

MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
PG COURSES – AFFILIATED COLLEGES
Course Structure for M.Sc. Nutrition and Dietetics
(Choice Based Credit System)
(With effect from the academic year 2021-2022 onwards)

INTRODUCTION:

Outcome-Based Education is incorporated into the curriculum based on the requirements of NAAC and UGC – Quality Mandate (2018). To fulfill these requirements, the Programme Educational Objectives (PEOs), Programme Outcomes (POs) and Programme Specific Outcomes (PSOs) and Course Outcomes (COs) were framed for all programmes in alignment with the Vision, Mission and Educational Objectives of the University.

VISION AND MISSION OF THE UNIVERSITY:

VISION:

To provide quality education to reach the un-reached.

MISSION:

- To conduct research, teaching and outreach programmes to improve conditions of human living.
- To create an academic environment that glorify women and men of all races, caste, creed, cultures and all atmosphere that values intellectual curiosity, pursuit of knowledge, academic freedom and integrity.
- To offer a wide variety of campus educational and training programmes, including the use of information technology to individuals and groups.
- To develop partnership with industries and government so as to improve the quality of work place and to serve as catalyst for economic and cultural development.
- To provide quality / inclusive education especially for the rural and unreached segments of economically down-trodden students including women, socially oppressed and differently abled.

VISION AND MISSION OF THE DEPARTMENT

Vision

To empower students to become lifelong learners by providing a comprehensive education in Nutrition and Dietetics. Inspiring students in professional excellence, Research and extension. Creating a leader to serve in the global community.

Mission

- To create progressive, educational experiences that enable learners to be knowledgeable, skillful and competent in Nutrition and Dietetics professionals.
- To pursue, excel and maintain a leadership role in the quest of knowledge by way of quality research, capacity building, consultancy and innovative.

- To educate and inspire students to become passionate healers who demonstrate integrity, caring and excellence.

PREAMBLE:

The post graduate programme in this discipline has been designed to provide the students intensive and extensive theoretical and experiential learning. The programme allows flexibility in the choices based credit systems. It is envisaged that the current of thrust areas, which students can select, based require trained professionals in areas such as Public Nutrition, Dietetics and Clinical Nutrition, Institutional Food Administration as well as Food Science and Quality Control.

PROGRAMME OUTCOME

PO1 Provide academic, research institutions and Disciplinary Knowledge.

PO2 Equip hospitals, food services institutions and industry.

PO 3 Apply planning, monitoring and evaluation of nutrition and health programmes, Scientific Reasoning and Problem Solving.

PO4 Apply critical thinking skills to develop new food products and Analytical Reasoning.

PO5 Achieve practical proficiency to work efficiently in food analysis laboratories, Digital Literacy, Self directed and Lifelong learning.

PO6 Work in teams to develop communication skills and adopt good manufacturing, Cooperation/Team Work and Multi-Cultural Competence.

PO7 Practice in food industries, Develop ability to undertake diverse and challenging career opportunities in food industries and Moral and Ethical awareness.

PROGRAMME SPECIFIC OUTCOMES

The students of M.Sc. Nutrition and Dietetics programme will be able to

PSO 1.a: Apply the acquired scientific knowledge, concept and principles of Food Science and Chemistry, Nutrition Nutritional Biochemistry, Food Analysis, Human Physiology, Biochemical Techniques, Research methodology in Food Science and Nutrition, Community Nutrition, Clinical and Therapeutic Nutrition, Food Microbiology and Safety, Functional Foods and Nutraceuticals in their future endeavor.

PSO. 1.b. Harness and apply the professional and entrepreneurial skills in various Industries, Institutes for the Economic empowerment of self and the community.

PSO.2.a. Make use of the learnt communication skills and strategies to disseminate the gained Knowledge and skills in real life situation among the peer group, learned gatherings and the community.

PSO.2.b. Enhance and correlate the scientific innovations from lab to the community.

PSO.3. Discover the scientific reasons for the problems occurs in the community and able to solve them wisely by using learnt knowledge and skills in the Nutrition and Dietetics programme.

PSO.4. Analyse and evaluate the current practices in Food Science and Chemistry, Nutrition Nutritional Biochemistry, Food Analysis, Human Physiology, Biochemical Techniques, Research methodology in Food Science and Nutrition, Community Nutrition, Clinical and Therapeutic Nutrition, Food Microbiology and Safety, Functional Foods and Nutraceuticals to bring whole some development among the community through various extension activities.

PSO.4.b. Analyse critically the existing situation/issues of the community and provide solution to overcome the situation/issues for promoting the sound health among the people by using acquired knowledge and skills.

PSO.5.a. Make use of ICT for lifelong learning to improve the carrier opportunities and face the challenges in the day today life.

PSO.6. Form team work and bring cooperation among the peer group, professional and the community to meet the multi-cultural competency to bring harmonious situation.

PSO.7. Follow the moral and ethical values obtained from the programme to bring sustainable and peaceful environment.

ELIGIBILITY FOR ADMISSION:

- ❖ All students admitted to the programme should have science background.
- ❖ The candidates should have completed 10, +2 with science, Food and Nutrition, Bio-chemistry, Food Technology or composite / General Home Science at B.Sc. level.

DURATION OF THE PROGRAMME:

The students shall undergo the prescribed programme of study for a period of not less than two academic years (four semesters). Each semester contains 90 working days.

MARK ASSESSMENT:

There is a separate passing minimum for the external and overall components. Distribution of marks between **Internal** and **External** Assessment are

For Theory: 25 : 75

For Practical: 50 : 50

Passing minimum of 40% for external and overall components.

Internal Marks for Theory (Core Theory, Core Practical, Elective,) shall be allotted in the following:

The average of the best two from three compulsory tests.

Each test is of one hour duration for **15 Marks**

Assignment- **10 Marks**

Total-**25 Marks**

Internal Marks for Practical (continuous assessment) shall be allotted in the following manner:

Experimental Work-**25 Marks**; Regularity-**25 Marks**; Total- **50 Marks**

QUESTION PATTERN: (EXTERNAL)

THEORY

Time: 3 hrs

Maximum: 75 marks

Question paper will consist of

Part-A: Q. No: 1- 10

Objective type (2 questions from each unit) **(10x1=10 marks)**

Part-B: Q. No: 11- 15

Descriptive – short answer (Internal choice from each unit-2 questions for each)

(5x5=25 marks)

Part-C: Q. No : 16- 20

Essay type Questions (Internal choice from each unit- 2 question for each)

(5x8=40 marks)

Food Microbiology and Safety

Time: Three hours

Maximum: 75 marks

10 × 1 = 10 marks

Answer ALL questions.

Choose the correct answer:

PART A

1. The most spoilage bacteria grows at_____.
(a) Acidic pH (b) Neutral pH(c) Alkaline pH (d) All of the above
2. Which of the following is not counted as mold characteristics?
a) Possession of strength b) Possession of refractorinessc) Resist corrosion d) Resist metal penetration in molds

3. Which of the following sand mold contains free water?
a) Green sand mold b) Dry sand mold c) Core sand mold d) Shell mold
4. Which of the following is not a gram positive bacteria
a) Sterptococci b) Psuedomonas c) mycobacteriad) None of these
5. The bacterial envelope includes all of the following structures except
a. capsule b. cell wall c. cell membrane D. endospore
6. A Gram negative cell wall is _____ than a Gram positive one.
a. thicker b. thinner c) Bothd) None
7. Flagella and pili are made of
a. lipids b. carbohydrates c. nucleic acids D. protein
8. Watery soft rot is found mostly in
a) Fruits b) Vegetables c) Cereals d) none
9. Yeast are most likely to grow in frozen fruits during
a) Slow Thawing b) Refrigeration c) Temperature d) none
10. Concentrate of fruits and vegetable juices
a) favor the growth of *A. niger* and *A. flavour* species b) favour the growth of yeast and of acid and sugar tolerant *Leuconostoc* and *Lactobacillus* species c) favor the growth of Saprophytic bacteria d) None of the above.

Part B

5 × 5 = 25 Marks

Answer ALL questions, choosing either (a) or (b),

11.a) Classify microorganisms

OR

b) Write the aim and objectives of food microbiology

12.a) Discuss the characteristics of mould

OR

b) Enumerate the economics importance of yeast

13.a) Details on spoilage of bakery products

OR

b) Describe the types of spoilage in milk

14.a) Explain the microbes in fish and write the changes due to spoilage

OR

b) Brief on contamination and spoilage of egg

15.a) Describe the process of wine production

OR

b) How beer is produced? Explain

PART - C

5 × 8 = 40 marks

Answer ALL questions, choosing either (a) or (b),

16.a) Discuss the external factors affecting growth of microorganism

OR

b) Explain the internal factors affecting growth of microorganism

17.a) Draw the structure of bacteria and explain any four characters.

OR

b) Classify mould with example and write its structure, reproduction and economic importance

18.a) Describe the contamination and spoilage of vegetables

OR

b) Explain on spoilage of milk products

19.a) Details on contamination and spoilage of meat

OR

b) Describe the sources of contamination on poultry and its spoilage

20.a) Write the causes, symptoms and treatment for salmonella and staphylococcus food poisoning

OR

b) Describe clostridium food poisoning.

PRACTICAL

Time: 3 hrs

Maximum: 50 marks

Major Practical

– 15 marks

Minor Practical

– 10 marks

Identification (Spot tests) - 20 marks

Observation Note

- 05 marks

Total

- 50 marks

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Sem (1)	Sub. No. (2)	Subject Status (3)	Subject Title (4)	Contact Hrs./Week (5)	Credits (6)
I	1	Core -1	Advanced Food Science and Chemistry	6	4
	2	Core -2	Nutritional Biochemistry	6	4
	3	Core -3	Advanced Human Physiology	5	4
	4	Core -4	Biochemical Techniques	5	4
	5	Elective 1	Research methodology in Food Science and Nutrition	4	3
	6	Core-5 Practical-1	Biochemical Techniques	4	2
II	7	Core -6	Advanced Nutrition-1	5	4
	8	Core -7	Community Nutrition	5	4
	9	Core -8	Clinical and Therapeutic Nutrition	4	4
	10	Core -9	Food Microbiology And Safety	4	4
	11	Elective 2	Functional Foods and Nutraceuticals	4	3
	12	Practical-2	Food Analysis	4	2
	13		Internship	4	2

Sem (1)	Sub. No.(2)	Subject Status (3)	Subject Title (4)	Contact Hrs./ Week(5)	Credits (6)
III	14	Core- 12	Clinical Dietetics I	6	4
	15	Core-13	Food Processing And Preservation	6	4
	16	Core-14	Human Factors and Ergonomics	5	4
	17	Elective-3	Food Packaging	5	3
	18	Practical -3	Clinical Dietetics I	4	2
	19	Practical-4	Food Processing and Preservation	4	2
IV	20	Core- 17	Clinical Dietetics II	6	4
	21	Core- 18	Food Quality Control	4	4
	22	Core- 19	Nutrition For Fitness	4	4
	23	Practical-5	Clinical Dietetics II	4	2
	24	Practical -6	Internship Training	2	2
	25	Elective-3	Field Work	3+	3
	26	Core-22	Project	7+	8

ADVANCED FOOD SCIENCE AND CHEMISTRY

LEARNING OBJECTIVES (LOs)

- To provide complete and simplified reach out to understanding of the basic Food Chemistry & Nutrition to the students of the Food Technology.
- To study on Carbohydrates, dietary fibre, starch, Proteins, Lipids, Pigments, Food flavours, Enzymes, Nutrition, balanced diet, essential amino acids and essential fatty acids, protein efficiency ratio, water soluble and fat-soluble vitamins, role of minerals in nutrition, co-factors, anti-nutrients, nutraceuticals, nutrient deficiency diseases.
- To examine the Chemical and biochemical changes: changes occur in foods

Unit I

Introduction to Food Science and simple sugars

Carbohydrates in the diet-classification, chemistry, Functionality and their Role in Food Industry and Functional Properties of Carbohydrates, Starch: Structure, gelatinization, methods for following gelatinization changes, characteristics of some food starches. Effects of ingredients and conditions on gelatinization .Modified food starches.

Non starch Polysaccharides: Cellulose, hemicelluloses, pectine, gums, animal polysaccharides. Sugars and Sweeteners: Sugars, syrups, sugar alcohols, potent sweeteners , sugar products. Sweeteners chemistry related to usage in food products: Structural relationships to sweetness perceptions, hydrolytic reactions, solubility and crystallization, hygroscopicity, colligative properties, Textural contribution, fermentation , non enzymatic browning.

Unit II

Lipids

Introduction, Classification and Composition, Functional Properties of Food Lipids, Deep Fat Frying , Deteriorative Changes in Fats and Oils, Antioxidants–Preventing the Deteriorative changes in Fats and oils

Unit III

Protein

Introduction and sources, Classification, composition and Biological Functions, Functional Properties of Protein, Protein Concentrates, Isolates and Hydrolysate and their applications.

Unit IV

Vitamins and Minerals

Vitamin A, B, C, D, E, K-classification, importance, occurrence, determination, application, functions, Minerals classification, nutritional and functional role, bioavailability, Estimation of minerals in foods, effect of processing on mineral content of foods.

Unit V

Enzymes and Pigments

Enzymes-Introduction, classification, role of enzymes and Coenzymes in metabolism, isozymes, enzymes in clinical diagnosis, Biotechnological application—enzyme utilization in food industry, applications in food industry, Pigments-natural colours used in foods, novel sources of natural colourants, stability of natural colourants, stabilized forms of natural colorants.

REFERENCE:

1. Belitz. W. grosch. 1986. Food Chemistry. Springer Verlag Berlin Heidelberg, New York. 2. David. S. R. Robinson, 1987. Food biochemistry and Nutritive Value.
2. Longman Group, U.K. 3. Leslie Hart. F. and Harry Johnstone Fisher, 1971. Modern Food Analysis. Spinger– Verlag, New York.
3. Dauthy, M.E. 1995. Fruit and Vegetable processes. FAO Agricultural Services Bulletin 119. Rome.
4. Sadasivam. S.A, Manickam, 1996. Biochemical methods for agricultural sciences. New Age International Publishers.
5. Potter H.N: Food Science, the AV Publishing Co., Inc., Westport, Connecticut 1968.
6. Destrosier N.W. The technology of food preservation. The AV Publishing Co., inc Westport, Connecticut 1973.

COURSE OUTCOMES

On completion of the course, students will be able to

CO 1. Discuss the concept, source, and composition of macro and micronutrients.

CO 2: Identify the role and functions of the macro and micro nutrients, enzymes and pigments in human nutrition and food industries.

CO 3. Classify the macronutrients, micronutrients and enzymes.

CO.4 Assess the physico-chemical and functional properties of the micronutrients, micronutrients and pigments

CO 5. Predict the effects of processing of foods on micronutrients, micronutrients and pigments

Mapping

Advanced Food Science and Chemistry											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	3	2	3	3	2	3	3	2
3	3	3	3	3	1	3	3	2	3	3	2
4	3	3	3	3	2	3	3	1	3	3	1
5	3	3	3	3	1	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

NUTRITIONAL BIOCHEMISTRY

LEARNING OBJECTIVES (LOs)

- Augment the biochemistry knowledge acquired at the under graduate level.
- Understand the mechanisms adopted by the human body for regulation of metabolic pathways.
- Get an insight into interrelationships between various structure and functions. Become proficient for specialization in nutrition.

UNIT 1 Carbohydrates

Introduction to Nutritional Biochemistry, Chemistry of Carbohydrates, structure, and properties of carbohydrate, Monosaccharides, Oligosaccharides, Polysaccharides

UNIT II Lipids and Proteins

Chemistry of Lipids—Introduction, Lipids—Structure and Classification, Chemical Properties of Fatty Acids and Neutral Fats, Chemistry of Proteins and Nucleic acids, Amino Acids—Structure, Classification and Properties, Proteins—Structure, Classification and Properties, Structure and Classification of Nucleic Acids

UNIT III Vitamins

Vitamins—Introduction and Classification, Structure and Properties of Water Soluble Vitamins, Structure and Properties of Fat Soluble Vitamins, Metabolism of vitamins.

UNIT IV Enzymes And Co enzymes

Introduction to Enzymes and Coenzymes, Nomenclature and Classification of Enzymes, Specificity of Enzymes, Mechanism of Enzyme Action, Enzyme Kinetics, Factors Affecting Enzyme Activity, Enzyme Inhibition, Role of Enzymes and Coenzymes in Metabolism, Isozymes, Enzymes in Clinical Diagnosis

UNIT V Carbohydrates, Proteins and Lipids Metabolism

Carbohydrate Metabolism: An Overview, Glycolysis, Oxidation of Phruvate to Acetyl CoA, Citric Acid Cycle, Gluconeogenesis, Metabolism of Glycogen, Hexose Monophosphate Pathway, Entry of other Sugars into Glycolytic Pathway, Regulation of Blood Glucose Level, Electron Transport Chain, Interrelationship with metabolism

Reference

1. Arumugam, (1994). Elements of Biochemistry. Saras publication
2. AmbikaShanmugam, (1998). Fundamentals of Biochemistry. Karthik Offset Printers.
3. Plummer D.T (1987)B3rd An Introduction to Practical Biochemistry , McGraw- HillBook Co.
4. Amanual of laboratory techniques CantrowA andTrumper, Clinical Bio-Chemistry, M.W.B.Saunders co– 1975.

COURSE OUTCOMES

On completion of the course, students will be able to

CO1. Classify the biomolecules and Illustrate the structure of primary metabolites .

CO2. Identify the properties of biomolecules.

CO 3. Analyse the mechanisms adopted by the human body for the regulation of metabolic pathways.

CO 4. Asses the biosynthesis and metabolic pathway of macronutrient and the role of biomolecules in the metabolism.

CO5. Predict interrelationships between various structure and functions to become proficient for specialization in nutrition.

Mapping

Core –Nutritional Biochemistry											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	3	2	3	3	2	3	3	2
3	3	3	3	3	1	3	3	2	3	3	2
4	3	3	3	3	2	3	3	1	3	3	1
5	3	3	3	3	1	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

ADVANCED HUMAN PHYSIOLOGY

Learning Objectives (LOs)

This course will enable students to

- Advance their understanding of some of the relevant issues and topics of human physiology.
- Enable the students to understand the integrated functions of all systems and the grounding of nutritional science in physiology.
- Understand alterations of structure and functions in various organs and systems in disease conditions.

Unit I

Cell Structure and Function

Levels of cellular organisation and function- organelles, tissues, organs and systems-cell membrane, transport across cell, membrane and intercellular communication, regulation of cell multiplication, Nervous System – Structure and function of neuron, conduction of nerve impulse, synapses, role of neurotransmitters, Organization of central nervous system, structure and functions of brain, spinal cord, afferent and efferent nervous, blood brain barrier, CSF, Hypothalamus and its role in various body functions- obesity, sleep, memory.

Unit II

Endocrine system-Endocrine glands - Structure, functions, role of hormones, regulation of hormonal secretion. The neuro endocrine axis, disorders of endocrine glands, emphasis of physiology on physiology of diabetes and stress hormone. Sense Organs- Structure and function. Secretory, Digestive and Absorptive functions, role of liver, pancreas and all.

Unit III Digestive System -

Structure and function-Role of lungs in the exchanges of gases, Transport of Oxygen and CO₂, Role of hemoglobin and buffer systems, Cardio- respiratory response to exercise and physiological effects of training. The Circulatory System - Structure and function of heart and blood vessels, Regulation of cardiac output and blood pressure, heart failure, hypertension, Blood formation, composition, blood clotting and haemostasis: Formation and function of plasma protein, Erythropoiesis, Blood groups and histocompatibility indices. Use of blood for investigation and diagnosis of specific disorders, Anemia

Unit IV

The excretory system – Structure and function of nephron, Urine formation, role of kidney in maintaining pH of blood, Water, electrolyte and acid base balance, diuretics, The Musculo- Skeletal system - Structure and

function of bone, cartilage and connective tissue , Disorders of the Skeletal system, Types of muscles, Structure and Function.

Unit -V

Immune System- Cell mediated and humoral immunity, Activation of WBC and production of antibodies , Role in inflammation and defence. Reproduction- Menstrual cycle, Spermato genesis, physiological changes in pregnancy.

References

1. Ganong,w.f(1985)Review of Medical Physiology 12thEdition, Lange Medical Publication.
2. Moran Campell.E.J.,Dickinson ,C.J.,Slater,J.D.,EdwardsC.R.W and Sikora, K.(1984)ClinicalPhysiology,5thEdition,ELBS,BlasckwellScientificPublications.
3. Guyton A.C (1985) Function of the Human Body , 4th Edition , W. B.Sanders Company,Philadelphia
4. Wilson,K.J.W.andWaugh,A(1996)Ross and Wilson Anatomy and physiology in Health and illness 8thEdition, churchill Livingstone.
5. JainA.KTextbookofPhysiology.Vol.IandIIAvichalPublishingCo.,NewDelhi.

COURSE OUTCOMES

On completion of the course, students will be able to

CO1. Illustrate the structure of the various cell, organs, glands and system in the human body.

CO2. Find out the role of various cell, organs, glands and system in the human body.

CO 3. Focus the composition and mechanism of various organs in the human body.

CO 4. Assess the mechanism, process and regulations of different organs and syste in the human body.

CO5. Predict the alterations of structure and functions in various organs and systems in diseases conditions.

Mapping

Core – Advanced Human Physiology											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	3	2	3	3	2	3	3	2
3	3	3	3	3	1	3	3	2	3	3	2
4	3	3	3	3	2	3	3	1	3	3	1
5	3	3	3	3	1	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

BIOCHEMICAL TECHNIQUES

Learning Objectives (LOs) :

- Enable the students to learn basics of biochemical Techniques.
- This subject will introduce some of the experimental techniques used in biochemistry and molecular biology.
- Biochemical Aspects of Hematology

Unit I: Spectroscopy – Concept of spectroscopy, Laws of Photometry, Beer-Lambert's Law. Instrumentation and application of UV, Visible, and IR, Raman spectroscopy, Radioisotope Techniques: Units and measurement of radioactivity, Use of radioisotopes in Bio medicine and research, Electron Microscopy: Transmission and scanning, freeze fracture techniques.

Unit II: Electrophoretic techniques

Electrophoresis: Moving boundary zone electrophoresis, paper and gel electrophoresis, isoelectric focusing, Chromatography: Paper Chromatography, Thin Layer Chromatography, (TLC), Ion exchange, gel filtration and affinity chromatography, High Pressure Liquid Chromatography (HPLC) – Normal & reverse phase, Centrifugation techniques and their application. subcellular fractionation.

Unit III: Chemical examination

Chemical examination: Reducing sugar-Benedict test, protein: -Heat and acetic acid test, and sulfosalicylic acid method, Ketone bodies-Roth's test, Bile pigment (Fouchet method), bile salt (Hay's test), Urobilinogen- Ehrlich aldehyde test and Bence Jones protein test, Renal clearance test- urea, creatinine, Test for mucin.

Unit IV: Microscopical Examination: Microscopic examination

Identification of casts and crystals and blood cells-RBC, WBC, SE epithelial cells, Smear for gram staining and urine culture.

Unit V: Biochemical Aspects of Hematology

Complete blood count (CBC)-red blood cell, white blood cell, platelet counts, percent hemoglobin, Bleeding time, clotting time, Serum Aspartate aminotransferase, alanine aminotransferase, creatine kinase, gamma glutamyl transpeptidase, alkaline phosphatase

Reference Books

1. Wilson and Walker's Principles and Techniques of Biochemistry and Molecular Biology
2. John.F.Roby, Bernard J. Whik. Biochemical Techniques, Published 1987.
3. Helmut Gunzler Alex Williams, Handbook of Analytical Techniques. March 20001

COURSE OUTCOMES

On completion of the course, students will be able to

CO 1. Outline the basic knowledge of biochemical Techniques and the instruments.

CO 2. Find out the working principles of various biochemical instruments used in the laboratory.

CO 3. Analyse the applications of biochemical techniques and instruments.

CO 4. Recommend the various biochemical techniques to find out the abnormalities.

CO 5. Compile and predict the normal and abnormal biochemical aspects.

Mapping

Core –Biochemical Techniques											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	3	2	3	3	2	3	3	2
3	3	3	3	3	1	3	3	2	3	3	2
4	3	3	3	3	2	3	3	1	3	3	1
5	3	3	3	3	1	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

RESEARCH METHODOLOGY IN FOOD SCIENCE AND NUTRITION

Learning Objectives (LOs)

- To understand the methodology of research and techniques
- To develop skills in conducting research from planning a study to report Writing
- To apply statistical procedure to analyse numerical data draw inferences.

Unit I

Methods of Research

Merits and demerits of scientific research, Different types of research and characteristics: Historical research, Ex-post fact or research, laboratory experiments, Field experiments, survey research, evaluative research, Case study research, operational research, participatory research, Hypothesis: Definition, purpose, types

Unit II

Sampling Design

Census and sample survey- Steps in sampling design, Sample size and its determination, Types of sampling: Random Sampling, Simple random sampling, Stratified random sampling, Systematic sampling, Cluster sampling, Non random sampling methods: Judgment sampling Convenience sampling, quota sampling, Benefits of sampling, Sampling errors, Non sampling errors.

Unit III

Methods of Data Collection and Classification

Methods of collecting primary data: Questionnaire, Interview, Schedule, Observation, Inventories, Checklists, Scaling techniques, Drafting of questionnaire, training of interviewers, Criteria for evaluation of instruments—reliability and validity, Sources of secondary data, precautions in the use of secondary data, Classification of data: types of classification, Formation of discrete and continuous probability distributions, Tabulation of data : parts of a table, general rules of tabulation ,types of tables, Diagrammatic representation of data, Graphic representation of data.

Unit IV

Statistical Methods

Measures of central tendency :mean, median and mode ,their relative advantages and disadvantages, Measures of dispersion: Mean deviation, standard deviation, Coefficient of variation, percentile, Types of correlation, coefficient of correlation and its interpretation-Rank correlation, Regression equations and predictions, Analysis of variance, Contingency tables, Chi-square test, „t“test:student’s „t“test,paired „t“test,unpaired „t“test,,F“test.

Unit V

Sampling Statistics and Introduction to Statistical Package for Social Sciences (SPSS), Introduction to Statistical Package for Social Sciences (SPSS), Interpretation and Report writing, Meaning of Interpretation, why Interpretation, Technique of Interpretation, precaution in Interpretation. Significance of report writing, Different steps in writing Report, Layout of the Research Report, Types of Report, Oral Presentation, Mechanics of writing a Research Report, Precautions for writing Research Reports, Conclusions.

References

1. Van Maanen (1983) Quantitative Methodology, Sage Publication
2. Patton M.Q (1980) Qualitative Evaluation Methods. Sage Publication
Walker, R. (1983) Applied Qualitative Research, Gower, London
3. Cameron, M.E and Van Staveren, W.A (1988) Manual on Methodology for Food Consumption Studies Oxford University Press Oxford.
4. Research Methodology-Methods and Techniques (2004) Fatma Zohra Sahraoui

COURSE OUTCOMES

On completion of the course, students will be able to

CO 1. Describe the concept of Research, Sampling Design, Data, report writing, Statistical Methods, and SPSS.

CO 2. Identify the different types of research, data, sampling and statistical methods.

CO 3. Plan the research design; discover the appropriate sampling methods, data collection, hypothesis, statistical analysis for getting solution to the problems.

CO 4. Assess the means of interpreting the data and conclude the results based on the acquired scientific research knowledge and skill to solve the research problem.

CO 5. Prepare the research report by using appropriate research methods and statistical tool s/w to get solution to the existing problem based on research ethics.

Mapping

Core –Research Methodology in Food Science and Nutrition											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	3	2	3	3	2	3	3	2
3	3	3	3	3	1	3	3	2	3	3	2
4	3	3	3	3	2	3	3	1	3	3	1
5	3	3	3	3	1	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

Practical -1 - Biochemical Techniques

1. Assay of serum transaminases– SGOTand SGPT.
2. Estimation of serumurea.
3. Estimation of serumuricacid.
4. Estimation of serumcreatinine.

Hematology.

5. RBC and WBC counting
6. Different ialleucocyte count.
7. Clotting and bleeding time.
8. Separation of plasma proteins.
9. Erythrocyte Sedimentation Rate, Packed cell volume. Prothrombintime,
10. Differentialcount, TotalRedBloodcellcount, TotalWhitebloodcellcount, Plateletcount

COURSE OUTCOMES:

On completion of the course, students will be able to

CO 1. Demonstrate isolate and estimate the amount of biomolecules in general.

CO2. Demonstrate separation of protein by electrophoresis..

CO 3. Analyze blood for glucose level

CO 4. Gain knowledge of biological samples and their collection procedures.

CO 5. Assess presence and absence of normal and abnormal constituents in urine by performing qualitative urine analysis

Mapping

Biochemical Techniques Practical											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	1	2	3	3	2	3	3	2
3	3	3	3	3	2	3	3	2	3	3	2
4	3	3	3	3	2	3	3	2	3	3	2
5	3	3	2	3	3	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

ADVANCED NUTRITION-I

Learning Objectives (LOs) :

- To enable the students to
- Gain in depth knowledge in the study of nutrients.
- Understand the recent trends in the study of nutrients and interrelationship of Micro nutrients,
- Develop competence for undertaking nutritional investigations.

UNIT 1 Understanding Nutrition

Nutrition Science: Basic Concepts, History of Nutrition, Nutritional Requirements, Methods For Studying The Nutrient Requirements, National And International Recommendations On Nutrient Requirements, Goals of National And International Requirement Estimates and Dietary.

UNIT II Human Energy Requirements

Energy: Some Basic Concepts, Definition and Components of Energy Requirement, Factors Affection Energy Expenditure and Requirement, Methods of Estimation of Energy Expenditure and Requirement, Energy Requirements and Dietary Energy Recommendations, Energy Imbalance: An Overview

UNIT III Carbohydrates

Classification of Carbohydrates, Functions, Digestion and Absorption, Metabolic Utilization of Carbohydrates, Regulation of Blood Glucose Concentration, Dietary Fibre, Resistant Starch, Fructo Oligosaccharides(FOS), Glycemic Index(GI), Modification of Carbohydrate Intake for Specific Disorder

UNIT IV Proteins

Proteins– An Overview, Methods of Determination of Proteins and Amino Acid Content in Foods, Improvement of Quality of Protein in the Diet, Methods of Estimating and Assessing Protein Requirements at Different Stages of Life Cycle, Nutritional Requirements and Recommended Allowances for Proteins and Amino Acids, Protein Deficiency. Lipids- Fats: Some Basic Facts, Types of Fats and its metabolism c) Functions of Fat and Oils, Nutritional Requirements of Fat and Oils, Excessive Fat Intake

UNIT V

Vitamins

VitaminA, VitaminD, Vitamin E, Vitamin K, Thiamin (VitaminB1orAneurin), Riboflavin, Niacin,

Pyridoxine (VitaminB6), Folate, Cyanocobalamin (VitaminB12),Ascorbic acid (VitaminC), Interaction with other Nutrient MINERALS – General Nutritional Functions of Minerals, Absorption and Metabolism of Minerals, Calcium, Phosphorus , Magnesium , Sodium, Potassium and Chloride, Interactions of Macro minerals with other Nutrients.

REFERENCE:

1. Belitz.W.grosch.1986.FoodChemistry.SpringerVerleyBelinHeidelberg,NewYork.2.David.S.R obinson,1987.Food biochemistryand NutritiveValue.
2. LongmanGroup,U.K.3.LeslieHart.FandHarryJohnstoneFisher,1971.ModernFood Analysis.Spinger– Verlag,NewYork.
3. .Dauthy,M.E.1995.FruitandVegetableprocesses.FAOAgriculturalServicesBulletin 119.Rome.
4. Sadasivam.S.A, Manickam, 1996. Biochemical methods for agricultural sciences.NewAgeInternationalPublishers.
5. PotterH.N:FoodScience,theAVPublishingCo.,Inc.,Wetpoet,Connectcut1968.
6. DestrosierN.W.The technologyoffoodpreservation.TheAVPublishingCo.,incWest post,Connectcut1973.

COURSE OUTCOMES

On completion of the course, students will be able to

CO1 Trace the history of Nutrition Science and outline the basic concept of macronutrients and micronutrients.

CO 2. Find out the functions of macro and micro nutrients.

CO 3. Focus the factors affection energy expenditure, methods of estimating and assessing protein requirements at different stages of human life.

CO 4. Recommend the requirements of energy, macro and micro – nutrients needed during different stages of human life.

CO 5 Predict the nutrient and nutrient interaction .

Mapping

Advanced Nutrition - I											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	3	2	3	3	2	3	3	2
3	3	3	3	3	1	3	3	2	3	3	2
4	3	3	3	3	2	3	3	1	3	3	1
5	3	3	3	3	1	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

COMMUNITY NUTRITION

Objectives:

- Describe the expanding role of the community dietitian and Health Economics status
- Understand and articulate nutrition problems and practices in the community.
- Discuss and understand the various nutrition monitoring and surveillance methodologies and how they are used.

Unit-I

Health Economics & Economics of Malnutrition

Introduction, Health Economics, Malnutrition and its Economic Consequences, Economics in Nutrition
Economic Evaluation of Malnutrition

Unit-II

Nutritional Problems

Introduction, Protein Energy Malnutrition (PEM), Micronutrient Deficiencies, Vitamin Deficiencies,
Fluorosis, Lathyrism

Unit-III

Assessment of Nutritional Status in Community Settings

Introduction, Nutritional Assessment- Goals and Objectives, Methods of Nutritional Assessment, Indirect Assessment of Nutritional Status, Direct Assessment of Nutritional Status, Nutritional Anthropometry, Methods of Assessing Nutritional Status in Individuals Methods of Assessment of Nutritional Status of Community, Clinical Assessment, Biochemical Assessment, Dietary Assessment

Unit-IV

Nutrition Monitoring & Nutrition Surveillance

Introduction Monitoring, Nutrition Monitoring, Nutrition Surveillance System(NSS), Nutrition Policy & Programmes- Introduction, National Nutrition Policy(NNP), Nutrition Programmes-Anemia, Iodine and Malnutrition, Integrated Child Development Services (ICDS) Programme, Nutrient Deficiency Control Programmes, Supplementary Feeding Programmes, Food Security Programmes, Self Employment and Wage Employment Schemes

Unit-V

Strategies to Combat Public Nutrition Problems

Introduction, Immunization, Supplementary Feeding Programmes, Improving the Quality of Food Produced by Genetic Approaches, Clean Water, Sanitation and Street Foods and Strategies to Improve the Street Foods, Improving Food and Nutrition Security, Fortification of Food, Conceptualization & The Process of Nutrition Education, Introduction, Understanding the Need and Scope of Nutrition Education, Importance of Nutrition Education, Potential Challenges and the Constraints of Nutrition Education, Theories of Nutrition Education, Process of Nutrition Education Communication

Reference

1. Mahan, L.K. and Escott-Stump, S. (2008): Krause's Food Nutrition and Diet-Therapy, 12th Edition, W-13 Saunders Ltd., Canada.
2. Garrow J.S., James W.P.T., Ralph A., (2000), Human Nutrition and Dietetics, 10th edition, Churchill Livingstone, London.
3. Antia F.P. and Philip Abraham (2001) Clinical Nutrition and Dietetics, Oxford Publishing Company, New Delhi.
4. Williams, S.R. (2003): Nutrition and Diet Therapy, 7th Edition, Times Mirror/Mosby Company, New Delhi.
5. Esthr. Winterfeldt, Margret Bogle, Lea L. Ebro. (2011). Dietetics: Practice & Future Trends. Third Edition. Jones and Barlet Publishers. UK.

COURSE OUTCOMES

On completion of the course, students will be able to

CO 1. Discuss the concept of Health Economics, deficiency diseases Nutritional Assessment, Nutrition Monitoring & Nutrition Surveillance, Nutrition Policy & Programmes and Nutrition Education.

CO 2. Find out the scope, need, importance and role of Health Economics, Nutritional Assessment, Nutrition Monitoring & Nutrition Surveillance, Nutrition Policy & Programmes and Nutrition Education to promote the health status of the community.

CO 3. Identify the causes for deficiency diseases and focus the methods of assessing nutritional status, nutrition education, intervention Programmes.

CO 4. Assess the consequences of deficiency diseases and nutritional intervention programmes to promote the overall development of the community.

CO 5. Predict the nutritional problems and develop the nutrition programmes and strategies to overcome the existing nutritional problems.

Mapping

Core –Community Nutrition											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	3	2	3	3	2	3	3	2
3	3	3	3	3	1	3	3	2	3	3	2
4	3	3	3	3	2	3	3	1	3	3	1
5	3	3	3	3	1	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

CLINICAL AND THERAPEUTIC NUTRITION

Learning Objectives (LOs) :

- To determine role of dietitian and health care
- To correct nutrient deficiencies this may have occurred due to the disease.
- To afford rest to the whole body or to the specific organ affected by the disease.
- To adjust the food intake to the body's ability to metabolize the nutrients during the disease.
- To bring about changes in body weight whenever necessary.

UNIT 1- Introduction to Medical Nutrition Therapy

Definitions and Role of Dietitian in Health Care, the Nutrition Care Process (NCP)
Importance of Coordinated Nutritional and Rehabilitation Services, Patient Care and Counseling

Adaptation of Therapeutic Diets

Therapeutic Diets, Types of Dietary Adaptations for Therapeutic Needs, Normal Nutrition: Abuse of Therapeutic Diet, Diet Prescription, Construction Therapeutic Diets, Routine Hospital Diets, Mode of Feeding

UNIT II-Nutritional Management of Infections and Fevers

Defense Mechanism in the Body, Nutrition and Infection, Metabolic Changes during Infection, Classification and Etiology of Fever /Infection, Typhoid, Chronic Fever /Infection, Medical Nutrition Therapy In Critical Care – Nutritional Management of the Critically Ill, Special Feeding Methods in Nutritional Support, -Nutrition During Stress – The Stress Response, Surgery, Burns, Trauma, Sepsis

Unit IV

Nutritional Management of Food Allergies and Food Intolerance

Adverse Food Reactions, Adverse Food Reactions- The Diagnosis Process, Treatment and Management of Adverse Food Reactions and Prevention of Adverse Food Reactions, Nutrient And Drug Interaction – Nutrient And Drug Interaction: Basic Concept, Effect of Nutrition On Drugs, Drug Effects On Nutritional Status, Drug And Drug Interaction, Clinical Significance And Risk Factors For Drug-Nutrient Interactions, Guidelines To Lower Risk And Wise Use Of Drugs,

Unit V Nutrition, Diet and Cancer

Cancer, Etiological Risk Factors in Cancer,
Metabolic Alterations and Resultant Nutritional Problems/Clinical Manifestations Associated with Cancer,
Nutritional Requirements of Cancer Patients-General Guidelines,
Dietary Management of Cancer Patients and Feeding Problems Related to Cancer Therapy, Cancer Prevention

REFERENCE:

1. Sri lakshmi (2003) Dietetics, Wiley Eastern publishers.
2. Corrine Robinson (1990) Normal and Therapeutic Nutrition, Oxford and IBH publishers.
3. Swaminathan. M. (2000) Principles of Nutrition and Dietetics, Bappco publishers, Bangalore.
4. Gopalan et al., (2001) Nutritive value of Indian Foods, NIN publication, Hyderabad.
5. Bhavana sabarwal (1999) principles and practices of Dietetics, Ajay verma common wealth publishers, New Delhi.
6. Davidson Passmore (1989) Human Nutrition and Dietetics, London Churchill and Livingston publishers.

COURSE OUTCOMES

On completion of the course, students will be able to

- CO 1. Elaborate the concept of Medical Nutrition Therapy, Therapeutic Diets, Dietitian, various diseases, Nutrient and drug interaction.
- CO 2. Identify the different types of Dietitian, therapeutic diet, diseases and disorders, effects of Nutrition On Drugs.
- CO 3. Analyse the Nutrition Care Process, adaptation of therapeutic diets , etiology and various factors influence the different diseases and disorders.
- CO 4. Assess the clinical manifestation and consequences of various diseases and disorders , Mode of Feeding, Patient Care and Counseling.
- CO 5. Propose the recommended nutrient requirements, dietary guidelines and construct the menu for various s diseases and disorders and integrate the coordinated Nutritional and Rehabilitation Services to overcome the problems.

Mapping

Core –Clinical and Therapeutic Nutrition											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	3	2	3	3	2	3	3	2
3	3	3	3	3	1	3	3	2	3	3	2
4	3	3	3	3	2	3	3	1	3	3	1
5	3	3	3	3	1	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

FOOD MICROBIOLOGY AND SAFETY

Learning Objectives (LOs):

This course will enable the student to:

- Gain deeper knowledge of role of microorganisms in humans and environment.
- Understand the importance of microorganisms in food spoilage and to learn advanced, techniques used in food preservation.
- Understand the latest procedures adopted in various food operation to prevent food-borne, disorders and legal aspects involved in these areas.

UNIT I Microbiology of Foods

Food Microbiology–Basic Concept, History Of Food Microbiology, Role of Microbiology In Biotechnology, Role Microorganisms In Fermented Foods, Indicators of food safety and quality, Microbiological criteria of foods and their significance.

UNIT II Food Safety–Basic Concepts

Food Safety and Importance of Safe Food, Factors Affecting Food Safety Microorganisms in Foods, Recent concerns of Food Safety

UNIT III Occurrence And Growth Of Microorganisms In Food

Microbiology of Air, Water and Soil, Sources of Foods Contamination, Factors Affecting the Growth of Microorganisms, Control and Destruction of Microorganisms

UNIT IV Food Spoilage

Factors Responsible for food Spoilage, Chemical Changes due to Spoilage, Spoilage of Different Foods

UNIT V Food Hazards Of Microbial Origin

Food Borne Diseases, Food Borne Intoxications, Food Borne Infections, Food Borne Toxic Infections, Mycotoxins,
Food Borne Diseases Due to Naturally Occurring Toxicants Reporting and Investigations of Food Borne Diseases.

REFERENCE:

1. Atlas, M. Ronald (1995) Principles of Microbiology, 1st Edition, Mosby-Year Book, inco, Missouri, U.S.A.
2. Frazier, W.C. (1998) Food Microbiology, Mc Graw Hill Inc, 4th Edition.
3. Roday. S. (1999) Food Hygiene and Sanitation, 1st Edition, Tata Mc Graw Hill, New Delhi.
4. Joshua A.K. 2000 Microbiology. Popular Book Depot, Madras.
5. Adams & Moss 2000, Food Microbiology, Panima Publishing corporation, New Delhi.
6. Anandhanarayan. R & C.K.J. Panicker, 2003, Textbook of Microbiology, Orient longman publications, Chennai.

COURSE OUTCOMES

On completion of the course, students will be able to

- CO 1. Trace the history of food microbiology, and the basic concept of Food Microbiology, Food Safety, Foods Spoilage and Food Hazards.
- CO 2. Identify the different types of microbes and sources of microbial spoilage and contamination of food.
- CO 3. Analyze the role of microbes in food spoilage, Biotechnology and fermented foods, Indicators of food safety and quality.
- CO 4. Deduct different microbes and recommend the various measures to prevent the spoilage.
- CO 5. Propose the latest procedures adopted in various food operations to prevent food-borne, disorders and legal aspects involved in these areas.

Mapping

Food Microbiology and Safety											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	3	2	3	3	2	3	3	2
3	3	3	3	3	1	3	3	2	3	3	2
4	3	3	3	3	2	3	3	1	3	3	1
5	3	3	3	3	1	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

FUNCTIONAL FOODS AND NUTRACEUTICALS

Learning Objectives (LOs)

- Gain knowledge about functional foods and nutraceuticals
- Have thorough understanding about the health effects
- Be familiar with applications in industry.

Unit I

Introduction

Functional foods and nutraceuticals-Introduction, definition, importance Health attributes of functional foods- Introduction, Health living Index provides information on healthy diet

Unit II

FFN and probiotic

Prebiotic and Probiotic immune system, sources of microalgal health supplements, Colonic Functional Foods: Introduction, Metabolism, Probiotics, Symbiotic, Health aspects of functional colonic foods, Host – microbe interaction, treatment of GI tract disorders

Unit III

Phytochemicals

Introduction – Terpenoids, Polyphenolics, Anthocyanins, Isoflavones, Silymarin, Tangeretin, Saponins Other dominant phytochemicals

Unit IV

Other Nutraceuticals

Source, natural constituents of animal and vegetable lipids, functions of PUFAs, Functional foods in the control of aging, mood and performance

Unit V

Nutraceuticals in medical foods

Anti-Tumor properties:

Nature of tumour growth, mode of carcinogenesis, Diet and gene interactions, Mechanisms of action, Nutrients & their role of functional foods

Reference:

1. Mary K. Schimsl and Theodore P. Labuza; Essentials of functional foods 2000, Culinary and Hospitality industry Publication Services
2. C. Remacle and B. Reusens, Functional Foods, Aging and Degenerative Diseases, Culinary & Hospitality Publications Services

COURSE OUTCOMES

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

CO 1. Describe about source, chemistry and uses of several natural nutraceuticals.

CO 2. Describe occurrence, chemical nature and medicinal benefits of natural nutraceuticals belong to different phytochemical categories.

CO 3. Explain about different free radical which generate in body and their effects and different dietary fibres and complex carbohydrate as functional food ingredients

CO4. Explain the role of free radicals in development of different diseases and aging

CO 5. Explain the role of natural and synthetic antioxidants, functional foods in prevention of chronic diseases.

Mapping

Core –Functional Foods and Nutraceuticals											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	3	2	3	3	2	3	3	2
3	3	3	3	3	1	3	3	2	3	3	2
4	3	3	3	3	2	3	3	1	3	3	1
5	3	3	3	3	1	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

Practical -2

FOOD ANALYSIS

- 1) Determination of moisture, Ash-total, acid soluble and insoluble.
- 2) Determination of Protein in foods by micro-Kjeldahl method.
- 3) Determination of Fat –Crude fat.
- 4) Carbohydrates, Starch–Digestible and Resistant Starches, Dietary fiber–Soluble and insoluble.
- 5) Mineral estimation–Dry and wetashing, calcium, iron, phosphorous.
- 6) Vitamin estimation –Ascorbic acid, thiamine, riboflavin and β carotene.
- 7) Enzyme activity assays –Amylase, lipase and protease
- 8) Biological value-calculations
- 9) Protein Efficiency Ratio(PER)
- 10) Estimation of Fat Soluble vitamins

COURSE OUTCOMES:

On completion of the course, students will be able to

- CO 1. Explain safety and quality management systems that ensure integrity through the food chain.
 CO2. Discuss the practical applications of Laboratory Information Management Systems in the food industry.
 CO 3. Understand the quality management standards, philosophies and frameworks.
 CO 4. Students will know about test for assessment.
 CO 5. Understand about the key regulatory issues that ensure food safety and quality.

Mapping

Food Analysis Practical											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	1	2	3	3	2	3	3	2
3	3	3	3	3	2	3	3	2	3	3	2
4	3	3	3	3	2	3	3	2	3	3	2
5	3	3	2	3	3	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

Field work - (Internship Training in hospital -one month)

Field Work - Report

- Students are likely to attend their fieldwork locations and complete assignments as listed on Assignments Due Date according to the schedule directed by the department.

COURSE OUTCOME

CO: 1 Analyze the internship training in the hospital

CO: 2 Experience in the hospitals has the opportunity to observe in action

CO: 3 Internships can speed up the process of moving towards the career goals.

CO: 4 Students will develop professional aptitude, strengthen personal character, and provide a greater door to opportunity

CO:5 Understand about the internships are way to show commitment to professionalism, self improvement, and excellence

Mapping

Internship Training											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	1	2	3	3	2	3	3	2
3	3	3	3	3	2	3	3	2	3	3	2
4	3	3	3	3	2	3	3	2	3	3	2
5	3	3	2	3	3	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

CLINICAL DIETETICS–I

Learning Objectives (LOs):

- To understand the etiology, physiological and metabolic anomalies of acute and chronic disorders/diseases
- To understand the effect of various disorders/diseases on nutritional status, in utritional and dietary requirements
- To identify the factors related to various diseases &account for their effect on the underlying disease process involved.
- To understand the possible nutrition factors in different diseases.
- Tostudythecurrentknowledgeofthediseasestoareasonableplanfornutritionalcareinitspreventionand treatment.

Unit I

Nutritional Management for Infections, Fevers, Covid-19 and Burns

Nutritional management for infections and fevers – meaning, etiology, nutrition and infection– metabolic changes during infection, Febrile conditions -classification, etiology, symptoms, dietary management, treatment-fever, typhoid, tuberculosis, malaria, Covid-19etiologySigns,symptoms,causesdietarymanagementandtreatment, Nutritional management for burns – classification, complication, dietarymanagement,modeoffeeding,support,non-dietarytreatmentforburns

Unit II

Nutritional Care in Weight Management and Gastrointestinal tract diseases and disorders

Obesity and underweight- Types, predisposing factors, diagnosis, Nutritional care in weight management, treatment and prevention, Gastro-intestinal tract disorders and diseases: types, etiology, clinical symptoms, Dietary Management, treatment – Dyspepsia, Diarrhoea, Dysentery, Constipation, HiatalHernia,Diverticular disease,Pepticulcer,Gastritis,GERD,Inflammatorybowelsyndrome,Shortbowel syndrome, Ulcerativecolitis.

Unit III

Diet for Liver, Gallbladder and Pancreatic diseases and Diabetes:

Liver,GallbladderandPancreaticdisorders:classification,etiology,DietaryManagement,clinicalsymptoms,treatment-
Hepatitis,cirrhosis,hepaticencephalopathy,Cholelithiasis,CholecystitisPancreatitis.Diabetes:classification

etiology, factors affecting blood glucose, metabolic aberrations, Hormonal controls & functions of the disorders, symptoms, complications, diagnosis, Nutritional therapy, Insulin therapy, prevention.

Unit IV

Nutritional management of coronary heart and renal diseases

Cardiovascular diseases: types, risk factors, causes, relation to lipid metabolism, hormonal mechanisms, symptoms, complications, dietary management, treatment and prevention – Hypertension, Atherosclerosis Myocardial Infarction, Congestive Heart failure, Coronary Bypass Surgery. Renal problems: classification, etiology, clinical and metabolic manifestations, clinical symptoms, commonly available commercial formulas for renal patients, dietary Management, treatment-renal calculi, glomerulonephritis, Renal failure.

Unit V Diet for Cancer and disabling disease:

Nutrition & Cancer: Causes, epidemiological factors, treatment, therapeutic problems & Goals, Problems related to cancer treatment, nutritional therapy. Nutrition support in disabling disease: Pre-disposing factors, nutritional therapy-Gout.

REFERENCE:

1. Srilakshmi (2003) Dietetics, Wiley Eastern publishers.
2. Corrine Robinson (1990) Normal and Therapeutic Nutrition, Oxford and IBH publishers.
3. Swaminathan.M. (2000) Principles of Nutrition and Dietetics, Bappa publishers, Bangalore.
4. Gopalan et al., (2001) Nutritive value of Indian Foods, NIN publication, Hyderabad.
5. Bhavanasabarwal (1999) principles and practices of Dietetics, Ajay verma commonwealth publishers, New Delhi.
6. Davidson Passmore (1989) Human Nutrition and Dietetics, London Churchill and Livingstone publishers.

COURSE OUTCOMES

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

CO 1 Understand the basic principles of diet and diet therapy.

CO 2 Acquire the knowledge of modifications of normal diet for therapeutic purposes.

CO 3 Apply the principles of diet for the management of metabolic diseases.

CO 4 Use the nutrition care process for special conditions like allergy.

CO 5 Develop the dietary models for cancer and Covid

Mapping

Core –Clinical Dietetics I											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	3	2	3	3	2	3	3	2
3	3	3	3	3	1	3	3	2	3	3	2
4	3	3	3	3	2	3	3	1	3	3	1
5	3	3	3	3	1	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

FOOD PROCESSING AND PRESERVATION

Learning Objectives (LOs)

- Impart systematic knowledge of basic and applied aspects of food processing and technology.
- Provide the necessary knowledge of basic principles and procedures in the production of important food products
- Orient the student to potential use of various by-products of food industry

Unit I

Introduction: Importance of storage, Physical principles in food Processing operations Thermal processing- Degree of processing or preservation, selecting heat treatments, heat resistance of microorganisms, nature of heat transfer, protective effects of food constituents, types of thermal treatments, Refrigeration- Refrigeration, cool storage and shelf life extension, cool storage with air circulation, humidity control and gas modification (I.e. CA, MA, & SA), Freezing- Changes during freezing- rate of freezing, choice for final temperature for frozen foods, freezing methods, freezing effects, Dehydration - Dehydration, water activity and food safety / quality methods of dehydration.

Unit-II

Chemical principles in food processing

Preservation / Processing by Sugar, Salt, curing, Smoke, acid and chemicals, chemical changes in foods that affect texture, flavour, colour, nutritive values and safety during handling, storage and processing, chemical and biochemical reactions affecting food quality and safety, Processing technology of foods and nutritional implications for the following Cereals and pulses, Wheat grain characteristics and products: Wheat milling process, milling of durum or semolina. Corn wet milling: Corn starch products, Barley malting: dry milling and air classification: wet fractionation of barley pearling, Storage and quality of cereal grains, Rice processing, fractionation, quick-cooking rice, parboiled rice, rice based instant foods, Pulses - Processing, elimination of toxic factors, quick-cooking dals fermentation and germination.

Unit III

Oilseeds, Fruits and Vegetables

Oilseed pressing, solvent extraction, purification (degumming, refining, bleaching, deodorization) hydrogenation, plasticizing and tempering, products- butter, margarine, shortening, mayonnaise and salad dressing, inter-esterification and production of MCT. Fruits and Vegetables - Structure, composition, physiological and biochemical changes during ripening handling and storage, Varietal, harvesting and pre-processing considerations for vegetables, post harvest, processing practices. Processing of vegetables, canning, freezing, dehydration, pickles and chutneys, Fruit Processing - Citrus juices, apple juices, slices and dehydrated products, grape juice and raisins, Canning, fruit-based beverages and concentrates, squashes, jams, jellies, ketchup's, sauces, high sugar, high acid products.

Unit - IV

Milk and Milk Products, Meat, Fish and Eggs

Milk processing-Classification, separation and standardization, pasteurisation, off flavor removal, homogenisation, packaging. UH sterile milk, Milk products - Fortified milk, Skim milk, concentrate milks, cream.

Butter, cheese, cultured milk products, dehydrated milk products, ice creams. Indigenous milk products, Khoa, Channa, paneer, curd, yoghurt, ghee, kulfi, Chemistry of processed meats, Ageing and tenderising, curing, smoking and freezing of meat, fresh storage of meat, Fish preservation and processing, Meat and fish products: Preservation by curing, smoking, salting and pickling, and dehydration, of meat, Dehydrated egg powder and frozen egg, egg storage

Unit - V

Additives and Preservatives, Definition of food additives, acids, bases, buffer systems and salts, chelating agents, antimicrobial agents, sweeteners, stabilizers and thickeners, fat replacers, firming, texturizers, appearance control and clarifying agents. Flavour enhancers, aroma substances, sugar substitutes, sweeteners, antioxidants, Anticaking agents, bleaching agents, protective gases, Processing and extraction of essential oils and colours, stability, storage and preservation.

Reference

- 1) Rao, Chandra Gopala (2006). Essentials of food process engineering. B.S. Publications.
- 2) Khatkar, Bhupendra Singh (2007). Food science and technology. Daya Publishing House.
- 3) Singh, N.P (2007). Fruit and vegetable preservation. Oxford Book Company.
- 4) Ahluwalia, Vikas (2007). Food processing. Paragon International Publishers.
- 5) Sivasankar, B (2005). Food processing and preservation. Prentice - Hall of India
- 6) Paul, Meenakshi (2007). Effects of food processing on bioactive compounds. Gene-Tech Books.
- 7) Rahman, Shafiur: (2007). 2nd Edn Handbook of food preservation. CRC Press.
- 8) Arthey, David. (2005). 2nd edn Fruit processing. Springer,
- 9) Fellows, P (2005). 2nd edn Food processing technology. Woodhead publishing company.
- 10) Lewis Michael (2000). Continuous Thermal Processing Of Foods. Aspen.
- 11) Koutchma, Tatiana (2007). Ultraviolet light in food technology, CRC Press.

COURSE OUTCOMES

On completion of the course, students will be able to

- CO1. Explain the mechanisms of spoilage and deterioration of foods and raw materials: microbial, chemical, physical, biochemical, etc.
- CO2 Analyze, interpret and explain complex phenomena of vegetables and fruits in context of preservation principles
- CO 3. Compile a literature review on a new topic related to preservation principles and analyze results of specific literature work in that area (Bloom III-IV) Exams, assignments

CO 4. Compare and contrast processing methods for milk and milkproducts Communicate clearly and effectively Assignments

CO5. Explain the effects of processing steps on nutritional quality, including bioactive components, of foods

Mapping

Core –Food Processing and Preservation											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	3	2	3	3	2	3	3	2
3	3	3	3	3	1	3	3	2	3	3	2
4	3	3	3	3	2	3	3	1	3	3	1
5	3	3	3	3	1	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

HUMAN FACTORS AND ERGONOMICS

Learning Objectives (LOs)

- To become aware of the role of ergonomics in work effectiveness and efficiency
- To understand the environmental factors contributing to productivity, safety, control and well-being of individual performing the work.

UNIT-I

Introduction to Ergonomics

Definition ,History and evolution, Scope of Ergonomics in home and other occupations, Nature o f work in house hold and other occupations, Human Body and Work: Physiology of Neuro-muscular function in relation to occupational ergonomics; Physiological factors in muscle work; Physical work capacity; Energy requirement for muscular work; Energy expenditure for different activities; Endurance and muscular strength.

UNIT-II

Job Analysis

Significance of job analysis for occupational ergonomics, Fundamental elements of job analysis, Anthropometry in relation to occupational ergonomics, Postures-Definition and Scope

UNIT-III

Application of Ergonomic Principles in:

Tool Evaluation and Design; Work Station Evaluation and Design; Maintenance of Postures, Identifying types of postures assumed during work, analysis and interpretation, Effect of wrong postures on cardio -vascular and muscular skeletal system, Correct techniques of lifting and carrying weights

UNIT-IV

Physiological Aspects of Work, Structure and Function of the muscles, Biochemistry of muscle work, Physiological factors involved in muscular work, Carbohydrates, fats and protein, Oxygen, Cardio-Vascular and Respiratory system, Thermo- regulatory system, Endurance and muscular strength, Skill, Maximal work, Speed, Factors affecting physiological reactions doing work, Workload and posture

UNIT-V

Cardio-Respiratory Fitness

Anthropometric measurements and Physical Fitness Index, Body composition –body fat%, Bodys urfacearea, lean body mass by skin fold method and Somatotyping, MaximumaerobiccapacityusingmodifiedHarvardtest(Queenscollegetest), Determination of workload using heart rate and oxygen consumption- Treadmill, stepstool, Heartrate and oxygen consumption.,Pulserate,Timeandmotion study, Energycost. Assessment of Physical work capacity(PWC)

References

1. AstrandP.O.and RadahlK.:Textbook ofWorkPhysiology,McGrawHill,NewYork.
2. DaviesD.R.and ShakletonVJ.:Physiologyofwork,Motunen&Co.Ltd.
3. OsborneDavid:Ergonomicsatwork,JohnWileyandsons,NewYork.
4. DulJanandWeedmesterBernard:ErgonomicsforBeginners,TylorandFrancis,London.
5. N.EvaluationofHumanWork.APracticalErgonomicsMethodology.TylorandFrancis,London.
6. PheasantStephan:BodySpace,Anthropometry,ErgonomicsandtheDesignsatwork,Taylor&Francis, London.

COURSE OUTCOMES

On completion of the course, students will be able to

- CO1. Explain the psychology of human behavior as it relates to workplace safety.
 CO2. Identify ergonomic hazards; recommend appropriate controls.
 CO 3. Relate the human and workplace factors which contribute to ergonomic hazards.
 CO 4. Explain and apply human factors engineering concepts in both evaluation of existing systems and design of new systems.
 CO5. Acknowledge the impact of workplace design and environment on productivity.

Mapping

Core –Human Factors and Ergonomics											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	3	2	3	3	2	3	3	2
3	3	3	3	3	1	3	3	2	3	3	2
4	3	3	3	3	2	3	3	1	3	3	1
5	3	3	3	3	1	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

Elective-3 – FOOD PACKAGING

Learning Objectives (LOs)

- This course is designed to enable students to
- Gain Knowledge about various packaging materials and importance of packaging Be familiar with testing and evaluation of packing media
- Be familiar with packaging laws and regulations.

Unit I

Packaging-Concepts, Definition, Significance, Classification, Packaging–Development, Packaging of Foods. Fresh and processed, general characteristic s& food preservation

Unit-II

Primary Packaging Media- Properties and Applications, Paperboards, metals, plastics, wood& plywood, glass, flexible etc,
Labels,caps&closures&wads,adhesives,inks&lacquers,cushioningmaterials,reinforcements etc.Testing & evaluation of packaging media.- Retail packs (including shelf life evaluation)and transport packages.

Unit-III

Packaging systems and methods for food products-Vacuum packaging, gas flush packaging,CAP &MAP,A septic &retort packing, bag-inBox etc, Foodproducts-
Generalclassificationandpackingtypes,varietiesandtrends

Unit IV

Storage, handling and distributionofpackages(foods)-
includingpalletisation&Containerization,Foodmarkingandroleofpackaging,PackagingAesthetic&graphi
c design.

Unit V

Packaging - Laws & Regulations- FDA, PFA, Packaging commodity Rules, Weight and measures Actetc, Coding &marking including barcoding, Environmental7Ecoissuesandwastedisposal.

References

1. Sacharow & Grif in Food Packing-AVI Publications
2. Darry,R.T.Blackie,Principles&ApplicationofMAP-Academic&Professions
3. Robertson G.L Food Packaging-Mewyork, Marcell DekkerINC.
4. Bureauof G & MultonJ.K Food Packaging Technology (Vol1&2) VCH, Publishers, INC, New York.

COURSES OUTCOME

On completion of the course, students will be able to

- CO 1 : Understand the principles, the fundamentals and the importance of packaging systems in the supply chain of food
- CO 2 : Acquire knowledge on major packaging systems for foods and beverages in what concerns the materials, properties and their relation with the foods shelf-life and performance in the supply chain
- CO 3 : Students be able to design evaluation schemes and to interpret laboratory results in order to select optimized packaging systems

CO 4 : Have an overview of physical, mechanical and chemical properties of the materials

CO 5 : Understand the impact of packaging on the safety of the food product and the role regarding food security
 Understand the principles of the legislation and the procedures needed for safety assurance and compliance demonstration

Mapping

Elective - Food Packaging											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	3	2	3	3	2	3	3	2
3	3	3	3	3	1	3	3	2	3	3	2
4	3	3	3	3	2	3	3	1	3	3	1
5	3	3	3	3	1	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

CLINICAL DIETETICS-I

I. Visit to hospital to observe tube feeding

II. Meal Planning and preparation of diet for

- a) Post-operative patient
- b) Typhoid, tuberculosis
- c) Covid-19
- d) Obesity, Underweight
- e) Ulcer
- f) Typhoid And Tuberculosis
- g) Cirrhosis, Hepatitis

COURSE OUTCOMES:

On completion of the course, students will be able to

CO 1. Understand the etiology, physiology and metabolic anomalies of acute and chronic diseases and patient needs.

CO 2. Know the effect of the various diseases on nutritional and dietary requirements.

CO 3. Students enable to recommend and provide appropriate nutritional care for prevention and treatment of various diseases.

CO 4. Nutritional Education and Diet Counseling

CO 5. Planning and preparation of diets with modifications.

Mapping

Clinical Dietetics I Practical											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	1	2	3	3	2	3	3	2
3	3	3	3	3	2	3	3	2	3	3	2
4	3	3	3	3	2	3	3	2	3	3	2
5	3	3	2	3	3	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

FOOD PROCESSING AND PRESERVATION PRACTICAL

1. Refrigeration and Freezing of fruits and vegetables.
2. Refrigeration and Freezing of meat and fish.
3. Sun and Oven drying of Fruits and vegetables.
4. Preparation of Jam, Jelly, Syrup and Squash.
5. Preparation of pickles.
6. Visit to Canning and Bottling unit.
7. Visit to fish processing unit.
8. Visit to a food packaging unit.

COURSE OUTCOMES:

On completion of the course, students will be able to

CO 1. To develop the skill to analyze the quality like sugar such as jam, jelly etc.

CO 2. To explain the fermentation process such as canning and bottling unit .

CO 3. To analyze technologies in food preservation..

CO 4. To discuss preservation of foods by salt and acid.

CO 5. To evaluate the novel technologies in food preservation.

Mapping

Food Processing and Preservation Practical											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	1	2	3	3	2	3	3	2
3	3	3	3	3	2	3	3	2	3	3	2
4	3	3	3	3	2	3	3	2	3	3	2
5	3	3	2	3	3	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

CLINICAL DIETETICS –II

Learning Objectives (LOs) :

- To study different tests for various diseases
- To know the bio chemical composition of blood and different parts of the body

Unit I

Changes in Carbohydrate metabolism: Level of blood glucose in normal and abnormal conditions – maintenance of blood glucose level, Inborn errors of carbohydrate metabolism, ketosis, pentosuria, galactosuria, glucosuria, Glycogen storage diseases, Glucose tolerance test, galactose tolerance test

Unit II

Changes in Lipids during disorders: Types and level of lipids in blood lipid transport, Plasma lipoprotein metabolism, plasma lipoprotein and atherosclerosis, Primary disorders of lipoproteins hyper and hypocholesterolemia, Inborn errors of fat metabolism

Unit III

Changes in protein during disorders: Plasma – functions and inborn errors of amino acid metabolism – phenylketonuria, albinism, alkaptonuria and maple syrup urine disease.

Unit IV

Tests for liver and gastric function - Bile Salt – functions, formation of bile acids and bile salts, bile pigments from haemoglobin, Test for liver function tests based on excretory, metabolism, capacity for intoxication and enzymes, vitamin and mineral metabolism, Test for gastric function : collection and examination of stomach contents determination of free acidity, fractional test meal – normal and abnormal curves, examination of duodenal contents, Test for malabsorption examination of faeces - determination of fat content of faeces, fat balance study, Xylose absorption and excretion test and vitamin A absorption test.

Unit V

Tests for renal function

Urine examination – their significance in health and disease: tests for kidney function – urea clearance, insulin clearance, creatinine clearance, concentration test, dye test.

Reference

1. Cantrow A and Trumper, Clinical Bio-Chemistry, M.W.B.Saunders co – 1975
2. Swaminathan, M. Bio-Chemistry for medical teachers
3. Harold valley, Clinical, Bio-Chemistry(1986)
4. Saunderson's Clinical Bio-Chemistry
5. Bhavanasabarwal(1999)principlesandpracticesofDietetics,Ajayvermacommonwealthpublishers,NewDelhi.
6. DavidsonPassmore(1989)HumanNutritionandDietetics,LondonChurchillandLivingstonpublishers.

COURSE OUTCOMES:

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

- CO 1 Understand the basic principles of diet and diet therapy.
- CO 2 Acquire the knowledge of modifications of normal diet for therapeutic purposes.
- CO 3 Apply the principles of diet for the management of metabolic diseases.
- CO 4 Use the nutrition care process for special conditions like liver and gastric function.
- CO 5 Develop the dietary models for renal failure.

Mapping

Core – Clinical Dietetics II											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	3	2	3	3	2	3	3	2
3	3	3	3	3	1	3	3	2	3	3	2
4	3	3	3	3	2	3	3	1	3	3	1
5	3	3	3	3	1	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

FOOD QUALITY CONTROL

Learning Objectives (LOs)

This course aims to:

- Provide adequate theoretical background and understanding about sensory evaluation of food.
- Enable students to use various sensory methods for evaluation variety of foods.
- 3.Enable studentstoanalyseandinterpretsensoryevaluationdata.

Unit I

General principles of quality control – quality attributes - size, shape, colour, consistency, viscosity,texture,taste and flavour. Methods of evaluation of food quality – sensory, objective technique, microbiological methods of quality evaluation. General testing conditions – quantitative difference tests – designing of questionnaire(or) evaluation of scorecard.

Unit II

Food contaminants: Naturally occurring toxicants, anti-nutritional factors in foods. Environmental containments: Biological contaminants, Pesticide residues, veterinary drug residues and heavy metals.

Unit III

DirectAdditive:Preservatives,Nitrate,Nitrite,andN-nitroso compounds.IndirectAdditives,Anti-microbialandveterinarydrugs,pesticides,polyhalogenatedaromatichydrocarbons, polycyclicaromatic hydrocarbons.Other organic residues, packing materials, heavy metals, Radio nuclides in foods.

Unit IV

Common adulterants –teststodetectadulterants.Governmentandtradestandardsforquality– foodlawsandregulations–PFA,FPO and APEDA- BIS standards – Agmark standard – International Standards for export. HACCP–Food safety system.

Unit V

Laws and regulations for setting up a processing unit. FSSAI rules and regulations, FSSAI Licence, Registration FSSAI in Food safety and Standards

Reference

1. Giridarilal Sidappa, G.S., and Tandon,G.L.(1979) Preservation of fruits and vegetables, ICAR, NewDelhi.
2. FPO(1955), QualityControl.
3. Horace, D.Graham, 1980, the safety of foods, 2nd End, AVI publishingCo.Inc,Westport.
4. JulieMillerJones,1992,FoodSafety,EaganPress,USA.
5. LewisM.J.1987,Physicalpropertiesoffoodandprocessingsystem,EllisHarwood Ltd.,England.
6. Picgott,J.R,1984,SensoryAnalysisofFoods,ElsevierAppliedSciencePublisher,NewYork

COURSE OUTCOMES

On completion of the course, students will be able to

CO1.Explain safety and quality management systems that ensure integrity through the food chain.

CO2. Discuss the practical applications of Laboratory Information Management Systems in the food industry.

CO 3. Understand the quality management standards, philosophies and frameworks.

CO 4. Students will know about risk management strategies employed in the food industry.

CO5.Understand about the key regulatory issues that ensure food safety and quality.

Mapping

Core –Food Quality Control											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	3	2	3	3	2	3	3	2
3	3	3	3	3	1	3	3	2	3	3	2
4	3	3	3	3	2	3	3	1	3	3	1
5	3	3	3	3	1	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

NUTRITION FOR FITNESS

Unit I

Definition, components and assessment criteria of age: Specific fitness and health status. Holistic approach to the management of fitness and health: Energy input and output Diet and Exercise. Effect of specific nutrition on work performance and physical fitness, nutrition, exercise, physical fitness and health inter-relationship.

Unit II

Different energy systems for endurance and power activity:
Fuels and nutrients to support physical activity. Shifts in carbohydrate and fat metabolism, mobilization of fats stores during exercise. Nutrition in Sports: Sports specific requirement. Diet manipulation, Pre-game and post game meals. Assessment of different nutrigenic aids and commercial supplements. Diets for persons with high energy requirements, stress, fracture and injury.

Unit III

Significance of physical fitness and nutrition in the prevention and management of weight control, fat reduction and obesity. Exercise and Weight control –fundamentals of aerobics. Nutrition guidance on balanced eating and nutritional advice to clients for obesity, skin nourishment, hair treatment.

Unit IV

Yoga-Meaning, Aims, Objectives, significance. Systems of Yoga –Eight limbs of yoga.

Unit V

Asanas- Classification, difference between physical exercise and yogic exercise, Guidelines for practicing Asanas, Meditation-Meaning, types, benefits.

References

1. B.K.S. Iyengar, Light on yoga, London University, in paperback, 1989.
2. Yogeshwar, Text Book of Yoga, Madras Yoga Centre.
3. K. Chandrasekaran, "Sound health through Yoga" Prem Kalyan Publication, S

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edapatti,1999.

4. Ira Wolinsky 1998. Nutrition in Exercise and sports, 3rd edition, CRC Press.
- 5.Sizer, F.& Whitney , E(2000) Nutrition - Concepts & Controversies, 8th Edition ,Wadsworth Thomson Learning.

COURSE OUTCOMES

On completion of the course, students will be able to

CO1. Identify the major muscle groups of the body that are used with cycling.

CO2. Students will acquire knowledge and demonstrate skills to safely engage in physical activity

CO 3. Students will understand the principles of lifetime fitness and will incorporate fitness activities into a healthy and active lifestyle.

CO 4. Students will use basic principles of health and wellness to develop an informed, personal approach to mental and physical health. Students will acquire knowledge and demonstrate skills to safely engage in physical activity

CO5. Students will demonstrate and value knowledge of psychological and sociological concepts, principles, and strategies that apply to physical activity and sport.

Mapping

Core –Nutrition For Fitness											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	3	2	3	3	2	3	3	2
3	3	3	3	3	1	3	3	2	3	3	2
4	3	3	3	3	2	3	3	1	3	3	1
5	3	3	3	3	1	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

Practical-6 - CLINICAL DIETETICS-II

Practicals

- Preparation of diet counseling aids for common disorders
- Visit to hospital to observe tube feeding
- Planning and Preparation of diets for patients with common multiple disorders and complications and discharge diet plans
- Preparation of diet counseling aids for common disorders.

Meal Planning and preparation of diet for

- Diabetes
- Hypertension, Atherosclerosis,
- Renal failure, Renal stone
- Gall bladder stone
- glomerular nephritis
- Cancer and Gout

COURSE OUTCOMES:

On completion of the course, students will be able to

CO 1. Understand the etiology, physiology and metabolic anomalies of acute and chronic diseases and patient needs.

CO 2. Know the effect of the various diseases on nutritional and dietary requirements.

CO 3. Be able to recommend and provide appropriate nutritional care for prevention and treatment of various diseases.

CO 4. Nutritional Education and Diet Counseling

CO 5. Planning and preparation of diets with modifications.

Mapping

Clinical Dietetics II Practical											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	1	2	3	3	2	3	3	2
3	3	3	3	3	2	3	3	2	3	3	2
4	3	3	3	3	2	3	3	2	3	3	2
5	3	3	2	3	3	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

Internship Training in Hospitals (One Month)

- ❖ The Dietetic Internship is to provide a high quality education and a variety of
- ❖ Supervised practice experiences to prepare in terms to be effective entry-level dietitian nutritionists.
- ❖ A summary of the Internship shall be submitted to the department and viva voce shall be conducted for student individually

COURSE OUTCOME

CO: 1 Analyze the internship training in the hospital

CO: 2 Experience in the hospitals has the opportunity to observe in action

CO: 3 Internships can speed up the process of moving towards the career goals.

CO: 4 Students will develop professional aptitude, strengthen personal character, and provide a greater door to opportunity

CO:5 Understand about the internships are way to show commitment to professionalism, self improvement, and excellence

Mapping

Internship Training											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	1	2	3	3	2	3	3	2
3	3	3	3	3	2	3	3	2	3	3	2
4	3	3	3	3	2	3	3	2	3	3	2
5	3	3	2	3	3	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

***Fieldwork**

- ❖ Students are likely to attend their fieldwork locations and complete assignments as listed on Assignments Due Date according to the schedule directed by the department.

COURSE OUTCOME

CO: 1 The students will observed and analyzed theories used to identify solutions for a specific project or case report.

CO: 2 Understand that field reports facilitate the development of data collection techniques

CO: 3 Understand that observation skills and allow you to understand how theory applies to real world situations.

CO: 4 Students used methods of observing professional practice that challenge or refine existing theories.

CO:5 Students to make their own observations, order their experiences, make decisions and set their own priorities as to what to focus on that

Mapping

Field Work											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	3	3	3	3	2	3	3	3	3	3	3
2	3	3	3	1	2	3	3	2	3	3	2
3	3	3	3	3	2	3	3	2	3	3	2
4	3	3	3	3	2	3	3	2	3	3	2
5	3	3	2	3	3	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)

Individual project & Viva-voce

- Students are encouraged to work on Individual Project to get acquaintance to real life problem solving and hands -on experience. The outcomes of the projects would be submitted as report and viva voce shall be conducted for student individually.

COURSE OUTCOME

CO: 1 The project gives students the opportunity to experience real research

CO:2 Students will have a greater problem solving skills.

CO:3 Students will gain better understanding of research methods.

CO: 4 Deeper understanding of the discipline of the research

CO: 5 Better understanding of career and education path.

Mapping

Project Viva Voce											
CO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
1	2	3	3	3	2	3	3	3	3	3	3
2	3	3	3	2	2	3	3	2	3	3	2
3	3	2	3	3	2	3	3	2	3	3	2
4	3	3	3	1	2	3	3	2	3	3	2
5	3	3	2	3	3	3	3	2	3	3	2

Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)