report to be presented in the department after the completion of the placement period /project.

III SEMESTER

CORE PAPER - THERAPEUTIC NUTRITION

Code:21FSNP0313

Credits:T4+P0

Hours/week:4

Marks: 100

Learning Objectives:To

1. understand the etiology, physiology and metabolic anomalies of acute and chronic diseases and patient needs
2. learn the effect of the various diseases on nutritional status and nutrient and dietary requirements

Learning Outcomes:

On successful completion of this course the student will be able:

- ✓ To intervene the metabolic anomalies of acute and chronic diseases.
- ✓ To plan menu for various diseases based on their nutritional status and dietary needs.

Course Contents:

UNIT I

Nutrition Care Process:Assessment of patient needs based on interpretation of

patient data – clinical, biochemical, biophysical and personal. Definition and history of dietetics, Modification of normal diets to therapeutic diets, Understanding of routine hospital diets and enteral and parenteral feeding methods and formulas. Dietetics in modern health care management. classification of a dietitian. Role of dietitian- functions and Team approach in patientcare.

UNIT II

Medical Nutrition Management in Gastrointestinal tract Disorders:

Etiopathophysiology, metabolic & clinical aberrations, diagnosis, complications, treatment, MNT, dietary counselling and recent advances in GERD, peptic ulcer, dyspepsia, flatulence, inflammatory bowel disease, dumping syndrome, diverticular disease, hernia, hemorrhoids, intestinal failure, short bowel syndrome, bariatric surgery, ERAS guidelines. Pre, post and perioperative nutrition, Recent aspen and Espen guidelines

Unit-III

Medical Nutrition Therapy in Liver-Etiopathophysiology, metabolic & clinical aberrations, diagnosis, complications, treatment, MNT, dietary counselling and recent advances Jaundice, Hepatitis, fatty liver and Cirrhosis- Alcoholic and Non-alcoholic liver diseases ,Pancreas- Pancreatitis and Gall Bladder– Cholelithiasis, cholecystitis.

Medical Nutrition Management in metabolic diseases :

Etiopathophysiology, metabolic & clinical aberrations, diagnosis, complications, treatment, MNT, dietary counselling and recent advances in Diabetes Mellitus – Type 1, Type 2 and Gestational diabetes and Endocrine disorders – Polycystic ovary disease, thyroid imbalances.

Medical Nutrition Management in Coronary Heart Diseases: Etiology, metabolic & clinical aberrations, diagnosis, complications, treatment, MNT, dietary counseling and recent advances in Artherosclerosis, Hypertension.

UNIT IV

Medical Nutritional Management of Infections:Etiology, metabolic and clinical aberrations, complications, Treatment, prevention, MNT , dietary counseling and recent advances in Fevers and respiratory problems–Asthma, Bronchitis, Covid -19,

Medical Nutritional Management of Weight imbalances:Etiology, metabolic and clinical aberrations, complications, prevention, MNT, dietary counseling

and recent advances in Weight optimisation.

Medical Nutritional Management of Renal diseases: Etiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of Renal disorders – Acute and chronic glomerular nephritis, Nephrotic syndrome, Renal stones, AKI, ESRD and Dialysis. Recent KDOQI guidelines. Neurological disorders – Parkinsons, Epilepsy, Dementia, Multiple Sclerosis, Alzheimer's disease.

UNIT V

Medical Nutritional Management of Pulmonary Disorders and Cancer : Chronic obstructive pulmonary disease. Etiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of Cancer (General and specific cancers, effect of cancer therapy on MNT, Mnt in Cancer), Neutropenic Diet, Recent ESPEN ONCO guidelines.

Medical Nutritional Management of Musculo – skeletal disorders: Etiology, metabolic clinical aberrations, and complications in Bone fractures, Osteoporosis, Arthritis and Rheumatic heart disease.

Medical Nutritional Management of Inborn errors of metabolism: Etiology, metabolic and clinical aberrations and complications in PKU, maple syrup disease, Glycogen storage disease, Lactose intolerance, neiman-pick disease and fabry disease.

References

1. Mahan, L. K. and Escott Stump. S. (2016) Krause's Food & Nutrition Therapy 14th ed. Saunders-Elsevier
2. Shils, M.E., Shike, M, Ross, A.C., Caballero B and Cousins RJ (2005) Modern Nutrition in Health and Disease. 10th ed. Lipincott, William and Wilkins.
3. Williams, S.R. (2001) Basic Nutrition and Diet Therapy. 11th ed. Times Mirror Mosby College Publishing
4. World Cancer Research Fund & American Institute for Cancer Research (2007) Food, Nutrition, Physical Activity and the Prevention of Cancer- A Global Perspective. Washington E.D. WCRF.
5. Mahan L K and Escott – Stump S (2000); Krause's Food Nutrition and Diet Therapy 10th Ed W B Saunders Ltd
6. Escott – Stump, S (1998): Nutrition and diagnosis related care 4th Edition, Williams and Wilkins
7. Garrow J S, James W P T and Ralph A (2000) Human Nutrition and Dietetics, 10th Edition, Churchill Livingstone

CORE PAPER - THERAPEUTIC NUTRITION PRACTICAL

Code: 21FSNP0314 Credits: T0+P2 Hours/Week: 4 Marks: 100

Objectives:

1. To enable the students to enable the students to recommend and provide appropriate nutritional care for prevention/ and treatment of the various diseases.

Specific Objectives of Learning :

- ✓ The students will be able to plan a day's menu based on the person/ patients disease condition.
- ✓ The students will be able to prepare nutritious/ hospital/ paediatric diet.

Contents:

1. Practical experience in weighing and measuring food items
2. Preparation of clear and full liquid diets and soft diet.
3. Planning and preparing diet for:
 4. Febrile condition
 5. Surgical condition
6. Gastrointestinal disorders
7. Liver and Gall bladder disorders
8. Diabetes and Cancer
9. Cardio Vascular Disorders
10. Renal Disorders
 11. Obesity and Underweight
 12. Lactose free diet
 13. Juvenile diabetes
 14. Diet for inborn errors of metabolism
 15. Cancer

References :

1. Mahan, L.K. and Escott-Stump, S. (2007): Krause's Food Nutrition and Diet Therapy, 1^{2th} Edition, W.B. Saunders Ltd.
2. Mayrice. E. Shills, James, A.Olsen, Moshe Shihe, (2012) Modern Nutrition on Health and Disease, Vol.1 & 2, 11th edition, Lea and Pediger, Philadelphia.
3. Davidson. S.S. Passmore, ,Martin A. Eastwood. F. (1989) Human Nutrition and Dietetics, 9th Edition F & S Lingstons Edinburgh and London
4. Longvah, T, Ananthan, R, Bhaskarachary, K, Venkaiah, K. (2017). *Indian Food Composition Tables (IFCT)*, Indian Council of Medical Research, National Institute of Nutrition, Hyderabad.
5. Recommended Dietary Allowances and Estimated Average Requirements Nutrient Requirements for Indians – 2020. A Report of the Expert Group Indian Council of Medical Research National Institute of Nutrition.NIN,Hyderabad

6. B. Srilakshmi,(2014) Dietetics, 7thedition,New Age international Private Ltd
7. Antia .P.(1989) Clinical Nutrition and Dietetics, Oxford University, Mumbai.

CORE

CORE PAPER FOOD PRODUCT DEVELOPMENT AND MARKETING

Code: 21FSNP0315

Credits:T3+P1

Hours/Week:5

Marks: 100 Learning Ob

- 1 understand various aspects of development of a foodproduct
- 2 acquire knowledge on the importance of Consumer Research, Finance and Communication

Learning Outcomes:

On successful completion of this course the student will be able:

- ✓ To appraise the main features and trends of a specific food product product within an appropriate marketsetting
- ✓ To understand the development cycle of the foodproduct.
- ✓ To develop and justify technical specifications for the newproduct

UNIT- I

New Food Products development: Definition, classification, characteristics, factors influencing new product development – social concerns, health concerns, impact of technology and market influence. Consumer Behavior: Factors influencing food purchases, product acceptance, purchasing trends. Changing food trends

UNIT- II

Phases in new food product development: Generation of New Product

Ideas: Internal sources of idea, External sources of ideas and market place analysis. Screening of the ideas:Team approach and involvement of various departments, objectives of screening, criteria for screeningideas.Market Sector perspective and market research.

UNIT - III

Prototype development, standardization, statistical modeling for product formulation. Sensory Evaluation: Descriptive, thershold and acceptance test. Shelf life testing- types of shelf life testing mode of food deterioration. Technical development – recipe development and scale up. Product integrity and conformance to Food safety standards.**TestMarketing:** Evaluating results and analyzing.

UNIT - IV

Use of various new ingredients to suit product functions, Use of stabilizers, flavors, colorant and their standards. Packaging- types, new trends in

packaging materials and methods. Graphic designing and nutritional labeling recent guidelines.

Costing and Marketing of food products: Cost benefit analysis, Marketing strategies, promotional methods for marketing

UNIT - V

Entrepreneurship - Starting and managing a food based enterprise - Steps in preparing a business plan- Plant location, investment, financing the project. Government schemes for startups, Components of management, Developing managerial skills, Managing a food industry. Qualities of an entrepreneur.

Related Experience

Projects on:

1. Market and literature survey to identify the concepts of new products based on special dietary requirements, functionality, convenience and improvisation of existing traditional Indian foods.
2. Screening of product concept on the basis of techno-economic feasibility.
3. Development of prototype product and Standardization of formulation process.
4. Proximate Analysis of New Product
5. Packaging, labeling and shelf-life studies
6. Cost analysis and Final Project Report

References:

1. Fuller, Gordon W. 2004. New Product Development- From Concept to Marketplace, CRC Press. 2. 2.
2. Anil Kumar, S., Poornima, S.C., Abraham, M.K. & Jayashree, K. 2004. Entrepreneurship Development. New Age International Publishers.
3. Moskowitz, Howard and Saguy, R. I. Sam 2009. An Integrated Approach to New Food Product, CRC Press.
4. Man C M D and Jones A A (1994) Shelf life Evaluation of Foods. Blackie Academic and Professional, London
5. Olickle, J K (1990) New Product Development and value added. Food Development Division, Agriculture, Canada
6. Graf E and Saguy I S (1991), Food Product Development : From concept to the Market Place, Van Nostrand Reinhold New York
7. Awasthi D, Jaggi R and Padmanand V. A Manual for Entrepreneurs: Food Processing Industry. Tata McGraw-Hill Publishing Limited. 2006.
8. Hal Macfie, (2007) Consumer- led food product development, CRC.
9. Mary Earle & Richard Earle., Food Product Development: Maximizing Success., CRC, Woodhead Publishing Ltd., 2001

10. Madhavi P., Satyanarayana G.(2018),Entrepreurship, Make in India and Jobs Creation, New Century Publications, New Delhi,

CORE PAPER FOOD PRODUCT DEVELOPMENT MARKETING PRACTICALS

Code: 21FSNP0316

Credits: T0+P2

Hours/Week: 4

Marks: 100

Learning Objectives: To

1. Understand the concept of development of a new product and prepare new products
2. Acquire skills to develop special dietary foods, convenience foods and improvise existing ethnic Indian foods.

Learning Outcomes:

Students on completion will be able to:

- ✓ design, develop and justify technical specifications for the new product

Course

Content

Practicals on:

1. Market and literature survey to identify the concepts of new products based on special dietary requirements, functionality, convenience and improvisation of existing traditional Indian foods.
2. Screening of product concept on the basis of techno-economic feasibility.
3. Development of prototype product and Standardization of formulation process.
4. Proximate analysis of the product and product specific nutrient analysis
5. Packaging, labeling and shelf-life studies (Total microbial count, isolation of microbes and other keeping quality tests specific to the new products developed)
6. Cost analysis and Final Project Report

References

1. Fuller, Gordon W. (2004). New Product Development- From Concept to Marketplace, CRC Press. USA.

2. AnilKumar, S.,Poornima,S.C.,Abraham,M.K.&Jayashree,K.(2004).Entrepreneurshi pDevelopment.NewAgeInternationalPublishers.
3. Moskowitz,HowardandSaguy,R.I.Sam(2009).AnIntegratedApproachtoNew FoodProduct, CRCPress.USA.
4. ManualofMethodsofAnalysisofFoods-Microbiological Testing.(2012).LabManual14.FSSAI,GoI, NewDelhi.
5. Sadasivam.S,Manickam.A.(2018).BiochemicalMethods,third edition, NewAgeInternationalPublishers,NewDelhi.
6. NewAgeInternationalPublishers,NewDelhi.

MSC FSN GRI

CORE PAPER - NUTRITION IN CRITICAL CARE

Code: 18FSNP0317

Credits: T4+P0

Hours/week: 4

Marks: 100

Learning Objectives: To

1. Understand the physiology, metabolism and special nutritional requirements of the critically ill.
2. Familiarise with the special nutritional support techniques and feeding formulation to meet their nutritional needs.

Learning Outcomes:

On successful completion of this course the student will be able to:

- ✓ to know the feeding therapy to be followed in hospitalized/critically ill patients
- ✓ Apply nutritional support systems during emergency.

Course

content UNIT-I

Nutritional screening and assessment of nutritional status of Critically ill

, Must, NRS 2002, Nutric Score Glim Criteria, NCP — PES An overview of critical illness, its consequences on organ function, treatments, and effect on nutrient metabolism.

UNIT-II

Nutritional support systems and other life-saving measures for the critically ill. Immunonutrition, conditionally essential nutrients, scientific or medical formula and parenteral nutrition in critical care.

UNIT-III

Medical nutrition therapy: Enteral nutrition: Types, routes, composition of feeds, indication and contraindication, safety practices for enteral feeding. Parenteral nutrition: Types, modes, compounding TPN admixtures and composition, feeds and indication and complications of enteral and parenteral Refeeding syndrome.

UNIT-IV

Management of high risk conditions: Patho-physiological, clinical and metabolic aspects, understanding of the special nutritional requirements, nutritional goals and monitoring the therapy in critical illnesses like: Management of nutrition support therapy in sepsis, MOF, ventilated, burns, trauma and organ transplantation, critically ill patients.

UNIT-V

Home care for critically ill and elderly requiring long term nutritional support. HPN, Palliative care and rehabilitation diets in stages. Diet related ethical issues in terminal illness.

References:

1. Zaloga, G.P. (1994): Nutritional in critical care, Times Mirror/Mosby..
2. Shikora, S.A. and Blackburn, G.L. (Ed) (1999). Nutritional support-Theory and Therapeutics, Chapman and Hall, ITP (International Thomson Publishing).
3. Mahan, L.K. and Escott-Stump, S. (2000): Krause's Food Nutrition and Diet Therapy, 10th Ed. W.B. Saunders Ltd.
4. Phillips, G.D. and Lodgers C.L. (1986). Parenteral and Enteral Nutrition. A Practical Guide. Churchill Livingstone.
5. Kinney, J.M. and Borum, P.R. (editors) (1989) Perspectives in Clinical Nutrition. Urban and Schwarzenberg.
6. Torosian, M.H. (editor) (1995) Nutrition for the Hospitalized Patient. Basic Science & Principles of Practice.
7. Keynes, W.M. and Flower, P.B.S. (1984) Clinical Endocrinology. Willam Heinemann Medical Books, London.
8. Galambos, J.P. (1979) Cirrhosis in the series major problems in Internal Medicine, W.B. Saunders company Philadelphia
9. Shills, M.E., Olson, J., Shike, M. and Roos, C. (2005): Modern Nutrition in Health and Disease. 10th Edition. Williams and Williams. A. Beverly Co. London.
10. Cresci, P. D. (Ed.). (2015). Nutrition support for the critically ill patient: A guide to practice. CRC Press. 4. Escott-Stump, S. (2008). Nutrition and diagnosis-related care. Lippincott Williams & Wilkins.

IV SEMESTER
CORE PAPER – PUBLIC HEALTH NUTRITION

Code:21FSNP0418

Credits:T4+P0

Hours/Week:4

Marks:100

Learning Objectives:To

1. enable students to learn the concepts of public health nutrition
2. enable the students to understand the health status of the community

Learning Outcomes :

On successful completion of this course the student will be able:

- ✓ to assess the health status of the community
- ✓ to know the various organizations related with food and nutrition with its functions

Course Content

Unit: I

Concept of public nutrition - Relationship between health and nutrition, role of public nutritionists in the health care delivery system; Population dynamics - Demographic transition, population structure, population policy, fertility behaviour, nutrition and quality of life interrelationship; determinants of health status and indicators of health and nutritional status

Unit: II

Health care facility- primary health care of the community, health care delivery system

Determinants of nutrition and health status- socio cultural, biologic, environmental and economic factor, indicators of health and malnutrition.

Population Dynamics Demographic transition Population structure: Implications on quality of life
Population Policy

Economics of Malnutrition Health Economics and Economics of Malnutrition Impact of malnutrition on productivity and national development

Unit: III

Food and Nutrition Security- food production, access, distribution availability, losses, consumption, food security; Social-cultural aspects and dietary patterns; their implications for nutrition and health; National nutritional policy and intervention programme – Aim, objectives, guidelines and thrust areas, PDS - Public distribution system and Agricultural planning; New strategies Nutrition intervention Programmes- Objectives, Operation of feeding programmes - ICDS, Anganwadi and TINP; National organizations - ICMR, NIN, NNMB, ICAR, CFTRI, NIPCCD and Pradhan Mantri Gramodaya Yojana (PMGY); Recent Government programmes related to nutrition, International organizations - FAO, WHO, UNICEF, UNESCO and World Bank.

Unit: IV

Health based interventions including immunization, provision of safe drinking water/ sanitation, prevention and management of diarrhoeal diseases; Food based interventions including food fortification, dietary diversification; supplementary feeding and biotechnological approaches. Introduction to IEC Aims and Objectives, Importance of IEC, relevance to programmes - Nutrition education for behaviour change – Rationale, Planning Execution and evaluation of Intervention Programmes - Different Media, their characteristics and use- IEC for different targetgroups.

Unit: V

Epidemiology- concept and definitions; Basic measurements in epidemiology; Types of epidemiology- descriptive epidemiology - Defining the population, describing the diseases, measurement of diseases and comparing with known indices, analytical epidemiology- Observational studies cohort, case control and cross sectional analytic study; Experimental epidemiology – Randomized controlled; Design and planning of nutritional epidemiology studies; Evaluation of epidemiological studies; Uses of epidemiology.

References

1. Owen, A.Y. and Frackle, R.T., (2002): Nutrition in the Community. The Art of Delivering Services, 2nd Edition TimesMirror/Mosby.
2. Park, K. (2000): Part's Textbook of Preventive and Social Medicine, 18th Edition, M/s. BanarasidasBhanot,Jablpur.
3. Beaton, G.H. and Bengoa, J.M. (Eds) (2000): Textbook of Human Nutrition, Oxford and IBH Publishing Co. Pvt. Ltd., NewDelhi.
4. Bamji, M.S., Rao, P.N., Reddy, V (Eds) (2003): Textbook of Human Nutrition, Oxford and IBH Publishing Co. Pvt. Ltd., NewDelhi.
5. Anisa Basheer (1995): Environmental Epidemiology, Rawat Publications,Jaipur.
6. Beghin I. Cap, M. and Dujardan, B. (1988), A guide to nutritional status assessment, WHO,Geneva.
7. Sheila ChanderVir. Public Health Nutrition in developing countries (Part I & II). Woodhead Publishing India Pvt. Ltd.
8. Mark Lawrence & Tony Worsley. Public Health Nutrition- From principles to practice. Allen & Unwin.
9. Mishra RC. Health & Nutrition Education. APH Publication corporation.

CORE PAPER- FUNCTIONAL FOODS AND NUTRACEUTICALS

Code: 21FSNP0419

Credits: T3+P0

Hours/Week: 3

Marks: 50

Learning Objectives: To

1. Enable students to understand the relation between functional foods and nutraceuticals
2. Impart knowledge on the role of functional foods and nutraceuticals in the areas of preventive dietetics.

Learning Outcomes:

On successful completion of this course the student will be able to:

- ✓ Knowledgeable about specific issues concerning functional foods and nutraceuticals
- ✓ Understanding the use of various functional foods in therapeutic conditions
- ✓ To develop diets/supplements incorporating functional foods

Course

content **UNIT I**

Nutraceuticals: Definition, Classification, food and non food sources, mechanism of action. Role of omega-3, fatty acids, carotenoids, dietary fiber, phytoestrogens; glucosinates; organosulphur compounds as nutraceuticals. Use of nutraceuticals in health sciences. Their role in prevention and control of diseases

UNIT II

Prebiotics, probiotics and synbiotics: Definition, characteristics, types, sources, their effects on gut microbes. Role in health promotion and in chronic diseases. Production, application in health foods and safety issues.

UNIT III

Functional foods: Definition, development of functional foods, benefits and sources of functional foods in Indian diet. Effects of processing conditions and storage; Development of biomarkers to indicate efficacy of functional ingredients; Research frontiers in functional foods.

UNIT IV

Functional foods and Nutraceuticals in health and disease: Sources and role of functional foods and nutraceuticals in diseases; Concept of dietary supplements, phytochemicals, phytosterols, dietary fiber ; Regulation of dietary supplements in - inborn error of metabolism, obesity, neurological disorder, diabetes mellitus, hypertension, CVD, cancer, arthritis, and AIDS; Role of nutraceuticals in sports nutrition.

UNITV

Development of nutraceutical and functional foods – Standards for health claims. Process of developing, preclinical & clinical studies, Marketing and Regulatory issues, Regulatory bodies in India

MSC FSN GRI

References:

1. Mahtab,S,Bamji,KamalaKrishnasamy,Brahmam,G.N.V.(2019).TextBookof Human Nutrition, Fourth Edition, Oxford and IBH Publishing Co. P. Ltd.,New Delhi.
2. Schmidl,M.K.,&Labuza,T.P.(2000).EssentialsofFunctionalFoods.Maryland:AnASPEN Publication,AspePublishers,Inc.
3. Srilakshmi(2017).NutritionScience.6thedition,NewAgeInternationalPvt.Ltd ,NewDelhi.
4. Tamine,A.(2005).ProbioticDairyProducts.UnitedKingdom:BlackwellPublishingLtd.
5. USFDAregulationsonfunctionalfoods.
6. Webb,G.P.(2006).DietarySupplements andFunctionalFoods.NewYork:BlackwellPublishingLtd.
7. Wildman,R.E.C.(2007).HandbookofNutraceuticalsandFunctionalFoods.London:CRCPress,Taylor andFrancis,BocoRaton.
8. GibsonGR&WilliamCM.FunctionalFoods-ConcepttoProduct.2000.
9. GoldbergI.FunctionalFoods:DesignerFoods,PharmaFoods.2004.
10. DebasisBagchi.Nutraceutical&FunctionalFoodRegulationintheUSandaroundtheworld(2014). 2ndEd. AcademicPress,Elsevier.
11. YashaJahuPomeranz(1991).FunctionalPropertiesofFoodComponents.2ndEd. AcademicPressElsevier
12. GeoffreyP.Webb(2011)DietarySupplements &FunctionalFoods.2ndEd.WileyBlackwell

INTERNSHIP

Code: 21FSNP0420 Credits:0 +4Period/WeekMarks: 100

Learning Objectives:

1. To gain hands on experience of working in various institutions related to the area of Food and Nutrition.

The students could work with Hospitals / Food Industries etc. They would be required to present a report and a viva voce of their Internship in their Department .

ETHICS IN FOOD AND NUTRITION RESEARCH

Code: 21FSNP0422 Credits: T4+P0

Pd/Wk: 4

Marks: 100

Learning Objectives: To

1. understand the aspect of Nutrition Research
2. acquire the Knowledge about the significance of nutrition Research

Learning Outcomes:

On successful completion of this course the student will be able:

- ✓ To collect the scientific literature in nutrition research
- ✓ To execute the paper publications in nutrition related journals
- ✓ To make the research design for their research
- ✓ To prepare the report for their research

UNIT - I

Nutrition Research: Definition, Classification, Purposes of Nutrition Research, Major types of Nutrition Research Studies – Intervention Research, Outcomes Research, Epidemiological Research, Translational Research. Sources of Scientific Literature. Differences between Magazine/ Newspapers, Trade Publications and Scholarly / Academic Journals. Introduction to Scientific Journals, Types of Research Articles, Nutrition Related Journals. Checklist for Selecting Articles.

UNIT –II

Important Science databases for nutrition (MEDLINE/Pubmed, Web of Science, Scopus, Science Direct). Ethics in Nutrition Research – Introduction, History of Research Ethics, Responsible conduct of Research, Ethics and Human Subjects Research, Institutional Review Boards.

UNIT -III

Quantitative Research – Key concepts, Foundation, Reliability and Validity, Error and bias, Sampling, Instruments and Measurements, Anatomy of a Research Article. Research Design – Experimental study Design, Quasi – Experimental designs, Descriptive Quantitative Design and Additional types of design.

Qualitative Nutrition Research – Introduction, Thematic Analysis, Phenomenology, Grounded Theory, Case studies. Evaluation of Qualitative Research - Statement of the problem, Literature Review, Research design, Subject selection, Data collection, Data analysis, Results and Discussion.

UNIT – IV

Systematic Reviews and Evidence-Based Nutrition practice guidelines -

Introduction, Systematic reviews, Systematic Review process for the evidence analysis library – Using the Evidence analysis library of the Academy of Nutrition and Dietetics and Additional systematic Reviews and Guidelines.

UNIT –V

Survey Basics, Sampling, Construct and Refine the cover Letter and Questionnaire, Test the Reliability and Validity of a Survey, Collect and Analyze Survey Data.

Writing and Disseminating a Research Proposal and Paper – Title and Abstract Introduction, Methods, Use a style manual to format the paper. Dissemination: Posters, Presentations and Publications.

Securing Grants for Nutrition Research – Government Funding and Non Government Funding.

Text books and Reference materials

1. Bandarkar, P.L. and Wilkinson T.S. (2000): Methodology and Techniques of Social Research, Himalaya Publishing House, Mumbai.
2. Copper, H.M. (2002). Intergrating research : A guide for literature reviews (2nd Edition).
California: Sage
3. Harman, E & Montages, I. (Eds.) (2007). The thesis and the book, New Delhi :Vistar.
4. Mukherjee, R. (1989): The Quality of Life: Valuation in School Research, Sage Publications, New Delhi.
5. Strass, A and Corbin, J. (1990): Basis of Qualitative Research: Grounded Theory
6. Karen Eich Drummond and Alison Murphy (2018). Nutrition Research Concepts and Application, Navigate Companion Website.

MODULAR COURSES

MODULAR COURSE FOOD DEHYDRATION

18FSNP04M2**Food Dehydration****2 Credits****Learning Objectives:****Enable the students to**

- Learn the concept and principle of drying
- Know the process and mechanism of drying
- Gain knowledge on drying of various foods
- Analyse the quality of dried food products

Course Outcomes:

On successful completion, the students will be able to:

- ❖ Understand about moisture content, moisture removal and its requirement.
- ❖ Know drying mechanism and types of mechanical driers.
- ❖ Can select suitable drying method and drier meeting the requirement.
- ❖ Can judge quality of dried product.

Unit I Introduction to Drying/Dehydration

Drying definition, Moisture removal and its need, Dehydration of food, Drying process and methods, Types of dryers and their applications.

Unit II Grain Drying

Concept of grain drying, Methods of grain drying, Grain dryers- Unheated and heated air dryers - Batch and continuous type - Flat bed type - PHTC type - Columnar type - LSU type - Baffle type - Rotary type.

Unit III Fruit and Vegetable drying

Concept of fruit and vegetable drying, process and the methods, Various driers for fruit and vegetable drying, solar, cabinet, tunnel tray etc. and their advantages and limitations.

Unit IV Milk and Meat drying

Concept of milk drying, process and methods- spray, drum, rotary, freeze driers and their advantages and limitations. Meat drying methods and the type of driers used, Advantages and limitations.

Unit V Quality of dried products

Physical, Chemical and Microbiological characteristics of dehydrated foods, Re-hydration ratio, size and density, shelf-life, water activity, Microbial stability of selected foods.

Textbooks

1. Potter NN and Hotchkiss JH. Food Science. Springer Science & Business Media, 2013, ISBN: 9401572623
2. Desrosier, N.W. and James N. (2007). Technology of food preservation. AVI Publishers.

3. Shafiur Rahman M. Handbook of Food Preservation. CRC Press, 2007
ISBN: 9781420017373
4. Brennan JG. Food Processing Handbook. John Wiley & Sons, 2012
ISBN: 9783527634378
5. Srilakshmi, B. 2005. Food Science, New Age International (P) Ltd.,
Publishers,
New Delhi.
6. Girdharilal, G.S. et.al.. (1986). Preservation of Fruits and
Vegetables. New Delhi: Publications and Information Division, ICAR.
7. Julians, B.O. (1985). Rice Chemistry and Technology, 2nd edition,
American Association Chemists, St. Paul Mimesota, USA.

MSC FSN GRI

**MODULAR COURSE COMPUTER APPLICATIONS IN
NUTRITIONAL SCIENCES**

Code:21FSNP03M2

Credits:T2+P0

Hours/week:3

Marks:100

Learning Objective

1. To impart knowledge on use of computers in the field of nutritional science

Learning Outcomes:

On successful completion of this course the student will be able:

- ✓ know the use of computers in food industries, diet counseling
- ✓ To gain knowledge on computer applications used for communicating informations to the community

Course Content

UNIT I Introduction to various software for their application in food technology, diet counseling and nutrition research.

UNIT II Familiarization with the application of computer in some common food industries like, milk plant, bakery units & fruits vegetable plants, starting from the receiving of raw material up to the storage & dispatch of finished product.

UNIT III Basic Introduction to computer Application of computers in dietary units, online diet counseling and record maintenance

References

1. Computer Applications in Food Technology : Use of Spreadsheets in Graphical, Statistical and Process Analysis by R. Paul Singh, AP.
2. Manuals of MS Office
3. Diet Softwares

MODULAR COURSE NUTRITION COUNSELING

Code:21FSNP04M3

Credits:T2+P0

Hours/week:3

Marks:100

Learning Objective to

1. help individuals to manage their disease condition effectively through counseling \
2. Relate dietary management and lifestyle counseling

Learning Outcomes:

On successful completion of this course the student will be able to:

- ✓ correlate the importance and principles of dietetics in the management of diseases
- ✓ practice the role of dietitian an effective manner

Course content

UNIT I

Practical consideration in giving dietary advice and counselling - Factors affecting and individual food choice.Communication of dietary advice Consideration of behaviour modification Motivation.

UNIT II

Counselling and educating patient Introduction to nutrition counselling. Determining the role of nutrition counsellor.Responsibilities of the nutrition counsellor. Practitioner v/s client managed care behavior. Communication and negotiation skills.

UNIT III

Teaching aids used by dietitians- charts, leaflets, posters etc., preparation of teaching material for patients suffering from Digestive disorders, Hypertension, Diabetes, Atherosclerosis & Hepatitis and cirrhosis. Computer application a) Use of computers by dietitian b) Dietary computations c) Dietetic management d) Education/ training e) Information storage f) Administrations.

Life Style Counselling : Weight management – exercise, yoga Stress management – positive therapy

References:

1. Marcia NahikianNelms, (2016), Medical Nutrition Therapy: A Case-Study Cengage Learning Boston ,USA.
2. Tripathi,K., Maheshwari,A., (2016) Fundamentals Of Diabetes, Jaypee Brothers Medical Publishers.
3. Defronzo, R. A., Ferrannani ,Ele., (2015), International Textbook of Diabetes Mellitus, 4 th edition, ISBN:9780470658611, John Wiley & Sons, Ltd.
4. Mahan, L.K. and Stump, S.E., (2010), Krause’s Food, Nutrition and Diet Therapy 11th Edition, W.B. Saunders Co. 9.
5. Richard I H., (2010),Text Book of Diabetes, 4thedition,A John Wiley & Sons, Ltd.,Publishers

MODULAR COURSE – FITNESS NUTRITION

Code:21FSNP04M1Credits:T2+P0

Hours/week:2

Marks:50

Learning Objectives:

- 1.To enable students understand the interaction between exercise and nutrient metabolism.
2. To enlighten students on common nutritional problems experienced by persons following exercise programmes for fitness.
3. Plan age specific diet and physical fitness schedules based on activity levels.

Learning Outcomes :

On successful completion of this course the student will be able to:

- ✓ Identify factors affecting fitness and health status
- ✓ Recommend suitable dietary and physical fitness plan for disease conditions.

Course content

UNIT-I

Introduction to Fitness :Definition of Fitness and Wellness and their importance in the maintenance of health . Fitness component and factors effecting fitness and health status .

Energy: -Release of energy from macronutrients- A review -Energy metabolism during exercise -Energy requirements for physically active persons .

UNIT-II

Carbohydrates: -Effect of exercise on carbohydrate metabolism -Pre exercise diet & carbohydrate loading. -Post exercise carbohydrate intake - Carbohydrate requirements- quality concerns.Protein and lipids :Amino acid metabolism during exercise -Effect of protein on exercise performance. -Fat metabolism during exercise with special reference to the type & intensity of exercise. Minerals ,Vitamins and water-Effect on these nutrients and exercise performance

UNIT-III

Screening for Fitness Level Kinanthropometric assessment techniques -size, shape, proportion, composition, maturation, and gross function .Cardiac screening-heart rate, blood pressure and lung function.Assessment of Cardio-respiratory fitness using Maximum aerobic capacity (VO2 max).Assessment of cardiac risk profile for fitness and exercise.

References

1. Fred and Brouns (2002) “ Essentials of sports Nutrition”, 2nd ed., John Wiley & Sons pub.
2. W.D. Mc Ardle &Katch (2005) “ Sports & Exercise Nutrition”, 4th ed.,Williams & Wilkins, A Waverly Company
3. Burke L & Deakin V (2006) Clinical Sports Nutrition”, 3rd ed., Tata McGraw Hill Pub.,
4. Melvin H. Williams, Eric S. Rawson, J. David Branch, (2016).
5. Nutrition for health, fitness and sport, McGraw Hill,
6. Corbin, Charles. Gregory Welk, William Corbin,(2015)Concepts of Fitness andWellness: A Comprehensive Lifestyle Approach; 9th Edition, McGrawHillHigher Education Pubication, USA

MODULAR COURSE- NURTITION ASSESSMENT

Code:21FSNP04M2 Credits:T2+P0

Hours/week:2

Marks:50

Learning Objectives:

1. To understand the concept and methods of nutritional status assessment of an individual and community

2. Learning Outcomes :

On successful completion of this course the student will be able to:

- ✓ Explain nutritional concerns among vulnerable sections of the community
- ✓ Gain knowledge with regard to standard methods and techniques for assessing nutritional status.
- ✓ familiarise with the use of indices and indicators for screening and consequent identification of malnutrition

Course content

UNIT I

Introduction to Nutritional status assessment , Definition of nutritional status
Purpose of nutritional status assessment in community setting, Significance of standardised methods and techniques for assessing nutritional status

UNIT II

Methods of community nutritional assessment Clinical examination, Anthropometry, Biochemical and Biophysical methods, Measurement tool techniques and errors , Standardization of methods, Data recording, analysis and interpretation, Use, plotting and interpretation of growth chart

Dietary methods: 24 hour recall, Food Frequency Questionnaire Ecological variables, Vital health statistics: IMR, MMR, Under 5 Mortality rates National/regional nutrition and health surveys

UNIT III:

Screening for identification of Malnutrition in the community Indices , indicators and their interpretation

References

1. Jelliffe DB. The Assessment of the Nutritional Status of the Community.WHO Monograph.World Health Organization, Geneva 1966; 53.
2. Jelliffe DB &Jelliffe E F P (1989). Community nutritional assessment with special reference to less technically developed countries. Oxford Medical Publications. Oxford University Press, Oxford, UK
3. WHO (2009).WHO Child growth standards: Length/height for age, weight for age, weight forelength, weight for height and body massindex (2009).

MODULAR COURSE - FOOD QUALITY EVALUATION

Code: 21FSNP03M3

Credits : 2

Pd/Wk: 2

Marks :50

Learning Objectives:

Enable the students

1. To illustrate the concepts and principles of food quality evaluation
2. To provide basic knowledge about sensory evaluation
3. To know the instruments/tools available for objective evaluation

Learning Outcomes:

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

- Know with the basics of food quality evaluation

- Suggest a suitable technique for food quality evaluation
- Address the controlling factors in sensory and objective evaluation

Unit-I: Introduction to Food quality

Food quality meaning, quality traits: sensory, chemical, microbial and toxicological aspects.

Unit –II: Sensory evaluation

Definition of sensory evaluation; sensory attributes; human senses and sensory perception; factors influencing measurements: psychological and physiological errors.

Unit III Sensory Evaluation methods

Classification of test methods; comparison: paired-comparison, duo-trio and triangle tests, ranking: numeric scoring test, hedonic scale, sensitivity and descriptive tests.

Unit IV Objective methods for evaluation

Instruments/tools for evaluation of sensory attributes such as colour, flavour, texture and taste, advantages and limitations. Food Rheology meaning, concept, component.

Unit V Applications of Sensory Analysis in the Food Industry

Quality control; storage stability testing; product development and consumer acceptance testing

References:

1. Herbert Stone, Joel L. Sidel, (2012), “Sensory Evaluation Practices”, Academic Press Publishers.
2. Harry T. Lawless, Hildegarde Heymann, (2010), “Sensory Evaluation of Food: Principles and Practices”, Springer Science & Business Media.
3. Meilgard (1999). Sensory Evaluation Techniques, 3rd ed. CRC Press LLC,

DISCIPLINE CENTRIC ELECTIVES
INSTRUMENTATION METHODS FOR FOOD ANALYSIS

Code:21FSNP03D1 Credits:3+0 Hours/Week:3 Marks: 100

Learning Objectives:

1. Understand the principles and applications of food analysis techniques used in the field of foods and nutrition.

Learning Outcomes:

The student will be able to:

- ✓ Choose appropriate strategies and instrumentation for analysis of different sample types.
- ✓ Get familiarity with the analytical instruments through an understanding of the working principles and applications.
- ✓ Demonstrate a comprehensive understanding of the theory and usage of radio isotope techniques and their application in biological sciences and food preservation.

Course content

UNIT I

Spectrometric methods Principles and applications of UV and visible spectrophotometry, flame photometry-Atomic Absorption Spectrophotometry (AAS) and Atomic Emission Spectrophotometry (AES), Spectrofluorimetry and brief mention (principle and applications) of Nuclear Magnetic Resonance

(NMR), Electron Spin Resonance (ESR) spectrometry, Mass spectrometry (MS), Fourier Transform Infrared Spectrometry (FTIR) and Electron microscopy.

UNIT II

Chromatographic techniques Principle and applications of paper, thin layer, adsorption, gel, gas, ion exchange, affinity chromatography, HPLC and HPTLC techniques.

UNIT III

Electrophoretic techniques Principle and applications of paper, starch gel, agar gel and polyacrylamide gel electrophoresis. Isoelectric focusing, Immuno-electrophoresis, Enzyme linked immunosorbant assay (ELISA), Radio-immuno assay (RIA).

UNIT III

Electrophoretic techniques Principle and applications of paper, starch gel, agar gel and polyacrylamide gel electrophoresis. Isoelectric focusing, Immuno-electrophoresis, Enzyme linked immunosorbant assay (ELISA), Radio-immuno assay (RIA).

UNIT IV

Centrifugation techniques Basic principles, preparative centrifugation techniques, analytical ultracentrifugation techniques, application-determination of molecular weight and purity of macromolecules.

UNIT V

Radioisotope techniques Radioactive isotopes, units of radioactivity, Geiger and Scintillation counting techniques, Cerenkov counting, autoradiography, applications of radioisotopes in biological sciences and food preservation. Hazards of ionizing radiations.

Reference

1. Nielsen S. Suzanne. Food Analysis, Springer, U.S.A. 2010.
2. AOAC. Official methods of analysis, Association of Official Chemists, 14th edn, Washington DC. 1985.
3. Plummer TD. An Introduction to Practical Biochemistry, Tata McGraw Hill Publishing Company Ltd. 1999.
4. Winton LA and Winton BK. Techniques of Food Analysis, Allied Scientific Publishers, New Delhi. 1999.
5. Raghuramulu N, Nair KM and Kalyanasundaram S. A Manual of Laboratory Techniques, NIN Press, National Institute of Nutrition, Hyderabad. 2010.
6. Sadasivam S. Biochemical Methods, Wiley Eastern Ltd, New Delhi. 1992.
7. Jayaraman J. Laboratory Manual in Biochemistry, Wiley Eastern Ltd. 1985.

**DISCIPLINE CENTRIC ELECTIVE
NUTRIGENOMICS AND NUTRIGENETICS**

Code:21FSNP03D2

Credits:3+0

Hours/Week:3

Marks:

100

Learning Objectives: To

1. familiarize students with the basic concepts of nutrigenomics and nutrigenetics
2. develop an understanding of gene interaction and diet and its importance in prevention of disease.

Learning Outcomes:

The student will be able to:

- ✓ Discuss how nutrition may affect gene expression
- ✓ gain knowledge on concepts of nutrigenomics and design diets for prevention of disease
- ✓ applications of nutrigenomics in future nutrition research

Course Content

UNIT 1

Introduction Concept of functional genomics, systems biology, nutrigenomics, nutrigenetics, personalised nutrition.

UNIT II

Diet and gene expression Short-term gene expression regulation by nutritional factors. Diet and epigenetics. Perinatal programming. Diet in early life and metabolic programming.

UNIT III

Gene polymorphisms and responses to diet, diet as a risk or preventive factor of pathologies. Experimental designs in human nutrigenetics studies. Nutrigenetics of cancer, osteoporosis, cardiovascular disease and obesity.

UNIT IV

The intestinal microbiota - role in nutrigenomics. Computational approaches: Introduction to different types of public domain databases, data mining strategies, primer designing.

UNIT V

Technologies in Nutrigenomics Genomics Techniques: Different sequencing approaches, Microarray, Massarray, SNP genotyping, PCR and RT-PCR techniques

Discovery and validation of biomarkers for important diseases and disorders

Modulating the risk of inflammatory bowel diseases,obesity,cancer, and malnutrition through nutrigenomics;

REFERENCES

1. Journal Nutrients 2012, 4, 1898-1944; Molecular Nutrition Research—The Modern Way Of Performing Nutritional Science. Journal Nutrients 2013, 5, 32-57;
2. Nutrigenetics and Metabolic Disease: Current Status and Implications for Personalized Nutrition JNutrigenetics Nutrigenomics 2011;4:69–89; Nutrigenetics and Nutrigenomics: Viewpoints on the Current Status and Applications in Nutrition Research and Practice. J Am Diet Assoc. 2006;106:569-576;
3. Nutrigenomics: From Molecular Nutrition to Prevention of Disease.

MSC FSN GRI

DISCIPLINE CENTRIC ELECTIVE
FAMILY AND COMMUNITY SCIENCE

Code:21FSNP03D3

Credits: 3Hours/Week:3

Marks:100

Learning Objectives:

1. To have a sound knowledge in various branches of Home Science for strengthening the extension and research base.

Learning Outcomes

on successful completion of these units, students are expected :To

- ✓ describe the importance of each branch of Home Science
- ✓ understand the essence of each subject
- ✓ prepare them for UGC NET, SLET and ASRB

Course content

UNIT I

Food Science and Nutrition : Food groups, Cooking Methods, Principles and Methods of Preservation, Composition of Food, Food Additives, Food Adulteration, Food Laws, Food Processing. Concept of nutrition, Nutrients, Malnutrition digestion, absorption and metabolism of macro and micro nutrients, deficiencies and sources. Food Hygiene and sanitation. Food borne infections, Nutrition through life cycle – RDA, Diet modifications for Diabetes, Cardio Vascular Disease, Obesity, Anaemia and Renal Disorders.

UNIT II

Institution Management – Management, principles and functions, Food Service – Types and styles – personnel management, record maintenance in food service institutions, standardization of recipe, portion control and cost control.

UNIT III

Textiles and Clothing : General properties and structure of all textile fibers. Processing and manufacture of natural and man-made fibers. Definition and classification of yarns: Identification of yarns and their use in various fabrics. Fabric construction, definition and types of woven, non-woven and knitted fabric. Testing of fibers, yarns and fabric. Clothing : Principles of clothing- Socio-Psychological aspects of clothing, selection of fabrics for the family. Clothing construction – basic principles of drafting, flat pattern and draping methods. Textile design-principles and concepts. Care and maintenance of

textiles materials and garments; Laundry agents-methods and equipments.

UNIT IV

Resource Management – Concept of Home Management and steps – Management of Human Resources; Classification of Resources; Basics characteristics of Resources, Decision making in family, Steps in decision making; Methods of resolving conflicts. Work simplification; Importance of work simplification in home; Mundel’s classes of change; Housing, Interior design. Principles of Interior design, Various colours and colour schemes. Household equipment-selection and Care.

UNIT V

Human Development – Child development- Principles and Stag. Life Span Development – Theories of Human Development and Behaviour. Child rearing , Socialization practices and Dynamics, Early Childhood Care and Education – Emerging trends. Development problems and disabilities during childhood and adolescence. Advanced child study methods and assessment.

References:

1. Corbman.P.B. (1985). Fibre to Fabric. New York :Macraw Hill BookCompany.
2. Dantiyagi. S. (1996). Fundamentals of Textiles and their Care New Delhi: Orient Longman Limited. Education Planning Group . (1987). Home Management, New Delhi : Arya Publishing House.
3. Jha, J.K. (2002). Encyclopaedia of Teaching of Home Science, Vol.I,II and III . New Delhi: Anmol Publications.
4. Srilakshmi.B. (1997). Food Science. New Delhi. New Age International Pvt.Ltd.
5. Suriakanthi.A., (2002). Child Development - An Introduction Gandhigram :Kavitha Publications.
6. Varghese , M.A.et al (1994). Home Management , New Delhi: Wiley Eastern Limited.

DISCIPLINE CENTRIC ELECTIVE - FOOD SERVICE MANAGEMENT

Code:21FSNP03D4

Credits:T3+P0

Hours/week:3

Marks:100

Learning Objectives:To

1. develop skills in handling and maintenance of equipment
2. understand the key areas of institutional food service administration

Learning Outcomes :

On successful completion of this course the student will be able to:

- ✓ administer a food service system in an effective manner
- ✓ manage the human resources within a food service organization or department
- ✓ develop appropriate skills required for a food service industry
- ✓ develop and provide best nutritional menu and food to the client

Course content

UNIT I

Food Industry-Introduction, Definition of food service industry, principles of food service industry, objectives, types of food service industry commercial and non commercial; Hospitals, school meals, hostels, Industrial canteens, commercial hotel, canteens Institutions catering to different types of handicapped personnel.

UNIT II

Developing goals, policies, rules and procedures for food service institution: Developing objectives and goals -Definition, importance, types of goals, Policies, procedures, rules. Principles and procedures of management-Definition of management, organization & interaction at work, principles of management, functions of management, Managerial roles & responsibilities, the manager & leadership quality.

UNIT III:

Tools of Management and Equipments used in Food Service Industries

Tools of management –Definition, classification:- tangible tools, intangible tools, Organization chart, structure, function, work schedules and improvement techniques.

Classification of **equipments** electrical and non electrical equipments for food storage, preparation, serving, dishwashing methods and laundering.

UNIT IV

Quantity Food Production: Quantity food selection, purchase, storage, waste control, food operation management..Production management – food production, recipe development, Service systems.Menu mechanics, Work Improvement and productivity. Food plant –types of kitchen layout of different food service establishments drainage water lines, lighting and ventilation adopted in different units such as kitchen storage sinning areas, working heights in relation to equipments

UNIT V

Personnel and Financial management - Definition, man power planning, recruitment procedures, selection and induction, labour benefits and laws. Personnel policies, staff employment, training, placement, promotion, personnel records, work appraisals. Financial management-Definition, buying and accounting procedures in food service institution; budget, records to be maintained, cost accounting/analysis- Cost concepts-types of cost-fixed cost, semi-fixed cost, variable cost. Costing of foods – selling price.

Food cost control-methods of controlling food cost, break even analysis. Records to be maintained-System of book keeping, book of account-cash book, purchase book, sales book, purchase returns book, sales returns book, journal and ledger.

Reference

1. Sethi, M., Malhan, S. (2015), Catering Management: A Integrated approach, New age International.
2. June, Payne, Palacio, and Monica, (2016.), Foodservice Management: Principles and Practices, Pub. Harlow :Pearson, 13th Edition,
3. Vinayakam, N., Mani, P, Land Nagarajan, K, L. (2015), Principles of Accounting, Himalaya Publications, New Delhi,
4. Knight, J.B. and Kotschevar, L.H., (2017), 3rd Edition, Quantity: Food Production, Planning and Management, John Wiley and Sons.
5. Finch C.F. (1984), Food Preparations, MacDonald and Evans Ltd. Plymouth.
6. West B.B, Wood L, Harger V.P., (2006), Food Service in Institutions. John Willey and Sons, Inc., New York
7. Singh .R.K (2006), Modern Trends in Hospitality industry, AMAN, Publications, New Delhi.
8. Lillicrap, G. Cousins, J. and Weekes, S., (2014), 9th Edition, Food and Beverage Service, Hodder and Stoughton (Publishers) Ltd., England.

DISCIPLINE CENTRIC ELECTIVE - FOOD TOXICOLOGY

Code:21FSNP03D5 Credits:T3+P0

Hours/week:3

Marks: 100

Learning Objectives:

1. to know the principles of food toxicology
2. to encompass the awareness about natural food toxicants there in food
3. to appraise the toxicology substances in food additives

Learning Outcomes:

On successful completion of this course the student will be able:

- ✓ to evaluate the toxicity in food
- ✓ to understand the mechanism of toxicity
- ✓ to create awareness about Food allergies and sensitivities

Course content

UNIT I

Principles of Toxicology: Classification of toxic agents; characteristics of exposure; spectrum of undesirable effects; interaction and tolerance; biotransformation and mechanisms of toxicity. Evaluation of toxicity: Risk vs. benefit: Experimental design and evaluation: Prospective and retrospective studies: Controls :Statistics (descriptive, inferential): Animal models as predictors of human toxicity: Legal requirements and specific screening methods: LD50 and TD50: In vitro and in vitro studies; Clinical trials.

UNIT II

Natural Toxins in Food: Natural toxins of importance in food- Toxins of plant and animal origin; Microbial toxins (e.g. Algal toxins, bacterial toxins and fungal toxins). Natural occurrence, toxicity and significance. Food poisoning; Mycotoxicoses of significance. Determination of toxicants in foods and their management.

UNIT III

Food allergies and sensitivities: Natural sources and chemistry of food allergens; true/untrue food allergies; handling of food allergies; food sensitivities (anaphylactoid reactions, metabolic food disorders and idiosyncratic reactions); Safety of Genetically Modified food: potential toxicity and allergenicity of GM foods. Safety of toys and children consumables.

UNIT IV

Environmental Contaminants and Drug Residues in Food: Fungicide and pesticide residues in foods; heavy metal and their health impacts; use of veterinary drugs (e.g. Malachite Green in fish and β - agonists in pork); other contaminants in food. Radioactive contamination of food, Food adulteration and potential toxicity of food adulterants.

UNIT V

Food Additives and toxicants added or formed during Food Processing: Safety of food additives; toxicological evaluation of food additives; food processing generated toxicants: nitroso compounds, heterocyclic amines, Dietary Supplements and Toxicity related to Dose: Common dietary supplements; relevance of the dose; possible toxic effects.

References

1. Helferich, W., and Winter, C.K. Food Toxicology CRC Press 2001 Shibamoto, T. and Bjeldanes, L. 2009. Introduction to Food Toxicology, 2nd Ed. Elsevier Inc., Burlington, MA.
2. Duffus, J.H. and Worth, H.G. J. Fundamental Toxicology The Royal Society of Chemistry 2006.
3. Stine, K.E. and Brown, T.M. Principles of Toxicology (2nd ed.) CRC Press 2006.
4. Tönu, P. 2007. Principles of Food Toxicology. CRC Press, LLC. Boca Raton, FL.

DISCIPLINE CENTRIC ELECTIVE - FOOD QUALITY AND ASSURANCE

Code: 21FSNP03D6

Credits: 3+0

Hours/Week: 3

Marks:

100 Learning Objectives: To

1. Know the importance of quality assurance in food industry
2. Know the tests and standards for quality assessment and food safety
3. Know the laws and standards ensuring food quality and safety

Learning Outcomes:

On successful completion of this course the student will be able to apply:

- ✓ the importance and functions of quality control unit in food industries
- ✓ the methods used for evaluation of food quality
- ✓ the national and international organization enforcing food quality and safety

Course

content UNIT I

UNIT I

Food Spoilage: Food spoilage definition; factors influencing food spoilage; Types of food spoilage such as microbes, enzymes and insects; Changes in food quality due to spoilage; Methods for detection of food spoilage; Concept of food preservation and the principles.

UNIT II

Food Additives and Adulterants: Food additives definition; Common food additives and its function and usage; Permissible limits of additives in foods; Implications of additives on consumers health; Food adulteration: Meaning and definition; Types of food adulterants; Methods used for detection of food adulterants.

UNIT III

Testing of Food Quality: Quality meaning and need of food quality testing; Types of evaluation – subjective and objective; Subjective evaluation methods based on difference, rate, sensitivity etc.; Objective evaluation methods – tools and instruments used; quality standards for cereal, pulses and legumes, vegetables and fruits, milk, egg and flesh foods, fat and sugar and related products.

UNIT IV

Food Quality Control and Assurance: Current concepts of quality control and assurance; Need and importance of quality control programmes such as quality plan, documentation of records, product standards Product and purchase specifications and process control; Principles of HACCP and its role in total quality process; Duties and responsibilities of food quality controller.

UNIT V

Food Laws and Standards: Need and importance; National food legislation such as FSSAI, Essential Commodities Act, ISI or BIS, AGMARK, FPO and PFA; International Organization

suchasFAO, WHO,CodexAlimentariusandAPEDA.

MSC FSN GRI

References:

1. Early, R. (1995). Guide to Quality Management Systems for the Food Industry, Blackie, Academic and Professional, London
2. Gould, W.A. and Gould, R.W. 1988. Total Quality Assurance for the Food Industries, CTI Publications Inc, Baltimore
3. Pomeranz, Y. and Meloan, C.E. 1996. Food Analysis: Theory and Practice, CBS Publishers and Distributor, New Delhi
4. Askar, A. and Treptow, H. 1993. Quality Assurance in Tropical Fruit Processing, Springer-Verlag, Berlin
5. Ranganna, S. 1986. Handbook of Analysis and Quality Control for Fruit and Vegetable Products, 2nd Edition, Tata Mc Graw Hill Publishing Co Ltd., New Delhi
6. Hagstad, H. V. and Hubbert, W.T. (1986). Food Quality Control, Foods of Animal Origin, Iowa State University Press, Ames
7. Srilakshmi, B. 2005. Food Science, New Age International (P) Ltd., Publishers, New Delhi.

GENERIC ELECTIVE CULINARY NUTRITION

Code: 21FSNP02G1

Credits: T3+P0

Hours/week: 3

Marks: 100

Learning Objectives: To

1. acquire knowledge about the requirement of nutrients across age groups
2. learn about the Importance of vegetarian diet, meatless cooking, sustainable food systems
3. understand the Various diets and their significance

Learning Outcomes:

On successful completion of this course the student will be able to:

- ✓ practice and communicate evidence based nutrition

Course content

UNIT I

Life cycle nutrition: Nutrient requirements, Food sources and cooking across for different age groups

Food Based Macronutrients : Knife skills and meatless cooking

UNIT II

Vegan and Vegetarian Nutrition: Meaning,scope and benefits of veganism, Vegan and vegetarian cooking techniques

UNIT III

Econutrition :sustainable food systems,root to frond cooking,microgreens and its nutritional benefits and culinary uses

UNIT IV

Food Allergy: Understanding allergy related to food , difference between food allergy and food intolerance Allergy free cooking

Alternative Diets: Macrobiotic,Paleo, Meditarrean diet ,Detox diet,Fruit diet and gluten free diet
pros and cons

UNIT V

Gut Health: Meaning, importance of gut health and significance of gut microbiome ,Low FODMAP cooking

Weight management using High fiber/ low Glycemic cooking
Ayush practices for immunity and health

References

1. Jacqueline B. Marcus (2013)Culinary Nutrition: The Science and Practice of Healthy Cooking. Academic Press; 1st edition
2. Elana Amsterdam (2013).Paleo Cooking from Elana's Pantry: Gluten-Free, Grain-Free, Dairy-Free Recipes. Ten Speed Press; Illustrated edition
3. Annemarie Colbin (1986)Food and Healing: How What You Eat Determines Your Health, Your Well-Being, and the Quality of Your Life. Ballantine Books; 10th Anniversary ed. edition

GENERIC ELECTIVE NUTRITION FOR HEALTH

Code: 21FSNP02G2 Credits:T3+P0 Hours/week:3 Marks:100

Learning Objectives:To

1. acquire knowledge about the macro and micronutrients
2. learn about the Importance of vegetariandiet
3. understand the Various mechanisms of specificfoods

Learning Outcomes:

On successful completion of this course the student will be able:

- ✓ to know the role of vegetarian diet in preventing the degenerativediseases
- ✓ To acquire knowledge about the types ofdiet
- ✓ To improve the life style through Physical Activity

Course content

UNIT I

Basic Components of Foods and their Functions, Energy producing nutrients: Carbohydrates: Simple and complex carbohydrates and food sources Lipids: triglycerides, cholesterol and phospholipids and food sources Proteins: amino acids, protein quality and food sources Regulatory nutrients: vitamins, minerals and dietary fibres.

UNIT II

Energy metabolism and Weight Management: Human digestion and absorption and food metabolism. Energy balance and weight control.

UNIT III

Applying Nutrition in Daily Life: Planning a healthy diet: use of food pyramid and nutrition guideline. Use of nutrition label.The use of dietary supplement and functional food.

UNIT IV

Role of Diet in Disease Prevention and Management : Cardiovascular diseases and fat intake, Cancer: risk factors for cancer, nutrients involved in antioxidant function and role of diet in cancer prevention, Diabetes mellitus: risk factors for Type II diabetes, use of alternative sweeteners and principles of dietary restriction, Osteoporosis: bone health, use of calcium supplement and phytoestrogen

UNIT V

Nutraceuticals and functional foods for health and disease prevention Nutraceuticals: Sources, types and bioavailability of probiotics, prebiotics, bioactive peptides, bioactive lipids, phytochemicals, bioactive vitamins and minerals.Functional foods for immune, intestinal, bone and brain health.Functional foods for cancer, diabetes, cardiovascular disorders, osteo-arthritis, rheumatoid arthritis, osteoporosis, other inflammatory conditions, and obesity.

References

1. Judith E. Brown, Nutrition Now. 8th edition, Cengage Learning, 2017.
2. Janice Thompson & Melinda Manore (2013) Nutrition for Life. 3rd edition, Pearson education.

3. Blake JS (2008) Nutrition & You. San Francisco: Pearson Education.

**GENERIC ELECTIVE-
FOOD PRESERVATION AND PACKAGING**

Code: 21FSNP02G3

Credits: T3+P0Pd/Wk:3

Marks:

100 Learning Objectives: To

1. Understand concept and principles of food preservation
2. Impart knowledge about the various food packaging materials and its importance
3. Know the trends in food packaging

Learning Outcomes:

On successful completion of this course the student will be able:

- ✓ To Knowledgeable about the applications of preservation
- ✓ To make out the different preservation process
- ✓ to opt for the exact packaging material for food products

Course Content

UNIT I

Introduction to Food Preservation: Meaning, concept, methods of food preservation, advantages and limitations. Preservation of fresh produce and processed foods.

Thermal Preservation: use of high temperature preservation method - pasteurization and sterilization, canning concept, principal, application, advantages and limitations. Low temperature Storage - Refrigeration, Chilling, cryogenic chilling, chill storage, freezing, cryogenic freezing, frozen food storage, freeze drying, changes in food during freezing, various types of freezers (tunnel types, fluidized bed, air blast etc.)

Unit II

Preservation by Drying and using Chemical Preservatives - Concept, principle and method of Drying, dehydration, solar drying, Sun drying, Drying Osmosis, Mechanical Driers - Spray drying, Foam drying, Drying by smoking - Definition, Principles, applications and Factors influencing different drying methods.

Chemical preservatives: preservatives meaning, types and mode of action, advantages and limitations.

Unit III

Novel Preservation methods - Food Irradiation, High pressure processing, PEF, ozonotreatment, membrane filtration, concept, principal, application, advantages and limitations.

UNIT IV

Introduction to Food Packaging: Packaging terminology- definition .Functions of food packaging, Packaging environment. Characteristics of food stuff that influences packaging selection.

Packaging material and their properties: Glass, Paper and paper board, Corrugated fibre board (CFB), Metal containers: Tin Plate and Aluminum, Composite containers, Collapsible tubes, Plastic Films, Laminations, Metalized films, Coextruded films, Testing of packaging material. Concern and safety of packaging materials, recycling and waste disposal.

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UNIT V

Packaging Systems and methods: Vacuum Packaging, Controlled atmospheric packaging, Modified atmospheric packaging, Aseptic Packaging, Retort processing, Microwave packaging, Active Packaging, intelligent packaging, Edible packaging, Shrink and stretch packaging.

Food Labelling and Printing: Packaging aesthetic and graphic design; printing, Coding and marking including barcoding; Packaging Laws and regulations.

References

1. Robertson, G.L. 2006 Food Packaging: Principles and Practice (2nd ed.), Taylor & Francis Aggarwal, Poonam, Sep, 2003, Value added Products from mangoes, Food & Pack.
2. Chevan J.K. and P.M. Katecha (2003). Raisins – Pretreatments, drying methods and storage, Food & Pack.
3. Desrosier NW & Desrosier JN, The Technology of Food Preservation – AVI Publication
4. Jood Sudesh and Neelam Kheterpaul, 2002, Food Preservation, Geeta Souraz, Agrotech Publishing Academy, Udaipur-313002
5. NIIR. (2003). Food Packaging Technology Handbook, National Institute of Industrial Research Board, Asia Pacific Business Press Inc.
6. Han, J.H. (Ed.) 2005 Innovations in Food Packaging, Elsevier Academic Press,

GENERIC ELECTIVE

NUTRITION THERAPY IN NON-COMMUNICABLE DISEASE

Code: 21FSNP02G4

Credits: T3+P0

Hours/week: 3

Marks: 100 Learning Objectives: To

1. Acquire knowledge about the food and its composition
2. Learn about the role of healthy diet in disease prevention
3. Understand the concepts of nutraceuticals and functional foods

Learning Outcomes:

On successful completion of this course the student will be able to:

- ✓ Practice and disseminate information to people on healthy diet

UNIT I

Dietary management of metabolic syndrome and associated disorders Metabolic syndrome: Concept; Pathophysiology of insulin resistance. Diabetes mellitus – types, etiology, symptoms and diagnosis, aims of dietary treatments, special dietary considerations for type 1 and 2 diabetes, complications of diabetes

UNIT II

Diseases of the heart and blood vessels- etiology, symptoms and diagnosis; atherosclerosis, lipids and other dietary factors and coronary heart diseases (CHD). Diet in CHD, congestive heart failure and hyperlipidemia.

UNIT III

Nutritional aspects of disease affecting the skeleton Bone architecture and physiology- composition of bone, bone metabolism, bone mass development and markers, nutrients related to bone health. Rickets, osteomalacia and osteoporosis - etiology, pathophysiology, risk factors and nutritional care.

UNIT IV

Hypertension - Types, etiology, pathophysiology, risk factors, complications and nutritional care. Obesity- introduction, etiology, clinical assessment, treatment approaches, consequences of obesity and its prevention.

UNIT V

Cancer - etiology, pathophysiology, risk factors, complications and nutritional care. Chronic Obstructive Pulmonary disease (COPD) - etiology, pathophysiology, risk factors, complications and nutritional care.

References:

1. B. Srilakshmi, (2014) Dietetics, 7th edition, New Age International Private Ltd

2. Antia.P.(1989)ClinicalNutritionandDietetics,OxfordUniversity,Mumbai.
3. Mahan,L.K.andEscott-Stump,S.(2007):Krause'sFoodNutritionandDietTherapy,12thEdition,W.B.SaundersLtd.
4. Mayrice.E.Shills,James,A.Olsen,MosheShihe,(2012)ModernNutritiononHealthandDisease,Vol.1&2,11thedition,LeaandPediger,Philadelphia.
5. Davidson.S.S.Passmore,,MartinA.Eastwood.F.(1989)HumanNutritionandDietetics,9thEditionF&SLingstonsEdinburgh andLondon
6. Longvah,T,Ananthan,R,Bhaskarachary,K,Venkaiiah,K.(2017).IndianFoodComposition Tables (IFCT), Indian Council of Medical Research, NationalInstituteofNutrition,Hyderabad.
7. Recommended Dietary Allowances and Estimated Average RequirementsNutrientRequirementsforIndians – 2020.AReportoftheExpertGroupIndianCouncilofMedicalResearchNationalInstituteofNutrition.NIN,Hyderabad

VALUEADDED COURSE- DESIGNING OF DIET

Code:21FSNP0VA1

Credits:2

Learning Objectives:

1. To learn to plan diets for healthy living

Course content

1. Identification of food sources for various nutrients using food composition table.
2. Estimation of BMI and other nutritional status parameters to plan diet.
3. Record yourself-diet using 24-hour dietary recall and its nutritional analysis.
4. Introduction to meal planning, concept of food exchange system.
5. Planning of meal for adults of different activity levels for various income groups.
6. Planning of nutritious snacks for self and Preparation of nutritious snacks using various methods of cooking.

7. Understanding the Nutritional labeling of food products.

References

1. Longvah, T, Ananthan, R, Bhaskarachary, K, Venkaiah, K. (2017). Indian Food Composition Tables (IFCT), Indian Council of Medical Research, National Institute of Nutrition, Hyderabad.
2. Recommended Dietary Allowances and Estimated Average Requirements Nutrient Requirements for Indians – 2020. A Report of the Expert Group Indian Council of Medical Research National Institute of Nutrition. NIN, Hyderabad.
3. B. Srilakshmi, (2014) Dietetics, 7th edition, New Age International Private Ltd

MSC FSN GRI

VALUEADDEDCOURSE-ARTOFBAKING

Code:21FSNP0VA2

Credits:2

LearningObjectives:

1.Learntheartofbasicbakingtechniques

Coursecontent

1. Introductionbakingandbakingtehniques
2. Bakingredients,Essentialtoolsandequipment,environmentalrequirements
3. Fundamentals techniques of making baked products –
Biscuits,cookies,breadsuns,rolls,pizzabaseandpasterie.
4. Cakemaking-icinganddecorations
5. Makinglowfatandsugarfreebakedproducts
6. Use,handling,packagingandstorageofbakedproducts

References

1. Radhakrishnan.S.(2015)AGuidetoBakingProcess,Educationistpress,ADivisi
onofWrite&PrintPublications,NewDelhi-110015
2. Hamlyn.(1984).TheBestofBaking,London.
3. IndiraKakati.(1984).EggLessBaking,Sahibabad:VikasPublishingHouse

VALUE ADDED COURSE – FOOD PRESERVATION

Code: 21FSNP0VA3

Credits: 2

Learning Objectives:

1. To gain knowledge on home scale preservation of foods

Course content

1. Introduction to preservation-meaning, types and importance
2. Home scale food preservation techniques- Essential tools and equipments required
3. Fundamental techniques of preparing baked products- Sauces and chutnies, Ketchup (tomato), Squashes (lemonsquash, orangesquash, pineapplesquash), Syrups (rose syrup and almond syrup), Jams (apple jam and mixed fruit jam), Pickles (Amla, lemon, mixed vegetable), Preserve (carrot), Murraba (Ginger), Leathers (Guava), Jelly (Pectin), Dehydration of cereal products, fruits and vegetables (Rice fryums, sapota flakes, brinjal fryums).
4. Use, handling, packaging and storing of preserved foods.
5. Food additives used for food preservation and permissible limits.

References

1. Food safety and Standards Authority of India. www.fssai.gov.in
2. National Center for Home Food Preservation. <http://nchfp.uga.edu/>
3. Siddhapa GS, Lal Gand Tandon. Preservation of fruits and vegetables. Indian Council of Agriculture Research, New Delhi, 1998.
4. Srivastava SS. Phal Parirakshan. Kitab Mahal, Lucknow 2006.

VALUE ADDED COURSE – FOOD LAWS AND ADULTERATION

Code: 21FSNP0VA4

Credits: 2 Learning Objectives:

1. To gain basic knowledge on various food laws and about adulteration.

Course content

1. Highlights of Food Safety and Standards Act 2006 (FSSA) – Food Safety and Standards
2. Authority of India – Rules and Procedures of Local Authorities.
3. Common Foods subjected to Adulteration - Definition – Types; Poisonous substances, Foreign matter, Cheap substitutes, Spoiled parts. Adulteration through Food Additives – Intentional and incidental. General Impact on Human Health.
4. Methods of Detection Adulterants in the following Foods; Milk, Oil, Grain, Sugar, Spices and condiments, Processed food, Fruits and vegetables. Additives and Sweetening agents (at least three methods of detection for each food item).

References

1. Food Safety and Standards Authority of India. Ministry of Health and Family Welfare, Government of India.
2. Mudambi, S.R. and M.V. Rajgopal 2006. Fundamentals of Foods and Nutrition. Wiley Eastern Ltd. Raheena Begum. 1989. A Textbook of Foods, Nutrition and Dietetics. Sterling Publishers Pvt. Ltd. New Delhi.