

M.Sc. FOOD SCIENCE AND NUTRITION

July 2018 onwards

| Category | Subject code | Title of the course | Credits | Contact hours | | CFA | ESE | Total marks |
|---------------------------|--------------|--|-----------|---------------|----------|-----|-----|-------------|
| | | | | T | P | | | |
| I SEMESTER | | | | | | | | |
| Core course | 18FSNP0101 | Applied Physiology | 4 | 4 | - | 40 | 60 | 100 |
| | 18FSNP0102 | Advanced Food Science | 3 | 3 | - | 40 | 60 | 100 |
| | 18FSNP0103 | Advanced Nutrition I | 3 | 3 | - | 40 | 60 | 100 |
| | 18FSNP0104 | Advanced Food Science & Advanced Nutrition - Practical | 2 | - | 4 | 60 | 40 | 100 |
| | 18FSNP0105 | Food Microbiology | 3 | 3 | - | 40 | 60 | 100 |
| | 18FSNP0106 | Nutritional Biochemistry | 3 | 3 | - | 40 | 60 | 100 |
| | 18FSNP0107 | Nutritional Biochemistry Practical | 2 | - | 4 | 60 | 40 | 100 |
| Value added course | 18GTTP0001 | Gandhi in Everyday Life | | 2 | | 50 | | 50 |
| Total | | | 20 | 18 | 8 | | | |
| II SEMESTER | | | | | | | | |
| Core course | 18APRP0001 | Research Methods | 4 | 3 | - | 40 | 60 | 100 |
| | 18APRP0002 | Applied Statistics | 4 | 4 | - | 40 | 60 | 100 |
| | 18FSNP0208 | Advanced Nutrition II | 3 | 3 | - | 40 | 60 | 100 |
| | 18FSNP0209 | Food Product Development and Marketing | 3 | 3 | - | 40 | 60 | 100 |
| | 18FSNP0210 | Food Product Development and Marketing –Practical | 2 | - | 4 | 60 | 40 | 100 |
| Non-Major Elective | | | 4 | 4 | - | 40 | 60 | 100 |
| Value added course | 18ENGP00C1 | Communication/Soft Skills | 2 | 2 | - | 50 | | 50 |
| | 18FSNP0211 | Industrial Training* | 2 | - | - | 50 | | 50 |
| Total | | | 24 | 19 | 4 | | | |
| III SEMESTER | | | | | | | | |
| Core course | 18FSNP0312 | Therapeutic Nutrition | 4 | 4 | - | 40 | 60 | 100 |
| | 18FSNP0313 | Therapeutic Nutrition Practical | 2 | - | 4 | 60 | 40 | 100 |
| | 18FSNP0314 | Nutraceuticals and Functional Foods | 3 | 3 | - | 40 | 60 | 100 |
| | 18FSNP0315 | Nutrition in Critical care | 3 | 3 | - | 40 | 60 | 100 |
| Major Elective | 18FSNP03EX | | 4 | 4 | - | 40 | 60 | 100 |
| Modular Course | 18FSNP03MX | | 2 | 2 | - | 50 | | 50 |
| Core Course | 18FSNP03F1 | Extension/Field visit | - | 2 | - | 50 | - | 50 |
| | 18EXNP03V1 | Village Placement Programme (VPP) | 2 | - | - | 50 | - | 50 |
| Total | | | 20 | 18 | 4 | | | |

| IV SEMESTER | | | | | | | | |
|-------------------------------------|------------|---------------------------------|-----------|-----------|-----------|-----|-------|-----|
| Core Course | 18FSNP0416 | Public Health Nutrition | 4 | 4 | - | 40 | 60 | 100 |
| | 18FSNP0417 | Food Safety and Quality Control | 4 | 4 | - | 40 | 60 | 100 |
| | 18FSNP0418 | Internship** | 4 | - | - | 100 | - | 100 |
| | 18FSNP0419 | Dissertation | 6 | - | 12 | 75 | 75+50 | 100 |
| Modular Course | 18FSNP04My | | 2 | 2 | - | 50 | - | 50 |
| Cumplutory non Credit Course | 18FSNP04F2 | Extension/Field visit | - | 2 | - | 50 | - | 50 |
| Total | | | 20 | 12 | 12 | | | |
| Grand Total | | | 84 | | | | | |

*II Semester Break

**IV Semester Break

MAJOR ELECTIVE COURSES

| Course Code | Title of the course | Credits | Contact Hours | CFA | ES E | Total |
|-------------|--------------------------------|---------|---------------|-----|------|-------|
| 18FSNP03E1 | Scientific Writing | 4 | 4 | 40 | 60 | 100 |
| 18FSNP03E2 | Food Service Management | 4 | 4 | 40 | 60 | 100 |
| 18FSNP03E3 | Family and Community Science | 4 | 4 | 40 | 60 | 100 |
| 18FSNP03E4 | Food Additives | 4 | 4 | 40 | 60 | 100 |
| 18FSNP03E5 | Food Packaging | 4 | 4 | 40 | 60 | 100 |
| 18FSNP03E6 | Food Toxicology | 4 | 4 | 40 | 60 | 100 |
| 18FSNP03E7 | Food Processing and Technology | 4 | 4 | 40 | 60 | 100 |

NON -MAJOR ELECTIVE COURSES

| Course Code | Title of the course | Credits | Contact Hours | CF A | ES E | Tota l |
|-------------|----------------------------------|---------|---------------|------|------|--------|
| 18FSNP02N1 | Food Preservation | 4 | 4 | 40 | 60 | 100 |
| 18FSNP02N2 | Nutrition for Healthy Life Style | 4 | 4 | 40 | 60 | 100 |
| 18FSNP02N3 | Culinary Science | 4 | 4 | 40 | 60 | 100 |

MODULAR COURSES

| Modu lar | Course Code | Title of the course | Credit s | Contact Hours | CFA | ESE | Total |
|----------|-------------|------------------------------------|----------|---------------|-----|-----|-------|
| MX | 18FSNP03M1 | ICT for Nutrition Education | 2 | 2 | 50 | - | 50 |
| | 18FSNP03M2 | Food Fermentation | 2 | 2 | 50 | - | 50 |
| MY | 18FSNP04M1 | Nutritional Assessment and Fitness | 2 | 2 | 50 | - | 50 |
| | 18FSNP04M2 | Food Dehydration | 2 | 2 | 50 | - | 50 |

CORE PAPER- APPLIED PHYSIOLOGY

Code: 18FSNP0101

Credits: T4 + P0

Hours/week: 4

Marks: 100

Objectives:

1. To understand the structure and functions of systems in human body.
2. To understand the integrated function of all systems and disease conditions.

Specific Objectives of Learning:

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.

UNIT I

Cell structure and function: Levels of cellular organization and function – organelles, tissues, organs and systems – brief review. 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. Secretory, Digestive and Absorptive functions. Structure and functions of liver, pancreas and gall bladder and their dysfunction. Hormones of GIT.

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.

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, Physiology of Circulation. Lymphatic system.

Immune system: Cell mediated and humoral immunity. Activation of WBC and production of antibodies. Role in inflammation and defense.

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.

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. Evlync. Pearce, (1997). Anatomy and Physiology for nurses, 16th Edition, New Delhi. Jaypee Brohers.
3. Mariakuttikan A, Arumugam N (2010). Animal Physiology, Saras Publications.
4. K.Sembulingam and Prema sembulingam (2012).Essential of Medical Physiology,6th Edition, Jaypee Brohers Medical Publishers (p) Ltd.

Reference Books:

1. Ganong, W. F. (1985): Review of Medical Physiology, 12th Edition, Lange Medical Publication.
2. Moran Campell E.J., Dickinson, C.J., Slater, J.D., Edwards, C.R.W. and sikora, k.(1984): Clinical Physiology, 5th Edition, ELBS, Blackwell Scientific Publications.
3. Guyton, A.C,(1985): Function of the Human body, 4th Edition , W.B. Sanders Company, Philadephia.
4. Guyton, A.C, and Hall, J. B. (1996): Text Book of Medical Physiology, 9th Edition ,W.B. Sanders company, Prime Books (Pvt.) Ltd., Bangalore.
5. Wilson, K.J.W. and Waugh, A. (1996): Ross and Wilson Anatomy and Physiology in Health and Illness, 8th Edition, Churchill Livingstone.
6. McArdle, W.D., Katch, F.I. and Katch, V.L. (1996): Exercise Physiology. Energy, Nutrition and Human performance, 4th Edition, Williams and wilkins, Baltimore.
7. Jain, A.K., Textbook of physiology. Vol I and II. Avichal publishing co., New Delhi.
8. John E. Hall Guyton and Hall Textbook of Medical Physiology, 13th Edition

Journals

1. European Journal of Applied Physiology
2. Journal of Comparative Physiology A · Neuroethology, Sensory, Neural, and Behavioral Physiology
3. Journal of Comparative Physiology B · Biochemical, Systems, and Environmental Physiology , Journal of Membrane Biology

Lecture Schedule

| Units | Topics to be covered | Hours |
|--------------|---|-------|
| I | Cell structure and function: Levels of cellular organization and function – organelles, tissues, organs and systems – brief review | 2 |
| | Cell membrane, transport across cell membrane and intercellular communication | 1 |
| | Structure of bones | 1 |
| | function of bone | 2 |
| | Structure and function cartilage and connective tissue. Osteoporosis | 2 |
| | Musco skeletal system-types,structure and function | 2 |
| | Digestive System | |
| | Review of structure and function. | 2 |
| | Secretory | 2 |
| | Digestive& Absorptive functions | 2 |
| | Structure and functions of liver | 1 |
| | Pancreas and gall bladder and their dysfunction. | 1 |
| | Hormones of GIT | 2 |
| Total | 20 | |
| II | Respiratory system: Review of structure and functions | 1 |
| | Role of lungs in the exchange and Transport of gases. | 2 |
| | Excretory system Structure and functions of nephron. | 1 |
| | Urine formation. | 2 |
| | Role of kidney in maintaining PH of blood. | 2 |
| | Water - acid base balance, diuretics | 2 |
| Total | 10 | |
| III | Circulatory system: Structure and functions of heart and blood vessels. | 2 |
| | Blood: Composition- plasma, blood cells, haemoglobin, blood clotting process | 2 |

| | | |
|-----------|--|-----------|
| | Heart: beat, initiation , conduction and regulation. | 2 |
| | Physiology of Circulation. Cardiac cycle Lymphatic system. | 2 |
| | Immune system: Cell mediated and humoral immunity. Activation of WBC and production of antibodies. Role in inflammation and defense. | 3 |
| | Total | 11 |
| IV | Endocrine system: Endocrine glands – Pitiutary, thyroid, adrenals, pancreas- hormones of endocrine glands-Functions and role , Disorders of endocrine glands. | 2 |
| | Reproductive system: General anatomy of female and male reproductive system | 2 |
| | Menstrual cycle, spermatogenesis, Oogenesis, Process of reproduction, Pregnancy and parturition | 3 |
| | Mammary glands-structure and lactation. Physiological changes in Menopause | 2 |
| | Total | 9 |
| V | Nervous system: Central nervous system, structure and function of brain and spinal cord, | 3 |
| | Autonomic nervous system, Review of structure and function of neuron, conduction of nerve impulse, synapse | 2 |
| | ,role of neurotransmitters afferent blood brain barrier, CSF. Hypothalamus and its role in various body functions –sleep, memory and obesity. | 3 |
| | Sense organs: Review of structure and function. Role of skin, eye, ear, Nose and tongue in perception of stimuli. | 2 |
| | Total | 10 |
| | Seminar | 4 |
| | Unit I to V Total hours | 64 |

CORE PAPER - ADVANCED FOOD SCIENCE

Code: 18FSNP0102

Credits: T3 +P0

Hours/Week: 3

Marks: 100

Objectives:

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

Specific Objectives of Learning:

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
- ✓ The uses of ingredients in food product development

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. 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. 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. 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.

Lecture Schedule

| Units | Topics to be covered | Hours |
|------------|---|-----------|
| I | Constituents of food Water: structure and properties; types of water Water: sorption phenomena; water solution interactions | 2 |
| | Phase transition of foods containing water, ice formation and structure Heat transfer during processing, relationship between viscosity and temperature | 2 |
| | Water activity and food spoilage Food dispersion meaning, concept of colloidal system and rheology Structure, formation and stability of gels Structure, formation and stability of sols, Structure, formation and stability of emulsion Structure, formation and stability of foams. | 2 |
| | Total | 6 |
| II | Polysaccharides, sugars and sweeteners Review on polysaccharides, structure and composition of starch Properties and characteristics of food starches | 2 |
| | Effect of heat on food starch properties – gelatinization, retrogradation, dextrinization Factors influencing gelatinization and dextrinisation process | 2 |
| | Modified food starches meaning, preparation methods and the properties Structure, composition and characteristics of non-starch polysaccharides such as cellulose and hemicellulose, | 3 |
| | Structure, composition and characteristics of non-starch polysaccharides such as pectin and gums | 2 |
| | Role of starch and non-starch polysaccharides in food and industrial applications .Properties of sugars and sweeteners, role of sweetener in food products. | 2 |
| | Total | 11 |
| III | Proteins and Enzymes Review on amino acid structure and composition, classification of amino acids, | 2 |
| | Amino acid properties, meaning of peptide bond and polypeptides Review on structure of proteins, Classification and properties of proteins | 2 |
| | Effect of heat on physiochemical properties of proteins – denaturation, gelation . Role of proteins in food products and the industrial applications of proteins Texturized vegetable protein meaning and the preparation method | 2 |
| | Protein concentrate and isolates meaning and the preparation methods Review on enzymes, classification and its nature Mechanism of enzyme action, Factors influencing enzyme activity | 2 |
| | Role of enzymes in food products; Immobilized enzymes and its application in food industries. | 2 |
| | Total | 10 |

| | | |
|--------------------------------|---|-----------|
| IV | Fat and Oil Structure and composition of fat, properties of fat. Oil structure, composition and the properties | 3 |
| | Methods to determine the quality of fat/oil – Acid value, peroxide value, TBA etc | 2 |
| | Effect of processing on physico-chemical properties of fat/oil; Sources of fat and its shelf life | 2 |
| | Quality changes in fat/oil during storage and prevention of fat spoilage Role of fat/oil in food products and the industrial applications of fat Fat substitutes meaning and the preparation of margarine | 2 |
| | Total | 9 |
| V | Food colours and flavours Natural: Pigments meaning, composition and the properties; Classification of pigments – fat and water soluble Effects of processing on stability of fat soluble pigments present in foods | 2 |
| | Effect of processing condition on stability of water soluble pigments present in foods. Factors influencing stability of food colours. Method of extraction of natural colours and its feasibility. | 2 |
| | Artificial colour meaning, composition and the properties Effect of processing on stability of artificial colours and the factors influencing it food and industrial applications of natural and artificial colours | 3 |
| | Flavors: Taste and nonspecific saporous sensations, Flavour compounds in foods such as vegetables, fruits and spices | 1 |
| | Flavours produced from fermentation and volatiles on foods Role of flavours in food and industrial usage, Effect of processing on food flavours and the concept of microencapsulation | 1 |
| | Total | 9 |
| | Seminar | 3 |
| Unit I to V Total hours | | 48 |

CORE PAPER- ADVANCED NUTRITION – I

Code: 18FSNP0103

Credits: T3 +P0

Hours/Week: 3 Marks: 100

Objectives:

1. To highlight the physiological and metabolic role of nutrients and their relationship to human health and wellbeing.
2. To understand the health problems associated with nutrient deficiency or toxicity

Specific Objectives of Learning:

After studying this paper, the students will have a thorough understanding on

- ✓ the essential of nutrients in growth and development of humans
- ✓ the importance of diet in maintaining human health and leading active lifestyle
- ✓ The concept of diet therapy in treatment and management of nutritional disorders

UNIT I

Energy: Energy definition; unit of measurements – Calorie & Joule; Concept of energy balance – energy intake and expenditure; Energy sources: Carbohydrate, protein & fat; Measurement of energy value of foods by Bomb Calorimeter; Energy expenditure components: basal and resting metabolic rate, thermic effect of food and physical activity; Factors influencing energy expenditure; Methods for determination of energy expenditure – direct and indirect calorimetry; Estimation of energy requirements of individuals and groups: RDA, principles and the methods used for RDA measurement.

UNIT II

Carbohydrates: Classification and functions; Digestion and absorption process; Metabolism and regulation; dietary fibre meaning and types; Physiological role and health benefits of dietary fibre, Resistant starch meaning and its physiological benefits; Requirements and food sources; Glycemic index of foods.

Proteins: Classification and functions; Digestion and absorption; Metabolism and regulation of proteins; Requirements and food sources; Factors influencing protein quality: Amino acid composition and digestibility; Protein quality evaluation methods: *in vitro* and *in vivo* methods; Therapeutic application of specific proteins and amino acids.

UNIT III

Lipids: Classification and functions; Digestion and absorption process; Metabolism and regulation; Requirements and food sources; Fatty acids types: Saturated and unsaturated difference; Essential Fatty Acids (EFA): Definition and functions; Role of n-3, n-6 fatty acids in health and disease; Trans fatty acids and its association to cardiovascular diseases.

Vitamins: Classification – fat and water soluble; Fat soluble vitamins (A,D,E and K): Functions, Requirements and food sources; Physiological, pharmacological and therapeutic effects, toxicity and deficiency of fat soluble vitamins; Water soluble vitamins: Thiamine, riboflavin, niacin, biotin, pyridoxine, folic acid, pantothenic acid, ascorbic acid, cyano-cobalamin, choline, inositol functions, requirements, food sources; Deficiency and toxicity of water soluble vitamins.

UNIT IV

Minerals: Macro minerals: Calcium, phosphorus, Magnesium, sodium, potassium and chloride functions, requirements, food sources, deficiency and toxicity; Microminerals: Iron, copper, zinc, manganese, iodine, fluoride. Trace Minerals: Selenium, cobalt, chromium, vanadium, silicon, boron, nickel functions, requirements, food sources, deficiency and toxicity. Interrelationship between vitamins and minerals in metabolism

UNIT V

Water: Body composition – extra- and intra- cellular fluid; Physiological functions; water balance and its regulation; Requirement and the sources; Nutritional and health problems due to deficiency or excess of water intake.

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. Srilakshmi (2008). Nutrition Science. New Age International Pvt. Ltd, New Delhi.
6. Mahan L K and Escott – Stump S (2000). Krause's Food Nutrition and Diet Therapy 10th Ed WB Saunders Ltd
7. Shills, M.E., Olson, J., Shike, M. and Roos, C. (1998): Modern Nutrition in Health and Disease. 9th Edition .Williams and Williams. A. Beverly Co. London.
8. SreeDevi.V. (1997). Nutrition Education. Discovery Publishing House, New Delhi.
9. Bamji, M.S., Rao, P.N. and Reddy, V. (2008). Textbook of Human Nutrition, Oxford & IBH Publishing Co. Pvt. Ltd.
10. Gopalan, C. (1995). Recent Trends in Nutrition, Oxford University Press, London.

Lecture Schedule – Theory

| Units | Topics to be covered | Hours |
|--|--|----------|
| I | Energy | |
| | Meaning of energy, unit of measurements – Calorie & Joule definition, Concept of energy balance – energy intake and expenditure; | 1 |
| | Energy sources of food: Carbohydrate, protein & fat; energy metabolism of carbohydrate, protein and fat, Measurement of energy value of foods by Bomb Calorimeter – principle and process; | 1 |
| | Energy expenditure components: basal and resting metabolic rate meaning and the concept, factors influencing BMR | 1 |
| | Energy expenditure components: thermic effect of food and physical activity, factors influencing thermic effect of food and physical activity | 1 |
| | Determination of energy expenditure – direct method | 1 |
| | Determination of energy expenditure - indirect method | 1 |
| | Estimation of energy requirements of individuals and groups: factorial, computation and others | 1 |
| | Meaning of RDA and nutritional status, principles and the methods used for RDA measurement | 1 |
| | ICMR RDA of energy for different age groups, definition of reference-men and women | 1 |
| | Total | 9 |
| II | Carbohydrates | |
| | Carbohydrate meaning, classification of carbohydrate – mono-, oligo- and poly-saccharide | 1 |
| | Physiological functions of carbohydrate, digestion and absorption process Review of metabolism and regulation, deficiency and toxicity of carbohydrate, | 1 |
| | Dietary fibre meaning and types, physiological role and health benefits of dietary fibre, Resistant starch meaning and its physiological benefits Carbohydrate requirements and food sources, Glycemic index of foods | 2 |
| | Protein, polypeptide and amino acid meaning, classification of proteins Functions of proteins, digestion and absorption | 1 |
| | Review of protein metabolism and regulation, requirements and foods sources Factors influencing protein quality – antinutritional factors and digestibility | 1 |
| | Protein quality evaluation methods - PER, DC, NPU, BV, AAS, PDCAAS In vitro and vivo method for protein quality evaluation – Amino acid score, PER, BV details Deficiency and toxicity of proteins, therapeutic applications of proteins and amino acids | 3 |
| | Total | 9 |
| | Lipids | |
| Lipid definition, classification of lipid Lipid functions, digestion and absorption process | 1 | |

| | | |
|--------------|---|-----------|
| III | Review of metabolism and regulation, deficiency or toxicity, requirements and food sources Fatty acids meaning and the types, essential Fatty Acids (EFA): Definition and functions | 1 |
| | Role of n-3, n-6 fatty acids in health and disease, trans fatty acids and its association to cardiovascular diseases | 1 |
| | Vitamins definition, classification of vitamins, functions of vitamin A, absorption, requirement and food sources, deficiency/toxicity | 2 |
| | Vitamin D and E functions, absorption, requirement and food sources, deficiency or toxicity | 1 |
| | Vitamin K functions, absorption, requirement and food sources, deficiency or toxicity | |
| | Vitamin B1 and B2 functions, absorption, requirement and food sources, deficiency or toxicity Niacin, vitamin B6, biotin functions, absorption, requirement and food sources, deficiency or toxicity Folic acid, vitamin B12, vitamin C functions, absorption, requirement and food sources, deficiency or toxicity | 2 |
| | Pantothenic acid, choline, inositol functions, absorption, requirement and food sources, deficiency or toxicity | 1 |
| Total | 9 | |
| IV | Minerals | |
| | Minerals meaning, classification of minerals, calcium functions, absorption, Calcium requirement and food sources, deficiency or toxicity Phosphorus and magnesium functions, absorption, requirement and food sources, deficiency or toxicity | 2 |
| | Sodium, potassium and chloride functions, absorption, requirement and food sources, deficiency or toxicity | 1 |
| | Iron and iodine functions, absorption, requirement and food sources, deficiency or toxicity | 1 |
| | Zinc and copper functions, absorption, requirement and food sources, deficiency or toxicity | 2 |
| | Manganese and fluoride functions, absorption, requirement and food sources, deficiency or toxicity Selenium and chromium functions, absorption, requirement and food sources, deficiency or toxicity | 2 |
| | Cobalt and vanadium functions, absorption, requirement and food sources, deficiency or toxicity Silicon, boron and nickel functions, absorption, requirement and food sources, deficiency or toxicity | 2 |
| | Inter relationship between vitamins and minerals | 1 |
| Total | 11 | |
| V | Water and phytochemicals | |
| | Body fluid and water - composition of human body, water and electrolyte balance | 3 |
| | Functions of water, absorption requirement and sources Nutritional and health problems associated to deficiency or excess of water intake | 4 |
| | Total | 7 |
| | seminar | 3 |
| | Total hours for Unit I – V | 48 |

**CORE PAPER- ADVANCED FOOD SCIENCE & ADVANCED NUTRITION -
PRACTICAL**

Code: 18FSNP0104

Credits: T0+P2

Hours/Week: 4

Marks: 100

Objectives:

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

Specific Objectives of Learning :

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

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 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

References

1. Srilakshmi (2008). Nutrition Science. New Age International Pvt. Ltd, New Delhi.
2. Mahan L K and Escott – Stump S (2000). Krause's Food Nutrition and Diet Therapy 10th Ed WB Saunders Ltd
3. Shills, M.E., Olson, J., Shike, M. and Roos, C. (1998): Modern Nutrition in Health and Disease. 9th Edition .Williams and Williams. A. Beverly Co. London.
4. SreeDevi.V. (1997). Nutrition Education. Discovery Publishing House, New Delhi.
5. Bamji, M.S., Rao, P.N. and Reddy, V. (1996). Textbook of Human Nutrition, Oxford & IBH Publishing Co. Pvt. Ltd.

CORE PAPER- FOOD MICROBIOLOGY

Code: 18FSNP0105

Credits: T3 +P0

Hours/Week: 3

Marks: 100

Objectives:

1. To gain deeper knowledge of role of microorganism in humans and environment
2. To understand the role of microbes in food, health and disease.
3. To study the Microbes in relation to food spoilage, food borne diseases and food preservation.

Specific Objectives of Learning :

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.
- ✓ Discuss the rationale for the use of standard methods and procedures for the microbiological analysis of food.
- ✓ Explain the effects of fermentation in food production and how it influences the microbiological quality and status of the food product.

UNIT I

Microbiology of importance 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. Method of isolation and detection of microorganisms in food -conventional method, rapid method (newer techniques); Immunological methods: fluorescent, antibody, radio Immunoassay, ELISA etc. Chemical methods: Thermo-stable nuclear, ATP measurement and PCR (Polymer chain reaction)-only principles in brief.

UNIT II

Perishable and non-perishable foods- Contamination, preservation and spoilage of cereal and cereal products-flour, bread, pasta and prepared dough **Vegetables and fruit products-**contamination, preservation and spoilage of dehydrated, canned fruits and vegetables.

UNIT III

Meat and meat products- Contamination,preservation and spoilage of meat and meat products-sausages and dried beef,ham,poultry,meatpickles,sea foods(pickling of fish).
Milk and milk products-butter,cheese,evaporated and condensed milk,curd.Eggs-dried eggs.

UNIT IV

Production of fermented foods-production of wine,vinegar,beer,soy based products and cereal based fermentedproducts-idli,dhokla,bread.Genetically modified foods-definition,technique involved in genetically modified foods,role of genetically modified foods.Merits and demerits-of golden rice,brinjal,tomato,potato and concept of probiotics,prebiotics and symbiotics.

UNIT V

Food borne illness-bacterial,food borne poisoning,infections and intoxications-non – bacterial-mycotoxins,food parasites,sea food intoxications.

References:

1. Frazier W.C and Westhoff D.C.(1992), Food Microbiology, Tata McGraw Hill Publishing Co., Ltd. New Delhi.
2. Annak.Joshua, (2001). Microbiology, Popular Book Depot.Chennai-15.
3. Ray, B. (2001) Fundamental Food Microbiology, 2nd Ed, CRC press, Boca raton F.
4. JoshiVK&Pandey(2004).Biotechnology:food,fermentation,microbiology,biochemistryand technology,vol I &II,Educational publishers and distributors,New Delhi.
5. Crueger W and Crueger A (2003) Biotechnology: A textbook of Industrial Microbiology 2nd Edition,Panima Publishing Corpoartion,New Delhi.
6. Guttierrez-Lopez GF and Barbosa-Canovas GV (Eds) (2003) Food Science and Food Biotechmolgy CRC press,USA.
7. Halford NG (2003) ‘Genetically Modified Crops’ Imperial College Press, UK
Modern Food Micro-Biology by James M. Jay, (2000), 6th edition, An Aspen Publication,Maryland, USA.
8. Food Microbiology: Fundamentals and frontiers by M.P. Doyle, L.R. Beuchat and Thoma J. Montville, (2001), 2nd edition, ASM press, USA.

Lecture Schedule

| Units | Topics to be covered | Hours |
|------------|---|-----------|
| I | Bacteria, morphology Bacteria cultural characteristics and biochemical activities, primary source in foods | 2 |
| | Fungi: morphology Fungi: cultural characteristics and biochemical activities, primary source in foods | 2 |
| | Algae : morphology, cultural characteristics Algae : Biochemical activities, primary source in foods Yeast- morphology, cultural characteristics | 3 |
| | Biochemical activities, primary source in foods Factors affecting the growth of microorganisms in food; intrinsic parameters that affect microbial growth. Extrinsic parameters that affect microbial growth. | 3 |
| | (Only principles in brief) Method of isolation and detection of microorganisms in food -conventional method, rapid method Newer techniques;Immunological methods: fluorescent, antibody, Radio Immunoassay, ELISA. Chemical methods:Thermostablenuclear,ATP measurement PCR (Polymer chain reaction) | 3 |
| | Total | 13 |
| II | Cereal and cereal products Contamination, Preservation Spoilage –flour, bread Spoilage –pasta and prepared dough | 4 |
| | Vegetables and fruit products-contamination Preservation Spoilage of dehydrated &canned fruits Spoilage of vegetables. | 4 |
| | Total | 8 |
| III | Meat and meat products- Contamination, Preservation Spoilage of meat and meat products-sausages Dried beef,ham, Poultry, meat pickles, | 4 |
| | Sea foods(pickling of fish). | 1 |
| | Milk and milk products- Contamination Preservation Spoilage of butter, cheese,evaporated | 4 |
| | Condensed milk,curd Eggs- contamination Preservation Spoilage of dried eggs. | 3 |
| | Total | 12 |

| | | |
|----|---|-----------|
| IV | Production of fermented foods -production of wine Vinegar and beer, Soy based products Cereal based fermented products-idli,dhokla,bread. | 3 |
| | Genetically modified foods-definition,technique involved in genetically modified foods Role of genetically modified foods. Merits and demerits-of golden rice,brinjal, Tomato and potato Concept of probiotics,prebiotics and symbiotics. | 4 |
| | Total | 7 |
| V | Food borne illness -bacterial,food borne poisoning, Infections and intoxications-mycotoxins | 3 |
| | Food parasites Sea food intoxications. | 3 |
| | Total | 6 |
| | Seminar | 2 |
| | Total hours for Unit I – V | 48 |

CORE PAPER - NUTRITIONAL BIOCHEMISTRY

Code: 18FSNP0106

Credits: T3 +P0

Hours/Week: 3

Marks: 100

Objectives:

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

Specific Objectives of Learning

on successful completion of these units, students are expected :

- ✓ To describe the concepts and chemistry of major nutrients
- ✓ To explain the macronutrient metabolism and its bioenergetics
- ✓ To describe protein synthesis and nucleic acid metabolism
- ✓ To gain basic knowledge on the concepts of nutrigenomics
- ✓ To understand the role of antioxidants in prevention of degenerative diseases

UNIT - I

Review of structure, chemistry and functions of carbohydrate, protein and lipids

Heteropolysaccharides: Definition, classification, structure and properties of glycoprotein and proteoglycans.

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

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

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. Basic concepts of nutrigenomics, definition, scope, transcriptomics, epigenomics and proteomics.

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 LissInc.
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](#)(2006). Biochemistry, New Central Book Agency (pvt) ltd, Edition 3.
- 10.[J.L. Jain](#)(2004).Fundamentals Of Biochemistry (Multi Colour Ed), S Chand publisher, 6th Edition.
11. Murray, R K., Granner, D K., Mayes, P A and Rodwell, V W (2012) : 29th Ed Harper's illustrated Bio-Chemistry. Lange Medical book.

JOURNALS

1. Current Science
2. Indian Journal of Biochemistry and Biophysics
3. Bioscience,Biotechnology and Biochemistry
4. Trends in biochemical and experimental
5. Metabolism-clinical and experimental
6. The keio journal of medicine

WEBSITES

1. www.kosmix.com/Health/Nutrition-s - 81k

3. simple.wikipedia.org/wiki/Riboflavin - 30k

3. en.wikipedia.org/wiki/Vitamin_D - 162k

Lecture Schedule:

| Units | Topics to be covered | Hours |
|--------------|--|----------|
| I | Review of structure,chemistry and functions of carbohydrate | 1 |
| | Review of structure,chemistry and functions protein | 1 |
| | Review of structure,chemistry and functions of lipids | 1 |
| | Heteropolysaccharides: Definition, classification, structure and properties of glycoprotein. | 2 |
| | Definition, classification, structure and properties of proteoglycans. | 2 |
| | Plasma proteins – classification,types, Plasma proteins, nature, Plasma proteins properties and functions. | 2 |
| | Total | 9 |
| II | carbohydrates – glycolysis and their regulation | 1 |
| | Gluconeogenesis and their regulation | 2 |
| | Citric acid cycle and their regulation, | 2 |
| | Hexose monophosphate pathway and their regulation | 1 |
| | Electron transport chain | 2 |
| | Fat:Synthesis of fatty acids, | 2 |
| | Synthesis of phospholipids , Synthesis of cholesterol, β -oxidation of fatty acids, ketogenesis. | 2 |
| | Protein metabolism- protein biosynthesis Steps involved in protein biosynthesis | 3 |
| Total | 15 | |
| III | Review of structure and composition of nucleic acids. Purine and pyrimidine – synthesis and breakdown. | 1 |
| | pyrimidine – synthesis and breakdown | 1 |
| | nucleic acids – DNA replication | 1 |
| | Transcription, | 1 |
| | DNA repair systems, Genetic mutation, | 1 |
| | Regulation of gene expression. | 1 |

| | | |
|-----------|--|-----------|
| | Basic concepts of nutreogenomics,definition,scope, | 1 |
| | Transcriptomics,Epigenomics and proteomics. | 3 |
| | Total | 10 |
| IV | Hormones – regulation of endocrine system, | 2 |
| | Classification of hormones according to their mechanism of action, | 2 |
| | Mechanism of action of hormones Insulin | 2 |
| | Mechanism of action of hormones thyroxine | 1 |
| | Minerals – biological role of minerals.-Iron, Iodine, Copper,cobalt,molybdenum, zinc Calcium,phosphorus and selenium. Detoxification and xenobiotics– metabolism of foreign compounds | 3 |
| | Total | 10 |
| V | Free Radicals and Antioxidants– Definition, classification of antioxidants, | 1 |
| | Generation of free radicals | 1 |
| | Role of antioxidants in prevention of degenerative disorders cancer CVD and Diabetes Mellitus). | 1 |
| | Total | 3 |
| | Seminar | 1 |
| | Total hours for Unit I – V | 48 |

CORE PAPER - NUTRITIONAL BIOCHEMISTRY PRACTICAL

Code: 18FSNP0107

Credits: T0+P2

Hours/Week:4

Marks: 100

Objectives:

1. To impart knowledge on analyses of selected constituent in blood and urine sample

Specific Objectives of Learning:

On successful completion of these units, students are expected :

- ✓ To 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.

Contents

I Blood Analysis

- Methods of collection of blood. Separation of serum and plasma
- Estimation of Hemoglobin.
- Estimation of glucose
- Estimation of serum creatinine
- Estimation of serum bilirubin
- Estimation of serum albumin
- Estimation of serum cholesterol
- Estimation of serum urea
- Estimation of total protein, AG Ratio,
- Estimation of SGPT / SGOT
- Estimation of serum alkaline phosphatase or acid phosphatases

II Urine Analysis

- Qualitative analysis of urine sugar, albumin, ketone bodies and bile salts
- Estimation of Urine sugar
- Estimation of Urine Albumin
- Estimation of Urine Bile salts
- Estimation of Urine Calcium
- Estimation of Urine Creatinine
- Estimation of urine urea.

References

1. H. Varley, GowenLock.A.H, willian Heinemann :Practical Clinical Biochemistry , Medical books CBS publishers and Distributors Ltd, 5th Edition
2. Raphael : Lynch's medical laboratory technology :, W B Saunders Co publication
3. Wootten: Micro analysis in Medical Biochemistry –Outline of Biochemistry - Coon and stump
4. J.Ochei and A. Kolhatkar:Medical laboratory science theory and practice, Tata MC Graw Hill publication, 4th Edition, 2008.
5. Medical Laboratory Technology, , Tata MC Graw Hill Publishers,1988.
6. Ramniksood :Text book of medical Laboratory technology, JAYPEE publisher, 2006.
7. Manual of Medical Laboratory Techniques, , JAYPEE Publisher, 1st Edition, 2008.
8. Ramakrishnan S, Sulochana K.N, Shankara S, M.K Ganesh, A Hemavathi: Laboratory Manual for practical Biochemistry, , JAYPEE publisher, 1st Edition, 2008.
9. [V.H. Talib](#): Handbook Medical Laboratory Technology, CBS Publishers & Distributors (Dec 1 2008)

II SEMESTER

CORE PAPER - ADVANCED NUTRITION – II

Code: 18FSNP0208

Credits:T3+P0

Hours/Week:3

Marks: 100

Objectives:

1. To familiarize students with changes occurring in the physiology and metabolism of human body as a result of change in altitude, gravity and exercise.
2. To provide in-depth knowledge of nutrients requirement and management during various conditions.

Specific Objectives of Learning :

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

- ✓ 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

Contents:

UNIT I

Exercise Physiology: Concept of energy, work and power; Effect of exercise on muscular, nervous, cardiovascular and respiratory system; Energy metabolism; energy systems during exercise; Components of energy expenditure such as BMR, thermogenic effect of food and physical activity; Energy cost of exercise; Nutrition management during exercise.

UNIT II

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 III

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 IV

Sea and Air Travel Nutrition: Physiological changes in human body during sea and air travel; Psychological preparedness for sea and air travel; Health and nutritional problems encountered during sea and air travel; Nutrient requirements and dietary management during sea and air travel.

UNIT V

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. Mahan, L.K. and Ecott-Stump, S. (2000). Krause's Food, Nutrition and Diet Therapy, 10th Edition, W.B. Saunders Ltd.
- 2.Sizer, F. and Whitney, E. (2000). Nutrition – Concepts and Controversies, 8th Edition, West Wadsworth, An International Thomson Publishing Co.
3. Whitney, E.N. and Rolfes, S.R. (2003). Understanding Nutrition, 8th Edition, West Wadsworth, An International Thomson Publishing Co.
4. Ira Wolinsky (Ed) (2003): Nutrition in Exercise and Sports, 3rd Edition, CRC Press
5. Parizkova, J. Nutrition, physical activity and health in early life, Ed. Wolinsky, I. CRC Pres
6. Goyet Fish, V., Seaman, J. and Geijer, U. (2008): The Management of Nutritional Emergencies in Large Populations, World Health Organisation, Geneva
7. Shills, M.E., Olson, J., Shike, M. and Roos, C. (1998). Modern Nutrition in Health and Disease. 9th Edition, Williams and Williams. A. Beverly Co. London.
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

Lecture Schedule

| Units | Topics to be covered | Hours |
|--|--|--|
| I | Exercise Physiology | |
| | Definition for energy, work, power, physical activity and exercise, types of exercise/physical activity Energy metabolism – Glycolysis, TCA cycle, ETC, energy currency | 2 |
| | Energy balance, energy expenditure, components of energy expenditure – BMR. Components of energy expenditure – thermic effect of food and physical activity | 2 |
| | Factors influencing energy expenditure Measurement of energy expenditure – direct and indirect method Energy cost of activity and its measurement, MET | 2 |
| | Effect of exercise on muscular and nervous system Effect of exercise on cardiovascular and respiratory system Nutrition management during exercise | 2 |
| | Total | 8 |
| II | Need and scope of sports nutrition; types of sport | 2 |
| | Preparation for competition: pregame meal, factors influencing pregame meal Carbohydrate loading meaning and its need, methods of carbohydrate loading | 2 |
| | The concept of meal during game, function and the factors influencing it Post game meal meaning, function and the factors influencing it | 2 |
| | Nutrient management during sports/game Ergogenic aids meaning and its uses in sports, types of ergogenic aids | 2 |
| | Nutrients as ergogenic aids in sports Dietary supplements used as ergogenic aids in sports | 2 |
| | Total | 10 |
| | III | High Altitude and Space Nutrition |
| High altitude meaning, changes in air composition and pressure at high altitude. Physiological changes in human body due to high altitude travel, acclimatization process | | 3 |
| Altitude sickness meaning, types and the symptoms The signs and symptoms of HAPE, HACE | | 2 |
| Nutrient requirements of high altitude travelers Dietary management of high altitude travelers | | 2 |
| Meaning of space nutrition, need and scope for space travel History of space travel – Mercury, Apollo, Gemini, Skylab, ISS Physiological changes in astronaut's body during space expedition | | 2 |
| Food systems used in space travel Health problems associated to space travellers and the control measures Nutrient requirement of astronauts and dietary management during space travel | | 3 |
| Total | | 12 |
| Sea and Air Travel Nutrition | | |

| | | |
|-----------|--|-----------|
| IV | Need and scope of sea travel, physiological changes in human body during sea travel Nutrient requirement during sea travel and dietary management | 2 |
| | Need and scope of air travel, physiological changes in human body during air travel Health and nutritional problems encountered during air travel | 2 |
| | Control and management of health problems during sea travel Nutrient requirements and dietary management during air travel Psychological preparedness for sea and air travel | 2 |
| | Total | 6 |
| V | Nutrition in Emergencies | |
| | Emergency situation or disaster meaning, types of disaster Need and importance of disaster management and the principles | 1 |
| | Natural disaster– earth quake, tsunami, famine, flood etc meaning and the impact on human survival, Man-made disaster – nuclear, fire, accidents meaning, the impact on human survival | 2 |
| | Role of national organization in disaster management Role of international organization in disaster management | 2 |
| | Nutritional and health problems in natural emergencies, Nutritional and health problems in man-made emergencies Control and management of communicable diseases - sanitation and immunization; Food distribution strategies | 3 |
| | Nutrient requirements and dietary management during natural disaster Nutrient requirements and dietary management during manmade disaster | 1 |
| | Total | 9 |
| | Seminar | 3 |
| | Total hours for Unit I – V | 48 |

CORE PAPER - FOOD PRODUCT DEVELOPMENT AND MARKETING

Code: 18FSNP0209

Credits:T3 +P0

Hours/Week: 3

Marks: 100

Objectives:

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

Specific Objectives of Learning:

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 market setting
- ✓ To understand the development cycle of the food product..
- ✓ To develop and justify technical specifications for the new product

UNIT- I

New Food Products development, Phases in Food Product Development

Definition, classification, characterization, factors influencing new product development – social concerns, health concerns, impact of technology and market place influence.

UNIT- II

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 screening ideas.

UNIT - III

Phases in Food Product Development-prototype, standardization, Sensory Evaluation: Descriptive, threshold 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 standards. . Food safety and food Spoilage .Market Sector perspective and market research.

UNIT - IV

Newer food stabilizing systems : Thermal processing, ohmic heating, stabilizing with high pressure, other non-thermal stabilizing systems, controlled / modified atmosphere packaging, irradiation, hurdle technology, low temperature stabilization -Use of various new ingredients to suit product functions, Packaging- types, new trends in packaging materials and methods. graphic designing and nutritional labeling.

UNIT - V

Test Marketing: Evaluating results and analyzing.

Entrepreneurship: Plant location, investment, financing the project

References:

1. Fuller G W (1994) New Food Product Development : From Concept to Market place CRC Press, New York
2. Man C M D and Jones A A (1994) Shelf life Evaluation of Foods. Blackie Academic and Professional, London
3. Olickle, J K (1990) New Product Development and value added. Food Development Division, Agriculture, Canada
4. Graf E and Saguy I S (1991), Food Product Development : From concept to the Market Place, Van Nostrand Reinhold New York

JOURNALS:

1. International Journal of Food Science and Technology
2. Food Technology
3. Journal of Food Technology
4. Trends in Food Science and Technology
5. Critical Reviews in Food Science and Nutrition

WEBSITES

1. en.wikipedia.org/wiki/Marketing - 91k –
2. www.educationforadults.com/career/food-science.html - 21k
3. www.aripaparo.com/ - 50k –
4. www.linkedin.com/in/gailbarnes - 37

Lecture Schedule:

| Units | Topics to be covered | Hours |
|------------|--|-----------|
| I | New Food Products development, | 1 |
| | Phases in Food Product Development | 1 |
| | Definition, classification, characterization, Factors influencing new product development – social concerns, health concerns, | 3 |
| | Impact of technology and market place influence. | 1 |
| | Total | 6 |
| II | Generation of New Product Ideas | 2 |
| | Internal sources of ideas | 1 |
| | External sources of ideas | 1 |
| | Market place analysis | 2 |
| | Total | 6 |
| III | Screening and refining the screening procedure for the product | 3 |
| | Team approach and involvement of various Departments | 2 |
| | Objectives of screening ,Criteria of screening | 2 |
| | Sensory Evaluation :Descriptive,threshold | 1 |
| | Acceptance test | 1 |
| | Shelf life testing-mode of food deterioration, Types of shelflife testing | 1 |
| | Product integrity and conformance to standards. | 1 |
| | Development Process | 2 |
| | Technical development – Recipe development and scale up, | 1 |
| | Total | 14 |
| IV | Food safety, Food spoilage | |
| | Market Sector perspective Market research | 1 |
| | Food safety, Food spoilage | 1 |
| | Newer food stabilizing systems : Thermal processing, ohmic heating, | 2 |
| | Stabilizing with high pressure, Other non-thermal stabilizing systems, controlled / modified atmosphere packaging, Irradiation, Hurdle technology, Low temperature stabilization | 3 |
| | Use of various new ingredients to suit product functions, Packaging, design graphic and labeling | 2 |
| | Total | 9 |
| V | Test Marketing;Evaluating results Analyzing. | 2 |
| | Entrepreneurship:Plant location, | 2 |
| | Investment, | 1 |
| | Financing the project | 4 |
| | Total | 9 |
| | Seminar | 4 |
| | Total hours for Unit I - V | 48 |

**CORE PAPER -FOOD PRODUCT DEVELOPMENT AND MARKETING
PRACTICAL**

Code: 18FSNP0210

Credits: T0+P2

Hours/Week: 4

Marks: 100

Objectives:

1. To understand the process of development of food products
2. To learn the skill of product marketing.

Specific Objectives of Learning:

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

- ✓ To assess the development cycle of a food product and review relevant principles of marketing theory.
- ✓ To develop a prototype of a new food product in the laboratory.
- ✓ To develop and justify technical specifications for the new product
- ✓ To understand the requirements for commercialization of the developed product

Contents:

1. Market survey consumer survey to identify new products in terms of Line extension, Repositioning existing products, New form/reformulation, New packaging of existing products, Innovative products, Creative products.
2. Product development, Concept and market research of the concern product
3. Development process – Idea generation, screening the ideas, developing the product, scaling up –sensory, quality analysis and test marketing. Food packaging and labeling and costing.
4. Project writing

References:

1. Fuller G W (1994) New Food Product Development : From Concept to Market place CRC Press, New York
2. Man C M D and Jones A (1994) Shelf life Evaluation of Foods. Blackie Academic and Professional, London
3. Olickle, J K (1990) New Product Development and value added. Food Development Division, Agriculture, Canada
4. Graf E and Saguy I S (1991), Food Product Development : From concept to the Market Place, Van Nostrand Reinhold New York

JOURNALS

- 1 International Journal of Food Science and Technology
- 2 Food Technology.

III SEMESTER

CORE PAPER - THERAPEUTIC NUTRITION

Code: 18FSNP0312

Credits: T4 +P0

Hours/week: 4

Marks: 100

Objectives:

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

Specific Objectives of Learning:

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.

Contents:

UNIT I

Assessment of patient needs based on interpretation of patient data – clinical, biochemical, biophysical and personal. Definition and history of dietetics, Dietetics in modern health care management. classification of a dietitian. Role of dietitian-functions and Team approach in patient care.

UNIT II

Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of Infections – Fevers and respiratory problems–Asthma, Bronchitis ; Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of Weight imbalances.

UNIT III

Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of Diabetes mellitus, Renal disorders – Acute and chronic glomerular nephritis, Nephrotic syndrome, Renal stones, ESRD and Dialysis. Neurological disorders – Parkinsons, Epilepsy, Alzheimer's syndrome.

UNIT IV

Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of Cardio vascular disorders – Atherosclerosis, Arteriosclerosis, Heart attack, Hypertension and Myocardial infraction. GI Tract disorders – Gastritis, Peptic ulcer, stomach cancer,

IBS (Irritable bowel syndrome), Diverticulosis, Tropical sprue and Ulcerative colitis. Liver, gall bladder and pancreatic disorders – Jaundice, cirrhosis, Hepatic coma, gall bladder stones, Acute and chronic pancreatitis.

UNIT V

Etiopathophysiology, metabolic and clinical aberrations, complications and medical nutritional management of Musculo – skeletal disorders – Bone fractures, Osteoporosis, Arthritis and Rheumatic arthritis.

Etiopathophysiology, metabolic and clinical aberrations, complications and medical nutritional management of Inborn errors of metabolism – PKU, maple syrup disease, Glycogen storage disease, neiman-pick disease and fabry disease.

References

1. Shils M E, Olson J A, Shike M and Ross A C (Ed) 1999: Modern Nutrition in Health and Diseases 9th Edition, Williams and Wilkins
2. Mahan L K and Escott – Stump S (2000); Krause's Food Nutrition and Diet Therapy 10th Ed W B Saunders Ltd
3. Escott – Stump, S (1998): Nutrition and diagnosis related care 4th Edition, Williams and Wikins
4. Garrow J S, James W P T and Ralph A (2000) Human Nutrition and Dietetics, 10th Edition, Churchill Livingstone
5. Shils M E, Olson J A, Shike M and Ross A C (Ed) 1999: Modern Nutrition in Health and Diseases 9th Edition, Williams and Wilkins
6. Mahan L K and Escott – Stump S (2000); Krause's Food Nutrition and Diet Therapy 10th Ed W B Saunders Ltd
7. Escott – Stump, S (1998): Nutrition and diagnosis related care 4th Edition, Williams and Wikins
8. Garrow J S, James W P T and Ralph A (2000) Human Nutrition and Dietetics, 10th Edition, Churchill Livingstone.

Lecture Schedule

| Units | Topics to be covered | Hours |
|-----------|--|----------|
| I | Assessment of patient needs based on interpretation of patient data | 2 |
| | Clinical, Biochemical, Biophysical and personal | 3 |
| | Definition and History of dietetics, Dietetics in modern health care management. | 2 |
| | Role of dietitian- functions and classification of a dietitian. Team approach in patient care. | 2 |
| | Total | 9 |
| II | Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of Infections – Fevers | 3 |
| | Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management respiratory problems–Asthma, Bronchitis | 3 |
| | Weight imbalances -Etiopathophysiology, metabolic and clinical aberrations, complications, | 2 |
| | Total | 8 |

| | | |
|-----------------------------------|---|-----------|
| III | Diabetes mellitus -Etiopathophysiology, metabolic aberrations, | 2 |
| | Clinical aberrations,Complications, | 2 |
| | Prevention and | 1 |
| | Recent advances in the medical nutritional management | 1 |
| | Renal disorders – Acute and chronic glomerular nephritis, Nephrotic syndrome, | 3 |
| | Renal stones, ESRD and Dialysis. | 2 |
| | Neurological disorders – Parkinsons, Epilepsy, Alzheimer’s syndrome. | 3 |
| | Total | 14 |
| IV | Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of Cardio vascular disorders – Atherosclerosis | 3 |
| | Arteriosclerosis, | 1 |
| | Heart attack, Hypertension and Myocardial infraction. | 3 |
| | GI Tract disorders – Gastritis, Peptic ulcer | 2 |
| | Stomach cancer, IBS (Irritable bowel syndrome) | 2 |
| | Diverticulosis, Tropical sprue and Ulcerative colitis. | 2 |
| | Liver and gall bladder, pancreatic disorders – Jaundice, cirrhosis, Hepatic coma | 3 |
| | Gall bladder stones, Acute and chronic pancreatitis | 2 |
| Total | 18 | |
| V | Musculo – Skeletal disorders Etiopathophysiology, metabolic and clinical aberrations, Complications, prevention and Recent advances in the medical nutritional management of Bone fractures | 2 |
| | Osteoporosis and Osteopenia | 2 |
| | Arthritis and Rheumatic arthritis. | 3 |
| | Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of Inborn errors of metabolism – PKU, | 2 |
| | Maple syrup disease, Glycogen storage disease | 2 |
| | ,Neiman-pick disease and fabry disease. | 2 |
| | Total | 13 |
| Seminar | 4 | |
| Total hours for Unit I – V | 64 | |

CORE PAPER - THERAPEUTIC NUTRITION PRACTICAL

Code: 18FSNP0313

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:
 - a. Febrile condition
 - b. Surgical condition
 - c. Gastrointestinal disorders
 - d. Liver and Gall bladder disorders
 - e. Diabetes and Cancer
 - f. Cardio Vascular Disorders
 - g. Renal Disorders
 - h. Obesity and Underweight
 - i. Nutritional Deficiency
4. Planning and preparing paediatric diets
 - a. Lactose free diet
 - b. Juvenile diabetes
 - c. Diet for inborn errors of metabolism

References :

1. Krause, M.V. Horsnh, M.A (1993): Food Nutrition Diet Therapy, W.B. SaundeersCompny, Philadelphia.
2. Gopalan, C.Ramasastri, B.V and Balasubramaniam, S.C. (1996): Nutritive Value of Indian Foods, National Institute of Nutrition, Hydrabad.
3. Sue Rod Williams, (1986): Nutrition and Diet Therapy, Times Mirror Mosby College Publishing, St.Louis, Toronto, Boston
4. Mahan. I. K. and Escotte – Stump. S, (2000): Kruse's Food Nutrition and Diet Therapy, 10th edition. W. B. Saunders ltd.

Core Paper- NUTRACEUTICALS AND FUNCTIONAL FOODS

Code: 18FSNP0314

Credits: T3 +P0

Hours/Week:3

Marks: 100

Objectives:

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

Specific Objectives of Learning:

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 diet supplements incorporating functional foods
- ✓ Practicing the effect of each food and its effect on health

Unit: I

Functional foods and Nutraceutical –Definition, concept, history of functional foods – Classification of nutraceuticals and functional foods- teleology of nutraceuticals; Evolution of nutraceuticals and functional foods market; Significance and relevance of nutraceuticals and functional foods in the management of various diseases and disorders.

Unit: II

Categorization of Nutraceuticals- Classification based on food source plant and animals; Plants herbs and flowers as functional foods, soya, olive oil, tea, grape wine, garlic dietary fibre, and others; Natural occurrence of certain phytochemicals- antioxidants and flavonoids, omega 3 and 6 fatty acids, carotenoids, phytoestrogens, glucosinates, organo sulphur compounds, isoprenoid derivatives, phenolic substances, fatty acids and structural lipids; Carbohydrates and amino acid based derivatives, Isoflavones, terpenoids saponins, tocotrienols and simple terpenes.

Unit: III

Functional foods and Nutraceuticals of microbial origin: Prebiotics, probiotics and symbiotics- Probiotics: Definition, types and relevance; Usefulness in gastro intestinal health and other health benefits; development of probiotic products; recent advances in probiotics; Challenges and regulatory issues related to probiotic

products. Prebiotics: Prebiotic ingredients in foods; types of prebiotics and their effects on gut microbes; health benefits of prebiotics; recent development in prebiotics. Symbiotics.

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 errors of metabolism, obesity, neurological disorder, diabetes mellitus, hypertension, CVD, cancer, arthritis, and AIDS; Role of nutraceuticals in sports nutrition.

Unit: V

Functional foods - Definition, development of functional foods, use of bioactive compounds in appropriate form with protective substances and activators; Effect of environmental condition and food matrix; Effects of processing conditions and storage; Development of biomarkers to indicate efficacy of functional ingredients; Research frontiers in functional foods; delivery of immunomodulators /vaccines through functional foods. Nutrigenomics- concept of personalized medicine; Use of anotechnology in functional food industry.

References:

1. Bamji, M.S. (2009). Textbook of Human Nutrition. New Delhi: (3rded.). Oxford & IBH Publishing Co., Pvt. Ltd.
2. Schmidl, M.K., & Labuza, T.P. (2000). Essentials of Functional Foods. Maryland: An ASPEN Publication, Aspe Publishers, Inc.
3. Srilakshmi, B. (2012). Nutrition Science. (4thed.). New Age International Pvt. Ltd.
4. Tamine, A. (2005). Probiotic Dairy Products. United Kingdom: Blackwell Publishing Ltd.
5. USFDA regulations on functional foods.
6. Webb, G.P. (2006). Dietary Supplements and Functional Foods. New York: Blackwell Publishing Ltd.
7. Wildman, R.E.C. (2007). Handbook of Nutraceuticals and Functional Foods. London: CRC Press, Taylor and Francis, Boca Raton.
8. Gibson GR & William CM. Functional Foods - Concept to Product. 2000.
9. Goldberg I. Functional Foods: Designer Foods, Pharma Foods. 2004.

10. Brigelius-Flohé, J & Joost HG. Nutritional Genomics: Impact on Health and Disease. Wiley VCH. 2006.
11. Cupp J & Tracy TS. Dietary Supplements: Toxicology and Clinical Pharmacology. Humana Press. 2003.
12. Mary, K. Schmidl and Theodre, P. Labuza (2000), Essentials of Functional Foods, Culinary and hospitality industry publication services
13. Israel Goldberg (2001), Functional foods, pharma foods, Nutraceuticals, Culinary and hospitality industry publication services.
14. Robert easy Wildman (2001), Handbook of Nutraceuticals and functional foods, Culinary and hospitality industry publication service.

Lecture Schedule

| Units | Topics to be covered | Hours |
|------------|---|-----------|
| I | Functional foods and nutraceutical –Definition, concept, history of functional foods | 2 |
| | Classification of nutraceuticals and functional foods- teleology of nutraceuticals | 1 |
| | Evolution of nutraceuticals and functional foods market | 1 |
| | Significance and relevance of nutraceuticals and functional foods in the management of various diseases and disorders. | 2 |
| | Total | 6 |
| II | Significance and relevance of nutraceuticals and functional foods in the management of various diseases and disorders. | 1 |
| | Plants herbs and flowers as functional foods, soya, olive oil, tea, grape wine, garlic dietary fibre, and others | 1 |
| | Natural occurrence of certain phytochemicals- antioxidants and flavonoids, omega 3 and 6 fatty acids, carotenoids, phytoestrogens, glucosinates, organo sulphur compounds, isoprenoid derivatives, phenolic substances, fatty acids and structural lipids | 3 |
| | Carbohydrates and amino acid based derivatives, Isoflavones, terpenoids saponins, tocotrienols and simple terpenes. | 3 |
| | Total | 8 |
| III | Functional foods and nutraceuticals of microbial origin: Prebiotics, probiotics and symbiotics- Probiotics: Definition, types and relevance; Usefulness in gastro intestinal health and other health benefits; development of probiotic products; recent advances in probiotics; Challenges and regulatory issues related to probiotic products. | 6 |
| | Prebiotics: Prebiotic ingredients in foods; types of prebiotics and their effects on gut microbes; health benefits of prebiotics; recent development in prebiotics, Symbiotics | 5 |
| | Total | 11 |

| | | |
|-----------|--|-----------|
| IV | Functional foods and nutraceuticals in health and disease: Sources and role of functional foods and nutraceuticals in diseases | 4 |
| | Concept of dietary supplements, phytochemicals, phytosterols, dietary fiber | 2 |
| | Regulation of dietary supplements in - inborn errors of metabolism, obesity, neurological disorder, diabetes mellitus, hypertension, CVD, cancer, arthritis, and AIDS | 3 |
| | Role of nutraceuticals in sports nutrition | 2 |
| | Total | 11 |
| V | Functional foods - Definition, development of functional foods, use of bioactive compounds in appropriate form with protective substances and activators | 4 |
| | Effect of environmental condition and food matrix; Effects of processing conditions and storage | 2 |
| | Development of biomarkers to indicate efficacy of functional ingredients; Research frontiers in functional foods; delivery of immunomodulators /vaccines through functional foods. | 4 |
| | Nutrigenomics- concept of personalized medicine; Use of anotechnology in functional food industry. | 2 |
| | Total | 12 |
| | Seminar | 2 |
| | Total hours for Unit I – V | 48 |

CORE PAPER - NUTRITION IN CRITICAL CARE

Code: 18FSNP0315

Credits: T4+P0

Hours/week: 3

Marks: 100

Objectives:

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

Specific Objectives of Learning :

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

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

UNIT-I

Nutritional screening and assessment of nutritional status of hospitalized and outdoor patients .Nutritional care plan, implementation of nutritional care .

Nutritional support systems and other life- saving measures for the critically ill. Role of immune enhancers, conditionally essential nutrients, immune suppressants, and special diets in critical care.

UNIT-II

Medical nutrition therapy: Enteral nutrition: Types, routes, composition of feeds, precautions while feeding. Parenteral nutrition: Types modes and composition of feeds and precautions while feeding. Complications of parenteral and enteral therapy, refeeding syndrome.Palliative care and rehabilitation diets in stages.Diet related ethical issues in terminally ill.

UNIT-III

Patho-physiological, clinical and metabolic aspects, understanding of the special nutritional requirements, nutritional goals and monitoring the therapy in critical illnesses like: Stress, trauma, sepsis, burns, CV complications and surgery, ESRD, dialysis, kidney transplantation.

UNIT-IV

Patho-physiological, clinical and metabolic aspects, understanding of the special nutritional requirements, nutritional goals and monitoring the therapy in critical illnesses like: Multiple organs failure, Cancer, AIDS, GI tract surgery, GERD (Gastro-esophagal reflux Disorder) and complication, Hepatic failure and transplants, Neurosurgery. Care in severe Iron,iodine and vitamin A deficiency.

UNIT-V

Nutritional support system in relief and rehabilitation. Surveillance of nutritional status in emergency relief situations such as flood, cyclone, earthquake, drought, war etc., Assessment of food needs, food distribution strategy, mass and supplementary feeding, special foods/ rations for nutritional relief, organizations for mass feeding/food distribution, transportation and storage, Feeding centres, sanitation and hygiene.

References:

1. Zaloga, G.P. (1994): Nutritional in critical care, Times Mirror/Mosby.
2. Shils, M.E., Olson, J.A., Shile, M. and Ross, A.C. (Ed) (1999): Modern Nutrition in Health and Disease, 9th Edition, Williams and Wilkins.
3. Shikora, S.A. and Blackburn, G.L. (Ed) (1999). Nutritional support-Theory and Therapeutics, Chapman and Hall, ITP (International Thomoson Publishing).
4. Mahan, L.K. and Escott-Stump, S. (2000): Krause's Food Nutrition and Diet Therapy, 10th Ed. W.B. Saundaers Ltd.
5. Phillips, G.D. and Lodgers C.L (1986). Parenteral and Enteral Nutrition. A Practical Guide. Churchill Livingstone.
6. Kinney, J.M. and Borum , P. R. (editors) (1989) Perspectives in Clinical Nutrition. Urban and Schwarzenberg.
7. Torosian, M.H (editor) (1995) Nutrition for the Hospitalized Patient. Basic Science & Principle of Practice.
8. Keynes, W.M. and Flower, P.B.S. (1984) Clinical Endocrinology. Willam Heinemann Medical Books, London.
9. Shields, R. (editor) (1992) Bailyere's Clinical Gastroentrology, Bailyere Tindall London
10. Galambos, J.P. (1979) Cirrohsis in the series major problems in Internal Medicine, W.B. Saunders company Philadelphia

Lecture Schedule

| Units | Topics to be covered | Hours |
|------------|--|-----------|
| I | Nutritional screening and assessment of nutritional status of hospitalized and outdoor patients | 2 |
| | Nutritional care plan, implementation of nutritional care . | 1 |
| | Nutritional support systems and other life- saving measures for the critically ill. | 2 |
| | Role of immune enhances, conditionally essential nutrients, immune suppressant's, and special diets in critical care. | 1 |
| | Total | 6 |
| II | Medical nutrition therapy: Enteral nutrition: Types, routes, composition of feeds, precautions while feeding. | 2 |
| | Parenteral nutrition: Types modes and composition of feeds and precautions while feeding | 2 |
| | Complications of parenteral and enteral therapy, refeeding syndrome | 1 |
| | Palliative care and rehabilitation diets in stages.Diet related ethical issues in terminally ill. | 2 |
| | Total | 7 |
| III | Patho-physiological, clinical and metabolic aspects, understanding of the special nutritional requirements | 3 |
| | nutritional goals and monitoring the therapy in critical illnesses | 3 |
| | Stress, trauma, sepsis, burns, CV complications and surgery | 2 |
| | ESRD, dialysis, kidney transplantation | 4 |
| | Total | 11 |
| IV | Patho-physiological, clinical and metabolic aspects, understanding of the special nutritional requirements, nutritional goals and monitoring the therapy in critical illnesses like: Multiple organs failure, Cancer | 4 |
| | AIDS, GI tract surgery, GERD (Gastro-esophagal reflux Disorder) and complication | 3 |
| | Hepatic failure and transplants, Neurosurgery | 2 |
| | Care in severe Iron,iodine and vitamin A deficiency | 2 |
| | Total | 11 |
| V | Nutritional support system in relief and rehabilitation. Surveillance of nutritional status in emergency relief situations such as flood, cyclone, earthquake, drought, war etc | 3 |
| | Assessment of food needs, food distribution strategy, mass and supplementary feeding, special foods/ rations for nutritional relief | 2 |
| | organizations for mass feeding/food distribution, transportation and storage | 2 |
| | Feeding centres, sanitation and hygiene | 2 |
| | Total | 12 |
| | Seminar | 2 |
| | Total hours for Unit I – V | 48 |

CORE PAPER – PUBLIC HEALTH NUTRITION

Code: 18FSNP0416

Credits: T4+P0

Hours/Week: 4

Marks: 100

Objectives:

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

Specific Objectives of Learning :

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

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

Nutrition during life span : Physical, physiological and biological changes, nutrient requirement during – pregnancy, lactation, infancy, preschool age (growth and development), school going and adolescents (eating disorders), adults and old age

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); 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 target groups.

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 Times Mirror/Mosby.
2. Part, K. (2000): Part's Textbook of Preventive and Social Medicine, 18th Edition, M/s. Banarasidas Bhanot, Jablpur.
3. Beaton, G.H. and Bengoa, J.M. (Eds) (2000): Textbook of Human Nutrition, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
4. Bamji, M.S., Rao, P.N., Reddy, V (Eds) (2003): Textbook of Human Nutrition, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
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. Parks K., Park: Text Book of Preventive and Social Medicine, Eighteenth Edition, M/S Banarasidas, Bhanot Publishers, 1167, Prem Nagar, Jabalpur, 482001

Journals

1. Nutrition Reviews
2. Journal of Nutrition
3. American Journal of Clinical Nutrition.
4. British Journal of Clinical Nutrition
5. European Journal of Clinical Nutrition.
6. International Journal of Vitamin and Nutrition Research

Lecture Schedule

| Units | Topics to be covered | Hours |
|------------|--|-----------|
| I | Concept of public nutrition - Relationship between health and nutrition | 1 |
| | Role of public nutritionists in the health care delivery system | 1 |
| | Population dynamics - Demographic transition, population structure, population policy, fertility behaviour, nutrition and quality of life interrelationship; | 3 |
| | determinants of health status and indicators of health and nutritional status | 1 |
| | Total | 6 |
| II | Nutrition during life span : Physical,physiological and biological changes,nutrient requirement during – pregnancy | 2 |
| | Physical,physiological and biological changes,nutrient requirement during lactation | 1 |
| | Physical growth and ,nutrient requirement during infancy ,preschool age,school going and physiological changes,nutrient requirement during adolescent age,eating disorders | 2 |
| | Physical,physiological and biological changes,nutrient requirement during adulthood and oldage | 2 |
| | Total | 7 |
| III | Food and Nutrition Security- food production, access, distribution availability, losses, consumption. | 3 |
| | Food security; Social-cultural aspects and dietary patterns; their implications for nutrition and health | 3 |
| | National nutritional policy and intervention programme – Aim, objectives, guidelines and thrust areas | 2 |
| | PDS - Public distribution system and Agricultural planning; New strategies Nutrition intervention Programmes- Objectives, Operation of feeding programmes - ICDS | 3 |
| | National organizations - ICMR, NIN, NNMB, ICAR,CFTRI,DFRL | 2 |
| | International organizations - FAO, WHO, UNICEF, UNESCO and World Bank | 2 |
| | | 14 |
| | Health based interventions including immunization, provision of safe drinking water/ sanitation, prevention and management of diarrhoeal disease. | 2 |
| | Food based interventions including food fortification, dietary diversification; supplementary feeding and biotechnological approaches. | 2 |
| | Introduction to IEC: Aims and Objectives, Importance of IEC, relevance to programmes | 2 |
| | Nutrition education for behaviour change – Rationale, Planning Execution and evaluation of Intervention Programmes | 3 |
| | Different Media, their characteristics and use- IEC for different target groups | 2 |
| | Total | 11 |
| | Epidemiology- concept and definitions; Basic measurements in epidemiology; Types of epidemiology- descriptive epidemiology | 2 |

| | | |
|----------|--|-----------|
| V | Defining the population, describing the diseases, measurement of diseases and comparing with known indices | 2 |
| | 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. | 2 |
| | Design and planning of nutritional epidemiology studies; Evaluation of epidemiological studies; Uses of epidemiology. | 2 |
| | Total | 8 |
| | Seminar | 2 |
| | Total hours for Unit I – V | 48 |

CORE PAPER- FOOD SAFETY AND QUALITY CONTROL

Code: 18FSNP0417

Credits: 4+0

Hours/Week:4

Marks: 100

Objectives:

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

Specific Objectives of Learning:

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

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.

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

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 FSSA, Essential Commodities Act, ISI or BIS, AGMARK, FPO and PFA; International Organization such as FAO, WHO, Codex Alimentarius, and APEDA.

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.

Lecture Schedule

| Units | Topics to be covered | Hours |
|--------------|---|-----------|
| I | Food spoilage definition; factors influencing food spoilage | 1 |
| | Types of food spoilage such as microbes, enzymes and insects | 2 |
| | Physiochemical and biochemical changes in food quality during spoilage | 1 |
| | Methods used for detection of food spoilage | 1 |
| | Food preservation concept and the principles | 1 |
| | Food borne illness – infection caused by bacteria | 1 |
| | Food borne illness – infection caused by yeast and fungi | 1 |
| | Food borne illness - intoxication | 1 |
| | Food safety meaning and the principles, need and importance of food safety in home and food industries | 2 |
| | Factors affecting food safety in food industries | 1 |
| | Role of kitchen-hygiene, employee health and food plant hygiene in prevention of food spoilage | 1 |
| | Regulatory authorities at local and district level ensuring foodsafety in food industries | 1 |
| | Regulatory authorities at national level ensuring food safety in food industries | 1 |
| | Total | 15 |
| II | Food additives definition, common food additives and its function | 2 |
| | Food additives: antimicrobial, antioxidant, chemical preservative mechanism of action and the food applications | 2 |
| | Food additives: flour enhancer, emulsifier, thickening agent mechanism of action and the food applications | 1 |
| | Food additives: stabilizing agent, curing agent, anticaking agent mechanism of action and the food applications | 2 |
| | Permissible limits of additives in foods | |
| | Implications of food additives on consumers health | 11 |
| | Food adulteration meaning, Types of food adulterants – incidental and accidental | 1 |
| | Heavy metal contamination in foods and ill effects on human health | 1 |
| | Methods used for detection of food adulterants | 1 |
| | Methods used for detection of food adulterants | 1 |
| | Total | 14 |
| III | Sensory attributes of food products – colour, flavour, texture and taste | 1 |
| | Subjective and objective, subjective evaluation methods based on difference | 2 |
| | Subjective evaluation methods based rate, | 1 |
| | Subjective evaluation methods based sensitivity and others | 1 |
| | Objective evaluation methods – tools and instruments used | 1 |
| | Quality standards for cereal, pulses and legumes | 1 |
| | Quality standards for vegetables and fruits | 1 |
| | Quality standards for flesh foods | 1 |
| | Quality standards for fat, sugar and processed food products | 2 |
| Total | 11 | |

| | | |
|----|---|-----------|
| IV | Food quality control and assurance meaning and the concepts of quality control and assurance | 2 |
| | Need and importance of setting up quality control unit in a food industry | 1 |
| | Requirements of food quality control unit | 1 |
| | Quality control process: raw material control, production process control, packing and distribution | 2 |
| | Total Quality Management – meaning and the principles | 1 |
| | Principles of HACCP and its role in total quality management process | 1 |
| | Duties and responsibilities of food quality controller | 1 |
| | Total | 9 |
| V | Food laws and standards concept, need and its importance | 1 |
| | National food legislation such as FSSA | 1 |
| | National food legislation: Essential Commodities Act, ISI or BIS, AGMARK, FPO, PFA, | 3 |
| | International Organization implementing food standards: FAO FDA, Codex Alimentarius, WHO and APEDA | 5 |
| | Total | 10 |
| | Seminar | 2 |
| | Total hours for Unit I – V | 64 |

MAJOR ELECTIVE- SCIENTIFIC WRITING

Code: 18FSNP03E1

Credits: 4 +0

Hours/Week: 4

Marks: 100

Objectives:

1. To be able to appreciate and understand importance of writing scientifically.
2. To develop competence in writing and abstracting skills
3. To write either a draft research proposal or a chapter of dissertation

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

- ✓ To write research abstracts and papers for publication
- ✓ To develop research proposal for any funding agencies
- ✓ To write their chapters for dissertation

UNIT – I

Scientific Writing as a means of communication. Different forms of scientific writing-
- Articles in Journals, Research notes and reports , review articles, Monographs, Dissertations, Bibliographies.

UNIT – II

The reasons for preparing outlines- As a guide for plan of writing- As skeleton for the manuscript. Kinds of outline - Topic outlines, - Conceptual outline, - Sentence outlines
- Combination of topic and sentence outlines

UNIT – III

Drafting Titles, Sub Titles, Tables, Illustrations
- Tables as systematic means of presenting data in rows and columns and lucid way of indication relationships and results.
- Formation Tables : Title, Body stub, Stub, Column, Spanner and Box Head
- Appendices : Use and guidelines

UNIT – IV

The Writing Process
- Getting started: Use outline as a starting device
- Drafting, Reflecting, Re-reading: Checking organization, headings, content, clarity, Grammar,- Brevity and precision in writing, Drafting and Re-drafting based on critical evaluation

UNIT – V

Clearly state the question to be addressed, Rationale and importance of the Empirical and theoretical conceptualization, Presenting pilot study / data, Research proposal and time frame, Clarity, specificity of method, Clear organization, Outcome of study and its implications, Budgeting, Available infra-structure and resources, Executive summary

References

1. APA (1984) Publication Manual of American Physiological Association (3rd edition), Washington: APA
2. Cooper, H.M.(1990) integrating Research: A Guide for Literature Reviews (2nd edition). California: Sage
3. Dunn, F.V. & Others (Ed) (1994). Disseminating Research: Changing Practice, Sage
4. Harman, E & Montagnes, I (Eds) (1997). The thesis and the Book. New Delhi : Vistaar.
5. Locke, L.F. and others (1987). Proposals that work: A guide for planning Dissertations & Grant Proposals (2nd Ed) Beverly Hills: Sage.
6. Richardson.L (1990) Writing Strategies , Reaching Diverse Audience. California: Sage
7. Seyler, V.Dorothy (1999) doing Research The complete Research Paper Guide, Boston : Mc.Graw – Hill College.
8. Thyer, B.A. (1994). Successful Publishing in Scholarly Journals. California: Sage.

Lecture Schedule

| Units | Topics to be covered | Hours |
|-----------|---|-----------|
| I | Scientific Writing as a means of communication | 4 |
| | Different forms of scientific writing | 4 |
| | Articles in Journals, Research notes and reports , review articles, Monographs, Dissertations, Bibliographies. | 4 |
| | Total | 12 |
| II | The reasons for preparing outlines - As a guide for plan of writing - As skeleton for the manuscript | 6 |
| | Kinds of outline - Topic outlines - Conceptual outline - Sentence outlines - Combination of topic and sentence outlines | 6 |
| | Total | 12 |

| | | |
|------------|--|-----------|
| III | Drafting Titles, Sub Titles, Tables, Illustrations - Tables as systematic means of presenting data in rows and columns and lucid way of indication relationships and results. | 4 |
| | - Formation Tables : Title, Body stab, Stab Column, Column Head, Spanner Head, Box Head | 4 |
| | - Appendices : Use and guidelines | 4 |
| | Total | 12 |
| IV | The Writing Process - Getting started, Use outline as a starting device | 7 |
| | - Drafting - Reflecting, Re-reading. Checking organization. Checking headings. Checking content . Checking clarity . Checking grammar | 3 |
| | - Brevity and precision in writing - Drafting and Re-drafting based on critical evaluation | |
| | Total | 10 |
| V | Clearly state the question to be addressed Rationale and importance of the Empirical and theoretical conceptualization Presenting pilot study / data | 5 |
| | Research proposal and time frame Clarity, specificity of method Clear organization | 5 |
| | Outcome of study and its implications Budgeting Available infra-structure and resources Executive summary | 5 |
| | Total | 15 |
| | Seminar | 3 |
| | Total hours for Unit I – V | 64 |

MAJOR ELECTIVE - FOOD SERVICE MANAGEMENT

Code: 18FSNP03E2

Credits:T4+P0

Hours/Week:3

Marks: 100

Objectives: To

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

Specific Objectives of Learning :

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

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

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

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

1. Sethi,M., Malhan.S (2015), Catering Management: A Integrated approach,New age International.
2. Bennion, M.(1980), Introductory Foods, 7th ed. Macmillan Publishing Co. USA
3. Finch C.F. (1984), Food Preparations, MacDonald and Evans Ltd. Plymouth.
4. West B.B, Wood L, Harger V.P., (2006), Food Service in Institutions. John Willey and Sons, Inc., New York
5. Casady M.S. (1973) 'Food preparation Handbook' published by the Home Science Association of India.
6. Karla Longree (1967) 'Quantity Food Sanitation' John Wiley and Sons, Inc., New York.
- g. Waldon (1969) Recipes for great restaurants, Colier Macmillan Boom company, New York.
7. Kotschewar L. and Terrel M.E. (1961) Food Service Planning layout and Equipment, John Wiley and Sons, Ltd., New York.
8. Singh .R.K(2006), Modern Trends in Hospitality industry,AMAN, Publications,New Delhi
9. Terell M.E., (1966) Professional Food Preparation, John Wiley and Sons, New York
10. Marzia M., Canty M., and Richard B., (1933), Introduction to Catering, Oxford Blackwell Scientific publications, London.
11. Lewis J., Minor E., Ronald F., (1984) – Food Service System Management. AVI Publishingcompany, New Delhi.
12. Paul M., Peter J., (1986) – The Management of catering operations,Holt, Pinehart and Winston publishers, New Delhi.

Lecture Schedule

| Units | Topics to be covered | Hours |
|--------------|---|-----------|
| I | Food Industry -Introduction, Definition of food service industry, principles of food service industry, objectives, | 2 |
| | types of food service industry commercial and non commercial; | 3 |
| | Hospitals, school meals, hostels, Industrial canteens, | 3 |
| | commercial hotel, canteens Institutions catering to different types of handicapped personnel. | 3 |
| | Total | 11 |
| II | Developing objectives and goals -Definition, importance, types of goals, Policies procedures, rules | 2 |
| | Principles and procedures of management-Definition of management, organization & interaction at work, | 2 |
| | Principles of management, functions of management , Managerial roles & responsibilities, the manager& leadership quality | 2 |
| | Total | 6 |
| III | Tools of management –Definition, classification:- tangible tools, intangible tools, Organization chart,structure,function, | 3 |
| | Work schedules and improvement techniques. | 2 |
| | Classification of equipments electrical and non electrical equipments for food storage, preparation,serving, dishwashing methods and laundering. | 3 |
| | Total | 8 |
| IV | Quantity food selection, purchase, storage, waste control, food operation management. | 3 |
| | Production management – food production, recipe development, Service systems. Menu mechanics, | 4 |
| | Work Improvement and productivity | 3 |
| | 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 | 4 |
| | Total | 14 |
| V | Definition, man power planning, recruitment procedures, selection and induction, labour benefits and laws. | 3 |
| | Personnel policies, staff employment, training, placement, promotion, personnel records, work appraisals. | 3 |
| | Financial management-Definition,buying and accounting procedures in food service institution; budget | 2 |
| | cost accounting/analysis- Cost concepts-types of cost-fixed cost, semi fixed cost, variable cost .Costing of foods –selling price | 3 |
| | Food cost control-methods of controlling food cost,break even analysis. | 3 |
| | 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 | 4 |
| Total | 18 | |
| | Seminar and Visit to institutions | 7 |
| | Total hours for Unit I – V | 64 |

MAJOR ELECTIVE - FAMILY AND COMMUNITY SCIENCE

Code: 18FSNP03E3

Credits: 4 Hours/Week: 4

Marks:100

Objectives :

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

Specific Objectives of Learning

on successful completion of these units, students are expected :

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

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 Book Company.
2. Dantiyagi. S. (1996). Fundamentals of Textiles and their Care New Delhi: Orient Longman Limited.
3. Education Planning Gropu . (1987). Home Management, New Delhi : Arya Publishing House.
4. Jha, J.K. (2002). Encyclopaedia of Teaching of Home Science, Vol.I,II and III . New Delhi: Anmol Publications.
5. Srilakshmi.B. (1997). Food Science. New Delhi. New Age International Pvt.Ltd.
6. Suriakanthi.A., (2002). Child Development - An Introduction Gandhigram : Kavitha Publications.
7. Varghese , M.A.et al (1994). Home Management , New Delhi: Viley Eastern Limited.

Lecture Schedule

| Units | Topics to be covered | Hours |
|-------|---|-----------|
| I | Food Science and Nutrition : Food groups, Cooking Methods, Principles and Methods of Preservation, Composition of Food | 2 |
| | Food Additives, Food Adulteration, Food Laws, Food Processing | 2 |
| | Concept of nutrition, Nutrients, Malnutrition digestion, absorption and metabolism of macro and micro nutrients, deficiencies and sources | 2 |
| | Food Hygiene and sanitation.Food borne infections, | 1 |
| | Nutrition through life cycle – RDA, Diet modifications for Diabetes, Cardio Vascular Disease, Obesity, Anaemia and Renal Disorders | 4 |
| | Total | 11 |
| II | Institution Management – Management, principles and functions | 2 |
| | Food Service – Types and styles | 3 |
| | personnel management | 2 |
| | Record maintenance in food service institutions | 2 |
| | Standardization of receipe, portion control and cost control | 2 |

| | | |
|------------|---|-----------|
| | Total | 11 |
| III | Textiles and Clothing : General properties and structure of all textile fibers. Processing and manufacture of natural and man-made fibers | 2 |
| | Definition and classification of yarns: Identification of yarns and their use in various fabrics | 1 |
| | Fabric construction, definition and types of woven, non-woven and knitted fabric | 2 |
| | Testing of fibers, yarns and fabric | 1 |
| | Clothing : Principles of clothing-Socio-Psychological aspects of clothing, selection of fabrics for the family | 1 |
| | Clothing construction – basic principles of drafting, flat pattern and draping methods | 1 |
| | Textile design-principles and concepts. Care and maintenance of textiles materials and garments | 1 |
| | Laundry agents-methods and equipments | 1 |
| | Total | 10 |
| IV | Resource Management – Concept of Home Management and steps | 2 |
| | Management of Human Resources; Classification of Resources; Basics characteristics of Resources | 2 |
| | Decision making in family, Steps in decision making; Methods of resolving conflicts | 2 |
| | Work simplification; Importance of work simplification in home | 2 |
| | Mundel’s classes of change; Housing | 2 |
| | Interior design. Principles of Interior design, Various colours and colour schemes | 3 |
| | Household equipment-selection and Care | 2 |
| | Total | 15 |
| V | Human Development – Child development- Principles and Stage | 2 |
| | Life Span Development – Theories of Human Development and Behaviour | 2 |
| | Child rearing | 2 |
| | Socialization practices and Dynamics | 2 |
| | Early Childhood Care and Education – Emerging trends | |
| | Development problems and disabilities during childhood and adolescence | 3 |
| | Advanced child study methods and assessment | 2 |
| | Total | 15 |
| | Seminar | 2 |
| | Total hours for Unit I – V | 64 |

MAJOR ELECTIVE - FOOD ADDITIVES

Code: 18FSNP03E4

Credits: T4+P0

Hours/week: 4

Marks: 100

Objectives:

1. to know the significant role of food additives
2. to learn about the classification, origin and of food additives.
3. to understand the flavor technology in food processing

Specific Objectives of Learning:

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

- ✓ to portray the specifications and functional properties of food additives
- ✓ to render the health and safety aspects of food additives
- ✓ to find out the food adulteration through learnt techniques

UNIT I

Food additives – definitions, classification and function , preservatives, antioxidants, colours and flavours, emulsifiers, sequesterants, humectants, hydrocolloids, sweeteners, acidulents, buffering salts, anticaking agents, etc. – chemistry, food uses and functions in formulations, indirect food additives; toxicological evaluation of food additives. Proteins, starches and lipids as functional ingredient; isolation, modification, specifications, functional properties and applications in foods.

UNIT II

Functionality of food additives, regulatory and legal aspects, sensory properties of foods objectives of additives, functional classification of additives, additives of natural origin, synthetic additives. Health and safety aspects of food additives. Present status of various food additives. Controversial food additives Saccharin, history, function, controversy status, aspartame, nitrite and nitrate compounds, nitrosamines.

UNIT III

Additives to improve acceptability, permitted food colors, natural and artificial, food flavours, natural and artificial, sweeteners natural and artificial. acidulents, antimicrobials, aerating agents, ant staling agents, bodying agents, clouding agents, curing agents clarifiers, dietary supplements, dietary fiber , emulsifiers, enzymes, fat replacers, gelling agents, leavening agents, stabilizers, surfactants, tenderizers, texturizers, thickeners, vitamins, nerutraceuticals, viscosity modifiers, whipping agents.

UNIT IV

Flavor technology; types of flavours, flavours generated during processing – reaction flavours, flavor composites, stability of flavours during food processing , analysis of flavours, extraction techniques of flavours, flavours emulsions; essential oils and oleoresins; authentication of flavours etc.

UNIT V

Food adulteration, definition, reasons for food adulteration, methods of adulteration, and methods of detection. Consumer's responsibilities, consumer organizations. The prevention of food adulteration Act, 1954. The consumer protection Act 1986, normal food adulterants in coffee, tea leaves, edible oil, milk, cereals, spice powders.

Text Books

1. Branen, A.L., Davidson PM & Salminen S. 2001. Food Additives. 2nd Ed. Marcel Dekker.
2. Freyberg, Nicholas; Gortner, Willis Always (1982). The Food Additives Book. Bantam Books

Reference materials

1. Gerorge, A.B. 2006. Encyclopedia of Food and Color Additives. Vol. III. CRC Press.
2. Gerorge, A.B. 2004. Fenaroli's Handbook of Flavor Ingredients. 5th Ed. CRC Press.
3. Madhavi, D.L., Deshpande, S.S & Salunkhe, D.K. 2006. Food Antioxidants: Technological, toxicological and Health Perspective. Marcel Dekker.

Web Sources

1. http://ariefm.lecture.ub.ac.id/files/2012/10/A_Larry_Branen_P_Michael_Davidson_Seppo_SalmiBookFi.org-FOOD-ADDITIVES.pdf

Lecture schedule:

| Unit | Topics to be Covered | Hours |
|------|--|-------|
| I | Food additives – definitions, classification and function , preservatives, antioxidants, colours and flavours, emulsifiers, sequesterants, humectants, hydrocolloids, sweeteners, acidulents, buffering salts, anticaking agents, etc. | 2 |
| | Chemistry, food uses and functions in formulations, indirect food additives; toxicological evaluation of food additives. | 4 |
| | Proteins, starches and lipids as functional ingredient; isolation, modification, specifications, fuctional properties and applications in foods. | 6 |
| | Total | 12 |
| II | Functionality of food additives, regulatory and legal aspects, sensory properties of foods | 3 |
| | Objectives of additives, functional classification of additives, additives of natural origin, synthetic additives | 3 |
| | Health and safety aspects of food additives. Present status of various food additives. | 4 |
| | Controversial food additives Saccharin, history, function, controversy status, | 3 |

| | | |
|------------|--|-----------|
| | aspartame, nitrite and nitrate compounds, nitrosamines. | |
| | Total | 13 |
| III | Additives to improve acceptability, permitted food colors, natural and artificial, food flavours, natural and artificial, sweeteners natural and artificial. | 2 |
| | Acidulents, antimicrobials, aerating agents, ant staling agents, bodying agents, clouding agents, curing agents clarifiers, dietary supplements | 4 |
| | Dietary fiber , emulsifiers, enzymes, fat replacers, gelling agents, leavening agents, stabilizers, surfactants, tenderizers, texturizers, thickeners, vitamins, nerutraceuticals, viscosity modifiers, whipping agents. | 6 |
| | Total | 12 |
| IV | Flavor technology; types of flavours, flavours generated during processing – reaction flavours, flavor composites | 4 |
| | Stability of flavours during food processing , analysis of flavours, extraction techniques of flavours, flavours emulsions; | 4 |
| | Essential oils and oleoresins; authentication of flavours etc. | 4 |
| | Total | 12 |
| V | Food adulteration, definition, reasons for food adulteration, methods of adulteration, and methods of detection | 4 |
| | Consumer’s responsibilities, consumer organizations. The prevention of food adulteration Act, 1954. | 4 |
| | The consumer protection Act 1986, normal food adulterants in coffee, tea leaves, edible oil, milk, cereals, spice powders. | 4 |
| | Total | 12 |
| | seminar | 3 |
| | Total hours for Unit I-V | 64 |

MAJOR ELECTIVE -FOOD PACKAGING

Code: 18FSNP03E5
100

Credits: T4+P0

Hours/week: 4

Marks:

Objectives

1. to impart knowledge about the various food packaging materials and its importance
2. to understand the Packaging techniques of dissimilar food products
3. to recognize the role and significance of packaging

Specific Objectives of Learning:

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

- ✓ to opt for the exact packaging material for food products
- ✓ to recuperate the packaging techniques
- ✓ to make over the eco friendly and modernized packaging

UNIT I

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

UNIT II

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, Co extruded films, Testing of packaging material.

UNIT III

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.

UNIT IV

Packaging of fresh and processed foods: Packaging of Fruits and vegetables, Fats and Oils, Spices, meat, Poultry and sea foods, Dairy Products, Bakery, beverages, Dehydrated and frozen foods. Liquid and powder filling machines – like aseptic system, form and fill (volumetric and gravimetric), bottling machines. Form Fill Seal (FFS) and multilayer aseptic packaging machines. Smart and Intelligent packaging.

UNIT V

Packaging Design & Environmental Issues in Packaging: Food marketing and role of packaging-

Packaging aesthetic and graphic design; Coding and marking including bar coding; Consumer attitudes to food packaging materials; Packaging Laws and regulations, safety aspects of packaging materials; sources of toxic materials and migration of toxins into food materials; Packaging material residues in food products; Environmental & Economic issues, recycling and waste disposal. Improvising the traditional packaging to latest packaging techniques.

Text Books:

1. Robertson, G.L. 2006 Food Packaging: Principles and Practice (2nd ed.), Taylor & Francis
2. NIIR. (2003). Food Packaging Technology Handbook, National Institute of Industrial Research Board, Asia Pacific Business Press Inc.

Reference Books

1. Ahvenainen, R. (Ed.) 2003 Novel Food Packaging Techniques, CRC Press,
2. Han, J.H. (Ed.) 2005 Innovations in Food Packaging, Elsevier Academic Press,
3. Coles, R., McDowell, D. and Kirwan, M.J. (Eds.) 2003 Food Packaging Technology,
4. Norman N. Potter and Joseph H. Hotchkiss (1998). Food Science, 5th Edition. CRS press.

Web source:

1. <https://pdfs.semanticscholar.org/4887/ce90b3ee2ba0600b490212ca6f5d73fe2af6.pdf>

Lecture Schedule

| Unit | Topics to be covered | Hours |
|------|---|-----------|
| I | Introduction to food packaging: Packaging terminology- definition . Functions of food packaging, | 3 |
| | Packaging environment | 3 |
| | Characteristics of food stuff that influences packaging selection. | 4 |
| | Total | 10 |
| II | Packaging material and their properties: Glass, Paper and paper board, Corrugated fibre board (CFB) | 5 |
| | Metal containers: Tin Plate and Aluminum, Composite containers, Collapsible tubes, Plastic Films, Laminations, Metalized films, Co extruded films | 6 |
| | Testing of packaging material. | 2 |
| | Total | 12 |
| III | Packaging Systems and methods: Vacuum Packaging, Controlled atmospheric packaging, | 3 |
| | Modified atmospheric packaging | 2 |
| | Aseptic Packaging, Retort processing, Microwave packaging, | 5 |
| | Active Packaging, intelligent packaging, Edible packaging, Shrink and stretch packaging. | 5 |
| | Total | 15 |

| | | |
|----|--|-----------|
| IV | Packaging of fresh and processed foods: Packaging of Fruits and vegetables, Fats and Oils, Spices, | 3 |
| | Meat, Poultry and sea foods, Dairy Products, Bakery, beverages, Dehydrated and frozen foods. | 3 |
| | Liquid and powder filling machines – like aseptic system, form and fill (volumetric and gravimetric), bottling machines. | 3 |
| | Form Fill Seal (FFS) and multilayer aseptic packaging machines. | 3 |
| | Smart and Intelligent packaging | |
| | Total | 12 |
| V | Packaging Design & Environmental Issues in Packaging: Food marketing and role of packaging-Packaging aesthetic and graphic design; Coding and marking including bar coding; | 3 |
| | Consumer attitudes to food packaging materials; Packaging Laws and regulations, safety aspects of packaging materials; sources of toxic materials and migration of toxins into food materials; | 3 |
| | Packaging material residues in food products; Environmental & Economic issues, recycling and waste disposal. | 3 |
| | Improvising the traditional packaging to latest packaging techniques. | 3 |
| | Total | 12 |
| | Seminar | 3 |
| | Total hours for Unit I-V | 64 |

MAJOR ELECTIVE - FOOD TOXICOLOGY

Code: 18FSNP03E6

Credits: T4+P0

Hours/week: 4

Marks: 100

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

Specific Objectives of Learning:

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

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.

Text Books:

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.

Reference Books:

1. Stine, K.E. and Brown, T.M. Principles of Toxicology (2nd ed.) CRC Press 2006.
2. Tönu, P. 2007. Principles of Food Toxicology. CRC Press, LLC. Boca Raton, FL.

Web Sources:

1. <http://197.14.51.10:81/pmb/AGROALIMENTAIRE/Introduction%20to%20Food%20Toxicology%20Second%20Edition.pdf>
2. <http://itvhe.ac.ir/fars/Documents/3b09148a-fd46-4882-81f1-21be68285268.pdf>

Lecture schedule

| Units | Topics to be covered | Hours |
|-------|---|-----------|
| I | Principles of Toxicology: Classification of toxic agents; characteristics of exposure; spectrum of undesirable effects; interaction and tolerance; biotransformation and mechanisms of toxicity | 4 |
| | Evaluation of toxicity: Risk vs. benefit: Experimental design and evaluation: Prospective and retrospective studies: Controls :Statistics (descriptive, inferential): | 3 |
| | Animal models as predictors of human toxicity: Legal requirements and specific screening methods: : LD50 and TD50: In vitro and in vitro studies; Clinical trials. | 5 |
| | Total | 12 |
| II | Natural Toxins in Food: Natural toxins of importance in food- Toxins of plant and animal origin; | 3 |
| | Microbial toxins (e.g. Algal toxins, bacterial toxins and fungal toxins). Natural occurrence, toxicity and significance. | 3 |
| | Food poisoning; Mycotoxicoses of significance | 3 |
| | Determination of toxicants in foods and their management. | 3 |
| | Total | 12 |
| III | Food allergies and sensitivities: Natural sources and chemistry of food allergens; | 3 |
| | true/untrue food allergies; handling of food allergies; | 3 |
| | food sensitivities (anaphylactoid reactions, metabolic food disorders and idiosyncratic reactions); | 3 |
| | Safety of Genetically Modified food: potential toxicity and allergenicity of GM foods. Safety of toys and children consumables. | 5 |
| | Total | 14 |
| IV | Environmental Contaminants and Drug Residues in Food: Fungicide and pesticide residues in foods; heavy metal and their health impacts | 3 |
| | use of veterinary drugs (e.g. Malachite Green in fish and β -agonists in pork); other contaminants in food. | 4 |
| | Radioactive contamination of food, Food adulteration and potential toxicity of food adulterants. | 4 |
| | Total | 11 |
| V | Food Additives and toxicants added or formed during Food Processing: Safety of food additives; toxicological evaluation of food additives; | 4 |
| | food processing generated toxicants: nitroso compounds, heterocyclic amines, | 4 |
| | Dietary Supplements and Toxicity related to Dose: Common dietary supplements; relevance of the dose; possible toxic effects. | 5 |
| | Total | 13 |
| | Seminar | 2 |
| | Total hours for Unit I- V | 64 |

MAJOR ELECTIVE - FOOD PROCESSING AND TECHNOLOGY

Code : 18FSNP03E7

Credits: T4+P0

Hours/Week: 4 Marks: 100

Objectives:

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

Specific Objectives of Learning :

After studying this paper, the students will be:

- ✓ Clear with the concepts and principles of food processing
- ✓ Produce processed food products from plant and animal sources through various production method
- ✓ prepare by-products from food processing.

Contents:

UNIT I

Cereal Processing and Technology: Structure, composition and nutritive value of cereal grains such as rice, wheat, maize, barley, oats and rye; Rice: parboiling, milling and pearling; Processing and milling of wheat, maize, barley, oats and rye; Millets: Structure, composition and nutritive value and processing of millets; Cereal Products: Flours and its quality; Processed 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; Antinutritional factors: nature and health problems and methods used to eliminate toxic constituents; 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; Hydrogenated fat and margarine; Effect of processing on nutritive value and physiochemical properties of vegetable oils; Rancidity and the types; Rancidity prevention methods.

UNIT III

Vegetables Processing and Technology: Structure, composition and nutritive value of vegetables; Pigments: Classification, effects on processing 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; Browning reactions: types and mechanism; prevention methods; 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; Concept of imitation milk and dairy substitutes.

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; changes in egg quality during storage and preservation methods; 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; Factors influencing meat quality; Ageing and tenderization of meat; Poultry: Muscle composition and

nutritive value; Processing and storage of poultry meat; Preservation methods for poultry; Fish: Fish composition and nutritive value; Selection criteria for fish; Processing and storage; Preservation methods for fish; Meat products: Fermented and nonfermented; Byproducts utilization; Effect of processing on nutritive value and physiochemical properties of meat, poultry and fish.

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, London
7. Desrosier, N.W. and James N. (2007). Technology of food preservation. AVI Publishers.

Lecture Schedule

| Units | Topics to be covered | Hours |
|-------|---|-----------|
| I | Cereal Processing and Technology | |
| | Structure, composition and nutritive value of cereal grains such as rice, wheat, maize | 1 |
| | Structure, composition and nutritive value of cereal grains such as barley, oats and rye | 1 |
| | Rice processing: parboiling, milling and polishing pearling | 1 |
| | Processing and milling of wheat, maize | 1 |
| | Processing and milling of barley, oats and rye | 1 |
| | Millets: Structure, composition and nutritive value | 1 |
| | Processing of millets | 1 |
| | Cereal Products: Flours and its quality, Processed products of rice | 1 |
| | Processed products wheat and maize | 1 |
| | By products of cereal processing and its utilization, breakfast cereals and extrusion | 1 |
| | Effect of processing on nutritive value of cereals, changes in physiochemical properties of cereal starch due to processing | 2 |
| | Changes in physiochemical properties of protein due to processing | 1 |
| | Storage of cereal grains and its product and the changes in quality | 2 |
| | Total | 15 |
| | Pulses Processing and Technology | |

| | | |
|---------------------------------------|--|-----------|
| II | Structure, composition and nutritive value of pulses | 1 |
| | Processing of pulses – milling | 1 |
| | Antinutritional factors: nature and health problems and methods used to eliminate toxic constituents | 1 |
| | Pulse products: Dals, flours, texturized vegetable protein, protein concentrates, isolates and hydrolysates | 2 |
| | By-products from pulses processing and its utilization | 1 |
| | Effect of processing on nutritive value and physiochemical properties of pulses. | 1 |
| | Storage of pulses grains and its product and the changes in quality during storage | 1 |
| | Structure, composition and nutritive value of nuts and oilseeds | 1 |
| | Oil extraction methods and refining process | 1 |
| | By-products during processing and its utilization, quality of refined vegetable oil, hydrogenated fat and margarine | 1 |
| | Effect of processing on nutritive value and physiochemical properties of vegetable oils | 1 |
| | Storage of nuts and oilseeds and the quality changes during storage | 1 |
| | Rancidity and the types; Rancidity prevention methods | 1 |
| | Total | 14 |
| III | Vegetables Processing and Technology | |
| | Structure, composition and nutritive value of vegetables | 1 |
| | Pigments: Classification and the properties | 1 |
| | Post harvest changes in vegetables and storage | 1 |
| | Preliminary processing of vegetables, fermented vegetable products | 1 |
| | Nonfermented vegetable products | 1 |
| | Vegetable waste during processing and its utilization | 1 |
| | Effect of processing on nutritive value and physiochemical properties of vegetables | 1 |
| | Storage of vegetables and the quality changes during storage | 1 |
| | Structure, composition and nutritive value of fruits | 1 |
| | Post harvest changes in fruits, concept of maturity, ripening and senescence | 1 |
| | Fermented fruit products Nonfermented fruit products Effect of processing on nutritive value and physiochemical properties of fruits (browning reactions) | 2 |
| | Storage of fruits and the quality changes during storage, fruit waste during processing and it utilization Methods used for preservation of vegetables and fruits | 1 |
| | Total | 13 |
| Milk Processing and Technology | Milk Processing and Technology | |
| | Milk types and composition | 1 |
| | Physiochemical and functional properties of milk | 1 |
| | Milk processing, by products of milk processing and its utilization | 1 |
| | Effects of processing on nutritive value and physicochemical properties of milk | 1 |
| | Fermented milk products | 1 |

| | | |
|-----------|---|-----------|
| IV | Nonfermented milk products | 1 |
| | Concept of imitation milk and dairy substitutes | 1 |
| | Quality changes in milk and milk products during storage, the preservation methods | 1 |
| | Structure, composition and nutritive value of eggs | 1 |
| | Egg quality evaluation methods | 1 |
| | Egg processing and egg products | 1 |
| | Effect of processing on nutritive value and physiochemical properties of eggs | 1 |
| | Changes in egg quality during storage and preservation methods | 1 |
| | Total | 13 |
| V | Meat Processing and Technology | |
| | Meat types, structure, composition and nutritive value | 1 |
| | Post mortem changes in meat and meat quality, factors influencing meat quality Meat processing, tenderization of meat Fermented and non-fermented meat products | 2 |
| | Quality changes in meat and meat products during storage and the preservation methods Effect of processing on nutritive value and physiochemical properties of meat, Poultry: Muscle composition and nutritive value | 1 |
| | Poultry processing and the products Quality changes in poultry and its product during storage and the preservation methods | 1 |
| | Effect of processing on nutritive value and physiochemical properties of poultry | 1 |
| | Fish: Fish composition, types and nutritive value | 1 |
| | Selection criteria for fish, fermented and non-fermented fish products | 1 |
| | Effect of processing on nutritive value and physiochemical properties of meat, poultry and fish. Quality changes in fish and fish products during storage and preservation methods By-products of meat, poultry and fish processing and its utilization | 1 |
| | Total | 9 |
| | Total hours for Unit I – V | 64 |

FOOD PRESERVATION

Code: 18FSNP02N1

Credits: T4+P0

Hours/week: 4

Marks: 100

Objectives

1. To recognize the magnitude of Preservation
2. To identify the different drying Techniques

Specific Objectives of Learning:

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

UNIT I

Low temperature processing and storage: 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, airblast etc.)

UNIT II

High temperature processing : heat processing using hot oil (frying, shallow frying, deep fat frying), heat sterilization, pasteurization and its types and advantages, heat processing using hot air, baking, effect of heat on foods (texture, flavor, aroma, colour and nutritive value).

UNIT III

Irradiation : Irradiation of foods, types and sources of irradiation, effects or impacts of radiation on foods constituents, hurdle technology, irradiation of packaging material, application of irradiation on foods, dosimetry, health consequence of irradiated food.

UNIT IV

Preservation by chemicals and high concentration : Types and mode of action of organic and inorganic preservatives, antibiotics, antioxidants, anti-browning, cleaning, sanitizing and fungicidal agents. Sugar concentrates- general principles and methods of preparation of jam, jellies and marmalade, crystallized and glazed fruits, preserves, squashes and syrups. Theory of gel formation. Salt concentrates- general principle, role of ingredients, preparation of sauerkraut, dill and common Indian pickles.

UNIT V

Methods of Drying: 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.

REFERENCES

1. Aggarwal, Poonam, Sep, 2003, Value added Products from mangoes, Food & Pack.
2. Chevan J.K. and P.M. Katecha (2003). Raisins – Pretreatmentss, drying methods and storage, Food & Pack.
3. Desrosier N W & Desrosier JN, The Technology of Food Preservation- AVI Publication
4. Jood Sudesh and Neelam Kheterpaul, 2002, Food Preservation, Geeta Souraz, Agrotech Publishing Acedemy, Udaipur-313 002
5. Potty VH. &bM J Mulki Food Processing Oxford & IBH Publications
6. Srilakshmi B, Food Science New Age International publication
7. Srinivasa, R.P. and Sanjeev Kuma (2003). Fruits and Vegetables Preservation, Principles and Practices, International Book Distributing, Co, Lucknow - 226004.
8. Swaminathan MS Food Science & Experimental Foods– Ganesh &Co
9. Wilkinson, V.M and G.W.Gould, 2005, Food Irradiation .The Computype Media, New Delhi – 110 002.

Lecture schedule

| Units | Topics to be covered | Hours |
|------------|---|-----------|
| I | Low temperature processing and storage: Chilling, cryogenic chilling, chill storage, freezing, cryogenic freezing, frozen food storage, freeze drying. | 6 |
| | Changes in food during freezing | 2 |
| | Various types of freezers (tunnel types, fluidized bed, airblast etc.) | 4 |
| | Total | 12 |
| II | High temperature processing : heat processing using hot oil (frying, shallow frying, deep fat frying). | 5 |
| | Heat sterilization, pasteurization and its types and advantages | 4 |
| | Heat processing using hot air, baking, | 3 |
| | Effect of heat on foods (texture, flavor, aroma, colour and nutritive value) | 3 |
| | Total | 15 |
| III | Irradiation : Irradiation of foods, types and sources of irradiation. | 4 |
| | Effects or impacts of radiation on foods constituents. | 2 |
| | Hurdle technology, irradiation of packaging material. | 3 |
| | Health consequence of irradiated food. | 2 |
| | application of irradiation on foods. | 1 |
| | Total | 12 |

| | | |
|----|--|-----------|
| IV | Preservation by chemicals and high concentration : Types and mode of action of organic and inorganic preservatives, antibiotics, antioxidants, anti-browning, cleaning, sanitizing and fungicidal agents. | 6 |
| | Sugar concentrates- general principles and methods of preparation of jam, jellies and marmalade, crystallized and glazed fruits, preserves, squashes and syrups. | 3 |
| | Theory of gel formation. Salt concentrates- general principle, role of ingredients | 4 |
| | preparation of sauerkraut, dill and common Indian pickles. | 3 |
| | Total | 16 |
| V | Methods of Drying: Drying , dehydration, solar drying , Sun drying, Drying Osmosis, . | 4 |
| | Mechanical Driers – Spray drying, Foam drying, | 2 |
| | Drying by smoking – Definition, Principles, applications | 2 |
| | Factors influencing different drying methods | 1 |
| | Total | 9 |
| | Seminar | 2 |
| | Total hours for Unit I – V | 64 |

NUTRITION FOR HEALTHY LIFESTYLE

Code: 18FSNP02N2

Credits: T4+P0

Hours/week: 4

Marks: 100

Objectives:

1. To acquire knowledge about the Macro and micro nutrients
2. to learn about the Importance of vegetarian diet
3. to understand the Various mechanisms of specific foods

Specific Objectives of Learning:

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

- to know the role of vegetarian diet in preventing the degenerative diseases
- To acquire knowledge about the types of diet
- To improve the life style through Physical Activity and Stress Coping Mechanism

UNIT –I

Definition - Nutrient, Food, Healthy Life style. Food Pyramid, Food Groups, Balanced Diet, Portion control, Selection of foods, Difference between Normal and Therapeutic Diet. Signs of Good Nutritional Stats and Poor Nutritional status. Factors Influencing Human Nutrition. Macro and Micro Nutrient – Meaning, Classification, Importance, Food Sources, Functions and Requirements.

UNIT-II

Vegetarian Vitality, Role of Vegetarian diet in degenerative diseases - Cardiovascular Disease, Obesity, Hypertension, Diabetes Mellitus, Gall stone, Diverticular disease and Bowel Function, Cancer.

UNIT- III

Body Boosting Nutrients – sources, requirements and Mechanism. Anti aging Nutrients- Sources, requirements and Mechanism. Brain active Nutrients - Sources requirements and Mechanism. Nutritional Strategy to ease anxiety. Appetizing Foods, Low Calorie Foods. Importance of Organic Foods, Low cost Nutrient foods.

UNIT- IV

Physiology of Nutrition – Aspects of Human Nutrition, Broca Normal Diet, Bodymass Index. Psychology of Diet Plans. Types of Diet – Low Carb Diet, Zone Diet, Protein Power Diet, Sugar Busters, Stillman Diet, Ketosis and Ketogenic Diet, Mayo Diet. Formula Diets for weight reduction According to Codex Elimetrius, G.M Diet, Detox Diet, Acetrom Diet.

UNIT- V

Healthy life style: Strategies, factors that promote life style changes, self management skills. Non nutrient components of foods and their association to health. Fluid balance – Water compartments in human body, fluid regulation water intake in different conditions, dehydration and water intoxication. Diet and Physical activity. Types of Stress and Stress management.

Text Books and Reference Materials

1. Shubhangini A Joshi (1997). Diet and Nutrition. Tata McGraw-Hill publishing Company Limited, New Delhi.
2. Suresh Gopalani, (2008). Fundamentals Of Applied Nutrition, Cyber Tech Publications, New Delhi
3. Srilakshmi, B, Food Science, 3rd Edition, New Age International Pub, New Delhi, 2003.

Web Sources

1. <http://www.state.nj.us/humanservices/dds/documents/BOOK%20TO%20JOE%201.pdf>
2. <http://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/TechnologyVocational/NutritionForHealthyLiving120.pdf>
3. https://www.nhlbi.nih.gov/health/educational/lose_wt/index.htm
4. <http://www.kznhealth.gov.za/healthyliving.pdf>
<http://www.mhhe.com/hper/physed/clw/01corb.pdf>

Lecture schedule

| Units | Topics to be covered | Hours |
|-----------|---|-----------|
| I | Definition - Nutrient, Food, Healthy Life style. Food Pyramid, Food Groups, Balanced Diet. | 2 |
| | Portion control, Selection of foods | 2 |
| | Difference between Normal and Therapeutic Diet. | 1 |
| | Signs of Good Nutritional Stats and Poor Nutritional status. | 3 |
| | Factors Influencing Human Nutrition. | 2 |
| | Macro and Micro Nutrient – Meaning, Classification, Importance, Food Sources, Functions and Requirements. | 4 |
| | Total | 16 |
| II | Vegetarian Vitality | 2 |
| | Role of Vegetarian diet in degenerative diseases - Cardiovascular Disease, Obesity | 3 |
| | Role of Vegetarian diet in degenerative diseases - Hypertension, Diabetes Mellitus, Gall stone. | 3 |
| | Role of Vegetarian diet in degenerative diseases - Diverticular disease | 3 |

| | | |
|------------|---|-----------|
| | and Bowel Function, Cancer. | |
| | Total | 11 |
| III | Body Boosting Nutrients – sources, requirements and Mechanism. | 3 |
| | Anti aging Nutrients- Sources, requirements and Mechanism. | 3 |
| | Brain active Nutrients - Sources requirements and Mechanism. | 3 |
| | Nutritional Strategy to ease anxiety. | 3 |
| | Appetizing Foods, Low Calorie Foods. | 3 |
| | Importance of Organic Foods, Low cost Nutrient foods. | 3 |
| | Total | 18 |
| IV | Physiology of Nutrition – Aspects of Human Nutrition, Broca Normal Diet, Bodymass Index | 4 |
| | Psychology of Diet Plans. | 3 |
| | Types of Diet – Low Carb Diet, Zone Diet, Protein Power Diet, Sugar Busters, Stillman Diet, Ketosis and Ketogenic Diet, Mayo Diet. | 5 |
| | Formula Diets for weight reduction According to Codex Elimetrius | 3 |
| | G.M Diet, Detox Diet and Acetrom Diet | 2 |
| | Total | 20 |
| V | Healthy life style: Strategies, factors that promote life style changes, self management skills.. Diet and Physical activity. | 4 |
| | Non nutrient components of foods and their association to health. | 3 |
| | Fluid balance – Water compartments in human body, fluid regulation water intake in different conditions, dehydration and water intoxication | 4 |
| | Types of Stress and Stress management | 3 |
| | Total | 14 |
| | Seminar | 2 |
| | Total hours for Unit I – V | 64 |

CULINARY SCIENCE

Code: 18FSNP02N3

Credits: T4+P0

Hours/week: 4

Marks: 100

Objectives:

1. To acquire knowledge about the Cookery
2. To know the therapeutic and culinary uses of raw ingredients

Specific Objectives of Learning:

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

- ✓ to acquire the knowledge about types of cooking
- ✓ to understand the significance of raw ingredients
- ✓ to formulate the different food products

UNIT –I

Introduction to cookery, Culinary history, aims and objectives of cooking, preliminary preparations – (Cleaning, Peeling and stringing, Cutting and grating, sieving, Soaking, Processing, Coating, Blanching, Marinating, Sprouting or germination, Fermentation, Grinding, Drying, Filtering) meaning, Advantages and disadvantages. Types of Foods – Natural Foods and Processed foods

UNIT –II

Methods of cooking: Moist heat method (Boiling, Simmering, Poaching, Stewing, Blanching, Steaming and Pressure cooking) Dry Heat Method (Roasting, Grilling or broiling, Toasting, Baking, Sauting and Frying) Combination method (Braising) – Principles, Advantages and Disadvantages. Solar Cooking.

UNIT –III

Food ingredients: Cereals, Pulses, Nuts and Oil seeds, Milk, Eggs, Flesh foods (Meat, Poultry and Fish), Vegetables and Fruits, Sugar, Fats and oils and Spices. Classification, nutritional value and their role in cookery. Criteria for Selection of the Food Ingredients. Functions of Food.

Food additives – Preservatives, Colours, Emulsifiers and Stabilizers

UNIT –IV

Beverages and Appetizers – Classification (Refreshing, Nourishing, Stimulating, Soothing, Appetising) Kitchen Spaces: Size and type of kitchen, Developing kitchen plans, Designing kitchen, Work centers of kitchens, storage in Kitchens, Maintenance of Kitchen, Simple layout plans.

UNIT-V

Preparation Procedures: Soups, Fruit Juices, Jam, Jelly, Marmalades, Pickles, Cutlets, Cake, Biscuits, Bread, Cookies, Chocolates

Text Books:

1. Hamlyn (1983). The Best of Baking. The Hamlyn Publishing Group Limited, London
2. Karen Rich Drummond, Lisa, M. Brefer (2010). Nutrition for Food Service and Culinary Professionals. 7th Edition, John Wiley & Sons, Inc.
3. Srilakshmi, B. 2005. Food Science, New Age International (P) Ltd., Publishers, New Delhi.
4. Potter, N. and Hotch Kiss, J.H. (1996): Food Science, Fifth edition, CBS Publishers and Distributors, New Delhi.

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1. <https://is.muni.cz/el/1411/jaro2013/BVAJ0222/um/39181669/39181807/0470052422.pdf>
2. <https://www.siuslaw.k12.or.us/site/handlers/filedownload.ashx?moduleinstanceid=1048&dataid=1066&FileName=Basic%20Principles%20of%20Cooking%20Part%201.pdf>
3. <http://agritech.tnau.ac.in/nutrition/pdf/cooking%20methods.pdf>
4. <http://culinary.kapiolani.hawaii.edu/wp-content/uploads/2013/09/Chapter-8.-Cooking-Methods.pdf>
5. https://www.nestleprofessional.us/sites/g/files/gfb131/f/media/nutripro_magazine_healthy_cooking_methods.pdf
6. <http://library.princeton.edu/libraries/firestone/rbsc/aids/Bib.7193989.Maggs.Cookery.pdf>

Lecture Schedule

| Units | Topics to be covered | Hours |
|------------|---|-----------|
| I | Introduction to cookery , Culinary history, aims objectives of cooking. | 3 |
| | Preliminary preparations – Cleaning, Peeling and stringing, Cutting and grating, sieving, Soaking, Processing, Coating,- meaning, Advantages and disadvantages. | 4 |
| | Blanching, Marinating, Sprouting or germination, Fermentation, Grinding, Drying, Filtering - meaning, Advantages and disadvantages. | 4 |
| | Types of Foods – Natural Foods and Processed foods | 2 |
| | Total | 13 |
| II | Methods of cooking: Moist heat method (Boiling, Simmering, Poaching, Stewing, Blanching, Steaming and Pressure cooking) | 3 |
| | Dry Heat Method (Roasting, Grilling or broiling, Toasting, Baking, Sauting and Frying) | 3 |
| | Combination method (Braising) – Principles, Advantages and Disadvantages. Solar Cooking. | 4 |
| | Total | 5 |
| III | Food ingredients: Cereals, Pulses, Nuts and Oil seeds, Milk, Eggs, Flesh foods (Meat, Poultry and Fish) | 4 |
| | Vegetables and Fruits, Sugar, Fats and oils and Spices. | 3 |
| | Classification, nutritional value and their role in cookery. | 3 |
| | Criteria for Selection of the Food Ingredients. Functions of Food. | 3 |
| | Food additives – Preservatives, Colours, Emulsifiers and Stabilizers | 3 |
| | Total | 16 |
| IV | Beverages and Appetizers – Classification (Refreshing, Nourishing, Stimulating, Soothing, Appetising) | 5 |
| | Kitchen Spaces: Size and type of kitchen, Developing kitchen plans, Designing kitchen. | 4 |
| | Work centers of kitchens, storage in Kitchens. | 3 |
| | Maintenance of Kitchen, Simple layout plans. | 3 |
| | Total | 15 |
| V | Preparation Procedures: Soups and Fruit Juices | 3 |
| | Jam, Jelly and Marmalades | 3 |
| | Pickles Cutlets, Cake and Bread | 3 |
| | Biscuits and Cookies, | 3 |
| | Chocolates | 1 |
| | Total | 13 |
| | Seminar | 2 |
| | Total hours for Unit I – V | 64 |

MODULAR COURSE - ICT FOR NUTRITION EDUCATION

Code: 18FSNP03M1

Credits: T2+P0

Hours/week: 2

Marks:50

Objectives:

1. To know the scope and significance of communication
2. To understand the theories and models of communication

Specific Objectives of Learning :

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

- ✓ **To make the communication process with small and large groups**
- ✓ To create awareness among people with Mass media and advertisement.
- ✓ To develop the tools for nutrition education

UNIT-I

Meaning of communication, Concept of communication, Scope of communication
Communication process, approaches to communication, types and functions of interpersonal communication , Dyadic, small and large group communication, Stages in human relationship development, Small group communication: types and functions

UNIT-II

Organizational communication: concept, types, functions and networks, Public communication- concept and techniques, Mass Communication- concept, significance, functions and elements Theories and models of mass communication , Intercultural communication- concept, stages and barriers, Relationship between culture and communication.

UNIT-III

Elements of Communication: Their significance and characteristics Introduction to new communication technologies Development and use of transparencies Use of video projector, slide and computers. Innovation, Factors influencing innovation, Diffusion of innovation and communication, Characteristics of innovation, Innovation adoption process.

UNIT-IV

Mass media of communication : Theories and models of mass communication, Development of mass communication, Different media, their characteristics and use - A. Press B. Radio C. Television D. Films E. e-mail. Inter-dependence of mass media on communication, Mass media of communication and advertisement.

UNIT-V

ICTs: types, characteristics, reach and access. Designing - (a) Leaflets (b) Pamphlets (c) Newspaper (d) Photograph (e) Posters (f) Flash card (g) Slide and film strip (h) Television (i) Puppets

References

1. Barker, L. (1990). "Communication", New Jersey: Prentice Hall, Inc; 171.
2. Devito, J. (1998) Human Communication. New York: Harper & Row.
3. Patri and Patri (2002); Essentials of Communication. Greenspan Publications
4. Devito, J. (1998) Human Communication. New York: Harper & Row.
5. Barker, Larry Lee. (1990) Communication. Eaglewood Cliffs, New Jersey: Prentice Hall.
6. McQuail, D. (2000) Mass Communication Theories. London: Sage Publications
7. Baran, Stanley J (2009). Introduction To Mass Communication, McGraw hill medical publishing
8. Baran, Stanley J (2014). Mass Communication Theory, Wadsworth Publishing
9. Vivian, J (2012). The Media Of Mass Communication, Pearson

MODULAR COURSE- FOOD FERMENTATION

Code: 18FSNP03M2

Credits: T2+P0

Hours/week: 2

Marks: 50

Objectives:

1. to develop skills in handling and maintenance of fermentor
2. to understand the fermentation techniques

Specific Objectives of Learning :

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

- ✓ to have appropriate knowledge about significance of fermentation
- ✓ to formulate the various food products through fermentation techniques

UNIT I

Fermentation, types of fermentation, Fermentation Pathways for Industrial Products: Biochemical pathways of metabolic reactions for utilization of carbon sources and formation of different metabolites by micro organisms; Strain Development -Various techniques of modifying the strains for increased production of industrial products. Use of chemicals, UV rays, genetic engineering to produce newer strains.

UNIT II

Typical media, Media formulation:- Carbon Source, Nitrogen source, Minerals, Growth Factors, Buffers, Precursors and Inhibitors, O₂ requirement and antifoams.

UNIT III

Fermentor design, Instrumentation and control, Types of fermentors (Shake flask, Batch/stir tank, Continuous, Bubble column, airlift and Tower fermenter), Types of fermentation processes, aeration and agitation (The oxygen requirement for industrial fermentation , Determination of K_La values).

UNIT IV

Downstream Processing: Various equipment for product recovery; micro-filters and Ultrafiltration systems for separation of cells and fermentation medium and for concentration of medium containing product; chromatographic systems of separation; extraction of product with solvent; evaporation and crystallization; centrifugation, different types of centrifuges; drying techniques; instrumentation and controls.

UNIT V

Fermentative Production: a) Foods: Processes for preparing fermented products including Yogurt (curd) and other Traditional Indian Products like idli, dosa, dhokla, shrikhand, etc., Soya based products like soya sauce, natto, etc., Cocoa, Cheese etc.; Alcoholic Beverages based on fruit juices (wines), cereals (whisky, beer, vodka etc.),

sugar cane (rum) etc. Process description, quality of raw materials, fermentation process controls etc.b) Industrial chemicals: Fermentative Production of Organic acids like (Citric Acid, Lactic Acid), Amino Acids (Glutamic acid, Lysine), Antibiotics (Erythromycin, Penicillin), Polysaccharides (Dextran, Xanthan) etc.; steroids transformation; process descriptions and key controls for optimal production.

Reference:

- Vogel, H.C. and C.L. Todaro, 2005 Fermentation and Biochemical Engineering Handbook : Principles, Process Design and Equipment , 2nd Edition, Standard Publishers.
- El-Mansi, E.M.T, 2007, Fermentation Microbiology and Biotechnology 2nd Edition, CRC / Taylor & Francis.
- Joshi, V.K. and Ashok Pandey, 1999, Biotechnology: Food Fermentation, Microbiology, Biochemistry and Technology , Vol. I & vol. II Educational Publisher.
- Pepler, H.J. and D. Perlman, 2004, Microbial Technology : Fermentation Technology , 2nd Edition, Vol. II Academic Press / Elsevier.
- Stanbury, P.F., A. Whitaker and S.J. Hall, 2005 Principles of Fermentation Technology ,2nd Edition Aditya Books (P) Ltd.

MODULAR COURSE- NUTRITION ASSESSMENT AND FITNESS

Code: 18FSNP04M1

ddCredits: T2+P0

Hours/Week: 2

Marks: 50

Objective :

1. Understand the components of health and fitness and the role of nutrition in these.
2. Develop ability to evaluate fitness and well- being.

Specific Objectives of Learning :

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

1. to make nutritional, dietary and physical activity recommendations to achieve fitness and well- being.
2. to develop and provide best tips for fitness and well being.

UNIT-I

Definitions, components and assessment criteria of age: specific fitness and health status. Anatomical fitness, Physiological fitness, Psychological fitness and Physiological fitness; Growth and development, strength, speed skill stamina, or endurance, specific fitness, general fitness, and health status.. Holistic approach to the management of fitness and health: Energy input and output. Diet and Exercise, Effect of specific nutrition on work performance and physical fitness, Nutrition, exercise, physical fitness and health inter- relationship

UNIT-II

Review of different energy systems for endurance and power activity: Endurance - Definition, classification, and factors affecting endurance. Fuels and nutrients to support physical activity: Shifts in carbohydrate and fat metabolism mobilization of fat stores during exercise.

UNIT-III

Significance of physical fitness and nutrition in the prevention and management of weight control regimes, Nutrition and exercise regimes for pre and postnatal fitness. Nutritional and exercise regimes for management of obesity. Critical review of various dietary regimes for weight and fat reduction. Prevention of weight cycling.

UNIT-IV

Healthy life style: Strategies, factors that promote life style changes, self management skills. Non nutrient components of foods and their association to health. Fluid balance – Water compartments in human body, fluid regulation water intake in different

conditions, dehydration and water intoxication. Recommended dietary allowances and balanced diet. Factors influencing dietary intake: Food habits, food fads and fallacies, their influence on health and wellbeing. Gender and health.

UNIT-V

Defining nutritional goals/ guidelines appropriate or health fitness and prevention and management of the chronic de-generative disorders. Alternative systems for health and fitness like Ayurveda, Yoga, Meditation, Vegetarianism and Traditional diets.

REFERENCES:

1. L.K. & Ecott Stump, S.(2000): Krause's Food Nutrition and Diet therapy. Edition, W.B. Saunders Ltd.
- 2.Sizer, F & Whitney , E. (2000); Nutrition Concepts & Controversies. 8th Edition, Wadsworth, An International Thomson Publishing Co.
3. Whitney, E.N. & rolfes, S.R. (1999); Understanding Nutrition, 8th Edition, West/ Wadsworth Thomson learning.
4. Ira Wokinsky (Ed.) (1998): Nutrition in Exercise and sports, 3rd Edition, CRC Press.
5. Parizkova, J. Nutrition, Physical activity and health in early life Ed. Wolinsky, I. CRC Press.
6. Shils, M.E. Olson, J.A. Shike N. and Ross, A.C. (Ed.) (1999): Modern Nutrition in Health & Disease 9th Edition, Williams & Wilkins.
7. McArdle, W. Katch, F and Katch, V. (1996) Exercise Physiology, Energy, Nutrion and Human Performance, 4th Edition. Williams and Wikins, Philadelphia.

Journals

1. Medicine and Science in Sports and Exercise.