



**MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI – 12**

M.Sc. NUTRITION AND DIETETICS

**TAMILNADU STATE COUNCIL FOR HIGHER EDUCATION,
CHENNAI – 600 005**

FROM THE ACADEMIC YEAR 2026–2027 onwards

M.Sc. NUTRITION AND DIETETICS

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 downtrodden students including women, socially oppressed and differently abled.

PREAMBLE

- ❖ The postgraduate 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.
- ❖ Outcome Based Education (OBE) has emerged as an effective approach in higher education to ensure quality, skill oriented and learner centered education. The Choice Based Credit System (CBCS) provides flexibility in curriculum design enables students to acquire knowledge, skills and competencies according to their interests and career aspirations. The curriculum is designed to promote flexibility, critical thinking, problem solving ability and lifelong learning through effective teaching, learning, and assessment practices. The revised curriculum framework integrates Programme Educational Outcomes (PEOs), Programme Outcomes (POs), Programme Specific Outcomes (PSOs), and Course Outcomes (COs) in alignment with the Vision and Mission of the University. The adoption of Revised Bloom's Taxonomy (RBT) ensures effective attainment of knowledge, skills, ethical values, and employability among learners. The courses are systematically designed and mapped to ensure that the outcomes of all courses collectively contribute to the achievement of the programme outcomes and the holistic development of students.

PROGRAMME EDUCATIONAL OUTCOMES (PEO)

In alignment with the Vision and Mission of the University, the following have been defined as the PEO for the graduates.

PEO1: Developing strong positive attitude to learn independently the concepts in the field of study

PEO2: Ensuring confidence among the learners to apply the knowledge and skills gained to solve real life issues

PEO3: Habituating ethical values among the learners to succeed in personal and professional life

PROGRAMME OUTCOMES (PO)

Programme Outcomes for the Under Graduate and Post Graduate Degree Programmes of the University are articulated as under.

After the successful completion of Postgraduate Programme from the University, the learner should be able to

PO1: Comprehend the knowledge acquired and communicate the same to others.

PO2: Analyze and compare the factual data / situation to comprehend and to critically evaluate to find solution to the problem ahead.

PO3: Apply theories and philosophies learned in solving the problem in scientific manner.

PO4: Think reflectively on the earlier activities and attempt for self-directed lifelong learning process.

PO5: Understand multicultural existence and identify the means to prolong moral/ethical values in personal and professional life.

PO6: Explore through multiple sources and get exposed to the digital literacy and information explosion with latest technology.

PO7: Act as a responsible member in the varied teams with facilitating capability and formulate teams as a leader for defined purposes.

Program Specific Outcomes (PSOs)

On successful completion of Master of Nutrition & Dietetics programme, the student should be able to:

PSO1: Disciplinary Knowledge:

Understand the fundamental principles, concepts, and theories related to Nutrition & Dietetics. Also, exhibit proficiency in performing experiments in the laboratory.

PSO2: Critical Thinking:

4 | Page Analyze complex problems, evaluate information, synthesize information, apply theoretical concepts to practical situations, identify assumptions and biases, make informed decisions and communicate effectively.

PSO3: Problem Solving:

Employ theoretical concepts and critical reasoning ability with Nutrition & Dietetics and practical skills to solve problems, acquire data, analyze their physical significance and explore new scientific findings.

PSO4: Analytical & Scientific Reasoning:

Apply scientific methods, collect and analyze data, test hypotheses, evaluate evidence, apply statistical techniques and use computational models.

PSO5: Research related skills:

Formulate research questions, conduct literature reviews, design and execute research studies, communicate research findings and collaborate in research projects.

PSO6: Self-directed & Lifelong Learning:

Continuously update the knowledge by lifelong learning and contribute to the growth and development of science and technology.

PSO7: Employability and Entrepreneurship

Develop skills for employability, entrepreneurship, and career readiness in industry, education, and technology-driven sectors.

PROGRAMME DETAILS

M.Sc. Nutrition and Dietetics

Programme Name: Master of Science (M.Sc.) in Nutrition and Dietetics

Duration: 2 Years (Four Semesters)

Medium of Instruction: English

Eligibility Criteria

Candidates seeking admission to the M.Sc. Nutrition and Dietetics programme generally need a Bachelor's degree in a relevant field (Nutrition, Home Science, Life Sciences, or Allied Health) with a minimum aggregate of 50% to 60% marks.

Programme Overview

The M.Sc. Nutrition and Dietetics programme is designed to provide students with a strong foundation in the science of nutrition, food, health, and diet therapy. The curriculum integrates theoretical knowledge with practical training to help students understand the relationship between food, nutrition, and human well-being.

The programme covers various aspects of Nutrition, including human physiology, biochemistry, food science, community nutrition, therapeutic nutrition, food service management, and

dietetics. Students gain hands-on experience through laboratory work, field visits, case studies, and internships, enabling them to apply nutritional principles in real-life situations.

EXAMINATION SCHEME

- M.Sc Nutrition & Dietetics curriculum is divided and studied in four semesters.
- The internal assessments and external examination are the two parts of evaluation scheme.
- The external theory and practical examinations will be conducted by the university at the end of each semester.
- There is a separate passing minimum of 40% for the external and overall components.

DISTRIBUTION OF MARKS BETWEEN INTERNAL AND EXTERNAL ASSESSMENT FOR CORE, SKILL ENHANCEMENT, ELECTIVE, AND ALLIED COURSES.

- * Theory Marks 25: 75
- * Practical Marks 50: 50
- Pass a minimum of 50% for external and overall components.

1. Internal Assessment.

- Internal Marks for Theory shall be allotted in the following manner

The average of the best two tests from three compulsory tests. Each test is of one hour duration	15 marks
Assignment	05 marks
Seminar	05 marks
Total	25 Marks

2. Marks for Practical / Major Project shall be allotted in the following manner

- Internal Marks: 50; External Marks: 50

3. External evaluation of Project;

Project report evaluation and Viva-Voce will be conducted by both the External examiner and the Guide at the end of the semester.

4. Internship

- Report for Internship / Industrial Visit / Research Institute Visit.
- Should be evaluated along with the project at the end of IVth semester.
- Students should submit a report for internship / industrial visit/field visit / Research institute visit/ knowledge updation activity at the end of the Third semester with attendance certificate from the concerned organization.
- The duration of the internship should be 60 hours.
- Internal: 50 marks; External: 50 marks

5. Extension Activity:

- The student should participate in any one of the programmes, like youth welfare activity, outreach programmes, Field Visit etc. the examination/report / evaluation will be conducted at the end of the fourth semester.

The question pattern for all theory courses shall be as follows.

6. Duration of Exam: 3 Hours

Section	Type of questions	Mark Distribution
Part A	Fifteen multiple-choice questions (Two question from each unit compulsory)	15 x1=15 Marks
Part B	Five Internal Choice questions (One question from each unit: either or choice)	5x4=20 marks
Part C	Five Internal Choice questions (One question from each unit: either or choice)	5x8=40 marks
Total		75 Marks

MODEL QUESTION PAPER

7 | Page

ADVANCED FOOD SCIENCE (For those who joined in July 2026 onwards) Time: Three hours Maximum:75 marks		
	Part-A (10×1=10 marks) Answer All questions	
1	Which of the following properties of colloids does not depend on the charge on particles? a) Coagulation b) Electro-osmosis c) Electrophoresis d) Tyndall effect	K1
2	Gelatinization is a process of a) Coagulation of proteins b) Swelling of starch by application of moist	K1

	heat c) Preparing gelatin-based sweets d) Browning bread slices	
3	Wheat flour with water becomes a) Elastic and substance is called gluten b) Weak and substance is called lipid c) Hard and unable to cook d) Wet and difficult to cook	K1
4	Which of the following factors is not responsible for the denaturation of proteins? (a) Heat b) Charge c) pH change d) Organic solvents	K1
5	Which of the following is not a classified form of conjugated proteins? a) Lipoproteins b) Glycoproteins c) Metalloproteins d) Complete proteins	K1
6	Enzyme complex involved in alcoholic fermentation is: a) Zymase b) Invertase c) Lipase d) Amylase	K1
7	The sweetest sugar is a) Sucrose b) fructose c) maltose d) glucose	K1
8	This is the function of dietary fat a) Signals cells b) forms part of cellular membranes c) provides energy to the body d) all of these	K1
9	Yellow color of milk fat is due to presence of? a) Vitamin D b) Carotenoids c) Calcium d) Folic Acid	K2
10	. What is the fat percentage of cow milk? a) 9% b) 10% c) 15% d) 4%	K2
11	What determines the color of an egg? a) Hen's egg b) Hen's diet c) Hen's size d) Hen's feather color	K2
12	The purpose of heat treatment on milk is _____ a) Kill pathogenic microorganism b) Heat milk c) Evaporation d) Taste enhancement	K2
13	The sweetest sugar is a) Sucrose b) fructose c) maltose d) glucose	K2
14	What is the main function of preservatives in food? a) To improve the taste of food b) To increase the shelf life of food c) To enhance the color of food d) To reduce the fat content of food	K2
15	What is the main function of colorings in food? a) To improve the taste of food b) To increase the shelf life of food c) To enhance the appearance of food d) To reduce the fat content of food	K2
PART-B		

16	(a) List the physical properties of food? Or b) Interpret on the factors affecting starch gelatinization?	K4
17	a) Detail on the functions of Proteins? Or b) Classify Enzymes?	K2
18	a) Detail on the health benefits of cooking oil? Or b) Explain about types of sugar?	K5
19	a) Enumerate on fermented milk products? Or b) Identify the factors affecting coagulation of egg proteins?	K4
20	a) What are Artificial Sweetening Agents? Or b) Discriminate on the types of flavorings?	K5
PART- C (5 X 8 = 40 Marks)		
21	a) What are the types of Colloids? Or b) Write about the types of starch?	K4
22	a) Brief on the classification of Proteins? Or b) Interpolate on the factors affecting Enzyme Activity?	K5
23	a)Detail on types of fats? Or b) Outline the properties of sugar?	K5
24	a) Discriminate the factors affecting the quality of egg? Or b) Illustrate the Non-Fermented products?	K3
25	a) Identify sugar related products and explain in detail? Or b) Summarize on types of Food Additives?	K4

Credit Distribution for PG Programme Nutrition & Dietetics

Semester-I	Credit	Hours	Semester-II	Credit	Hours	Semester-III	Credit	Hours	Semester-IV	Credit	Hours
Core-I	5	7	Core-IV	5	6	Core-VII	5	6	Core-XI	5	6
Core-II	5	7	Core-V	5	6	Core-VIII	5	6	Core-XII	5	6
Core- III	4	6	Core- VI	4	6	Core- IX	5	6	Project with viva voce	7	10
Elective- I Discipline Generic	2	5	Elective – III Discipline Generic	3	4	Core-X	4	6	Elective -VI (Industry / Entrepreneurship) 20% Theory 80% Practical	3	4
Elective- II Generic:	2	5	Elective - IV Generic:	3	4	Elective- V Discipline Generic	3	3	Skill Enhancement course / Professional Competency Skill	2	4
Skill Enhancement I	2	4	Skill Enhancement II	2	4	3.6 Skill Enhancement III	2	3	Extension Activity	1	
						3.7 Internship/ Industrial Activity	2	-			
	20	30		22	30		26	30		23	30
Total credit points-91											

Consolidated Semester wise and Component wise Credit Distribution

Parts	Sem I	Sem II	Sem III	Sem IV	Total Credits
Part I	5	5	5	5	20
Part II	5	5	5	5	20
Part III	4	4	5	7	20
Part IV	3	3	4	3	13
Part V	3	3	3	2	11
Part VI	-	2	2	1	5
Part VII	-	-	2	-	2
Total	20	22	26	23	91

MEASUREMENT OF ATTAINMENT OF COURSE OUTCOME

The Course Outcomes (COs) are measured through learners' performance using direct and indirect assessment methods for that particular course.

i. Internal Assessment (25 Marks)

Tests – 15 Marks

Seminar / Assignments/Attention (Participation) in Class – 10 Marks

11 | Page

ii. Semester End Examinations (75 Marks)

Written exams, Practical, Project report, and Comprehensive Viva Voce

Note: In both Internal and Semester End Examinations

Higher Order Thinking (K1, K2, & K3) – 60 % in each part

Lower Order Thinking (K4, K5, & K6) – 40 % in each part

PROGRAMME STRUCTURE

FIRST YEAR - SEMESTER I				
Part	Study Component	Course Title	Credits	No. of Hours
	Core-I	Advanced Food Science	5	6
	Core- II	Macronutrients	5	6
	Core- III	Applied Human Physiology	4	6
	Elective-I	Advanced Food Science Practical/ Applied Human Physiology practical	2	4
	Elective-II	Food Processing and Technology/ Principles of Menu Planning	2	4
	Skill Enhancement Course [SEC]-NME-1	Food Processing and Technology- Practical	2	4
			20	30
FIRST YEAR - SEMESTER II				
Part	Study Component	Course Title	Credits	No. of Hours
	Core-IV	Advanced Dietetics	5	6
	Core- V	Micronutrients	5	6
	Core- VI	Advanced Dietetics-Practical	4	6
	Elective-III	Research Methods in Nutrition/Human Factors and Ergonomics	3	4
	Elective-IV	Perspectives of Home Science/ Hospital Administration	3	4
	Skill Enhancement Course [SEC]-NME-1	Food Quality Control	2	4
			22	30
SECOND YEAR – SEMESTER- III				

Part	Study Component	Course Title	Credits	No .of Hours
	Core– VII	Nutritional Biochemistry	5	6
	Core– VIII	Food Preservation	5	6
	Core– IX	Food Biotechnology	5	6
	Core(Industry Module)– X	Nutrition for Fitness	4	6
	Elective–V	Performance Nutrition/Hospital Administration	3	3
	Skill Enhancement Course- II	Techniques in Food Analysis	2	3
		Internship/ Industrial Activity (Credit)	2	-
			26	30
SECOND YEAR- SEMESTER - IV				
Part	Study Component	Course Title	Credits	No. of Hours
	Core – XI	Advanced Food Service Management	5	6
	Core – XII	Biochemical Techniques	5	6
	Project with Viva Voce	Project Work with Viva voce	7	10
	Elective– VI (Industry Entrepreneurship)	Functional Foods and Health/Oncology Nutrition	3	4
	Skill Enhancement Course– III/Professional Competency Skill	Biochemical Techniques-Practical	2	4
	Extension Activity	Extension Activity	1	-
			23	30

I YEAR - SEMESTER I											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	ADVANCED FOOD SCIENCE	Core-I	6				5	6	25	75	100

Course Outcome

On completion of this course, Students will be able to

CO1 (K1 & K2 – Remembering and Understanding)

Overview of the relationship between the chemical structure and the properties of the main components in food, such as starch, protein and lipids.

CO2 (K3 – Applying)

Understand the Composition and characteristics of various food commodities.

CO3 (K4 – Analyzing)

Explain the cooking quality of foods and apply food science knowledge in the food industries.

CO4 (K5 & K6 – Evaluating and Creating)

Identify and understand the nutrients and functions of foods in maintaining health

Analyze the proper use of food colours and food additives in safe food preparation.

UNIT	Contents	No. of Hours
I	Properties of food- Food nutrients, solids, solutions and colloids, Solutions- Physical properties of solutions, classification of foods based on viscosity characteristics. Solutes- chemical properties, Food dispersion: Colloids- Types of colloid and properties of colloids and rheology of food dispersions; Structure, formation and stability of gels, sols, emulsion and foams. Starch- Sources, Structure and composition of starch; Properties and characteristics of food starches; Modified food starches- Structure and composition, Effect of heat on food starch properties, gluten formation in wheat flour, influencing factors [gluten], gelatinization, gelation and retro gradation, dextrinization and factors affecting gelatinization.	12
II	Proteins- Structure and composition, Classification and properties of proteins; Effect of heat on physio-chemical properties of proteins; Role of proteins in food products; Texturized vegetable protein, protein concentrates. Enzymes: Classification and its nature; Mechanism of action; Factors influencing enzyme activity; Role of enzymes in food products; Immobilized enzymes and its application in food industries.	12
III	Fats and oil -Structure, composition and properties of fats and oil; storage of fat, characteristics [shortening, plasticity, flavor, retention of moisture, melting point, optical activity, color, specific gravity], Hydrogenation, winterization, flavor reversion, smoking point, Rancidity-Types, Mechanism and prevention; Role of fat/oil in food products; Fat substitutes. Sugar and sugar products-Types of sugar, Types of granulated sugar, Physical and chemical properties, Sugar products -Types of honey, Jaggery, corn syrup, various forms of sugar used in cookery and Crystallization of sugar.	10
IV	Milk components- water, carbohydrate, milk fat, milk protein, minerals and other components in milk, Physiochemical properties of milk, Effect of physical and chemical factors on milk components [Effect of heat, protein, factors affecting coagulation, casein coagulation, minerals, Non-enzymatic browning], [Effects of acid], Effects of enzymes-renin, fermented and non- fermented milk products Egg -proteins in Egg, microscopic structure of egg, characteristics [colour, size],	12

	Nutritional qualities, quality check, functional properties- foaming, factors affecting foam formation.	
V	Food additives- Definition, different food additives and Need for food additives. Flavour compounds in vegetables, fruits and spices; Effect of processing on food flavors; Role of colors and flavors in food products.	12

TEXT BOOKS:

- Sreelakshmi B. (2015). Food Science. New Age International (P) Ltd. Publishers.
- S.M. Reddy (2015). Basic Food science and technology. New Age International publishers. Avantina Sharma (2017). Textbook of food science and Technology. CBS Publishers and distributes ltd. 3rd Edition.
- Swaminathan A. (2018). Hand book of Food and Nutrition, Bangalore press. Serpil Sahin and Servet Gulum Sumnu. (2006). Physical properties of Foods. Springer publications

REFERENCES:

- [Gerard L. Hasenhuett, Richard W. Hartel.](#) (2019). Food Emulsifiers and Their Applications. Springer publications. 3rd edition.
- Vickie. A. Vaciavik. (2021). Essentials of Food science. Springer publications. 5th edition.
- Dr. M. Swaminathan. (2015). Advanced textbook of Food and Nutrition. volume-2. Bapco publications.
- Eskein. (2012). Biochemistry of Food. Elsevier publications.
- Lyn Obrien Nabors. (2001). Alternative Sweeteners. Taylor and Francis publications.
- Janet D. Ward and Larry Ward. (2006). Principles of Food Science. Stem Publishers. 4th Edition

E LEARNING RESOURCES:

www.fao.org www.wfp.org

www.foodrisk.org.

<http://www.fsis.us>

CO–PO–PSO Mapping (Course Articulation Matrix)

CO	POs							PSOs						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
CO1	3	2	1	1	0	0	1	3	2	1	0	0	0	0
CO2	3	3	2	1	0	0	1	3	3	2	1	0	0	0
CO3	3	3	3	2	1	0	1	3	3	2	1	1	0	0
CO4	3	3	3	3	1	1	1	3	3	3	2	1	1	1
Total Score	12	11	9	7	2	1	4	12	11	8	4	2	1	1

Level of Correlation between Cos and POs, COs and POs

0 – No Correlation

1–Low

2– Medium

3 – High

I YEAR - SEMESTER I											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	MACRONUTRIENTS	Core-II	6				5	6	25	75	100
Course Outcome On completion of this course, Students will be able to CO1 (K1 & K2 – Remembering and Understanding) Explain the digestion, absorption, metabolism, physiological functions, requirements, and health implications of energy, carbohydrates, proteins, lipids, and water. CO2 (K3 – Applying) Apply the principles of energy balance, glycemic index, protein quality, lipid composition, and water-electrolyte balance in nutritional assessment, diet planning, and health promotion. CO3 (K4 – Analyzing) Analyze the role of macronutrients in metabolism, body composition, obesity, cardiovascular health, protein utilization, hydration status, and disease conditions. CO4 (K5 & K6 – Evaluating and Creating) Evaluate macronutrient-related health issues and formulate appropriate dietary strategies and nutritional recommendations for maintaining health and managing nutrition-related disorders.											
UNIT	Contents									No.of Hours	
I	ENERGY : Energy content of foods, physiological fuel value, Estimation of total energy requirements (BMR, REE and physical cost of activities) TEE, Energy balance, Basal metabolic rate, Total Energy requirements, BMR & RMR, Factors affecting BMR, Thermic effect of food. Changes in body weight									12	

	and body composition with the changing energy balance, Regulation of food intake- role of hunger and satiety centers. Energy balance and obesity	
II	CARBOHYDRATES Classification, Therapeutic uses of carbohydrates, sugars in parenteral nutrition. Glycemic index of foods and its uses. Toxic effects of fructose, xylitol and galactose. Sugar alternatives, Role of dietary fiber in health and disease. Role of carbohydrates in health and disease Non comparative Scales—Meaning and types	12
III	PROTEINS Historical review of protein metabolism, Amino acid patterns in protein and of animals and vegetable origin, critical study of methods of assessment of protein quality. Physiological functions of proteins. Essential Amino Acids, amino acid balance and imbalance, Role of protein in health and disease. Supplementation of individual amino acid.	12
IV	LIPIDS Concepts of visible and invisible fats, EFA, SFA, MUFA, PUFA, omega-6 to omega3 ratios. – Sources and physiological functions and their role in health and disease. Adipose tissue – Lipogenesis and Lipolysis, lipoproteins – types and health implication. Storage of body fat, Effects of deficiency. Fat substitutes, Hypocholesterolaemic foods – garlic, fiber and plant proteins.	12
V	WATER Sources, Function, Requirement, Distribution of water in the body and Factors influencing distribution of body fluid. Exchange of water in the body. Water imbalance – dehydration- water intoxication, water and electrolyte mechanism – ADH	10

TEXT BOOKS

1. Mahan, L.K., & Stump, S.E. (2002). Krause's Food Nutrition and Diet Therapy. W.B. Saunders's company, Philadelphia. 10th edition.
2. Satyanarayana, U., & Chakrapani, U. (2013). Biochemistry, Book and Allied Pvt. Ltd., Kolkata.
3. Shils, M. E., Olson, J. A., & Shike, M. (2000). Modern nutrition in health and disease. Modern

Nutrition in Health and Disease . Vol I and II. Lea and Febiger Philadelphia, A Waverly Company. Eighth edition.

- 4.Sizer, F., Whitney, E., & Webb, F. (2003). Nutrition Concepts and Controversy, Thomas Wadsworth, Australia. 9th edition.
5. Wardlaw, G. M., Byrd-Bredbenner, C., Moe, G., Berning, J. R., & Kelley, D. S. (2013). Wardlaw's perspectives in nutrition. McGraw-Hill.
6. Williams, S. R. (2004). Nutrition and diet therapy. Nutrition and diet therapy.

REFERENCES

1. Bogert, J.G.V., Briggs, D.H., & Calloway, (2000). Nutrition and physical fitness. W.B. Saunders Co., Philadelphia, London, Toronto. 11th edition.
2. Brown, J.E., (2002). Nutrition Now. Wadsworth Thomson Learning New York. 3rd edition.
3. Guthrie, H.A., (2001). Introductory Nutrition. C.V. Mosby Company, St. Louis. Tenth edition.
4. Jain, J.L., Jain, S., & Jain, N., (2005). Fundamentals of Biochemistry. S. Chand and Company Ltd. Ram nagar, New Delhi-110 055. 6th revised edition.
5. Swaminathan, M., (2002). Principles of Nutrition and Dietetics. BAPPCO, 88, Mysore Road. Bangalore – 560 018.
6. Toteja, G. S. (2004). Micronutrient profile of Indian population. Indian Council of Medical Research Publication, New Delhi.

CO–PO–PSO Mapping (Course Articulation Matrix)

CO	POs							PSOs						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
CO1	3	1	1	1	1	1	0	3	1	1	1	0	1	0
CO2	2	2	3	1	1	2	1	3	2	3	2	1	1	1
CO3	2	3	2	2	1	2	1	2	3	3	3	2	2	1
CO4	2	3	3	3	2	2	1	2	3	3	3	3	3	1
Total Score	9	9	9	7	5	7	3	10	9	10	9	6	7	3

Level of Correlation between Cos and POs, COs and POs

0 – No Correlation

1–Low

2– Medium

3 – High

I YEAR - SEMESTER I											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	APPLIED HUMAN PHYSIOLOGY	Core-III	6				4	6	25	75	100
Course Outcome On completion of this course, Students will be able to CO1 (K1 & K2 – Remembering and Understanding) Explain the structure and functions of cells, tissues, blood, and cardiovascular system. CO2 (K3 – Applying) Describe the respiratory, endocrine, and immune systems and their physiological functions. CO3 (K4 – Analyzing) Apply the principles of gastrointestinal physiology and reproductive processes in human health. CO4 (K5 & K6 – Evaluating and Creating) Analyze the structure and functions of the nervous and excretory systems in maintaining homeostasis. Understand the structural and functional organization of Skin, Nervous and Excretory system Evaluate the role of skin, temperature regulation, and integrated physiological mechanisms in the human body.											
UNIT	Contents									No.of Hours	
I	Cell • Structure and Function. • Transportation across cell membrane. • Cell theory and Cycle. Difference between Meiotic and Mitotic cell. • Stem cells- types and functions. Tissue • Structure and Function.									12	
II	Blood • Composition & Functions • Blood Group – ABO system & Rh factor.									12	

	● Blood Coagulation. Heart ● Structure & Function of Heart and Blood Vessels. ● Systemic & Pulmonary circulation ● Cardiac cycle and Conduction. ● Heart rate and Cardiac output. ECG. ● Blood pressure & their regulations.	
III	Respiratory System ● Structure and function. Gas Laws pertaining to Gas Exchange (Meaning only)-Henry's Law of Partial Pressure, Boyle - Mariotte's Law of Volume and Pressure, Dalton's Law of Partial Pressure, Charles's Law of Ideal Gas Equation and Fick's Law of Diffusion. ● Mechanism of respiration. ● Circulation and Exchange of respiratory gases. Internal and External Respiration. Chloride shift. ● Definitions of Lung volumes and Lung capacities ● Ventilation and Artificial Respiration. Immunity ● Definition and types Innate and Acquired immunity. ● Endocrine System ● Hormones and its type. ● Syndromes resulting from hypo and hyperactivity of Pituitary, Thyroid, Adrenals and Pancreas	12
IV	Gastro intestinal System ● Structure and function of GI tract and its accessory organs. ● Digestion and absorption of Carbohydrates, Proteins and Fats. Reproductive System ● Role of hormones in reproduction and Lactation. ● Menstrual Cycle and Menopause.	12

	● In vitro (IV) fertilization ● Spermatogenesis. Egg -proteins in Egg, microscopic structure of egg, characteristics [colour, size], Nutritional qualities, quality check, functional properties- foaming, factors affecting foam formation.	
V	Nervous System ● Structure and Function of Neuron. Afferent and Efferent Nerves. ● Conduction of Nerve Impulse -Synapses, Neurotransmitters, Summation and Action Potential. ● Sympathetic and Parasympathetic nervous System. ● Cerebrospinal fluid (CSF)–composition and function. ● Blood-brain barrier (BBB). ● Electroencephalogram(EEG) Excretory Systems Renal system ● Organs in the Urinary System. ● Structure and functions of Nephron. ● Just aglomerular Cell. ● Mechanism of formation of urine, ● Role of the kidney to regulate Blood pressure, Water, Electrolytes and Acid Base Balance. Skin ● Structure and function. Regulation of temperature of the body	10

TEXT BOOKS

1. K.Sembulingam & Prema Sembulingam (2019), Essentials of Medical Physiology. Jaypee publications. Eighth edition.
2. Waugh A, Ross and Wilson (2018). Anatomy and Physiology in Health and Illness. Elsevier publications. 13ed.
3. CC Chatterjee (2020). Human Physiology. CBS publishers. 13ed.

4. Indu Khurana (2020). Medical Physiology for Undergraduate Students. Elsevier Publication. 2nd Edition.
5. GK Pal (2019). Textbook of human physiology, Elsevier publications. 3rd edition.

REFERENCES:

1. Guyton, A.G. and Hall, J.B. (2005): Text Book of Medical Physiology. W.B. Sanders Company, Prism Books (Pvt.) Ltd., Bangalore. 9th Edition.
2. Wilson, K.J. W and Waugh, A. (2003): Ross and Wilson Anatomy and Physiology in Health and Illness. Churchill Livingstone. 8th Edition.
3. Jain, A.K.: Textbook of Physiology. Avichal Publishing Co., New Delhi. Vol. I and II.
4. McArdle, W.D., Katch, F.I. and Katch V.L (2001): Exercise Physiology.
5. Energy, Nutrition and Human Performance. Williams and Wilkins, Baltimore. 4th Edition.
6. Ganong, W.F. (1985): Review of Medical Physiology. Lange Medical Publication. , 12th Edition.
7. Moran Campbell E.J., Dickinson, C.J., Slater, J.D., Edwards. C.R.W. and Sikora, K. (1984): Clinical Physiology. ELBS, Blackwell Scientific Publications. , 5th Edition.
8. McArdle, W.D., Katch, F.I. and Katch, V.L. (1996): Exercise Physiology. Energy, Nutrition and Human Performance, Williams and Wilkins, Baltimore. 4th Edition.
9. Jain, A.K.: Textbook of Physiology. Avichal Publishing Co., New Delhi. Vol. I and II.
10. Winword. Sear's Anatomy and Physiology for Nurses. London, Edward Arnell.
11. Chatterjee Chandi Charan: Text Book of Medical Physiology, London W.B.

E LEARNING CONTENT

<https://youtu.be/MZDy0RvA52Y-Osmosis>
<https://youtu.be/TgcyiVQnVBs->
<https://youtu.be/44B0ms3XPKU->

CO-PO-PSO Mapping (Course Articulation Matrix)

CO	Pos							PSOs						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
CO1	3	1	2	2	1	1	1	3	1	2	1	1	2	1
CO2	3	2	3	2	2	2	2	3	2	3	2	2	2	2
CO3	3	3	3	2	2	2	2	3	3	3	3	2	2	3
CO4	3	2	3	2	2	1	2	3	2	3	2	2	2	3
Total Score	12	8	11	8	7	6	7	12	8	11	8	7	8	9

Level of Correlation between Cos and POs, COs and POs

0 – No Correlation

1–Low

2– Medium

3 – High

YEAR I- SEMESTER I											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	ADVANCED FOOD SCIENCE PRACTICAL	ELECTIVE - I			4		2	4	50	50	100
Course Outcome On completion of this course, Students will be able to CO1 (K1 & K2 – Remembering and Understanding) Explain and perform sensory evaluation techniques and analyze the functional properties of starch and pulses. CO2 (K3 – Applying) Apply principles of food chemistry to evaluate fruits, vegetables, milk, sugars, fats, and oils. CO3 (K4 – Analyzing) Analyze the physical properties of foods using standard laboratory methods and interpret experimental results. CO4 (K5 & K6 – Evaluating and Creating) Evaluate food quality, detect adulteration, and recommend suitable quality control measures for food products.											
UNIT	Contents									No.of Hours	
I	SENSORY METHOD ➤ Analysis of taste sensitivity ➤ Threshold test ➤ Duo-Trio test ➤ Multiple sample difference									3	

II	STARCH ➤ Microscopic structure and gelatinization ➤ Factors affecting gelatinization ➤ Sag test ➤ Gluten formation	3
III	PULSES ➤ Factors affecting cooking quality	3
IV	FRUIT ➤ Enzymatic browning ➤ Pectin test ➤ Firmness of gel	3
V	VEGETABLE ➤ Various methods of cooking ➤ Fat-soluble and water-soluble pigments	3
VI	MILK ➤ Detecting the presence of starch, soda, urea in milk sample ➤ pH of milk sample ➤ Effect of acid on milk ➤ Maillard reaction	
VII	SUGAR ➤ Relative sweetness of sugars: sucrose, maltose, lactose, fructose, dextrose, glucose, artificial sweeteners ➤ Stages of sugar cookery ➤ Effect of dextrose, jaggery, honey, and cream of tartar on sucrose	3

VIII	FATS AND OILS ➤ Smoking point of various oils: Ground nut oil, coconut oil, Gingelly oil, Olive oil, vanaspati, Ghee, Refined Sunflower oil, Rice bran oil ➤ Cooking temperature and fat absorption: Ground nut oil, coconut oil, Gingelly oil, Refined Sunflower oil, Rice bran oil	3
IX	PHYSICAL PROPERTIES ➤ Thousand-grain weight ➤ Thousand-grain volume ➤ Hydration capacity ➤ Hydration index ➤ Swelling capacity ➤ Specific gravity ➤ Seed displacement test ➤ Viscosity: Line spread test, Viscometer Food Adulteration	3

TEXTBOOKS:

1. Srilakshmi B. (2015). Food Science, New Age International (P) Ltd. Publishers.
2. Potter N. and Hotchkiss J.H. (1996). Food Science, Fifth ed., CBS Publishers and Distributors, New Delhi
3. Avantinasharma (2017). Textbook of Food Science and Technology. CBS Publishers and Distributors Ltd. 3rd Edition.
4. Reddy SM. (2015). Basic Food science and technology. New Age International publishers. 2ND edition.

REFERENCES:

1. Swaminathan A (1979). Food Science and Experimental Foods, Ganesh and Company Madras. 3rd edition.
2. Bennion, Marion and O. Hughes (2001). Introductory Foods. Ed: Macmillan N.Y. 1st edition.
3. Eskein. (2012). Biochemistry of Food. Elsevier publications
4. Desrosier, N.W. and James N. (2007). Technology of food preservation. AVI Publishers.
5. Manay, S. and Shadaksharamasamy, (2004). Food: Facts and Principles, New Age International Publishers, New Delhi. 1st edition.

E-LEARNING RESOURCES

<http://www.fao.org/3/V5030E/V5030E00.htm>
<https://fmtmagazine.in/fruits-vegetables-processing-technologies/>
www.fao.org
www.wfp.org

[Learn Microbiology with Online Courses and Classes](#)
[edX](#)

CO–PO–PSO Mapping (Course Articulation Matrix)

CO	Pos							PSOs						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
CO1	3	2	1	1	2	0	1	3	2	1	1	0	0	0
CO2	3	3	2	2	3	1	1	3	3	2	2	1	0	0
CO3	3	3	3	3	3	1	2	3	3	3	2	1	1	0
CO4	3	3	3	3	2	2	3	3	3	3	3	2	1	1
Total Score	12	11	9	9	10	4	7	12	11	9	8	4	2	1

Level of Correlation between Cos and POs, COs and POs

0 – No Correlation

1–Low

2– Medium

3 – High

YEAR I- SEMESTER I											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	ADVANCED HUMAN PHYSIOLOGY PRACTICAL	ELECTIVE-I			4		2	4	50	50	100
Course Outcome On completion of this course, Students will be able to CO1 (K1 & K2 – Remembering and Understanding) Identify and explain microscopic structures and principles of physiological investigations. CO2 (K3 – Applying) Perform and apply laboratory and physiological assessment techniques. CO3 (K4 – Analyzing) Analyze microscopic features and physiological data for interpretation. CO4 (K5 & K6 – Evaluating and Creating) Evaluate results, prepare reports, and demonstrate competency in experimental procedures.											
UNIT		Contents								No.of Hours	
I		CELLS AND TISSUES Microscopic study of tissues-epithelial, connective and muscular.								3	
II		BLOOD AND HEART - Microscopic structure of heart Separation of blood components (Centrifugation). Estimation of hemoglobin-Sahli's Acidhematin method. - Determination of Hematocrit (Wintrobe method). - Preparation and examination of stained blood smear (Wedge or glass slide method). - Determination of Erythrocyte Sedimentation Rate (Wintrobe method). - Determination of blood group. - Determination of bleeding time (Duke method) and coagulation time (Capillary tube method). - Platelet count (Rees Ecker method by hemocytometry).								3	

	Clinical examination of radial pulse (pulse rate).	
III	RESPIRATORY SYSTEM AND ENDOCRINE SYSTEM - Measurement of blood pressure (Sphygmomanometer). - Effect of exercise on blood pressure and heart rate.	3
IV	GASTROINTESTINAL SYSTEM AND REPRODUCTIVE SYSTEM Microscopic structure of digestive system	3
V	NERVOUS SYSTEM AND EXCRETORY SYSTEM - Microscopic structure of kidney. - Microscopic structure of reproductive organs-ovary, uterus, mammary glands and testis. - Microscopic structure of endocrine glands-thyroid, pituitary and adrenal.	3

TEXT BOOKS

1. Avantinasharma (2017).Textbook of Food Science and Technology. CBS Publishers and Distributors Ltd. 3rd Edition.
2. Potter N. and Hotchkiss J.H.(1996). Food Science, Fifth ed., CBS Publishers and Distributors, New Delhi
3. Reddy SM.(2015). Basic Food science and technology. New Age International publishers. 2ND edition.
4. Srilakshmi B.(2015).Food Science, New Age International (P)Ltd. Publishers.

REFERENCES

1. Bennion, Marion and O. Hughes (2001). Introductory Foods. Edi: MacMillian N. Y. 1st edition.
2. Eskein . (2012). Biochemistry of Food. Elsevier publications Desrosier, N.W. and James N.(2007). Technology of food preservation. AVI Publishers.
3. Manay,S. and Shadaksharamasamy, (2004). Food: Facts and Principles, New Age International Publishers, New Delhi. 1st edition.
4. Swaminathan A (1979). Food Science and Experimental Foods, Ganesh And Company Madras. 3rd edition.

CO–PO–PSO Mapping (Course Articulation Matrix)

CO	POs							PSOs						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
CO1	3	1	1	1	0	1	0	3	1	1	1	0	1	0

CO2	1	2	3	1	0	2	1	3	2	3	2	1	1	1
CO3	1	3	2	2	0	2	1	2	3	3	3	1	1	1
CO4	2	3	2	3	1	2	2	2	3	3	3	2	3	1
Total Score	7	9	8	7	1	7	4	10	9	10	9	4	6	3

MSU

1

7

I YEAR - SEMESTER I											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	FOOD PROCESSING AND TECHNOLOGY	ELECTIVE II	4				2	4	25	75	100
Course Outcome On completion of this course, Students will be able to CO1 (K1 & K2 – Remembering and Understanding) Explain the principles of food processing, enzyme activity, and effects of processing on food components. CO2 (K3 – Applying) Apply cereal, pulse, nut, and oilseed processing technologies and analyze their impact on nutritional and physiochemical properties. CO3 (K4 – Analyzing) Analyze fruit, vegetable, milk, egg, meat, poultry, and fish processing techniques and evaluate quality changes during storage and preservation. CO4 (K5 & K6 – Evaluating and Creating) Evaluate post-harvest technologies and practices to reduce losses and enhance shelf life of agricultural produce.											
UNIT	Contents									No.of Hours	
I	Processing of foods: Primary, secondary and tertiary processing, historical perspective, traditional technologies used in food processing. Effects of processing on components, properties and nutritional value of foods. Enzymes in Food Processing: Enzyme- Review of classification, enzyme inhibitors, enzymatic browning.									12	
II	Cereal Processing and Technology: Rice: parboiling, milling and pearling; Processing and milling of wheat, maize, barley, oats and rye. Millets: processing of millets; Cereal Products: Flours and its quality; processed products of rice, wheat and maize; By products utilization;									12	

	breakfast cereals and extrusion; Effect of processing on nutritive value of cereals; changes in physiochemical properties of cereal starch and protein due to processing. Milling process: Complete milling process, break rolls, reduction rolls, milled products and their nutritive value and applications Pulse Processing and Technology: Dals, flours, protein concentrates, isolates and hydrolysates; Byproducts utilization; Effect of processing on nutritive value and physiochemical properties of pulses. Nuts and Oil Seeds Processing and Technology: Nuts Processing methods, Oil seeds processing: Oil extraction methods and refining process; byproducts utilization; Effect of processing on nutritive value and physiochemical properties of vegetable oils.	
III	Vegetables Processing and Technology: Pigments: Classification, effects on processing of vegetables; preliminary processing of vegetables; Vegetable products: Fermented and non-fermented and its shelf life; Vegetable waste utilization; Effect of processing on nutritive value and physiochemical properties of vegetable Fruits Processing and Technology: Concept of maturity, ripening and senescence; Methods of fruit processing technologies: traditional and new methods. Fruit products: fermented and non-fermented; Effect of processing on nutritive value and physiochemical properties of fruits; Browning reactions: types and mechanism; prevention methods; Fruit waste utilization. Milk Processing and Technology: Milk types, composition, physiochemical properties; Milk processing- Separation, centrifugal process, natural creaming, pasteurization, sterilization, homogenization. Milk storage; Effects of processing on nutritive value and physicochemical properties of milk	12
IV	Egg Processing and Technology: Egg processing and storage; Effect of processing on nutritive value and physiochemical properties of eggs; changes in egg quality during storage and	12

	preservation methods. Meat Processing and Technology: Meat processing and storage; Factors influencing meat quality; Ageing and tenderization of meat. Poultry: Processing and storage of poultry meat; Preservation methods for poultry. Fish: Processing and storage; Preservation methods for fish. Effect of processing on nutritive value and physiochemical properties of meat, poultry and fish.	
V	Introduction of Post-Harvest Technology Introduction to post-harvest technology of agricultural produce; Status of Production, Losses, Need, Scope and Importance. Post-Harvest Loss- Definition, Factors contributing to Post-harvest Loss; and Technologies and Practices to reduce Post-harvest Losses.	10

TEXTBOOKS

1. Shakuntala Manay N and Shadakhsaraswamy M. (2004) Food Facts and Principles. New Age Publisher. 2nd edition.
2. Roday S. (2011). Food Science. Oxford publication. 1st edition.
3. B. Srilakshmi (2015) Food science. New Age Publishers. 6th edition. Fellows P. (2000). Food Processing Technology, 2nd Edition.
4. Woodhead Publishing Limited and CRC Press LLC. 1st edition.
5. Avantina Sharma. (2017). Textbook of Food Science and Technology. CBS Publishers and Distributes Ltd. 3rd edition.

REFERENCES

1. Rao CG. (2006). Essentials of food process engineering. PHI Learning Private Ltd.
2. Janet D Ward and Larry Ward. (2006). Principles of Food Science. Stem Publishers. 4th edition.
3. Srivastava RP and Kumar S. (2006) Fruits and Vegetables Preservation- Principles and Practices. International Book Distributing Co. 3rd edition.
4. WB Crusess. (2004). Commercial Unit and Vegetable Products.
5. W.V. Special Indian Edition, Pub Agrobios India. 2nd edition.
6. Forsythe SJ and Hayes PR (1998). Food Hygiene, Microbiology and HACCP. Gaiters burg Maryland Aspen.

7. Eskein. (2012). Biochemistry of Food. Elsevier publications. 1st edition.

E LEARNING RESOURCES:

- <http://www.fao.org/3/V5030E/V5030E00.htm><https://fmtmagazine.in/fruits-vegetables-processing-technologies/>https://www.actioncontrelafaim.org/wp-content/uploads/2018/01/technicalpaper_phl.pdf
- <https://www.nutsforlife.com.au/resource/nuts-and-processing/><https://www.fssai.gov.in/>

CO–PO–PSO Mapping (Course Articulation Matrix)

CO	POs							PSOs						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
CO1	3	2	1	1	0	0	1	3	2	1	0	0	0	0
CO2	3	3	2	2	1	1	1	3	3	2	2	1	0	0
CO3	3	3	3	3	2	1	2	3	3	3	3	2	1	1
CO4	3	3	3	3	3	2	3	3	3	3	3	3	2	2
Total Score	12	11	9	9	6	4	7	12	11	9	8	6	3	3

Level of Correlation between Cos and POs, COs and POs

0 – No Correlation

1–Low

2– Medium

3 – High

I YEAR - SEMESTER I											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	PRINCIPLES OF MENU PLANNING	Elective II	4				2	4	25	75	100
Course Outcome On completion of this course, Students will be able to CO1 (K1 & K2 – Remembering and Understanding) Explain the concepts of RDA, energy expenditure, growth, and development across different stages of life. CO2 (K3 – Applying) Describe the nutritional requirements and dietary planning for infants, preschool children, school children, adolescents, and adults. CO3 (K4 – Analyzing) Apply principles of nutrition to pregnancy, lactation, and geriatric nutrition for promoting health and well-being. CO4 (K5 & K6 – Evaluating and Creating) Evaluate nutritional problems and formulate appropriate dietary recommendations for different age groups and physiological conditions.											
UNIT	Contents									No.of Hours	
I	Recommended Allowances RDA for Indian basis for requirement, computation of allowance based on energy expenditure, components of energy expenditure. General concepts about growth and development through different stages of life.									12	
II	Preschool- Food habits and nutrient intake of preschool children. Dietary allowances and supplementary foods. School going age - , Nutritional status of school children, school lunch program, factors to be considered in planning a menu, food habits and nutritional requirement, packed lunch.									12	

III	Adolescence: Changes of growth characteristics of adolescents. Nutritional needs of the adolescents. Adults: Nutrition for adults. Basis for requirement Nutrition and work efficiency.	12
IV	Nutrition in Pregnancy ICMR Nutrient allowances, Dietary guidelines. Common nutrition related problem of pregnancy and Lactation.	12
V	Geriatric-Nutrition allowances- Dietary Guidelines—Psychosocial and economical factor, Affecting eating behavior. Infant- Rate of growth, weight as the indicator, Nutrition allowances for the infants. Breast feeding. Weaning foods suitable for infants. Premature infant and their feeding infant formulas.	10

REFERENCES

BOOKS

1. Nix. S 2016, Williams' Basic Nutrition & Diet Therapy, Fifteenth Edition, Elsevier .Simon Langley-Evans, 2015 Nutrition, Health and Disease: A Lifespan Approach 2nd Edition, Wiley Blackwell.
2. Jacalyn J. Mc Comb, Reid Norman, *et al.*, The Active Female: Health Issues Throughout the Lifespan 2010, Human Press.
3. Aleta L. Meyer and Thomas P. Gullotta., Physical Activity across the Lifespan: Prevention and Treatment for Health and Well-Being (Issues in Children's and Families' Lives), 2012, Springer.
4. Antia, F.P. 1992, Clinical Dietetics and Nutrition Oxford University Press, New Delhi.
5. Corinne, R.H. 1996, Normal and therapeutic nutrition, Mcmillan Co., New York. Davidson, S.R. and Passmore J.F., 1989, Human Nutrition and Dietetics, ELBS London.
6. Mahan, K.L., and Stump, S.E., 1996, Krauses Food, Nutrition and Diet therapy M.B. Saunders Co., USA.
7. Balasubramanian *et al.*, 1998, Dietary guidelines for Indians, ICMR, New Delhi. Passmore, AH and Adams, A.A., 1990, Clinical assessment of nutritional status – A working manual, and Wilson Publishing, London.
8. Bamji *et al.*, (1996), Textbook of Human Nutrition Oxford and IBH Publishing co.

Pvt. Ltd. Delhi.

9. Shils. E.M, Shike .M, Ross.A. C, Cabellero. B and Cousins. R.J (2011) Modern Nutrition in Health and Disease, Eleventh Edition, Lippincott Williams and Wilkins, Philadelphia.
10. Mahan, K.L., and Stump,S.E.,1996,KrausesFood,Nutritionand Diet therapy M.B. Saunders Co., USA.

E-LEARNINGRESOURCES

- ❖ www.four-h.purdue.edu
- ❖ www.ingenta.connect.com
- ❖ nal.usda.gov/fnic/lifecycle

CO–PO–PSO Mapping (Course Articulation Matrix)

CO	POs							PSOs						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
CO1	3	2	1	1	0	0	1	3	2	1	0	0	0	0
CO2	3	3	2	1	1	0	1	3	3	2	1	1	0	0
CO3	3	3	3	2	2	1	1	3	3	3	2	1	1	0
CO4	3	3	3	3	3	2	3	3	3	3	3	3	2	2
Total Score	12	11	9	7	5	3	5	12	11	9	6	4	2	1

Level of Correlation between Cos and POs, COs and POs

0 – No Correlation

1–Low

2– Medium

3 – High

YEAR I- SEMESTER I											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	FOOD PROCESSING AND TECHNOLOGY PRACTICAL	Skill Enhancement Course [SEC] NME-1			4		2	4	50	50	100
Course Outcome On completion of this course, Students will be able to CO1 (K1 & K2 – Remembering and Understanding) To develop the skill to analyze the quality like sugar such as jam, jelly etc. CO2 (K3 – Applying) To explain the fermentation process such as canning and bottling unit. CO3 (K4 – Analyzing) To analyze the technologies in food Preservation. CO4 (K5 & K6 – Evaluating and Creating) To discuss preservation of foods by salt and acids. To evaluate the novel technologies in food preservation.											
UNIT	Contents									No.of Hours	
	1. Refrigeration and Freezing of Fruits and Vegetables. 2. Refrigeration and Freezing Meat and Fish. 3. Sun Drying 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. Total									60	

CO–PO–PSO Mapping (Course Articulation Matrix)

	Food Processing and Technology Practical													
CO	POs							PSOs						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
CO1	3	2	1	2	1	1	2	3	2	1	2	1	2	2
CO2	2	3	2	3	2	1	2	2	3	2	3	2	2	2
CO3	2	3	3	2	2	2	3	2	3	3	2	2	3	3
CO4	2	3	3	3	3	3	3	2	3	3	3	2	3	3
Total Score	9	11	9	10	8	7	10	9	11	9	10	8	10	10

Level of Correlation between Cos and POs, COs and POs

0 – No Correlation

1–Low

2– Medium

3 – High

7
YEAR I- SEMESTER II

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	ADVANCED DIETETICS	Core-IV	6				5	6	25	75	100

Course Outcome

On completion of this course, Students will be able to

CO1 (K1 & K2 – Remembering and Understanding)

Critique the Nutritional screening technique

CO2 (K3 – Applying)

Comprehend the current concepts of therapeutic diets and critically ill

CO3 (K4 – Analyzing)

Implement the dietary principles on various disorders.

CO4 (K5 & K6 – Evaluating and Creating)

Acquire the knowledge of diet counseling skills.

Apply the dietary principles to manage the lifestyle Disorders in the society

UNIT	Contents	No.of Hours
I	- Nutritional screening, Nutritional care process, Nutritional Assessment, Nutritional diagnosis, Nutritional Intervention, Monitoring and evaluation. - Basic concepts of diet therapy –Therapeutic adaptations of Normal diet, Principles and classification of therapeutic diets. Routine Hospital diets – Regular, soft, fluid diet - Nutritional Management in critical care -Nutritional screening and nutritional Status assessment of critically ill, Nutritional requirement according to the critical condition - Nutritional support systems: Enteral and parenteral nutrition support-Types, composition and complications.	12
II	Medical Nutrition therapy for gastrointestinal and liver disorders	12

	Upper Gastrointestinal tract Diseases – Nutritional care and diet therapy in Diseases of oesophagus- Oesophagitis, Gastroesophageal reflux disease [GERD] and Hiatus hernia. - Disorders of stomach: Indigestion, Gastritis, Gastric and duodenal ulcers, and dumping syndrome - Lower gastrointestinal tract Diseases/Disorders-Common Symptoms of Intestinal dysfunction-Flatulence, constipation, haemorrhoids, diarrhoea, steatorrhoea, Diseases of the large intestine-Diverticular disease, Irritable bowel syndrome, inflammatory bowel disease - Diseases of Small intestine- Celiac disease, tropical sprue, intestinal brushborder enzyme deficiencies. - Diseases of the Liver- hepatitis, hepatic coma, cirrhosis, cholecystitis, cholelithiasis and pancreatitis, Zollinger Ellison syndrome and biliary dyskinesia.	
III	- Medical Nutrition therapy for Pulmonary disease-Effect of Malnutrition on pulmonary system, effect of pulmonary disease on nutritional status, chronic pulmonary diseases-Asthma, cystic fibrosis, chronic obstructive pulmonary disease and Pneumonia- Pathophysiology and dietary management. - Medical Nutrition therapy for Rheumatic disease- Etiology, Pathophysiology of Inflammation of Rheumatic diseases, Rheumatoid Arthritis, Osteoarthritis and Sjögren's syndrome. - Nutritional management of physiological stress- Classification, Complications, Metabolic changes in protein and electrolytes and Dietary management of burns, dietary management of trauma and stress.	12
IV	- Nutritional Management on Weight imbalance -Regulation of food intake and pathogenesis of obesity and malnutrition and starvation; Weight Imbalance: prevalence and classification. - Underweight-Etiology and Dietary management; Obesity-Etiology, classification, Energy balance, dietary modifications and Bariatric surgery-types and dietary modifications of pre and post bariatric surgery. - Nutritional Management in metabolic disorders- Prevalence, Etiology, risk	12

	factors, complications and dietary modifications of diabetes mellitus.	
V	- Nutritional management of cardiovascular diseases-etiolo gy, risk factors, clinical features and dietary modifications of Dyslipidemias, Atherosclerosis, Hypertension, Ischemic heart disease, Congestive cardiac failure. - Nutrition Management of Renal Disease -Etiology, Clinical and metabolic manifestations, Diagnostic tests, Types-Glomerulonephritis, Nephrotic syndrome, Renal Failure: Acute and chronic, ESRD, Nephrolithiasis and Dietary modifications. - Nutritional management in cancer- Pathogenesis and progression of cancer, types, Symptoms and Dietary management.	10
	•	

TEXT

BOOKS:

1. Mahan L.K., Sylvia Escott-Stump.(2000). Krause's Food Nutrition and Diet Therapy. W.B. Saunders Company London. 10th edition.
2. B. Srilakshmi. (2007).Dietetics. K.K. Gupta For New age International Pvt. Ltd. New Delhi Publisher.
3. Antia F.P. and Philip Abraham.(2001).Clinical Nutrition and Dietetics. Oxford Publishing Company.
4. Passmore P. and M.A. East Wood. (Digitised in 2010).Human Nutrition and Dietetics. Churchill Living Stone.
5. S.R.Mudambi and M.K. Rajagopal. (2009). Fundamentals, Food Nutrition and Diet therapy. New Age Publishers. 5th edition.
6. Robinson Ch., M.B. Lawlea, W.L., Chenoweth, and A.E., Carwick.(1990). Basic Nutrition and Diet therapy, Macmillan Publishing Company.

REFERENCES:

- Garrow JS, James WPT, Ralph A.(2000). Human Nutrition and Dietetics. Churchill Livingstone, NY. 10th edition.
- Groff L James, Gropper S Sareen.(2000).Advanced Nutrition and Human Metabolism. West / Wadsworth, UK. 3rd edition.
- Sue Rodwell Williams. (1993).Nutrition, Diet Therapy. W.B.Saunders Company London. 7th edition.

- Whitney, E.N. and C.B. Cataldo.(1983).Understanding Normal and Clinical Nutrition. West Pub. S1. Paul.

E-LEARNING RESOURCES:

- www.nutrition.gov-ServiceofNationalagricultural library,USDA.
- www.nal.usda.gov/fnic-Food and Nutrition informationcentre.
- www.healthy eating.org.
- www.eatright pro.org.<https://www.globalhealthlearning.org>.

CO–PO–PSO Mapping (Course Articulation Matrix)

	Advanced Dietetics													
CO	POs							PSOs						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
CO1	3	3	2	2	1	2	2	3	3	2	2	1	2	2
CO2	3	3	3	3	2	2	2	3	3	3	3	2	2	2
CO3	2	3	3	2	3	3	3	2	3	3	2	3	3	3
CO4	2	3	3	2	3	3	3	2	3	3	2	3	3	3
Total Score	10	12	11	9	9	10	10	10	12	11	9	9	10	10

Level of Correlation between Cos and POs, COs and POs

0 – No Correlation

1–Low

2– Medium

3 – High

I YEAR - SEMESTER II											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	MICRONUTRIENTS	Core-V	6				5	6	25	75	100
Course Outcome On completion of this course, Students will be able to CO1 (K1 & K2 – Remembering and Understanding) Explain the distribution, functions, requirements, food sources, deficiency disorders, toxicity symptoms, and recent advances related to macro minerals, micro minerals, trace minerals, and vitamins. CO2 (K3 – Applying) Apply the knowledge of micronutrient requirements, food sources, nutrient interactions, functional foods, nutraceuticals, and antioxidants in promoting health and preventing nutritional deficiencies. CO3 (K4 – Analyzing) Analyze the role of micronutrients in physiological functions, disease prevention, immune function, antioxidant defense mechanisms, and food-drug interactions. CO4 (K5 & K6 – Evaluating and Creating) Evaluate micronutrient-related health issues, nutritional deficiencies, toxicities, and dietary interventions and formulate appropriate nutritional strategies for improving health and nutritional status.											
UNIT	Contents									No.of Hours	
I	Distribution in the body; functions, effects of deficiency, food sources, requirement and recent research of macro minerals - Calcium, Phosphorous, Magnesium, Potassium, Sodium and Chloride.									12	
II	Distribution in the body, functions, food sources, requirement deficiency, toxicity and recent research of micro minerals and trace minerals. Micro minerals - – iron, zinc, fluoride, copper, iodine and manganese. Trace Minerals									12	

	-Selenium, cobalt, chromium, silicon, boron and nickel, Selenium and Vitamin E relationship, Chromium and glucose tolerance factor.	
III	Distribution in the body, functions, food sources, requirement deficiency, toxicity and recent research of Fat Soluble Vitamins A,D,E and K	12
IV	Distribution in the body, functions, food sources, requirement deficiency, toxicity and recent research of Water soluble vitamins – Water soluble vitamins: vitamin C, Thiamine, Riboflavin, niacin, pantothenic acid, biotin, folic acid, vitamin B12, vitamin B 6, choline and inositol.	12
V	Immuno-nutrients and Antioxidants Definition, Classification and function of functional food and nutraceuticals. Antinutrients present in various food groups – Cereals , legumes and nuts and oilseeds Food and drug interaction.	10

TEXT BOOKS

1. Guthrie, H.A. (2001) – “Introductory Nutrition”, Tenth edition, C.V. Mosby Company, St. Louis.
2. Bogert, J.G.V., Briggs,D.H, Calloway, (2000). “ Nutrition and physical fitness”, 11th edition W.B. Saunders Co., Philadelphia, London, Toronto.
3. Wardlaw, G.M and Kessel, M, (2002) “ Pererspective in Nutrition”, 5th edition, Mc Graw Hill, New York, New Delhi.
4. Willium, S. R. (2000), “ Nutrition and Diet Therapy”, Mosby Co., St. Louis.
5. Sizer, F.S and Whitney E. R. (2003), “ Nutrition , Concepts and Controversies” 9th edition, Thomas Wadsworth, Australia.

REFERENCES

1. Brown, J.E. (2002), “Nutrition Now”, 3rd edition, Wadsworth Thomson Learning New York.
2. Maurice, E. Shils, James A. Obson, Moshe shike, (2000), “ Modern Nutrition in Health and Disease”, 8th Edition, Vol I and II, Lea &Febiger.
3. Philadelphia, A Waverly Company.
3. Mahan L.K. and Stamp, S.E (2000), “Krause’s Food Nutrition and Diet Therapy”, 11th edition, W.B. saunder’s Company, Philadelphia.
4. Toteja, G.S and Singh P (2004), “ Micronutrient Profile of Indian Population”, ICMR Publication, New Delhi.
5. D. M. Swaminathan (2002), “ Principles of Nutrition and Dietetics”, BAPPCO, 88, Mysore Road

Bangalore – 560 018.

E-LEARNING RESOURCES

1. <https://www.udemy.com/share/1027yA/>
2. WHO | The e-learning platform Nutrition Knowledge Hub launchWFP Nutrition's Learning Platform - UN World Food ProgrammeNutrition Online Courses | Coursera
3. E-Learning Programs (nestlenutrition-institute.org)
4. WFP Nutrition's Learning Platform | Humanitarian Library

CO–PO–PSO Mapping (Course Articulation Matrix)

CO	POs							PSOs						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
CO1	3	1	1	1	1	1	0	3	1	1	1	0	1	0
CO2	2	2	3	1	1	2	1	3	2	3	2	1	1	1
CO3	2	3	2	2	1	2	1	2	3	3	3	2	2	1
CO4	2	3	3	3	2	2	1	2	3	3	3	3	3	1
Total Score	9	9	9	7	5	7	3	10	9	10	9	6	7	3

Level of Correlation between Cos and POs, COs and POs

0 – No Correlation

1–Low

2– Medium

3 – High

YEAR I- SEMESTER II											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	ADVANCED DIETETICS PRACTICAL	CORE VI			6		4	6	50	50	100
Course Outcome On completion of this course, Students will be able to CO1 (K1 & K2 – Remembering and Understanding) Evaluate various therapeutic diets CO2 (K3 – Applying) Identify the requirements for disease conditions and critically ill patients. CO3 (K4 – Analyzing) Assess and plan the diets for various disease conditions. CO4 (K5 & K6 – Evaluating and Creating) Create Knowledge in nutrient calculations and dietary principles. Design the personalized diets for different individuals in the society											
UNIT	Contents										
	1. Routine hospital diet: Regular diet, clear liquid, soft diet, Full liquid diet and Planning and preparing Enteral feed plan [8 hrs]. 2. Assessing requirements and planning diet for obese and underweight individual [6 hrs] 3. Planning and preparing diet for Diabetes Mellitus [IDDM and NIDDM] [6hrs]. 4. Planning and preparation of diet for Atherosclerosis with hypertension [6hrs] 5. Assessing and planning diets for the following conditions [13hrs] -Celiac disease -Lactose intolerance. -GERD -Peptic ulcer -Hepatitis										

	-Cirrhosis
	6. Planning and preparing diet for Pneumonia [6 hrs]
	7. Planning and preparing diet for Rheumatic arthritis [6hrs]
	8. Planning and preparation of diet for Glomerulonephritis [6hrs]
	9. Planning and preparation of diet for cancer according to the condition. [6 hrs]
	10. Planning and Preparing diet for pre and post Bariatric surgery patients. [6 hrs]
	11. Assessment and planning diet for post burn condition. [6 hrs].

TEXT BOOKS:

- Stump SE. (2012). Nutrition and diagnosis related care. Lippincott Williams and Wilkins. Canada. 7th edition.
- Width. M & Reinhardt. T. (2018). The Essential Pocket Guide for Clinical Nutrition. Wolters Kluwer Publishers. 2nd edition.
- Whitney EN and Rolfes SR. (2002). Understanding Nutrition, 9th edition, West/Words worth. Guthrie H. (2002). Introductory Nutrition. CV Mosby Co. St. Louis. Elia M, Ljungqvist O, Stratton RJ, Lanham SA. (2013). Clinical Nutrition.
- The Nutrition Society Textbook. Wiley Blackwell Publishers. 2nd edition. Mitch, W. and Ikizler, Alp. (2010). Handbook of Nutrition and the Kidney. Lippincott Williams and Wilkins, New Delhi. 6th edition.

REFERENCES:

- Gopalan C., Ram Sastri B.V. and Balasubramaniam S.C. (2006). Nutritive Value of Indian Foods. Hyderabad, National Institute of Nutrition. Indian Council of Medical Research.
- Clinical Dietetics Manual. (2018). Indian Dietetic Association. 2nd edition. Peggy Stanfield. Y.H. Hui. (2010). Nutrition and Diet therapy. Jones and Bartlett publishers.
- William's. (2012). Basic Nutrition and Diet therapy. 14th Edition.

E-LEARNING RESOURCES:

www.nutrition.gov-Servic eof National agricultural library, USDA.

www.nal.usda.gov/fnic-Food and Nutrition information Centre.

www.healthyeating.org.

www.eat right pro.org.

<https://www.global health learning.org>.

CO–PO–PSO Mapping (Course Articulation Matrix)

	Advanced Dietetics Practical													
CO	POs							PSOs						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
CO1	2	3	3	3	2	3	3	3	3	3	2	3	3	3
CO2	2	3	3	2	3	3	3	2	3	3	2	3	3	3
CO3	2	3	3	2	3	3	3	2	3	3	2	3	3	3
CO4	2	3	3	3	3	3	3	2	3	3	3	3	3	3
Total Score	8	12	12	10	11	12	12	8	12	12	10	12	12	12

Level of Correlation between Cos and POs, COs and POs

0 – No Correlation

1–Low

2– Medium

3 – High

I YEAR - SEMESTER II											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	RESEARCH METHODS IN NUTRITION	Elective- III	4				3	4	25	75	100

Course Outcome

On completion of this course, Students will be able to

CO1 (K1 & K2 – Remembering and Understanding)

Demonstrate knowledge of the scientific method, purpose and approaches to research and Become a qualified researcher.

CO2 (K3 – Applying)

Identify and selection of the research sampling and scales of measurement

CO3 (K4 – Analyzing)

Understand the types of tools applicable to research problem and develop skills of preparing out line of research work and construct common data collection tools

CO4 (K5 & K6 – Evaluating and Creating)

Assess the numerical data for providing statistical evidences to support the research results and interpretation of data with the use of tables and pictorial representations

Present research data in a scientific manner and Understand the key elements of a research report and various applications of computer in Nutrition research.

UNIT	Contents	No.of Hours
I	Foundation of Nutrition Research Meaning, Objectives and Classification of Research – Exploratory, Descriptive – Longitudinal and Cross sectional, Observation-Participant and Non-participant, Epidemiological Surveillance, Retrospective, INVIVO, INVITRO and Experimental – Pre-Experimental, Quasi Experimental, True Experimental and Statistical Experimental designs. Need of Research in Food Science and Nutrition Research Process-	12

	Selection and Formulation of Research Problem Objectives of Research: Explanation, Control and Prediction Hypothesis: Definition, Importance, Types and Errors- I&II Deciding Variables	
II	Sampling and Sample Design Sampling Process and Characteristics of good Sampling Classification of Sampling Techniques- Probability and Non Probability Sampling Preparation of Laboratory Food Samples Sampling and Non-Sampling Errors Measurements and Scaling- Fundamental and Comparative Scales– Meaning and types • Nominal Scale • Ordinal Scale • Interval Scale • Ratio Scale Non comparative Scales–Meaning and types • Continuous Rating Scale • Itemized Rating Scale • Likert Scale • Semantic Differential Scale • Stapel Scale	12
III	Data Collection and Preparation Data Collection Tools-Primary Data • Interviews-structured and unstructured • Case studies • Questionnaire • Surveys–Pilot &KAP Secondary Data • Published Sources • Unpublished Sources • Reliability and Validity of Tools–Meaning Data Preparation Process–	12

	• Editing • Coding • Classification • Tabulation	
IV	Statistical Methods Parametric and Non-Parametric tests–Difference and Applications Data Analysis Process- Descriptive Analysis- • Graphical and Diagrammatic Presentations • Central Tendency– Mean, Median & Mode • Dispersion-Standard Deviation Statistical Inference–Tests of Hypothesis • t – test • ANOVA– One Way & Two Way • Chi-square test–Goodness of Fit & Test of Independence	12
V	Reporting the Findings and Computer Applications Report Writing– • Importance • Types • Mechanics • Guidelines and Precautions • End Notes- Bibliography, Appendices, Footnotes and Glossary of terms Computer applications in nutrition research-importance and uses Applicable Statistical Analysis Software- • Literature Searching- Pub Med • Data Analysis- Micro Soft Excel, SPSS, Minitab • Plagiarism Checker–Turnitin, Scribbr	10

TEXTBOOKS

- Kothari CR (2004). Research Methodology– Methods & Methodology. Delhi, New Age International Pvt Ltd. 2nd Ed
- Chawla, Deepak and Neena Sondhi (2018): Research Methodology

- Concepts and Cases. Noida, Vikas Publishing House Pvt Ltd. 2nd Ed.
- Gupta, SP(2019). Statistical Methods. New Delhi. S Chand & Sons. 45th Ed.
- Copper, H.M. (2002). Integrating Research: A guide for literature reviews. California: Sage, 2nd Edition.
- Kerlinger, Foundation of Educational Research Ingle P.O. Scientific Report Writing. Nagpur, Sarla P. Ingle.

REFERENCES

- Ranjit Kumar (2011). Research Methodology: a step-by-step guide for beginners, SAGE Publications. 3rd edition.
- Anderson, David R and *etal.*, (2013): Statistics for Business and Economics. Delhi, Cengage Learning India Pvt Ltd. 11th Ed.
- Bandarkar, P.L. and Wilkinson T.S. (2000): Methodology and Techniques of Social Research. Himalaya Publishing House, Mumbai.
- Bell, Judith (2005): Doing your Research Project– A guide for first time researchers in education, health and social science. England, Open University Press. 4th Ed.
- Danial, Wayne W and Chad L Cross (2017): Biostatistics – Basic Concepts and Methodology for the Health Sciences – International Student Version. New Delhi, ArEmm International, 10th Ed.

CO–PO–PSO Mapping (Course Articulation Matrix)

	Research Methods in Nutrition													
CO	POs							PSOs						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
CO1	3	3	3	2	2	2	3	3	3	2	2	2	3	3
CO2	3	3	3	3	2	2	3	3	3	3	2	2	2	3
CO3	2	3	3	3	3	2	3	2	3	3	3	3	3	3
CO4	2	3	2	3	3	3	3	2	3	2	3	3	3	3
Total Score	10	12	11	11	10	9	12	10	12	10	10	10	11	12

Correlation

1–Low

2– Medium

3 – High

0 – No

YEAR - SEMESTER II										
Subject		Category	L	T	P	S	Credits	Inst.	Marks	

Code	Subject Name							Hours	CIA	External	Total
	HUMAN FACTOR AND ERGONOMICS	ELECTIV-III	4				3	4	25	75	100

Course Outcome

On completion of this course, Students will be able to

CO1 (K1 & K2 – Remembering and Understanding)

Explain the concepts, principles, scope, and physiological foundations of ergonomics, anthropometry, work physiology, posture, workload, and cardio-respiratory fitness in occupational and household settings.

CO2 (K3 – Applying)

Apply ergonomic principles, anthropometric measurements, posture assessment techniques, workload evaluation methods, and fitness assessment procedures to improve work efficiency and occupational well-being.

CO3 (K4 – Analyzing)

Analyze work postures, job requirements, physiological responses, energy expenditure, workload, and fitness parameters to identify ergonomic risks and their impact on health and performance.

CO4 (K5 & K6 – Evaluating and Creating)

Evaluate ergonomic conditions, workplace design, workload patterns, and physical fitness parameters and recommend appropriate ergonomic interventions for enhancing safety, productivity, and occupational health.

UNIT	Contents	No.of Hours
I	Introduction to Ergonomics - Definition, History and evolution. Scope of Ergonomics in home and other occupations, Nature of work in household and other occupations, Human Body and Work: Physiology of Neuromuscular 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.	12
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.	12

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	12
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	12
V	Cardio-Respiratory Fitness- Anthropometric measurements and Physical Fitness Index, Body composition - body fat % , Body surface area, lean body mass by skin fold method and Somato typing. Maximum aerobic capacity using modified Harvard test (Queens college test), Determination of workload using heart rate and oxygen consumption-Tread mill, steps tool, Heart rate and oxygen consumption, Pulserate, Time and motion study. Energy cost. Assessment of Physical work capacity(PWC)	10

TEXT BOOKS

1. Sanders, M. S., & McCormick, E. J. (1993). Human factors in engineering and design (7th ed.). McGraw-Hill. Wickens,
2. D., Gordon, S. E., & Liu, Y. (2003). An introduction to human factors engineering (2nd ed.). Pearson Education.
3. Tillman, B., Tillman, P. M., & Tillman, T. A. (2016). Human factors and ergonomics design handbook (3rd ed.).
4. McGraw-Hill Education. Kroemer, K. H. E., Kroemer, H. J., & Kroemer Elbert, K. E. (2001). Ergonomics: How to design for ease and efficiency (2nd ed.). Prentice Hall.
5. Proctor, R. W., & Van Zandt, T. (2018). Human factors in simple and complex systems (3rd ed.). CRC Press.

REFERENCES

1. Astrand P.O. and Rodahl K.: Textbook of Work Physiology, McGraw Hill, New.
2. Davies D.R. and Shingleton V.J.: Physiology of work, Motunen & Co. Ltd.
3. Osborne David: Ergonomics at work, John Wiley and sons, New York.
4. Dul Jan and Weedmester Bernard: Ergonomics for Beginners, Tylor and Francis, London. York
5. Wilson J.R. and Corlett N.: Evaluation of Human Work. A Practical Ergonomics Methodology. Tylor and Francis, London.
6. Pheasant Stephen: Body space, Anthropometry, Ergonomics and the Designs at work, Taylor & Francis, London.

CO–PO–PSO Mapping (Course Articulation Matrix)

CO	POs							PSOs						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
CO1	3	1	1	1	1	1	0	2	1	1	1	0	1	0
CO2	2	2	3	1	1	2	1	2	2	3	3	1	1	1
CO3	2	3	2	2	1	2	1	2	3	3	3	2	2	1
CO4	2	3	3	3	2	2	1	2	3	3	3	2	3	1
Total Score	9	9	9	7	5	7	3	8	9	10	10	5	7	3

Level of Correlation between Cos and POs, COs and POs

0 – No Correlation

1–Low

2– Medium

3 – High

I YEAR - SEMESTER II											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	PERSPECTIVES OF HOME SCIENCE	ELECTIVE-IV	4				3	4	25	75	100
Course Outcome On completion of this course, Students will be able to CO1 (K1 & K2 – Remembering and Understanding) Understand the concept of Extension Education and its importance CO2 (K3 – Applying) Comprehend the key aspects of human growth and development and realize the importance of mastering developmental tasks of each life span stage CO3 (K4 – Analyzing) Understand the basic concepts of Textile and Clothing CO4 (K5 & K6 – Evaluating and Creating) List personal goals and values, set living standards. Understand the meaning of Guidance and Counseling and Career perspectives in Home Science											
UNIT	Contents									No.of Hours	
I	Extension Education - Meaning, Definition, objectives, characteristics, principles - Extension teaching methods-types and methods - Qualities of a good Extension Worker - Communication, Innovation and Social change									10	
II	Human Development - Growth, Development, Maturation and Learning - Principles and Developmental stages & Task - Parental Disciplinary Techniques–merits and demerits - Early Childhood Education–Objectives. Types of Nursery Schools. - Exceptional children–Deaf, Blindness, Physical Impairment, Mental									10	

	Retarded and Giftedness, Rehabilitation.	
III	Textiles and Clothing • Classification and General Properties textile fibers. • Processing and manufacture of Cotton, Silk, Wool and Rayon fibers. • Yarn: Classification. • Fabric construction -woven, non-woven and knitted fabric • Clothing: selection for the family.	10
IV	Family Resource Management • Home Management –Meaning, objectives and process • Resources-Classification and characteristics • Time, Money and Energy management • Decision making-Steps and Methods of resolving conflicts • Work simplification-Importance of work simplification. Mundel's classes of Change • Principles and Elements of Interior design, various colors and color schemes.	10
V	Guidance and Counseling • Meaning, nature, types and scope of guidance and counseling • Various steps and techniques of Guidance and counseling • Need and importance of educational guidance.	8

TEXT BOOKS:

1. Jha, J.K. (2002). Encyclopedia of Teaching of Home Science, Vol. I, II and III. New Delhi: Anmol Publications.
2. Suriakanthi. A., (2002). Child Development- An Introduction, Gandhigram: Kavitha Publications.
3. Srilakshmi. B. (2015). Food Science. NewDelhi. New Age International Pvt. Ltd. PremlataMullick (2016), 4TH edition, Kalyani Publishers.

REFERENCES:

1. Serene and Ahla wat Santos Shekhar (2013), Textbook of Home Science Extension Education.
2. Tami James Moore and Sylvia M. Asay (2008), Family Resource Management, Sage Publications.
3. Diane E. Papalia (2004), 9th edition, Human Development, McGraw Hill India.
4. Rani K. Sudha and Srivastava Sushila, Textbook of Human Development: A lifespan development approach, S. Chand & Co Ltd.

CO–PO–PSO Mapping (Course Articulation Matrix)

	PERSPECTIVES OF HOME SCIENCE													
CO	POs							PSOs						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
CO1	3	2	3	2	3	2	2	3	1	1	2	2	2	2
CO2	3	3	2	2	2	3	3	1	3	2	2	3	2	3
CO3	3	2	3	3	1	2	2	1	1	3	2	1	3	2
CO4	2	3	3	2	3	2	3	2	2	2	3	2	2	3
Total Score	11	10	11	9	9	9	10	7	7	8	9	8	9	10

Level of Correlation between Cos and POs, COs and POs

0 – No Correlation

1–Low

2– Medium

3 – High

I YEAR - SEMESTER II											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	HOSPITAL ADMINISTRATION	Elective IV	4				3	4	25	75	100
Course Outcome On completion of this course, Students will be able to CO1 (K1 & K2 – Remembering and Understanding) Distinguish between the types of hospitals and the departments and their organizational structure. CO2 (K3 – Applying) Describe the code of ethics followed in hospitals and Explain the roles and responsibilities of health professionals CO3 (K4 – Analyzing) Recall legal laws and identify medical malpractices and Evaluate the quality and safety in hospitals through use of appropriate measures CO4 (K5 & K6 – Evaluating and Creating) Analyze the budgeting and fund flow management in hospitals. Discuss the National Health policy and community based health development in rural areas.											
UNIT	Contents									No.of Hours	
I	Introduction to Hospital Administration: Concept of Hospitals, Different types of Hospitals, Problems and constraints in different types of Hospitals, History of Hospital Development, Department and organization structure of different types of hospitals.									12	
II	Code of Ethics, Duties of Healthcare professionals - Doctors, Nurses, Nutritionists, and Dietitians (in brief) to their patients, professional large, profession in consultation, and to the community - Breach of ethics and code of conduct.									12	
III	Legal framework in Hospitals, Patient’s rights & provider’s responsibility: Medical Malpractices, Disciplinary Action, Management of Hazard and Safety in a Hospital Setup, Bio-Medical Waste Management - Benefits of Health Insurance and Managing Health Care, Medical audit to meet legal requirements of Hospitals									12	

IV	Accounting and financial Management in Hospitals: Principles, analysis and interpretation of financial reports, Preparation and use of budgets, Capital budgeting, Fund flow management, and budgetary control.	12
V	Health Planning & Management: National Health Policy, Provision of medical care, Primary healthcare, Health for All, Encouragement of indigenous systems of medicine, Process of health planning in India.	10

REFERENCES

1. Davidson S.R. and Passmore J.F., 1975, Human Nutrition and Dietetics. Vol. I, II Edition.
2. Francis, C.M and D'Souza, M.C., 2000, Hospital Administration. Jay Brothers.
3. Gillespie S. Mc Nei G., 1992, Hospital Management Macmillan and Co., New York.
4. Mitchell *et al.*, 1987, Nutrition in Health & disease, Pitman M. Edu. Publishing Co.
5. Robinson *et al.*, 1986, Normal and Therapeutic Nutrition. Macmillan Co., New York.

E-LEARNING RESOURCES

1. www.ingenta.connect.com-Food and Food ways.
2. www.fda.gov/search.html
3. www.wodswrth.com/nutrition
4. www.elsevier.com-IndianJournal of Nutrition and food microbiology.

CO–PO–PSO Mapping (Course Articulation Matrix)

CO	POs							PSOs						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
CO1	3	1	1	2	1	2	3	1	1	1	1	2	2	0
CO2	3	1	2	3	1	3	2	1	2	1	1	2	3	0
CO3	2	3	3	2	3	2	2	2	3	3	2	2	2	3
CO4	2	3	3	2	2	3	2	2	3	3	3	2	2	3
Total Score	10	8	9	9	7	10	9	6	9	9	7	8	9	6

Level of Correlation between Cos and POs, COs and POs

0 – No Correlation

1–Low

2– Medium

3 – High

I YEAR - SEMESTER I											
Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	FOOD QUALITY CONTROL	SEC-NME I	4				2	4	25	75	100
Course Outcome On completion of this course, Students will be able to CO1 (K1 & K2 – Remembering and Understanding) Explain the principles of food quality control, quality attributes, methods of food quality evaluation, food contaminants, food preservatives, food laws, standards, and regulatory requirements governing food safety. CO2 (K3 – Applying) Apply quality evaluation techniques, food safety regulations, food standards, and licensing procedures to assess food quality and ensure compliance with food safety requirements. CO3 (K4 – Analyzing) Analyze food contaminants, adulterants, preservatives, quality defects, and food safety hazards and examine their impact on food quality and consumer health. CO4 (K5 & K6 – Evaluating and Creating) Evaluate food quality and safety management systems, regulatory frameworks, and quality assurance measures and recommend suitable strategies for ensuring safe and high-quality food products.											
UNIT	Contents										No.of Hours
I	INTRODUCTION TO FOOD QUALITY 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, micro biological methods of quality evaluation. General testing conditions – quantitative difference tests – designing of questionnaire (or) evaluation of scorecard.										12
II	FOOD CONTAMINANTS Food contaminants: Naturally occurring toxicants, anti-nutritional factors in foods.										12

	Environmental containments: Biological contaminants, Pesticide residues, veterinary drug residues and heavy metals.	
III	FOOD PRESERVATIVES Direct Additive: Preservatives, Nitrate, Nitrite, and N-nitroso compounds. Indirect Additives, Anti- microbial and veterinary drugs, pesticides, poly halogenated aromatic hydrocarbons, polycyclic aromatic hydrocarbons. Other organic residues, packing materials, heavy metals, Radio nuclides in foods.	12
IV	FOOD LAWS Common adulterants – tests to detect adulterants, Government and trade standards for quality – food laws and regulations – PFA, FPO and APEDA- BIS standards – AGMARK standard – International Standards for export. HACCP- Food safety system.	12
V	LICENSING AND REGISTRATION Laws and regulations for setting up a processing unit. FSSAI rules and regulations, FSSAI Licence, Registration, FSSAI in Food safety and Standards	12

REFERENCES:

1. Giridarilal Sidappa, G.S., and Tandon, G.L. (1979) Preservation of fruits and vegetables, ICAR, New Delhi. FPO (1955), Quality Control.
2. Horace, D. Graham, 1980, the safety of foods, 2nd End, AVI publishing Co.Inc, Westport. Julie Miller Jones, 1992, Food Safety, Eagan Press
3. Lewis M.J. 1987, Physical properties of food and processing system, Ellis Harwood Ltd., England.
4. Picgott, J.R, 1984, Sensory Analysis of Foods, Elsevier Applied Science Publisher, NewYork.

E -LEARNING RESOURCES:

1. www.fda.gov
2. www.fsis.usda.gov
3. www.ifqa.com
4. www.ift.org
5. www.fao.org/fao-who-codexalimentarius

CO–PO–PSO Mapping(Course Articulation Matrix)

CO	POs							PSOs						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
CO1	3	1	1	1	1	2	0	3	1	1	1	0	1	0
CO2	2	2	3	1	1	2	1	3	2	3	2	1	1	1
CO3	2	3	2	2	2	2	1	2	3	3	3	2	2	1
CO4	2	3	3	3	2	3	1	2	3	3	3	3	3	1
Total Score	9	9	9	7	6	9	3	10	9	10	9	6	7	3

Level of Correlation between Cos and POs, COs and POs

0 – No Correlation

1–Low

2– Medium

3 – High