Syllabus

Bachelor of Science
in
Nutrition & Dietetics

Faculty of Allied Health Sciences

Shree Guru Gobind Singh

Tricentenary University, Gurugram

w.e.f. 2021 Batch

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Budhera, Gurugram

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Bachelor of Science (Nutrition and Dietetics)

Aim:

The B.Sc. Nutrition and Dietetics program provides a greater understanding of the scientific bases of nutrition and the influence of good nutrition on health. This course has a multidisciplinary emphasis providing a broad base of knowledge and skills. The characteristic feature that sets this course apart from various other courses is the provision of internship/ field placement for two months in the final year and carrying out a research project to gain competencies in scientific writing. This provides the student with an opportunity to interact with the community and participate in the development process.

Program Objectives:

a) Increasing student's knowledge.
b) Understanding of basic nutrition concept.
c) Developing skills-to make healthful decisions about nutrition.
d) Providing practical information to make reasoned judgments about matters related to nutrition now and in the future.
e) Representing a happy balance between meeting an educational requirement and learning useful information.
f) Increasing student's understanding of how nutrition 'truths' are identified and presenting a critical thinking process for making firm decision about nutrition.

Program Education Outcomes:

- Students will be able to establish and acquire scientific knowledge of the basic sciences and principles of nutrition and dietetics.
- Expressing a broad understanding of food composition and extrapolate its influence on human health and well- being.
- Assessing the scientific and social theory along with concepts in the context of food, culture, diet and nutrition.

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- Development of critical analysis skills, IT, communication and presentation skills as well as a life-long learning approach for career development in the field of nutritional sciences.
- Providing advice to individuals or communities in making proper food choices so as to prevent malnutrition or manage diet related disease conditions for promotion of optimum health.
- Enhanced teaching skills of menu planning for quality and quantity preparation and management of resources in food industries.

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SEMESTER I

BASIC NUTRITION (THEORY)

Paper Code: 05250101

Periods/week	Credits	Max. Marks: 100
L: 4 T: 0 P:0	4	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this course, students will be able to:

1. Learn the basic terminology of nutrition and the functions of food for healthy life.
2. Gain knowledge about different aspects of nutrients.
3. Understand the different food groups and role of food pyramid in balance diet.
4. Be familiar about the various methods of cooking.
5. To gain knowledge about newer trends in nutrition.

Unit 1: Introduction to Nutrition: Food as source of nutrients, functions of food, definition of nutrition, nutrients & energy, adequate, optimum & good nutrition, malnutrition. Interrelationship between nutrition & health: - Visible symptoms of good health.

Unit 2: Food guide: Basic five food groups – Steps to use food guide (according to R.D.A.) Functions, classification, food sources, RDA, storage in body, Consequences of inadequate and excessive intake of the following: Carbohydrates, Proteins and Fats, Dietary fiber, protein quality.

Unit 3: Nutrients: Functions, sources, RDA, bioavailability, deficiency & excess of-

- Macro and micro minerals
- Water soluble and fat-soluble Vitamins

Unit 4: Water and Energy: Water as a nutrient, components of body fluids, function, sources, requirement, water balance & effect of deficiency.

Energy- energy balance measurement of energy, energy intake and source of food and energy requirements.

Unit 5: Objectives and Principles of Cooking: Conduction, convection, and radiation. Effect of cooking & heat processing on the nutritive value of foods.

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Unit 6: Novel Foods:

- Functional Foods-Antioxidants, Phytochemicals, Probiotics.
- Organic foods
- Convenience foods
- Genetically modified foods
- Textured foods
- Nano foods
- Vegetarianism

References:

1. Bamji M.S., Rao N.P. and Reddy V. (1996): Textbook of Human Nutrition. 11th Ed. Oxford and IBH
2. Publishing Co. Pvt. Ltd., New Delhi.
3. Swami Nathan M (1974) Essentials of Foods and Nutrition. 1st Ed. Ganesh and co.
4. Nutritive Value of Indian Foods, NIN, ICMR.
5. Srilakshmi B. (2010) Food Science. 5th Ed. New Age International Publishers

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

PO / CO	a	b	c	d	e	f
1	√	√	√			
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BASIC NUTRITION (PRACTICAL)

Paper Code: 05250102

Periods/week	Credits	Max. Marks: 50
L: 0 T: 0 P:4	2	Internal: 30
		External: 20

Course Outcome:

On successful completion of this course, students will able to:

1. Find out nutrient availability and understand the principles behind the basic recipes.
2. Gain knowledge about the importance of weights and measures in cookery.

Practicals:

1. Use and care of kitchen equipments.

2. Rich Sources of nutrients price list, nutrition, and labeling.

3. Controlling techniques - Weights and measures standard, household measures for raw and cooked food.

4. Food preparation and classifying recipes as good, moderate, or poor, sources of specific nutrients. Amount of ingredients to be in standard recipe -

1. portion size,
2. Beverages - tea, coffee, cocoa, fruit juice, milk, milk shakes etc.
3. Cereals and flour mixtures - basic preparation & their nutritive value - boiled rice and rice pulao, chapati, puri, paratha, sandwiches, pastas, pancakes, cookies & cakes

5. Vegetables & fruits - Simple salads, Dry vegetables, Curries, fruits preparation using fresh and dried stewed fruit, fruit salad etc.

6. Milk and milk products Porridges, Curds, paneer, and their commonly made preparations. Milk based simple desserts and puddings, custard, kheer, ice cream.

7. Meat - cuts of meat - Meat preparations, Poultry, Fish, hard- and soft-cooked, poached, scrambled, fried & omelet etc.

8. Soups - Basic, clear, and cream soups etc.

9. Snacks- Pakoras, cheese toast, upma, poha, peanut, chikki, til & laddo etc.

References:

1. Bamji M.S., Rao N.P. and Reddy V. (1996): Textbook of Human Nutrition. 11th Ed. Oxford and IBH.
2. Publishing Co. Pvt. Ltd., New Delhi.

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3. Swami Nathan M (1974) Essentials of Foods and Nutrition. 1st Ed. Ganesh and co.
4. Nutritive Value of Indian Foods, NIN, ICMR.
5. Srilakshmi B. (2010) Food Science. 5th Ed. New Age International Publishers

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

CO \ PO	a	B	c	d	e	f
1	√	√	√	√	√	
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Nutritional Biochemistry-I (Theory)

Paper Code: 05250103

Periods/week	Credits	Max. Marks: 100
L: 3 T: 1 P: 0	4	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this unit, students shall be able to:

1. Relate the biochemical aspects of nutrition and health.
2. Recognize how fundamental biochemical principles and reactions are utilized in biochemical processes.
3. Explain the macronutrients and micronutrients important for the body.
4. Explain how nutrients are delivered and utilized by the body.
5. Explain the biochemical properties and functions of various nutrients

Unit 1: Basics of Energy Metabolism, Nutrition & Dietetics: Unit of measuring energy, calorific value of food, BMR & factors affecting it, SDA of food, calculation of energy requirement, balanced diet, nutrition in health & diseases (protein energy malnutrition).

Unit 2: Chemistry of Carbohydrates & Their Related Metabolism: Introduction, definition, classification, biomedical importance Brief outline of metabolism: Glycogenesis & glycogenolysis (in brief), Glycolysis, citric acid cycle & its significance, HMP shunt & Gluconeogenesis (in brief), regulation of blood glucose level.

Unit 3: Amino acids: Definition, classification, essential & non-essential amino acids.

Unit 4: Chemistry of Proteins & their related metabolism: Introduction, definition, and classification, biomedical importance Metabolism: Transformation, Decarboxylation, Ammonia formation & transport, Urea cycle.

Unit 5: Chemistry of Lipids: Introduction, definition, classification, biomedical importance, essential fatty acids, identification of fats & oils (saponification no, acid no, iodine no, acetyl no, reichert- miesel no. etc.)

Unit 6: Acid Base Balance Concepts & Disorders: pH, Buffers, Acidosis, Alkalosis

Unit 7: Vitamins & Minerals: Sources, requirement, deficiency disorders & biochemical functions.

Unit 8: General Concepts & Functions of Immune Globulins

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References:

1. A.C. Deb (2001) Fundamentals of Biochemistry 9th Ed. New Central Book Agency (p) Ltd;.
2. West and Todd (1966) Textbook of biochemistry 4th Ed. Macmillan Publishing Company
3. U. Satyanarayana and U. Chakrapani (2009) Biochemistry. 4th Ed. Elsevier.
4. Singh S.P. Viva in Biochemistry (2008). 4th Ed. CBS Publishers. 239-240
5. Sawhney S.K. and Singh R. (2014) Introductory Practical Biochemistry. 2nd Ed. Narsoha publishing house.
6. Pushpa Sundararaj and Anupa Siddhu. Qualitative tests and Quantitative Procedures in Biochemistry, A H Wheeler and Co Ltd. 2002 Second Edition, Wheeler, New Delhi

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NUTRITIONAL BIOCHEMISTRY-I (PRACTICAL)

Paper Code: 05250104

Periods/week	Credits	Max. Marks: 50
L: 0 T: 0 P: 4	2	Internal: 30
		External: 20

Course Outcomes:

On successful completion of this unit, students are expected to be able to:

1. Represent skills in the proper handling of apparatus and chemicals.
2. Understand the different processes used in industries and their applications.
3. Represent problem-solving skills and to nurture professional attitudes.

Practicals:

1. Safe and systematic working in the Laboratory.
2. Preparation of routine and standard laboratory reagents.
3. Principle, working use, care and maintenance of various instruments used in laboratory investigations.
4. Identification of Proteins (Qualitative Tests)
5. Identification of Carbohydrates (Qualitative Tests)
6. Identification of Fats (Qualitative Tests)

References:

1. A.C. Deb (2001) Fundamentals of Biochemistry 9th Ed. New Central Book Agency (p) Ltd;
2. West and Todd (1966) Textbook of biochemistry 4th Ed. Macmillan Publishing Company
3. U.Satyanarayana and U.Chakrapani (2009) Biochemistry. 4th Ed. Elsevier
4. Singh S.P. : Viva in Biochemistry (2008). 4th Ed. CBS Publishers. 239-240
5. Sawhney S.K. and Singh R. (2014) Introductory Practical Biochemistry. 2nd Ed. Narsoha publishing house.
6. Pushpa Sundararaj and Anupa Siddhu. Qualitative tests and Quantitative Procedures in Biochemistry, A H Wheeler and Co Ltd. 2002 Second Edition, Wheeler, New Delhi

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PHYSIOLOGY-I (THEORY)

Paper Code: 05250105

Periods/week	Credits	Max. Marks: 100
L: 3 T: 1 P: 0	4	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this unit, students shall be able to:

1. Understand the physiology of various organs of the body.
2. Obtain a better understanding of the principles of Nutrition and Dietetics through the study of physiology.
3. Understand alterations of structure and function in various organs and systems in disease conditions.

Unit 1: Composition and Function of Blood: Red blood cells–Erythropoietin, stages of differentiation function, count, physiological variations. Hemoglobin– structure, functions, concentration, physiological variation. Methods of estimation of Hb White blood cells–Production, function, lifespan, count, differential count Platelets–Origin, normal count, morphology functions. Plasma Proteins– Production, concentration, types, Albumin, Globulin, Fibrinogen, Prothrombin functions.

Hemostasis– Definition, normal hemostasis, clotting factors, mechanism of clotting, disorders of clotting factors. Blood groups– ABO system, Rh system Blood grouping & typing, Blood Transfusion reaction Cross matching Anticoagulants– Classification, examples and uses Anemia: Classification, effects of anemia on body

Blood Volume- Normal value, determination of blood volume and regulation of blood volume, Body fluid– pH, normal value, regulation, and variation.

Unit 2: Cardiovascular System: Heart –Physiological anatomy, Nerve supply Properties of Cardiac muscle, Cardiac cycle-systole, diastole Intra ventricular pressure curves. Cardiac Output– Heart Sounds- Normal heart sounds, cause characteristics and signification, Heart rate, areas of auscultation.

Blood Pressure– Definition, normal value, clinical measurement of blood pressure. Physiological variations, regulation of heart rate, cardiac shock, hypotension, hypertension. Pulse–radial pulse, triple response

Electrocardiogram (ECG)– significance.

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Unit 3: Digestive System: Physiological anatomy of Gastrointestinal tract, Functions of digestive system.

Salivary glands-Structure and functions. Deglutition– stages and regulation

Stomach– structure and functions Gastric secretion– Composition, function, regulation of gastric juice secretion. Pancreas– structure, function, composition regulation of pancreatic juice. Liver–functions of liver. Bile secretion, composition, function, regulation of bile secretion.

Bilirubin metabolism- types of bilirubin, Vanden berg reaction, Jaundice-types, significance. Intestine –small intestine and large intestine. Small intestine– functions-digestive, absorption, movements. Large intestine– functions, digestion and absorption of Carbohydrates, Proteins, Fats, Lipids. Defecation.

Unit 4: Respiratory System: Functions of Respiratory system, Physiological Anatomy of Respiratory system, Mechanism of normal and rigorous respiration Forces opposing and favoring expansion of the lungs Intra pulmonary pleural pressure, surface tension, recoil tendency of the wall.

Transportation of Respiratory gases: Transportation of Oxygen& Carbon dioxide.

Lung volumes and capacities. Regulation of respiration, Mechanisms of Regulation-nervous and chemical regulation. Hearing Breuer, Reflexes. Applied Physiology and Respiration: Hypoxia, Cyanosis, Asphyxia, Dyspnea, Dysbarism, Artificial Respiration, Apnea.

Unit 5: Nervous System: Functions of Nervous system, Neuron structure, classification and properties.

Neuroglia, Nerve fiber, classification, conduction of impulses continuous and salutatory. Velocity of impulse transmission and factor affecting Synapse –structure, types, properties Receptors–Definition, classification, properties Reflex action–unconditioned properties of reflex action, Babinski's sign Spinal cord nerve tracts- Ascending tracts, descending tracts– pyramidal tracts Extra pyramidal tracts Functions of Medulla, pons, hypothalamic disorders Cerebral cortex lobes and functions, Sensory cortex, Motor cortex, Cerebellum functions of Cerebellum Basal ganglia-functions EEG, Cerebrospinal Fluid (CSF)- formation, circulation, properties, composition, and functions lumbar puncture.

Autonomic, Nervous System: Sympathetic and para-sympathetic distribution and functions and comparison of functions.

Unit 6: Muscle Nerve Physiology: Classification of muscle, structure of skeletal muscle, Sarcomere contractile proteins, neuro muscular junction. Transmission across neuromuscular

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junction. Excitation contraction coupling. Mechanism of muscle contraction, muscle tone, fatigue: Rigor mortis.

References:

1. Chaudhari S K. (1998) Concise Medical Physiology. 3rd Ed. New Central Book Agency (P) Ltd., Calcutta.
2. Ganong, W.F. (1999) Review of Medical Physiology. 10th Ed. Prentice-Hall International, London.
3. Guyton A.C. (1996) Textbook of Medical Physiology. W. B. Saunders Co., Philadelphia, USA.
4. Jain A.K. (2001) Textbook of Physiology. Avichal Publishing Co., New Delhi.
5. Singh I., Chaurasia BD (1998) Human Anatomy. CBS Publisher and Distributors, New Delhi.
6. Tortora G.J. and Grabowski S.R. (2005) Principals of Anatomy and Physiology. 8th Ed. Harper Collins College Publishers, New York.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

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PHYSIOLOGY-I (PRACTICAL)

Paper Code: 05250106

Periods/week	Credits	Max. Marks: 50
L: 0 T: 0 P: 4	2	Internal: 30
		External: 20

Course Outcomes:

On successful completion of this unit, students shall be able to:

1. Identify basic physiology concepts.
2. Practice universal and essential safety precautions in hematology.
3. Understand the physiology and functions of blood, components of blood, factors affecting blood, and differences between serum and plasma.
4. Acquire knowledge about coagulation, elements of clotting cascade and laboratory blood tests.
5. Apply knowledge of physiology of human body in nutritional care practice.

Practicals:

1. Hemoglobinometry
2. White Blood Cell count
3. Red Blood Cell count
4. Determination of Blood Groups
5. Leishman's staining and Differential WBC count
6. Determination of packed cell Volume
7. Erythrocyte sedimentation rate [ESR]
8. Calculation of Blood indices
9. Determination of Clotting Time, Bleeding Time

References:

1. Chaudhari S K. (1998) Concise Medical Physiology. 3rd Ed. New Central Book Agency (P) Ltd., Calcutta.
2. Ganong, W.F.(1999) Review of Medical Physiology. 10th Ed. Prentice-Hall International, London.
3. Guyton A.C. (1996) Textbook of Medical Physiology. W. B. Saunders Co., Philadelphia, USA.
4. Jain A.K. (2001) Textbook of Physiology. Avichal Publishing Co., New Delhi.

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5. Singh I., Chaurasia BD (1998) Human Anatomy. CBS Publisher and Distributors, New Delhi.
6. Tortora G.J. and Grabowski S.R. (2005) Principals of Anatomy and Physiology. 8th Ed. Harper Collins College Publishers, New York.

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COMMUNICATION SKILLS AND PERSONALITY DEVELOPMENT (THEORY-AECC)

Periods/week	Credits	Max. Marks: 100
L: 4 T: 0 P: 0	4	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this unit, students shall be able to:

1. Understand the concept of communication as well as their objectives towards self and national development.
2. Appreciate the role of Nutrition and Dietetics in community development.

Unit 1: Listening Comprehension

1. Speeches
2. Interviews
3. audio-video clippings followed by exercises
4. Introduction to Communication
5. Importance of Communication
6. Barriers to Communication and ways to overcome them

Unit 2: Conversation Skills

7. Greetings and introducing oneself
8. Framing questions and answer
9. Role play
10. Buying: asking details etc
11. Word formation strategies
12. Vocabulary building: Antonyms, Synonyms, Affixation, Suffixation, One word substitution

Unit 3: Reading Comprehension

13. Simple narration and Stories
14. Simple Passages
15. Newspaper and articles clippings
16. Note Making
17. Paragraph Writing
18. Comprehension

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19. Report Writing: types, characteristics

20. Introduction to Letter Writing

Unit 4: Pronunciation

21. Pronunciation

22. Syllable and Stress

23. Intonation and Modulation

Unit 5: Writing Comprehension

24. Letters: types, format, style

25. Précis Writing

26. Paragraph: Order, Topic sentence, consistency, coherence

27. Report and Proposal

28. Project Writing: Features, Structure

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

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SEMESTER II

NUTRITION FOR LIFESPAN (THEORY)
Paper Code: 05250201

Periods/week	Credits	Max. Marks: 100
L: 4 T: 0 P: 0	4	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Understand the principles of nutritionally adequate meals for the family and the community.
2. Acquire knowledge about the nutritional needs of an individual throughout the lifecycle.

Unit 1: Introduction to Meal Management: Balanced diet, food groups & the planning of balanced diet. Food faddism & the faulty food habits.

Unit 2: Food Guides: For selecting adequate diet, international terms used for nutrients requirement and Recommended Dietary Allowances, nutrient density, nutrient composition table.

Unit 3: Nutrition in Pregnancy and Lactation: Physiological stages of pregnancy, nutritional requirements, food selection, Complication of pregnancy. Physiology of lactation, Nutritional requirements.

Unit 4: Nutrition during Infancy and Early Childhood (Toddler/ Pre-school): Growth & development, nutritional requirements, breast feeding, infant formula. Introduction of supplementary foods. Growth & nutrient need, nutrition related problems, feeding patterns during early childhood.

Unit 5: Nutrition in School Children and Adolescence: Nutritional requirement, importance of snacks, School lunch. Growth & nutrient needs, food choices, eating habits, factors influencing needs.

Unit 6: Nutrition During Adulthood and Geriatrics: Nutritional requirements, feeding pattern. Factors affecting food intake and nutrient use, nutrient needs, nutrition related problems during old age.

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References:

1. Bamji M.S., Rao N.P. and Reddy V. (1996): Textbook of Human Nutrition. 11th Ed. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Swami Nathan M (1974) Essentials of Foods and Nutrition. 1st Ed. Ganesh and co.
3. Wadlow and Ingel's (2012) Perspectives of Nutrition. 9th Ed. McGraw-Hill Education
4. Nutritive Value of Indian Foods, NIN, ICMR

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

PO / CO	a	b	c	d	e	f
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NUTRITION FOR LIFE SPAN (PRACTICAL)

Paper Code: 05250202

Periods/week	Credits	Max. Marks:50
L: 0 T: 0 P: 4	2	Internal: 30
		External: 20

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Understand the principles of nutritionally adequate meals for the family and the community.
2. Acquire knowledge about the nutritional needs of an individual throughout the lifecycle.

Practicals:

1. Planning, preparation and nutritional evaluation of diets in relation to physiological state.
2. Planning and preparation of a balanced diet for a pregnant woman.
3. Diet during complication of pregnancy.
4. Planning and preparation of a balanced diet for a lactating woman.
5. Preparation of weaning foods.
6. Planning and preparation of a balanced diet for pre-school child.
7. Balanced diet for school going child. Preparation of packed lunch.
8. Planning and preparation of a balanced diet for adolescence.
9. Planning of meals for adult belonging to different income group.
10. Planning meal for senior citizen.

References:

1. Bamji M.S., Rao N.P. and Reddy V. (1996): Textbook of Human Nutrition. 11th Ed. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Swami Nathan M (1974) Essentials of Foods and Nutrition. 1st Ed. Ganesh and co.
3. Wadlow and Ingel's (2012) Perspectives of Nutrition. 9th Ed. McGraw-Hill Education.
4. Nutritive Value of Indian Foods, NIN, ICMR

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NUTRITIONAL BIOCHEMISTRY-II (THEORY)

Paper Code: 05250203

Periods/week	Credits	Max. Marks: 100
L: 3 T: 1 P: 0	4	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Gain intense knowledge about the various metabolic activities occurring in the body.
2. Understand the mechanisms adopted by the human body for regulation of metabolic pathways.
3. Become proficient for specialization in Nutrition.

Unit 1: Brief out line of metabolism: Beta oxidation of fatty acids, Ketosis, Cholesterol & it's clinical significance, Lipoproteins in the blood composition & their functions in brief, Atherosclerosis

Unit 2: Enzymes - Introduction, definition, classification, coenzymes, isoenzymes, properties, factors affecting enzyme action, enzyme inhibition, diagnostic value of serum enzymes - Creatinine kinase, Alkaline phosphatase, Acid phosphatase, LDH, SGOT, SGPT, Amylase, Lipase, Carbonic anhydrase etc.

Unit 3: Hormones - Classification, general mode of action, hormones of Pituitary, Thyroid, Parathyroid, Adrenals, Reproductive Glands, Pancreas, hormonal disorders, counter regulatory hormones.

Unit 4: Water metabolism- Distribution of fluids in the body, ECF, ICF, Water metabolism, dehydration.

Unit 5: Hyperglycemia & hypoglycemia - Diabetes mellitus - definition, types, features, gestation diabetes mellitus, glucose tolerance test, glycosuria, Hypoglycemia & its causes.

Unit 6: Liver functions and their assessment - Based on - Carbohydrate metabolism, Protein metabolism, Lipid Metabolism. Measurements of serum enzyme levels. Bile pigment metabolism: Jaundice - its types and their biochemical findings.

Unit 7: Renal functions tests - Various tests, GFR & clearance.

Unit 8: Tumor markers & their clinical applications – Including oncofeatal antigens, CEA etc.

References:

1. Textbook of Biochemistry-A.K. Berry
2. Viva in biochemistry – S.P. Singh
3. Practical biochemistry – C. Rajgopal
4. Fundamentals of Biochemistry-A.C. Deb

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NUTRITIONAL BIOCHEMISTRY-II (PRACTICAL)

Paper Code: 05250204

Periods/week	Credits	Max. Marks: 50
L: 0 T: 0 P: 4	2	Internal: 30
		External: 20

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Understand the principles of biochemical methods used for the analysis of food and biological samples.
2. Perform biochemical analysis with accuracy and reproducibility.
3. Become proficient in biochemical analysis.
4. Use developed skills to be used in various diagnostic labs.

Practicals:

1. To study general properties of the enzyme Urease & Achromatic time of salivary amylase.
2. Estimation of glucose in urine by Benedict's methods
3. Urine analysis - normal & abnormal constituents of urine
4. Blood glucose estimation.

References:

1. Textbook of Biochemistry-A.K. Berry
2. Viva in biochemistry – S.P. Singh
3. Practical biochemistry – C. Rajgopal
4. Fundamentals of Biochemistry-A.C. Deb
5. Textbook of biochemistry-West and Todd

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MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

PO / CO	a	b	c	d	e	f
1	√				√	√
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PHYSIOLOGY-II (THEORY)

Paper Code: 05250205

Periods/week	Credits	Max. Marks: 100
L: 3 T: 1 P: 0	4	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Understand the physiology of various organs of the body.
2. Obtain a better understanding of principles of Nutrition and Dietetics through the study of physiology.
3. Understand alterations of structure and function in various organs and systems in disease conditions

Unit 1: Endocrine System: Definition, Classification of Endocrine glands & their hormones. Thyroid gland hormone– Physiological, Anatomy, Hormone secreted, Physiological function, regulation of secretion. Disorders–hypo and hyper secretion of hormone. Adrenal gland, Adrenal cortex physiologic anatomy of adrenal gland, Adrenal cortex, cortical hormones–functions and regulation

Adrenal medulla–Hormones, regulation, and secretion. Functions of Adrenaline and nor adrenaline. Pituitary hormones–Anterior and posterior pituitary hormones, secretion, function. Pancreas–Hormones of pancreas. Insulin–secretion, regulation, function and action. Diabetes mellitus–Regulation of blood glucose level. Parathyroid gland–function, action, regulation of secretion of parathyroid hormone. Calcitonin–function and action, Calcium Homeostasis.

Unit 2: Special senses: Vision– structure of eye. Function of different parts. Structure of retina. Hearing-structure and function of ear, mechanism of hearing. Taste–Taste buds' functions. Smell physiology, Receptors.

Unit 3: Excretory System: Excretory organs Kidneys: Functions of kidneys structural and functional unit nephron, vasarecta, cortical and juxta-medullary nephrons–Comparison, Juxta Glomerular Apparatus–Structure and function Renal circulation peculiarities. Mechanism of Urine formation: Ultra filtration criteria for filtration GFR, Plasma fraction, EFP, factors effecting EFR. Determination of GFR selective reabsorption– sites of reabsorption, substance reabsorbed mechanisms of reabsorption

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Glucose, and urea. H+Cl amino acids etc. TMG, Tubular load, renal threshold% of reabsorption of different substances, selective secretion Properties and composition of normal urine, urine output. Counter– Current Mechanisms: Micturition, Innervation of Bladder, Cysto-urethrogram. Diuretics: Water, Diuretics, osmotic diuretics, artificial kidney, renal function tests–plasma clearance. Actions of ADH, Aldosterone and PTH on kidneys. Renal function tests.

Unit 4: Reproductive system: Function of Reproductive system. Puberty, male reproductive system. Functions of testes, spermatogenesis site, stages, and factors influencing semen. Endocrine functions of testes. Androgens–Testosterone structure and functions. Female reproductive system: Ovulation, menstrual cycle. Physiological changes during pregnancy, pregnancy test Lactation: Composition of milk factors controlling lactation.

Unit 5: Skin-structure and function: Body temperature measurement, Physiological variation, Regulation of body temperature by physical chemical and nervous mechanisms. Role of hypothalamus. Hypothermia and fever.

References:

1. Chatterjee, C.C., Human Physiology, Medical Allied Agency, Kolkata
2. Guyton A.C. (1996) Textbook of Medical Physiology. W. B. Saunders Co., Philadelphia, USA.
3. Jain A.K. (2001) Textbook of Physiology. Avichal Publishing Co., New Delhi.
4. Singh I., Chaurasia BD (1998) Human Anatomy. CBS Publisher and Distributors, New Delhi.
5. Tortora G.J. and Grabowski S.R. (2005) Principals of Anatomy and Physiology. 8th Ed. Harper Collins College Publishers, New York.
6. Wagh, A. and Grant, A., Ross and Wilson's Antomy and Physiology in Health and Illness. Churchill- Livingstone, London.

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MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

PO / CO	a	b	c	d	e	f
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PHYSIOLOGY-II (PRACTICAL)

Paper Code: 05250206

Periods/week	Credits	Max. Marks: 50
L: T:0 P:4	2	Internal : 30
		External : 20

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Practice universal and essential safety precautions in haematology.
2. Understand the physiology and functions of blood, components of blood, factors affecting blood, and differences between serum and plasma.
3. Acquire knowledge about coagulation, elements of clotting cascade and laboratory blood tests.
4. Apply knowledge of anatomy and physiology of human body in nutritional care practice.

Practicals:

1. Haemoglobinometry
2. White Blood Cell count
3. Red Blood Cell count
4. Determination of Blood Groups
5. Leishman's staining and Differential WBC count
6. Determination of packed cell Volume
7. Erythrocyte sedimentation rate [ESR]
8. Calculation of Blood indices
9. Determination of Clotting Time, Bleeding Time
10. Blood pressure recording
11. Auscultation for Heart Sounds
12. Artificial Respiration
13. Determination of vital capacity

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References:

1. Chatterjee, C.C., Human Physiology, Medical Allied Agency, Kolkata
2. Chaudhari S K. (1998) Concise Medical Physiology. 3rd Ed. New Central Book Agency (P) Ltd., Calcutta.
3. Ganong, W.F.(1999) Review of Medical Physiology. 10th Ed. Prentice-Hall International, London.
4. Guyton A.C. (1996) Textbook of Medical Physiology. W. B. Saunders Co., Philadelphia, USA.
5. Jain A.K. (2001) Textbook of Physiology. Avichal Publishing Co., New Delhi.
6. Singh I., Chaurasia BD (1998) Human Anatomy. CBS Publisher and Distributors, New Delhi.
7. Tortora G.J. and Grabowski S.R. (2005) Principals of Anatomy and Physiology. 8th Ed. Harper Collins College Publishers, New York.
8. Vander, A.J., Sherman, J.H. and Luciano, D.S., Human Physiology. McGrwa Hill Publishing Co., USA,
9. Wagh. A. and Grant, A., Ross and Wilson's Antomy and Physiology in Health and Illness. Churchill- Livingstone, London.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

PO / CO	a	b	c	d	e	f
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2	√				√	
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ENVIRONMENTAL SCIENCE (THEORY-AECC)

Periods/week	Credits	Max. Marks: 50
L: T:0 P:4	2	Internal : 30
		External : 20

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Understand the significance of equitable use of natural resources and will be able to utilize the knowledge of biodiversity conservation and protection of environment.
2. Learn about atmospheric pollution and global issues related to environment like natural disasters and will be able to understand the different acts for pollution control.
3. Develop an understanding to major health issues of women and children will gain knowledge of Mortality and Mortality rate.
4. Have knowledge of different ecosystems and energy flow in ecosystem.
5. Gain knowledge of disaster management.

Unit 1:The Multidisciplinary nature of environmental studies:

- Definition, scope and importance.
- Need for public awareness.

Natural Resources

Renewable and non-renewable resources: Natural resources and associated problems.

- Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
- Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.
- Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- Energy resources: Growing energy needs, renewable and non-renewable energy

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sources, use of alternate energy sources. Case studies.

- Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

Unit 2: Ecosystems:

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.

Biodiversity and its conservation

- Hot-spots of biodiversity.
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts
- Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

Unit 3: Environmental Pollution:

Definition, causes, effects and control measures of:-

a. Air pollution

b. Water pollution

c. Soil pollution

d. Marine pollution

e. Noise pollution

f. Thermal pollution

g. Nuclear hazards

- Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
- Fireworks, their impacts and hazards
- Pollution case studies.
- Disaster management : floods, earthquake, cyclone and landslides.

Unit 4 :Social Issues and the Environment:

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- Environmental ethics: Issues and possible solutions.

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- Consumerism and waste products.
- Environmental Legislation (Acts and Laws)
- Issues involved in enforcement of environmental legislation

Human Population and the Environment

- Population growth, variation among nations with case studies
- Population explosion – Family Welfare Programmes and Family Planning Programmes
- Human Rights.
- Value Education.
- Women and Child Welfare.

5.Analysis of soil :

- pH,
- moisture content,
- water holding capacity,
- percolation,
- capillary action

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

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SEMESTER III

BASIC DIETETICS (THEORY)

Paper Code: 05250301

Periods/week	Credits	Max. Marks: 100
L: 3 T:1 P:0	4	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Understand the etiology, physiology and metabolic anomalies of acute and chronic diseases and patient needs.
2. Know the effect of various diseases on nutritional and dietary requirements.
3. Provide and recommend appropriate nutritional care for prevention and treatment of various diseases.

Unit 1: Introduction: Difference between registered dietician & Nutritionist, Role of dietician in hospital and community. Nutrient & diet clinics- Introduction, Nutritional Assessment, patient checkup.

Unit 2: Therapeutic Process: Phases of Care process, Diet Therapy, Objectives of Diet therapy, Concepts of Diet therapy. Therapeutic nutrition for changing needs, Role of Antioxidants in the prevention of degenerative disease.

Unit 3: Therapeutic Adaptation of Normal Diet: Consistency, energy intake, nutrient, fiber, frequency of feeding, mode of feeding, elimination of food, Introduction of therapeutic diets, Modification of diet, Routine hospital diets, clear liquid diet, liquid diet, semi-solid diet, soft diet, normal diet, tube feed, PEG feed, JJ feed, bland diet, high & low-calorie diet, high & low protein diet, high & low fiber diet, low cholesterol diet

Unit 4: Modification of Diet: Infection- nutrient & immune response, metabolic changes during infection, nutritional management. Surgical conditions- general surgery, emergency surgery, gastrointestinal surgery, bariatric surgery, nutritional management.

Unit 5: Diet in Fever: Types- metabolism in fever, general dietary consideration diet in influenza typhoid fever, recurrent malaria, and tuberculosis. Dietary counseling, educating the patient, follow-up dietary counseling, educating the patient.

Unit 6: Feeding the Patient, Infant and Children: Introduction objectives, feeding technique, psychology of patient, assessment of patient. Introduction, normal infant, pre-term infant,

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nutritional management, feeding problems, management of feeding problem.

References:

1 Normal and Therapeutic Nutrition - Robinson & Lawler, 17th edition, Mac Millan Publishers.

2 Textbook of Human Nutrition – Mahtab S. Bamji, N Prahlad Rao, Vinodini Reddy, 2nd edition, Oxford & IBH Publishing Co. Pvt. Ltd

3 Dietetics – B Srilakshmi, 7thedition, New Age International Publishers

4 Textbook of Nutrition and Dietetics- Kumud Khanna, Sharda Gupta, Santosh Jain Passi, Rama Seth, Ranjana Mahna & Seema Puri, 2nd edition, latest reprint, Phoenix Publishing House (P) Ltd.

5 Principles of Nutrition and Dietetics, M. Swaminathan,1993, Bappeo 88, Mysore Road, Bangalore

6 Nutrition and Diet Therapy, William; Sue Rodwell (1985),5th edition, Mosbey Co.St. Louis

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

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BASIC DIETETICS (PRACTICAL)

Paper Code: 05250302

Periods/week	Credits	Max. Marks: 50
L: 0 T: 0 P: 4	2	Internal: 30
		External: 20

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Plan, calculate and prepare therapeutic diets for different diseases.

Practical:

Planning, calculation and preparing diets for different disorders:

1. Normal Person
2. Liquid diet for burn
3. Trauma & Surgery
4. Bariatric
5. Typhoid fever and tuberculosis
6. Liver, gall bladder and pancreas
7. Snacks, desserts, and beverages for children

References:

1. Normal and Therapeutic Nutrition - Robinson & Lawler, 17th edition, Mac Millan Publishers.
2. Textbook of Human Nutrition – Mahtab S. Bamji, N Prahlad Rao, Vinodini Reddy, 2nd edition, Oxford & IBH Publishing Co. Pvt. Ltd
3. Dietetics – B Srilakshmi, 7thedition, New Age International Publishers
4. Textbook of Nutrition and Dietetics- Kumud Khanna, Sharda Gupta, Santosh Jain Passi, Rama Seth, Ranjana Mahna & Seema Puri, 2nd edition, latest reprint, Phoenix Publishing House (P) Ltd.
5. Principles of Nutrition and Dietetics, M. Swaminathan,1993, Bappeo 88, Mysore Road, Bangalore Nutrition and Diet Therapy, William; Sue Rodwell (1985),5th edition, Mosbey Co.St. Louis

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FOOD SCIENCE & PRESERVATION (THEORY)

Paper Code: 05250303

Periods/week	Credits	Max. Marks: 100
L: 4 T: 0 P: 0	4	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this unit, students shall be able to:

1. Gain knowledge regarding the physical and chemical properties of the food constituents.
2. Get familiar with the recent advances and research in the field.
3. Get familiarized with the effects of reactions on the quality and safety of food.
4. Apply food science to control and assure food quality.
5. Develop the basic knowledge about bakery equipments.
6. Learn about the various ingredients used in bakery preparation.

Unit 1: Cereals and Pulses: Structure, composition, and Nutritional value. Processing of cereals- Milling, polishing. Parboiling, flaking, parching, roasting, use in variety of preparations selection, storage and care, breakfast cereals. Processing of pulses- soaking, germination. Cooking and fermentations: Toxic constituents of pulses, Lathyrism.

Unit 2:Milk and Milk Products: Composition of milk, properties and effect of heat, nutritional importance, milk processing, milk products.

Unit 3: Fruits and Vegetables: Classifications, composition and importance in human nutrition storage, cooking of vegetables, changes during cooking, and effect of heat, acid and alkali.

Unit 4:Eggs & Flesh Foods: Composition & classification of egg & egg products, its nutritive value. Selection, storage, uses and nutritional aspects of meat, fish and poultry, spoilage of fish.

Unit 5:Nuts, Fats and Oils: Nutritive value, importance & classification of nuts and oil seeds. Types of fats, role of fat in cookery

Unit 6:Sugar and Sugar Products: Form of sugar and liquid sweetness, Caramelization, Hydrolysis, Crystallization, Indian confectionery

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Unit 7: Beverages: Coffee, tea, and cocoa, processing composition and preparation, spices and condiments, types, and composition.

Unit 8: Baking: Types of baked products & its nutritive value.

Unit 9: Food Preservation & Food Adulteration: Spices, Flavors, and Additives. Role of spices in food science - Importance, composition & classification. Food additives: Definitions, functions and uses in processed food products. Spices and flavoring constituents, flavors in food industries.

References:

1. Potter, N.M. -Food Sciences, The A VI Publications, 1973.
2. Manay S. and Shadaksharaswamy M (2008). Foods – Facts and Principles, 3rd Edition. Wiley Eastern Ltd.
3. Srilakshmi (2007). Food Science, 4th Edition. New Age International Ltd.
4. Raina U, Kashyap S, Narula V, Thomas S, Suvira, Vir S, Chopra S (2010). Basic Food Preparation: A
5. Professional baking – Wayne Gisslen, John Wiley & Sons.
6. Bakery materials and methods- Daniel A.R. applied science publishers Ltd.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

PO / CO	a	b	c	d	e	f
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2			√	√	√	
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FOOD SCIENCE & PRESERVATION (PRACTICAL)

Paper Code: 05250304

Periods/week	Credits	Max. Marks: 50
L:0 T:0 P:4	2	Internal: 30
		External: 20

Course Outcomes:

On successful completion of this course students shall be able to:

1. Have better understanding of the chemical reactions and physical changes that occur during the production, processing, storage and handling of foods and their applications.
2. Apply the principles of Food Preservation.
3. Have an exposure to various processing units of food industries.

Practicals:

1. To study the effect of cooking on whole and washed dehusked /decorticated pulses and legumes.
2. To prepare batter using different flours and study the effect of deep frying on them.
3. To demonstrate the effect of roasting on nuts and oil seeds.
4. To determine the smoking point of fats and oil.
5. To study the effect of heat on milk.
6. To study the effect of sugar on boiling point of water.
7. To prepare fruit jelly.
8. To study the effect of browning in fruits and vegetables.
9. Visit to food industry, dairy firm & confectionaries.
10. Food preservation techniques (use of different techniques in product formulation and analysis of product for quality standards).
    a. Sun drying and dehydration-cereals, legumes, vegetable based.
    b. Preservation with sugar-jams, jelly, preserves, etc.
    c. Preservation - salt, oil, vinegar-pickling.
    d. Preservation of foods using chemicals –tomato ketchup, squash.

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e. To study the effect of cooking time on the color, texture and acceptability of whole egg.

References:

1. Bakers handbook on practical baking (1966) Wheat associates, New delhi
2. Professional baking – Wayne Gisslen, John Wiley & Sons.
3. Bakery materials and methods- Daniel A.R. applied science publishers Ltd.
4. Potter, N.N. 1978. Food Science. 3rd Ed. AVI, Westport.
5. Manay S. and Shadaksharaswamy M (2008). Foods – Facts and Principles, 3rd Edition. Wiley Eastern Ltd.
6. Srilakshmi (2007). Food Science, 4th Edition. New Age International Ltd.
7. Raina U, Kashyap S, Narula V, Thomas S, Suvira, Vir S, Chopra S (2010). Basic Food Preparation: A
8. Complete Manual, Fourth Edition. Orient Black Swan Ltd.
9. Sethi Mohini and Rao E (2011). Food Science (Experiments and Applications), 2nd Edition. CBS Publishers & Distributers Pvt. Ltd.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

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COMMUNITY NUTRITION (THEORY)

Paper Code: 05250305

Periods/week	Credits	Max. Marks: 100
L: 4 T: 0 P: 0	4	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Understand the ecology of nutritional problems and prevalence in India.
2. Gain the skills in planning, executing, and evaluating nutrition projects in the community.
3. Become familiar with various approaches to nutrition and health interventions, programmes, and policies.
4. Appreciate the national and international contributor towards national improvement in alleviating nutrition problems.

Unit 1: Nutritional disorders: Epidemiology, clinical features, prevention and dietary treatment for Protein Energy malnutrition, nutritional anemia& vitamin deficiency disorders and over nutrition.

Unit 2: Methods of Assessment of Nutritional Status:

a) Direct assessment- Diet surveys, anthropometric, clinical, and biochemical estimation.

b) Indirect assessment- Food balance sheet, ecological parameters, and vital statistics.

Unit 3: Food and nutrition security: Definition, National and household food security. Factors affecting food security system. National and International systems to improve food security

Improvement of Nutrition of a Community: a) Modern methods of improvement or nutritional quality of food, food fortification, enrichment, and nutrient supplementations.

b) Nutrition education themes and messages in nutrition and health, Antenatal and postnatal care.

Unit 4: Nutrition and Infection Relationship: Immunization and its importance, Food borne infection and intoxication diseases, foods involved, methods of prevention, Infestation of food borne diseases, Outbreak, Prevention signs and control of infection. **Unit 5:**

Community Nutrition Program Planning: Identification of problem, analysis of causes,

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resources constraints, selection of interventions, setting a strategy, implementations, and evaluation of the program.

National and International Agencies: WHO, UNICEF, CARE, ICMR, ICAR, CSIR, CFTRI. Various nutrition related welfare programs, ICDS and others (in brief).

References:

1. D Bansal and C B Mamoria offered by Aggarwal Agricultural Problems of India.
2. Dietary Surveys- Their Techniques and Interpretation, F AO Nutritional Studies No.4
3. Note on the Management and Techniques of Diet Surveys in India. ICMR Special Report Series No. 21
4. M. Swaminathan,1993, Bappeo 88, Mysore Road, Bangalore. Principles of Nutrition and Dietetics,
5. Assessment of Nutritional Status of the Community, D B Jelliffe, WHO Monograph Series No. 53
6. Learning Better Nutrition, F AO Nutritional Studies No. 20
7. Nutrition Atlas of India, C Gopalan & K Raghavan, ICMR Publication.
8. Diet Atlas of India, C Gopalan, S C Balasubramaniam, B V Ramasastri & K Viswara Rao, ICMR Publications
9. Nutrition in the community, Arvind Wadhwa and Sushma Sharma (2003), Elite Publishing House Pvt. Ltd. New Delhi

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

CO \ PO	a	b	c	d	e	f
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COMMUNITY NUTRITION (PRACTICAL)

Paper Code: 05250306

Periods/week	Credits	Max. Marks: 50
L: 0 T: 0 P: 4	2	Internal: 30
		External: 20

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Undertake community-based projects for assessment and enhancement of nutritional knowledge.
2. Critically evaluate existing intervention and programmes in the government and voluntary sector and suggestion to improve the same.

Practical

1. Diet and nutrition surveys
   a. To study of various anthropometric methods of nutritional status assessment.
   b. To study of various Biochemical methods of nutritional status assessment.
   c. To study about various clinical sign and symptoms used in nutritional assessment.
   d. To study of various dietary approaches used in nutritional assessment.
   e. To study existing national food security system and report writing
2. Preparation of visual aids for community awareness.
3. Study about various software and applications used in nutritional assessment.
4. Field visit to observe the working of nutrition and health-oriented programs (survey-based result).

References:

1. D Bansal and C B Mamoria offered by Aggarwal Agricultural Problems of India.
2. Dietary Surveys- Their Techniques and Interpretation. F AO Nutritional Studies No.4
3. Note on the Management and Techniques of Diet Surveys in India. ICMR Special Report Series No. 21
4. M. Swaminathan,1993, Bappeo 88, Mysore Road, Bangalore. Principles of Nutrition and Dietetics,
5. Assessment of Nutritional Status of the Community,D B Jelliffe, WHO

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Monograph Series No. 53

6. Learning Better Nutrition, F AO Nutritional Studies No. 20
7. Nutrition Atlas of India, C Gopalan & K Raghavan, ICMR Publication.
8. Diet Atlas of India, C Gopalan, S C Balasubramaniam, B V Ramasastri & K Viswara Rao, ICMR Publications
9. Nutrition in the community, Arvind Wadhwa and Sushma Sharma (2003), Elite Publishing House Pvt. Ltd. New Delhi

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

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FUNDAMENTALS OF COMPUTER SCIENCE (THEORY-AECC)

Periods/week	Credits	Max. Marks: 100
L: 4 T: 0 P: 0	4	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Gain knowledge about computers to preparing power point presentations, seminars/research proposals, etc.
2. Have an easy access to Internet for collection of literature/study material.
3. Be oriented to potential use of computers for easy assessment of data.

Unit 1:Introduction: What are computers, Application areas, Characteristics & limitations, Evolution of computers, Classification& generations of computers, Data representation in computer memory (numbering system)

Unit 2 Computers: Architecture/Organization: Basic architecture, Functional Block diagram, Types of computers on the basis of purpose, Signal and Portability.

Unit 3: Hardware and Software: CPU their generations and performance parameters, Input, output, and storage devices. Primary (Main) Memories (RAM, ROM, Types of RAM and ROM, Cache Memory, Registers and types of registers, Storage Evaluation Criteria, Memory Capacity), Secondary Storage Devices: (Magnetic Disk, Floppy and Hard Disk, USBs, Optical Disks CD-ROMs). Types: System Software (Machine Level Languages, Operating Systems, Device Specific Drivers), Higher Level Languages, and Applications.

Unit 4:Languages and Operating Systems: Machine Language, Assembly Languages, Programming Languages. Use of Compilers, Assemblers, Linkers, Loaders, and interpreters in programming languages

Booting/Start Up Procedure of machines, Introduction to Operating System, Functions and Classification of Operating Systems, Basic introduction to DOS, UNIX/LINUX OS, Windows.

HTML, Use of Multimedia, Computer aided teaching and testing, Application Software MS office (Word, Excel and PowerPoint).

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Unit 5: Basic Introduction to Computer Networks: Data Communication, Network devices (Hub, Switches, Modems, and Routers etc), LAN, LAN topologies, WAN, MAN, Internet: Introduction, Basics of E-mail, Web browsers (IE, Google Chrome, and Mozilla Firefox).

Structure of Universal Resource Locator, Domains (.com, .in, .country specific, .org and rationale behind them), IP address, Backbone network, Network connecting devices, HTTP, DNS, Network Security and Search Engine.

References:

1. Subramanian, S: Introduction to Computers.
2. Norton Peter: Introduction to Computers.
3. Nagpal, D.P. Mastering Microsoft OFFICE 2000.
4. Dr. Nasib Singh Gill- Essential of Computer Fundamentals and Network Technology.
5. Douglas and Pearson – Computer network and internet.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

CO \ PO	a	b	c	d	e	f
1	√	√	√	√	√	
2	√	√	√	√	√	
3	√	√	√	√	√	√

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FOOD LAWS & FOOD SAFETY (THEORY)

Periods/week	Credits	Max. Marks: 100
L: 4 T: 0 P: 0	4	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Understand that nearly all food borne disease can be prevented with proper handling and be able to describe the proper handling required for different food groups.
2. Understand the role of safety and sanitation in food protection.
3. Recognize the role of time, temperature, cross contamination, and personal hygiene in food safety.
4. Understand national and international food laws.

Unit 1: Introduction: Concept and meaning of Food quality and food Safety, food adulteration, food hazards, Natural toxins.

Unit 2: Food Laws and Regulations: National and international food laws, Governing bodies. Exposure, estimation, toxicological requirements, and risk assessment.

Unit 3: Safety Assessment: Safety assessment of food contaminants and pesticide residues. Safety aspects of water and beverages such as soft drinks, tea, coffee, cocoa. Safety evaluation of heat treatments and related processing techniques.

Unit 4:Quality Assurance: Total Quality Management; GMP/GHP; GLP, GAP; Sanitary and hygienic practices; Quality manuals, documentation, and audits; Indian & International quality systems and standards like ISO and Food Codex; Export import policy, export documentation; Laboratory quality procedures and assessment of laboratory performance; Applications in different food industries.

Unit 5:Quality Control: In food service institutions.

References:

1. Early. R. (1995) Guide to Quality Management Systems for the Food Industry 1st Ed. Blackie, Academic and professional, London.

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2. Gould, W.A and Gould, R.W. (1998) Total Quality Assurance for the Food Industries. 1st Ed. CTI Publications Inc. Baltimore.
3. Pomeraz, Y. and MeLoari, C.E. (1996): Food Analysis: Theory and Practice. 2nd Ed. CBS publishers and Distributor, New Delhi.
4. Bryan, F.L. (1992): Hazard Analysis Critical Control Point Evaluations A Guide to Identifying Hazards and Assessing Risks Associated with Food Preparation and Storage. 9th Ed. World Health Organization, Geneva.
5. Kirk, R.S and Sawyer, R. (1991): Pearson s Composition and Analysis of Foods, Longman Scientific and Technical. England.
6. Food and Agricultural Organization (1980): Manuals of Food Quality Control. Additives Contaminants Techniques, Rome.
7. Furia, T.E. Ed. (1980) Regulatory Status of Direct Food Additives. CRC Press, Florida.
8. Krammer, A. and Twigg, B.A. (1970). Quality Control for the Food Industry. 3rd Ed. AVI, Westport.
9. Rekha S. Singhal, Pushpa R. Kulkarni, Dananesh V. Rege, (1997) Handbook of Indices of food Quality and Authenticity, wood head Publishing Ltd.
10. Hubbard, Merton R. (2003). Statistical Quality Control for the Food Industry, 3rd Ed, Springer.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

PO / CO	a	b	c	d	e	f
1	√	√	√	√		
2	√	√	√	√	√	
3	√	√	√	√		√
4	√	√			√	

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SEMESTER IV

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THERAPEUTIC NUTRITION (THEORY)

Paper Code: 05250401

Periods/week	Credits	Max. Marks: 100
L: 4 T: 0 P: 0	4	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Understand the etiology, physiology and metabolic anomalies of acute and chronic diseases and patient needs.
2. Know the effect of various diseases on nutritional and dietary requirements.
3. Provide and recommend appropriate nutritional care for prevention and treatment of various diseases.

Unit 1: Nutrition for Gastrointestinal and Liver Diseases: Causes, type, prevention, and dietary management- Diarrhea, Constipation, Peptic Ulcer. Diverticular Disease, IBS, Celiac Disease, Lactose Intolerance. Hepatitis, Cirrhosis, alcoholic liver disease, and Gall stones.

Unit 2: Diet for Metabolic Disorders: Introduction, definition, causes, symptoms, types, assessment, and nutritional management. Obesity and Diabetes Mellitus.

Unit 3: Diet for Cardiovascular and Kidney Disease: Introduction, stages of development, etiology, risk factor, nutritional management. Kidney transplant, Dialysis (introduction, types of dialysis, nutritional management), Kidney Stones (Types and Nutritional Management).

Unit 4: Diet in AIDS and Cancer: AIDS: - Introduction, stages of disease progression, relation of nutrition & AIDS, impact of AIDS on nutritional status, nutritional management.

Cancer: Introduction, origin, causes, types of cancer, diagnosis, relation of nutrition & cancer, effect of cancer on nutritional status, objectives of nutrition therapy, nutritional management.

Unit 5: Diet in Allergy, Burns and Surgery: Definition, classification, manifestations, common food allergies and test. Burn: Introduction, types & extent of burn, nutritional management. Surgery: Introduction, factors affecting surgery, pre-operative nutrition, post-operative nutrition, goals of dietary management, dietary management.

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Unit 6: Diet in addictive behavior: Anorexia nervosa: Introduction, types, difference between dieting and anorexia, symptoms, causes, risk factor, effect, treatment, nutritional management.

Bulimia nervosa: Introduction, symptoms, causes, risk factor, effect, treatment, nutritional management.

Alcoholism: Introduction, symptoms, causes, diagnosis, treatment, nutritional management.

References:

1. Normal and Therapeutic Nutrition - Robinson & Lawler, 17th edition, Mac Millan Publishers.
2. Textbook of Human Nutrition – Mahtab S. Bamji, N Prahlad Rao, Vinodini Reddy, 2nd edition, Oxford & IBH Publishing Co. Pvt. Ltd .
3. Dietetics – B Srilakshmi, 7thedition, New Age International Publishers.
4. Textbook of Nutrition and Dietetics- Kumud Khanna, Sharda Gupta, Santosh Jain Passi, Rama Seth, Ranjana Mahna & Seema Puri, 2nd edition, latest reprint, Phoenix Publishing House (P) Ltd.
5. Principles of Nutrition and Dietetics, M. Swaminathan,1993, Bappeo 88, Mysore Road, Bangalore.
6. Nutrition and Diet Therapy, William; Sue Rodwell (1985),5th edition, Mosbey Co.St. Louis.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

PO / CO	a	b	c	d	e	f
1	√	√				
2		√	√	√	√	
3		√	√	√	√	√

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THERAPEUTIC NUTRITION (PRACTICAL)

Paper Code: 05250402

Periods/week	Credits	Max. Marks: 50
L: 0 T: 0 P: 4	2	Internal: 30
		External: 20

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Inculcate skills and be trained in planning, calculation and preparing therapeutic diets for different diseases.

Practical

1. Standardization of common food preparations.
2. Planning and preparation of following diets:
   a. Normal diet,
   b. Tube feed,
   c. Liquid and soft diet,
   d. Bland diet
3. Planning, preparation, and calculations of therapeutic diets for different disease conditions.

References:

1. Normal and Therapeutic Nutrition - Robinson & Lawler, 17th edition, Mac Millan Publishers.
2. Text Book of Human Nutrition – Mahtab S. Bamji, N Prahlad Rao, Vinodini Reddy, 2nd edition, Oxford & IBH Publishing Co. Pvt. Ltd .
3. Dietetics – B Srilakshmi, 7thedition, New Age International Publishers.
4. Textbook of Nutrition and Dietetics- Kumud Khanna, Sharda Gupta, Santosh Jain Passi, Rama Seth, Ranjana Mahna & Seema Puri, 2nd edition, latest reprint, Phoenix Publishing House (P) Ltd.
5. Principles of Nutrition and Dietetics, M. Swaminathan,1993, Bappeo 88, Mysore Road, Bangalore Nutrition and Diet Therapy, William; Sue Rodwell (1985),5th edition, Mosbey Co.St. Louis.

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MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

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PRODUCT DEVELOPMENT & SENSORY EVALUATION (THEORY)

Paper Code: 05250403

Periods/week	Credits	Max. Marks: 100
L: 4 T: 0 P: 0	4	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Understand the various aspects of food product development including Food Science and Technology, Marketing and Consumer Research, Finance and Communication.
2. Develop commercially and nutritionally viable products which meet consumer needs.
3. Recognize the potential for entrepreneurship through marketing.
4. Justify processes of food product development and manufacture in terms of market, technological and environmental considerations.

Unit 1: Sensory evaluation of foods: Importance and application for product formulation. Basic tastes, threshold tests for basic tastes. Requirements for sensory analysis. Sensory panel, type, selection, and training. Subjective and objective sensory evaluation. Different types of sensory tests. Instrumental tests for sensory attributes – color, texture, and odor.

Unit 2: Product Development: Designing new product – types and drawing forces. Need for product development. Stages of product development. Success in product development. Consumer research. Role of sensory evaluation in consumer product acceptance.

Unit 3: Consumer Behavior: In purchasing foods. Factors influencing product acceptance and purchasing trends. Market place changes in processed foods.

Unit 4:Special food processing technologies and novel food ingredients: Membrane technology (reverse osmosis and ultra-filtration), agglomeration, agitation, air classification, extrusion, automation in food industries.

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 Jomes, A.A (1994): Shelf-life Evaluation of Foods. Blackie Academic and Professional, London.

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3. Shapton, D.A. and Shapton, N.F. (1991): Principles and Practices for the safe processing of Foods. Butterworth Heinemann Ltd., Oxford.
4. Oickle, J.G. (1990): New Product Development and Value Added. Food Development Division Agriculture, Canada.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

CO \ PO	a	b	c	d	e	f
1	√	√				
2			√	√	√	
3	√		√	√		√
4		√	√	√	√	

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Bakshi

PRODUCT DEVELOPMENT & SENSORY EVALUATION

(PRACTICAL)

Paper Code: 05250404

Periods/week	Credits	Max. Marks: 50
L: 0 T: 0 P: 4	2	Internal: 30
		External: 20

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Understand concepts about sensory evaluation of food.
2. Use different sensory methods for evaluating variety of foods.
3. Analyse and interpret sensory evaluation data.
4. Develop products which meet consumer needs and are nutritionally and commercially viable.
5. Be skilled in the various aspects including shelf-life assessment, testing of quality parameters and acceptability, packaging and labeling of a product.

Practical

1. Sensory analysis: Different types of sensory tests for basic taste and sensory attributes of products.
2. Stepwise development of a new food product, standardization, acceptability studies and submission of project report.

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 Jomes, A.A (1994): Shelf-life Evaluation of Foods. Blackie Academic and Professional, London.
3. Shapton, D.A. and Shapton, N.F. (1991): Principles and Practices for the safe processing of Foods. Butterworth Heinemann Ltd., Oxford.
4. Oickle, J.G. (1990): New Product Development and Value Added. Food Development Division Agriculture, Canada.

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MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

CO \ PO	a	b	c	d	e	f
1	√	√	√			
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FOOD SERVICE MANAGEMENT (THEORY)

Paper Code: 05250405

Periods/week	Credits	Max. Marks: 100
L: 4 T: 0 P: 0	4	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Understand the process of planning, organizing, in the management of human, material and financial resources.
2. Understand the principles underlying the preparation and service of quality food.
3. Develop the skills of menu planning for quality and quantity preparation.

Unit 1: Catering industry: Definition of catering. Classification of food service institutions according to

a. Function: Profit oriented, service oriented and public health facility oriented.
b. Processing method: Conventional system, commissary system and fast-food service systems.
c. Service of food: Self-service, tray service and waiter-waitress service.

Unit 2: Floor planning and Equipment: Characteristics of typical food service facilities. Equipment, classification, factors involved in selection, use and care of major equipment.

Unit 3: Quantity food preparation, Menu Planning, and Standardization: Selection, purchasing methods and storage of foods. Definition, principles involved in planning and types of menus. Definition, standard recipe format and uses. Portion sizes - Definition, portioning equipment, and portion control. Use of left-over foods.

Unit 4: Management: Definition, principles, and techniques of effective management. Tools of management, Organization chart, work study and work improvement. Personnel management, Methods of selection, orientation, training, supervision, and motivation of employees.

Unit 5: Financial management: Principles and methods of food cost control, factors affecting food cost, labor cost, operating cost, and overhead cost.

a. Calculate food cost, labor cost, operating cost, and overhead cost of a home-made dish.

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b. Calculate gross profit percentage of an establishment welfare/ commercial/ transport catering.

References:

1. West, B. Bessie & Wood, Levelle (1988): Food Service in Institutions, 6th Edition, Palacio June Macmillan Publication Company, New York.
2. Sethi Mohini (1993): Catering Management: An Integrated Approach, 2nd Edition, Wiley Publication.
3. Sethi Mohini (1993): Institutional Food Management, 2nd Edition, Wiley Publication.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

PO / CO	a	b	c	d	e	f
1	√	√				√
2		√	√	√		
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FOOD SERVICE MANAGEMENT (PRACTICAL)

Paper Code: 05250406

Periods/week	Credits	Max. Marks: 50
L: 0 T: 0 P: 4	2	Internal: 30
		External: 20

Course Outcomes:

On successful completion of this course, students shall be able to:

1 Learn the planning techniques in quantity cooking.

2 Gain practical experiences in the management of a food service institution.

Practical

1. Standardization and costing of recipes.
    a. Cereal and cereal products,
    b. Vegetables,
    c. Fruits,
    d. Meat, chicken and other fleshy foods,
    e. Sugar and jaggery,
    f. Milk and its products,
    g. Pulses,
    h. Nuts and Oil seeds.
2. Survey of hostels and cafeteria to assess various aspects of food service management.

References:

1. West, B. Bessie & Wood, Levelle (1988): Food Service in Institutions, 6th Edition, Palacio June Macmillan Publication Company, New York.
2. Sethi Mohini (1993): Catering Management: An Integrated Approach, 2nd Edition, Wiley Publication.
3. Keiser, J. & Kaillo, E. (1974): Controlling and Analysis of Cost in Food Service Operations, Wiley & Sons, New York.

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MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

PO / CO	a	b	c	d	e	f
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Bashky

NUTRITION COUNSELLING (PRACTICAL-AECC)

Periods/week	Credits	Max. Marks: 100
L: 0 T: 0 P: 8	4	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Assess nutritional status and dietary pattern of individuals.
2. Plan therapeutic diets for patients.
3. Develop skills in feeding patients.
4. Develop skills in diet counseling.

Unit 1:Counselling and Educating Patient: Introduction, determining the role of nutrition counselor, responsibilities of the nutrition counselor, Practitioner v/s client managed care. Conceptualizing entrepreneur skills and behavior. Communication and negotiation skills.

Unit 2:Practical Consideration in Giving Dietary Advice and Counselling: Factors affecting and individual food choice. Communication of dietary advice. Consideration of behavior modification, and motivation.

Unit 3:Teaching Aids Used by Dietitians: Charts, leaflets, posters etc., preparation of teaching material for patients suffering from Digestive disorders, Hypertension, Diabetes, Atherosclerosis & Hepatitis, and cirrhosis.

Unit 4: Computer Application: Use of computers by dietitian. Dietary computations, dietetic management, education/ training, information storage, administration, and research.

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MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

CO \ PO	a	b	c	d	e	f
1		√	√	√	√	
2	√		√	√	√	√
3			√	√	√	√
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SPORTS NUTRITION (THEORY)

Periods/week	Credits	Max. Marks: 100
L: 4 T: 0 P: 0	4	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Understand the components of sports and fitness and the role of nutrition in these.
2. Make nutritional, dietary physical activity recommendations.
3. Understand the basic nutritional requirements of a sportsperson during competitions.
4. Understand the physiological basis of fuel mobilization during exercise.

Unit 1: Approaches to The Management of Fitness and Health: Nutrition, exercise, physical fitness, and health- their inter relationship. Significance of physical fitness and nutrition in prevention and management of weight control regimes. Nutrition guidelines for maintenance of health and fitness.

Unit 2: Nutritional Requirements of Exercise: Effect of specific nutrients on work performance and physical fitness. Nutrients that support physical activity, Mobilization of fuel stores during exercise. Fluid requirements.

Unit 3: Nutrition in Sports: Sports specific requirements- Importance of carbohydrate loading, pre-game and post-game meals, Diets for persons with high energy requirements, stress, fracture, and injury.

Unit 4: Dietary Supplements and Ergogenic Aids: Definitions, Use of different nutragenic / ergogenic aids and commercial supplements, Sports drinks, sports bars etc.

Reference:

1. Whitney E.N and Rolfes S.R. Understanding Nutrition. Wadsworth Publishing; 10 edition (May 25, 2004).
2. Ira Wolinsky. Nutrition in Exercise and Sports. 3 illustrated, revised publisher CRC press, 1997.
3. Parizkova. J. Nutrition, Physical activity and health in early life. Illustrated, revised publisher CRC press, 1996.

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MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

PO / CO	a	b	c	d	e	f
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SEMESTER- V

SPORTS NUTRITION (THEORY)

Paper Code: 05250501

Periods/week	Credits	Max. Marks: 100
L: 4 T: 0 P: 0	4	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Understand the components of sports and fitness and the role of nutrition in these.
2. Make nutritional, dietary physical activity recommendations.
3. Understand the basic nutritional requirements of a sportsperson during competitions.
4. Understand the physiological basis of fuel mobilization during exercise.

Unit 1: Approaches to The Management of Fitness and Health: Nutrition, exercise, physical fitness, and health- their inter relationship. Significance of physical fitness and nutrition in prevention and management of weight control regimes. Nutrition guidelines for maintenance of health and fitness.

Unit 2: Nutritional Requirements of Exercise: Effect of specific nutrients on work performance and physical fitness. Nutrients that support physical activity, Mobilization of fuel stores during exercise. Fluid requirements.

Unit 3: Nutrition in Sports: Sports specific requirements- Importance of carbohydrate loading, pre-game and post-game meals, Diets for persons with high energy requirements, stress, fracture, and injury.

Unit 4: Dietary Supplements and Ergogenic Aids: Definitions, Use of different nutragenic / ergogenic aids and commercial supplements, Sports drinks, sports bars etc.

Reference:

1. Whitney E.N and Rolfes S.R. Understanding Nutrition. Wadsworth Publishing; 10 edition (May 25, 2004).
2. Ira Wolinsky. Nutrition in Exercise and Sports. 3 illustrated, revised publisher CRC press, 1997.
3. Parizkova. J. Nutrition, Physical activity and health in early life. Illustrated, revised publisher CRC press, 1996.

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MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

PO / CO	a	b	c	d	e	f
1	√	√				
2			√			√
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SPORTS NUTRITION (PRACTICAL)

Paper Code: 05250502

Periods/week	Credits	Max. Marks: 50
L: 0 T: 0 P: 4	2	Internal: 30
		External: 20

Course Outcomes:

On successful completion of this course, students shall be able to:

1. The students will be made aware of the various sports supplements in the market.
2. The students will be able to identify the game meals of different sportspersons and counsel thereafter.
3. The students will be aware about the different formulations of sports drinks and study the composition of the same.

Practical

1. Development and standardization of a sports bars or meal replacement bars.
2. Composition and brand names of supplements that improve Muscle mass commonly available in the market and role of nutrients listed in athletic performance.
3. Composition and brand names of protein, carbohydrate, fat supplements commonly available in the market.
4. Composition and brand names of supplements micronutrients commonly available in the market.
5. Composition and brand names of metabolite supplements commonly available in the market.
6. Planning a diet for strength athletes with supplements for muscle building.
7. Planning a diet for endurance athletes with supplements for energy and micronutrients.
8. Providing diet for clinical conditions with supplement usage (Planning the type, quantity, and timing of supplement intake).
9. Planning and preparation of diets for pre-game and post-game meal.

References:

1. Sports Nutrition Guidebook, by Nancy Clark, Leisure Press, 1990.
2. Ron Woods: Social Issues in Sport, HK, 2011

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3. Ronald J. Maughan, Nutrition in sport (volume vii of the Encyclopaedia of Sports Medicine), Blackwell Science Ltd, 2000.
4. Dosil, Joaquin. Eating disorders in athletes. John Wiley & Sons Inc., 2008.
5. Marie Dunford and J. Andrew Doyle. Nutrition for Sport and Exercise. Thomson Wadsworth, 2008.
6. Richard T. Cotton (Ed). Lifestyle & Weight Management Consultant Manual. American Council on Exercise, USA, 1996.
7. Houlihan, B. "Dying to Win", 2nd Edition. Council of Europe Publishing. May-2002

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

PO / CO	a	b	c	d	e	f
1	√	√				
2			√	√		
3	√				√	

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Barkha

FOOD MICROBIOLOGY (THEORY)

Paper Code: 05250503

Periods/week	Credits	Max. Marks: 100
L: 4 T: 0 P: 0	4	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Introduce the basic pathology terms to the students to help the study the clinical reports in future.
2. Understand the basic mechanisms of cell degeneration, cell death and repair and be able to correlate structural and functional alterations.
3. Understand the nutrient accumulations/ storage in a normal cell.

Unit 1: Introduction to Microbiology: Relevance to everyday life. General characteristics of bacteria, fungi, virus, protozoa, and algae. Beneficial effect of organism. Relevance of microbial standards for food safety.

Unit 2: Growth of microorganisms: Growth curve, effect of environmental factors in growth of microorganism- pH, water activity, oxygen availability, and temperature.

Unit 3: Microbiology of deficient food: Spoilage, contamination sources, types, effect on Cereal and cereal products, Sugar and sugar products, Vegetables and fruits, Meat and meat products, Fish, egg, and poultry, Milk and milk products, and Canned foods.

Unit 4: Environmental microbiology: Water borne diseases, Air borne diseases, Soil borne diseases, and Sewage diseases. Waste product handling: Planning for waste disposal, Solid, and liquid wastes.

Unit 5: Microbial intoxication and infections: Sources of contamination of food, toxin production and physiological action, sources of infection of food by pathogenic organisms, symptoms, and method of control.

Reference:

1. Banwart GJ. (1987) Basic Food Microbiology. CBS Publishers and Distributors.
2. Frazier WC, Westoff DC. (1998) Food Microbiology. 4th ed. Tata McGrawHill. Publishing Co. Ltd.

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3. Garbutt John (1997) Essentials of Food Microbiology. Arnold London.
4. Jay JM, Loessner DA, Martin J. (2005) Modern Food Microbiology. 7th ed. Springer.
5. Pelczar MJ, Chan ECS, Krieg N. (1993) Microbiology. 5th ed. Tata. McGraw-Hill Publishing Co. Ltd.
6. Prescott LM, Harley JP, Klein DA. (2008) Microbiology. 6th ed. WMC Brown. Publishers.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

PO / CO	a	b	c	d	e	f
1	√	√				
2	√			√		
3			√		√	

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FOOD MICROBIOLOGY (PRACTICAL)

Paper Code: 05250504

Periods/week	Credits	Max. Marks: 50
L: 0 T: 0 P: 4	2	Internal: 30
		External: 20

Course Outcomes:

On successful completion of this course, students shall be able to:

1. To microbiologically analyze the various food stuffs for quality and safety.
2. To understand the latest procedures adopted in various food operations.

Practical

1. Study of equipment in a microbiology lab.
2. Preparation of laboratory media and special media, cultivation of bacteria, yeasts, and molds.
3. Staining of bacteria: gram-staining.
4. Cultivation and identifications of important molds and yeast in food items.
5. Demonstration of available rapid methods and diagnostic kits used in identification of microorganisms or their products.
6. Visit (at least one) to food processing units or any other organization dealing with advanced methods in food microbiology.

References:

1. Banwart GJ. (1987) Basic Food Microbiology. CBS Publishers and Distributors.
2. Frazier WC, Westoff DC. (1998) Food Microbiology. 4th ed. Tata McGrawHill. Publishing Co. Ltd.
3. Garbutt John (1997) Essentials of Food Microbiology. Arnold London.
4. Jay JM, Loessner DA, Martin J. (2005) Modern Food Microbiology. 7th ed. Springer.

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MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

PO / CO	a	b	c	d	e	f
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2		√	√		√	

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FOOD LAWS & SAFETY (THEORY-DSE)

Paper Code: 05250505

Periods/week	Credits	Max. Marks: 100
L: 4 T: 0 P: 0	4	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Understand that nearly all food borne disease can be prevented with proper handling and be able to describe the proper handling required for different food groups.
2. Understand the role of safety and sanitation in food protection.
3. Recognize the role of time, temperature, cross contamination, and personal hygiene in food safety.
4. Understand national and international food laws.

Unit 1: Introduction: Concept and meaning of Food quality and food Safety, food adulteration, food hazards, Natural toxins.

Unit 2:Food laws and regulations: National and international food laws, Governing bodies.

Unit 3: Safety Aspects and Risk Assessment: Exposure, estimation, toxicological requirements, and risk assessment. Safety aspects of water and beverages. Safety assessment of food contaminants and pesticide residues. Safety evaluation of heat treatments and related processing techniques.

Unit 4: Quality assurance: Total Quality Management; GMP/GHP; GLP, GAP; Sanitary and hygienic practices; Quality manuals, documentation, and audits; Indian & International quality systems and standards like ISO and Food Codex; Export import policy, export documentation; Laboratory quality procedures and assessment of laboratory performance; Applications in different food industries. Quality control in food service institutions

Reference:

1. Early. R. (1995) Guide to Quality Management Systems for the Food Industry 1st Ed. Blackie, Academic and professional, London.

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2. Gould, W.A and Gould, R.W. (1998) Total Quality Assurance for the Food Industries. 1st Ed. CTI Publications Inc. Baltimore.
3. Pomeraz, Y. and MeLoari, C.E. (1996): Food Analysis: Theory and Practice. 2nd Ed. CBS publishers and Distributor, New Delhi.
4. Bryan, F.L. (1992): Hazard Analysis Critical Control Point Evaluations A Guide to Identifying Hazards and Assessing Risks Associated with Food Preparation and Storage. 9th Ed. World Health Organization, Geneva 5. Kirk, R.S and Sawyer, R. (1991): Pearson s Composition and Analysis of Foods, Longman Scientific and Technical. England.
5. Food and Agricultural Organization (1980): Manuals of Food Quality Control. Additives Contaminants Techniques, Rome.
6. Furia, T.E. Ed. (1980) Regulatory Status of Direct Food Additives. CRC Press, Florida.
7. Krammer, A. and Twigg, B.A. (1970). Quality Control for the Food Industry. 3rd Ed. AVI, Westport.
8. Rekha S. Singhal, Pushpa R. Kulkarni, Dananesh V. Rege, (1997) Handbook of Indices of food Quality and Authenticity, wood head Publishing Ltd.
9. Hubbard, Merton R. (2003). Statistical Quality Control for the Food Industry, 3rd Ed, Springer.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

PO / CO	a	b	c	d	e
1	√	√		√	
2	√	√			√
3			√	√	
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FOOD LAWS & SAFETY (PRACTICAL)

Paper Code: 05250506

Periods/week	Credits	Max. Marks: 50
L: 0 T: 0 P: 4	2	Internal: 30
		External: 20

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Understand the role of safety and sanitation in food protection.
2. Recognize the role of time, temperature, cross contamination, and personal hygiene in food safety.

Practical:

1. To identify various food adulterants and natural food toxins.
2. To study various safety aspects of food.
3. To review various national food safety regulations.
4. To study various sanitary and hygiene practices.
5. To study the applications of HACCP to food products.

References:

1. Gould, W.A and Gould, R.W. (1998) Total Quality Assurance for the Food Industries. 1st Ed. CTI Publications Inc. Baltimore.
2. Pomeraz, Y. and MeLoari, C.E. (1996): Food Analysis: Theory and Practice. 2nd Ed. CBS publishers and Distributor, New Delhi.
3. Bryan, F.L. (1992): Hazard Analysis Critical Control Point Evaluations A Guide to Identifying Hazards and Assessing Risks Associated with Food Preparation and Storage. 9th Ed. World Health Organization, Geneva.
4. Food and Agricultural Organization (1980): Manuals of Food Quality Control. Additives Contaminants Techniques, Rome.
5. Furia, T.E. Ed. (1980) Regulatory Status of Direct Food Additives. CRC Press, Florida.
6. Krammer, A. and Twigg, B.A. (1970). Quality Control for the Food Industry. 3rd Ed. AVI, Westport.

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NUTRACEUTICALS AND HEALTH FOODS (THEORY-DSE)

Paper Code: 05250507

Periods/week	Credits	Max. Marks: 100
L: 4 T: 0 P: 0	4	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Explain some important food components and their nutraceutical importance
2. Understand the mechanism of action of some phytochemicals and zoochemical in the treatment and prevention of diseases such as cancer, cardiovascular diseases and so on.
3. Know Indian foods and some of their claimed nutraceutical properties.

Unit 1: Nutraceuticals: Definition, Classification, food and non-food sources, mechanism of action. Role of omega-3, fatty acids, carotenoids, dietary fiber, phytoestrogens; gluconates, organo-Sulphur compounds as nutraceuticals. Use of nutraceuticals in traditional health sciences. Their role in preventing /controlling diseases.

Unit 2: Prebiotics and Probiotics: Usefulness of probiotics and prebiotics in gastrointestinal health and other benefits. Beneficiary microbes; prebiotic ingredients in foods; types of prebiotics and their effects on gut microbes.

Unit 3: Functional foods: Definition, development of functional foods, health benefits and sources of functional foods.

Unit 4: Development of nutraceutical and functional foods: Standards for health claims, Process of developing - preclinical & clinical studies, Marketing and Regulatory issues, Regulatory bodies in India.

Reference:

1. Colleen C., Kerry G., Keith R., Salter Venzon D., Samantha I. (2012). Phytochemicals: Health Promotion and Therapeutic Potential. 1st Ed. CRC Press
2. Bagchi D., Francis C. Lau, Ghosh D.K. (2010). Biotechnology in Functional Foods and Nutraceuticals. 4th Ed. CRC press

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Barkha

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

PO / CO	a	b	c	d	e	f
1	√	√				
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3	√	√	√	√	√	

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NUTRACEUTICALS AND HEALTH FOODS (PRACTICAL)

Paper Code: 05250508

Periods/week	Credits	Max. Marks: 50
L: 0 T: 0 P: 4	2	Internal: 30
		External: 20

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Explain various health foods and natural medicines.
2. Perform analysis of natural foods.

Practical

1. Identification of various nutraceuticals and functional foods available in the market
2. Preparation and sensory evaluation of probiotic/prebiotic/symbiotic foods
3. Preparation and sensory evaluation of antioxidant dietary fiber rich foods.
4. To conduct the market survey for identification of health claims of various nutraceuticals products.
5. Preparations of some traditional, fermented, functional and other products.
6. Preparation of soybean products, nondairy milk and their acceptability test.

References:

1. Colleen C., Kerry G., Keith R., Salter Venzon D., Samantha I. (2012). Phytochemicals: Health Promotion and Therapeutic Potential. 1st Ed. CRC Press.
2. Bagchi D., Francis C. Lau, Ghosh D.K. (2010). Biotechnology in Functional Foods and Nutraceuticals. 4th Ed. CRC

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

PO / CO	a	b	c	d	e	f
1	√	√	√			
2			√	√	√	√

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RESEARCH & BIOSTATISTICS (THEORY-AECC)

Periods/week	Credits	Max. Marks: 100
L: 4 T: 0 P: 0	4	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Understand the significance of Statistics and research methodology in nutrition research.
2. Understand the types, tools and methods of research.
3. Develop the ability to construct data gathering instruments appropriate to the research design.
4. Understand and apply the appropriate statistical technique for the measurement/ scale and design.

Unit 1: Introduction to Statistics: Meaning, definition, and characteristics of statistics. Importance, Branches. Statistics and health science including nursing. Parameters and estimates. Descriptive and inferential statistics. Variables and their types. Measurement scales.

Unit 2: Tabulation of Data: Raw data, the array, frequency distribution. Basic principles of graphical representation. Types of diagrams-histograms, frequency polygons, smooth frequency polygon, cumulative frequency curve, Normal probability curve.

Unit 3: Measures of Central Tendency: Introduction, Uses, applications and practical approach. Definition and calculation of mean for ungrouped and grouped data. Meaning, interpretation, and calculation of median ungrouped and grouped data. Meaning and calculation of mode. Comparison of the mean, and mode. Guidelines for the use of various measures of central tendency.

Unit 4: Measures of Variability: Introduction, Uses, applications and practical approach. The range, the average deviation or mean deviation. The variance and standard deviation. Calculation of variance and standard deviation for ungrouped and grouped data. Properties and uses of variance and standard deviation.

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Unit 5: Sampling Techniques: Introduction, Uses, applications and practical approach. Criteria for good samples. Application of sampling in Community. Sampling Methods, Sampling and Non-sampling errors. Sampling variation and tests of significance.

Reference:

1. Gupta S.P.: Statistical Methods, Sultan Chand & Sons, New Delhi.
2. Kapoor V. K and Gupta S. C: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
3. C.R. Kothari, "Research Methodology Methods & Techniques", Second Edition, New Delhi: New Age International publisher, 2004.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

PO / CO	a	b	c	d	e	f
1	√	√			√	
2		√	√	√		
3	√		√	√		
4			√	√	√	√

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SEMESTER- VI

INTERNSHIP/TRAINING

Paper Code: 05250601

Periods/week	Credits	Max. Marks: 100
L: 0 T: 0 P: 48	12	Internal: 40

Course Objectives:

1. Provide the student with practical experiences in health-related, safety, and emergency management settings under appropriate supervision by competent personnel.
2. Facilitate development of the student's personal skills and knowledge needed for professional growth and employment.
3. Enhance the student's understanding of the role of health and safety-related agencies or organizations in the health care delivery system in contributing to individual or community quality of life.
4. Provide the student with opportunities to gain experiences in one or more of the Seven Areas of Responsibilities for Health Educators Specialists. (Assessing needs; planning, implementing, evaluating and managing health education programs; serving as a health education resource person; advocating for health).
5. Apply the knowledge and skills attained during course work to practical health-related settings and issues.
6. Contribute significantly to the activities, events, and projects of the internship agency.
7. Describe the overall structure and function of the internship agency and the role of the agency in contributing to individual or community quality of life.
8. Assess professional strengths and weaknesses during the internship experience.

Required: Internship in Food Service Institutions / Food industry/ Hospitals & Clinics/Sports Organizations/Public Health Institutions

Submission of report on case studies on a minimum of patients in any disease condition.

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1	√		√	√	√	√
2		√	√	√	√	√
3	√		√	√	√	√
4			√	√	√	√
5		√	√	√	√	√
6			√	√	√	√
7			√	√	√	√
8			√	√	√	√

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PROJECT WORK

Paper Code: 05250602

Periods/week	Credits	Max. Marks: 100
L: 0 T: 0 P: 12	6	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Be aware of the current issues, problems and changing concepts in the field of Nutrition and Dietetics.
2. Develop the skill to study, analyze and condense the current literature.
3. Provide experience in-group discussion in the subject.
4. Acquire skills for public presentation of the research project.

Required: The project is to be carried out over a period of approximately 2 to 3 months. Students will select project in consultation with their respective supervisors. The projects will be selected such that a student can reasonably be expected to make an original contribution to the chosen area within the time allotted. The purpose of the project is to provide the student with training in academic research and acquisition of practical skills, including the design of a project, planning of experiments, dealing with practical problems, recording, presenting, and analyzing the data.

Report will be evaluated as stated under project work regulations.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

PO / CO	a	b	c	d	e	f
1	√	√			√	
2	√		√	√		
3			√	√		√
4	√		√		√	

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FOOD PACKAGING (THEORY)

Paper Code: 05250603

Periods/week	Credits	Max. Marks: 100
L: 4 T: 0 P: 0	4	Internal: 40
		External: 60

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Have an understanding for the need of food packaging and the recent packaging materials and labelling.
2. Acquire knowledge regarding food packaging and applications during transportation.

Unit 1: Food Packaging: Definition, functions of packaging materials for different foods, characteristics of packaging material. Food packages- bags, pouches, wrappers, tetra packs.

Unit 2: Packaging Materials: Introduction, purpose, requirements, types of containers. Modern Packaging Materials and Forms- Glass containers, metal cans, composite containers, aerosol containers, rigid plastic packages, semi rigid packaging, flexible packaging.

Unit 3: Packages of Radiation Stabilized Foods: Introduction, rigid containers, flexible containers, general methods for establishing radiation stabilization. Radiation measurement of radiations. Biodegradable packaging material - biopolymer based edible firm.

Unit 4: Packages of Dehydrated Products: Orientation, metallization, co-extrusion of multilayer films, stretch, package forms and techniques. Aseptic packaging, retortable plastic containers, modified and controlled atmosphere packaging, skin, shrink and cling film packaging, micro-openable containers, other package forms and components of plastics.

Unit 5: Packaging and Labelling of Finished Goods: Weighing, filling, scaling, wrapping, cartooning, labeling, marking, and trapping. Food Labeling- Standards, purpose, description, types of labels, labeling regulation barcode, nutrition labeling, health claims, mandatory labeling provision.

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Reference:

1. Vijaya Khader, Textbook of Food Science and Technology, Indian Council of Agricultural Research, New Delhi, 2001.
2. Stainley Sacharous. Roger C Griffin. Principles of Food Packaging 2nd Edition AVI Publishers Co. Westport.
3. F.A. and Paine. H.Y. Leonard Hill. A handbook of Food Packaging. Balckie Sons Ltd., London.
4. Sacharows.S. Handbook of packaging materials, AVI Publishers Co., Westport.
5. Croshy N.T. Food Packaging materials. Applied Science Pub., Ltd., London.
6. Paine F.A. The packaging media. Blackie and Sons Ltd., London
7. NIIR. Food Packaging Technology handbook, Delhi
8. Potter H (1995). Food Science, 5th Edition. CBS Publishers and Distributers.
9. Srilakshmi (2007). Food Science, 5th Edition. New Age International Ltd.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

PO / CO	a	b	c	d	e	f
1	√	√			√	
2			√	√	√	√

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FOOD PACKAGING (PRACTICAL)

Paper Code: 05250604

Periods/week	Credits	Max. Marks: 50
L: 0 T: 0 P: 4	2	Internal: 30
		External: 20

Course Outcomes:

On successful completion of this course, students shall be able to:

1. Have an understanding for the need of food packaging and the recent packaging materials and labelling.
2. Acquire knowledge regarding food packaging and applications during transportation.

Practical

1. Identification of different types of packaging and packaging materials.
2. Identify the latest trends in packaging consulting the websites and magazines.
3. To study the health claims of packaged food.
4. Identify the packaged food labelling and their advantages.
5. Visit to relevant industries and prepare report.

References:

1. Vijaya Khader, Textbook of Food Science and Technology, Indian Council of Agricultural Research, New Delhi, 2001.
2. Stainley Sacharous. Roger C Griffin. Principles of Food Packaging 2nd Edition AVI Publishers Co. Westport.
3. F.A. and Paine. H.Y. Leonard Hill. A handbook of Food Packaging. Balckie Sons Ltd., London.

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MAPPING OF COURSE OUTCOMES WITH PROGRAM OBJECTIVES:

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1	√	√	√			√
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