



MANONMANIAM SUNDARANAR UNIVERSITY

TIRUNELVELI – 12

M.SC., DIETETICS AND FOOD MANAGEMENT

TAMILNADU STATE COUNCIL FOR HIGHER EDUCATION,

CHENNAI – 600 005

FROM THE ACADEMIC YEAR 2023 – 2024 onwards

M.Sc., DIETETICS & FOOD MANAGEMENT

SEMESTER - I

Course status	Course Title	Credits	Hours
Core-I	Advanced Food Science	5	6
Core –II	Advanced Human Physiology	5	6
Core-III	Macronutrients	4	6
Core- I Practical	Advanced Food Science practical	2	4
Elective - I	Food processing and Technology/ Principles of Menu Planning	2	4
Elective - II	Food Processing and Technology- Practical	2	4
	Total	20	30

SEMESTER - II

Course status	Course Title	Credits	Hours
Core IV	Research Methods in Nutrition	5	6
Core V	Therapeutic Dietetics	5	6
Core VI	Therapeutic Dietetics- Practical	4	6
Elective III	Sports Nutrition	3	4
Elective IV	Functional Foods and Health	3	4
Skill Enhancement Course [SEC] - I NME	Nutrition in Special Condition	2	4
	Total	22	30

SEMESTER - III

Course status	Course Title	Credits	Hours
Core VII	Micronutrients	5	6
Core VIII	Food Microbiology	5	6
Core IX	Nutritional Biochemistry	5	6
Core X (Industry Module)	Techniques in Food Analysis	4	6
Elective V	Perspectives of Home Science	3	3
Skill Enhancement Course - II	Scientific Writing and Presentation Skills	2	3
	Internship / Industrial Activity	2	-
	Total	26	30

SEMESTER - IV

Course status	Course Title	Credits	Hours
CoreXI	Human Factors and Ergonomics	5	6
Core XII	Food Quality Control	5	6
Core XIII	Project Work with Viva voce	7	10
Elective VI	Hospital Administration	3	4
Skill Enhancement Course – III / Professional Competency Skill	Food Quality Control- Practical	2	4
Extension Activity		1	-
	Total	23	30

Total Credits - 91

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 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.

MMSU

TANSICHE REGULATIONS ON LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK FOR POSTGRADUATE EDUCATION	
Programme	M.Sc. DIETETICS AND FOOD MANAGEMENT
Programme Code	
Duration	2 years for PG
Programme Outcomes (Pos)	<p>PO1: Problem Solving Skill Apply knowledge of Management theories and Human Resource practices to solve business problems through research in Global context.</p> <p>PO2: Decision Making Skill Foster analytical and critical thinking abilities for data-based decision-making.</p> <p>PO3: Ethical Value Ability to incorporate quality, ethical and legal value-based perspectives to all organizational activities.</p> <p>PO4: Communication Skill Ability to develop communication, managerial and interpersonal skills.</p> <p>PO5: Individual and Team Leadership Skill Capability to lead themselves and the team to achieve organizational</p>

	<p>goals.</p> <p>PO6: Employability Skill</p> <p>Inculcate contemporary business practices to enhance employability skills in the competitive environment.</p> <p>PO7: Entrepreneurial Skill</p> <p>Equip with skills and competencies to become an entrepreneur.</p> <p>PO8: Contribution to Society</p> <p>Succeed in career endeavors and contribute significantly to society.</p> <p>PO 9 Multicultural competence</p> <p>Possess knowledge of the values and beliefs of multiple cultures and a global perspective.</p> <p>PO 10: Moral and ethical awareness/reasoning</p> <p>Ability to embrace moral/ethical values in conducting one’s life.</p>
<p>Programme Specific Outcomes (PSOs)</p>	<p>PSO1 – Placement</p> <p>To prepare the students who will demonstrate respectful engagement with others’ ideas, behaviors, beliefs and apply diverse</p>

frames of reference to decisions and actions.

PSO 2 - Entrepreneur

To create effective entrepreneurs by enhancing their critical thinking, problem solving, decision making and leadership skill that will facilitate startups and high potential organizations.

PSO3 – Research and Development

Design and implement HR systems and practices grounded in research that comply with employment laws, leading the organization towards growth and development.

PSO4 – Contribution to Business World

To produce employable, ethical and innovative professionals to sustain in the dynamic business world.

PSO 5 – Contribution to the Society

To contribute to the development of the society by collaborating with stakeholders for mutual benefit.

Template for P.G., Programmes

Semester-I	Credit	Hours	Semester-II	Credit	Hours	Semester-III	Credit	Hours	Semester-IV	Credit	Hours
1.1. Core-I	5	6	2.1. Core-IV	5	6	3.1. Core-VII	5	6	4.1. Core-XI	5	6
1.2 Core-II	5	6	2.2 Core-V	5	6	3.2 Core-VII	5	6	4.2 Core-XII	5	6
1.3 Core – III	4	6	2.3 Core – VI	4	6	3.3 Core – IX	5	6	4.3 Project with viva voce	7	10
1.4 Core Practical	2	4	2.4 Discipline Centric Elective – III	3	4	3.4 Core – X	4	6	4.4 Elective - VI (Industry / Entrepreneurship) 20% Theory 80% Practical	3	4
1.5 Discipline Centric Elective -I	2	4	2.5 Generic Elective -IV:	3	4	3.5 Discipline Centric Elective - V	3	3	4.5 Skill Enhancement course / Professional Competency Skill	2	4
1.6 Generic Elective-II Practical	2	4	2.6 NME I	2	4	3.6 NME II	2	3	4.6 Extension Activity	1	
1.7 SKILL ENHANCEMENT COURSE 1	-	-				3.7 Internship/ Industrial Activity	2	-			
	20	30		22	30		26	30		23	30
Total Credit Points -91											

M.Sc., DIETETICS & FOOD MANAGEMENT

SEMESTER - I

Course status	Course Title	Credits	Hours
Core-I	Advanced Food science	5	6
Core –II	Advanced Human Physiology	5	6
Core-III	Macronutrients	4	6
Core- I Practical	Advanced Food Science practical	2	4
Elective - I	Food processing and Technology/ Principles of Menu Planning	2	4
Elective - II	Food Processing and Technology- Practical	2	4
	Total	20	30

SEMESTER - II

Course status	Course Title	Credits	Hours
Core IV	Research Methods in Nutrition	5	6
Core V	Therapeutic Dietetics	5	6
Core VI	Therapeutic Dietetics- Practical	4	6
Elective III	Sports Nutrition	3	4
Elective IV	Functional Foods and Health	3	4
Skill Enhancement Course [SEC] - I NME	Nutrition in Special Condition	2	4
	Total	22	30

SEMESTER - III

Course status	Course Title	Credits	Hours
Core VII	Micronutrients	5	6
Core VIII	Food Microbiology	5	6
Core IX	Nutritional Biochemistry	5	6
Core X (Industry Module)	Techniques in Food Analysis	4	6
Elective V	Perspectives of Home Science	3	3
Skill Enhancement Course - II	Scientific Writing and Presentation Skills	2	3
	Internship / Industrial Activity	2	-
	Total	26	30

SEMESTER - IV

Course status	Course Title	Credits	Hours
CoreXI	Human Factors and Ergonomics	5	6
Core XII	Food Quality Control	5	6
Core XIII	Project Work with Viva Voce	7	10
Elective VI	Hospital Administration	3	4
Skill Enhancement Course – III / Professional Competency Skill	Food Quality Control- Practical	2	4
Extension Activity		1	-
	Total	23	30

Total Credits - 91**1.1 CORE -I-**

ADVANCED FOOD SCIENCE

CREDIT: 4

SEMESTER :1

YEAR :1

HOURS PER WEEK :15

COURSE OBJECTIVES:

To enable the students

Gain knowledge on the source and properties of food

Familiarize students with changes occurring in various foodstuffs as a result of processing and cooking.

Enable students to use theoretical knowledge in various applications and food preparations.

COURSE OUTCOME:

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

CO No.	CO Statement
CO1	Overview the relationship between the chemical structure and the properties of the main components in food like starch, protein and lipids.
CO2	Understand the Composition and characteristics of various food commodities.
CO3	Explain the cooking quality of foods and apply food science knowledge in food industries
CO4	Identify and understand the nutrients and functions of foods in maintaining health
CO5	Analyze the proper use of food colors and food additives in safe food preparation.

UNIT 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 retrogradation, dextrinization and factors affecting gelatinization.

UNIT 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.

UNIT 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.

UNIT 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 [color, size], Nutritional qualities, quality check, functional properties- foaming, factors affecting foam formation.

UNIT V

Food additives- Definition, different food additives and Need for food additives. Flavour compounds in vegetables, fruits and spices; Effect of processing on food flavours; Role of colours and flavours in food products.

Sweeteners- Properties, Artificial and Natural sweeteners and role of sweeteners in food industry.

TEXT BOOKS:

Srilakshmi B. (2015). Food Science.New Age International (P) Ltd. Publishers.

S.M. Reddy (2015). Basic Food science and technology. New Age International publishers.AvantinaSharma (2017).Text book of food science and Technology. CBS Publisheres and distributes ltd. 3rd Edition.

Swaminathan A.(2018) . Handbook of Food and Nutrition, Bangalore press.

Serpil Sahin and ServetGulumSumnu.(2006).Physical properties of Foods. Springer publications

REFERENCES:

[Gerard L. Hasenhuettl](#) , [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 text book of Food and Nutrition. volume-2.Bapco

publications.

Eskein.(2012). Biochemistry of Food. Elsevier publications.

Lyn O brienNabors.(2001).Alternative Sweeteners. Taylor and Francis publications.

Janet D. Ward and Larry Ward.(2006). Principles of Food Science. Stem Publishers. 4th Edition.

ELEARNING RESOURCES:

www.fao.org www.wfp.org

www.foodrisk.org.

<http://www.fsis.usda.gov/>

<https://www.fda.gov/food>

Mapping CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	3	2
CO2	3	3	3	2	1	2
CO3	3	3	3	3	3	2
CO4	2	3	3	2	1	3
CO5	3	3	3	2	2	3
Average	2.8	3	2.8	2.2	2	2.4

PEDAGOGY:

Lecture, Case study, journal reviewing, Assignments, Group discussion, Power point presentation

1.2 CORE - II
ADVANCED HUMAN PHYSIOLOGY

CREDITS: 4

SEMESTER :I YEAR :I

HOURS PER WEEK :15

Objectives:

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 function of the system
- Understand alterations of structure and function in various organs and systems in disease conditions.

COURSE OUTCOME:

On successful completion of the course the student will be able to-

CO No.	CO STATEMENT
CO 1	Develop insight of normal functioning of all the organ systems of the body and their interaction. Understand the current state of knowledge about the functional organization of Human Cell and Histology.
CO 2	Understand the structural and functional organization of Blood and Cardiac System
CO 3	Understand the structural and functional organization of Respiration, Immunity and Endocrine GIT and Urinary System
CO 4	Comprehend the structural and functional organization Digestive System and Reproductive System
CO 5	Understand the structural and functional organization of Skin, Nervous and Excretory system

UNIT 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.

UNIT II

Blood

- Composition & Functions
- Blood Group – ABO System & Rh factor.
- 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.

UNIT 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 Acquire immunity.

Endocrine System

- Hormones and its type.
- Syndromes resulting from hypo and hyperactivity of Pituitary, Thyroid, Adrenals and Pancreas.

UNIT IV

Gastrointestinal System

- Structure and function of GI tract and its accessory organs.
- Digestion and absorption of Carbohydrates, Proteins and Fats.

Reproductive System

- Roll of hormones in reproduction and Lactation.
- Menstrual Cycle and Menopause.

- Invitro (I V) fertilization
- Spermatogenesis.

UNIT 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.
- Juxtaglomerular Cell.
- Mechanism of formation of urine,
- Role of kidney to regulate Blood pressure, Water, Electrolytes and

Acid Base Balance.

Skin

- Structure and function.
- Regulation of temperature of the body.

TEXT BOOKS

- K. Sembulingam & Prema Sembulingam (2019), Essentials of Medical Physiology. Jaypee publications. Eighth edition.
- Waugh A, Ross and Wilson (2018). Anatomy and Physiology in Health and Illness. Elsevier publications. 13ed.
- CC Chatterjee (2020). Human Physiology. CBS publishers. 13 ed.
- Indu Khurana (2020). Medical Physiology for Undergraduate Students. Elsevier Publication. 2 Edition.
- GK Pal (2019). Textbook of human physiology, Elsevier publications. 3edition.

REFERENCES:

- Guyton, A.G. and Hall, J.B. (2005): Text Book of Medical Physiology. W.B.Sanders Company, Prism Books (Pvt.) Ltd., Bangalore. 9th Edition.
- Wilson, K.J.W and Waugh, A. (2003): Ross and Wilson Anatomy and Physiology in Health and Illness. Churchill Livingstone. 8th Edition.
- Jain, A.K.: Textbook of Physiology. Avichal Publishing Co., New Delhi. Vol.I and II.
- McArdle, W.D., Katch, F.I. and Katch V.L(2001): Exercise Physiology.

Energy, Nutrition and Human Performance. Williams and Wilkins, Baltimore. 4th Edition.

- Ganong, W.F. (1985): Review of Medical Physiology. Lange Medical Publication. , 12th Edition.
- 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.
- McArdle, W.D., Katch, F.I. and Katch, V.L. (1996): Exercise Physiology. Energy, Nutrition and Human Performance, Williams and Wilkins, Baltimore. 4th Edition.
- Jain, A.K.: Textbook of Physiology. Avichal Publishing Co., New Delhi. Vol. I and II.
- Winword. Sear's Anatomy and Physiology for nurses. London, Edward Arnell.
- Chatterjee Chandi Charan : Text Book of Medical Physiology, London W.B.

E LEARNING CONTENT

<https://youtu.be/MZDv0RvA52Y>-Osmosis <https://youtu.be/TgeyiVQnVBS->
Respiratory system <https://youtu.be/44B0ms3XPKU-> nervous system

Mapping: (CO/PSO)

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	1	3	3	2	3
CO2	3	1	3	3	2	3
CO3	3	1	3	3	2	3
CO4	3	1	3	3	2	3
CO5	3	1	3	3	2	3

PEDAGOGY

Lecture, Power Point Presentation, Demonstration, Group Discussion, Assignment, Library Visits, Seminars and Oral & Written Revision

1.3 CORE: III
MACRO NUTRIENTS

CREDITS:4 SEMESTER :1

YEAR :1

HOURS PER WEEK 15

OBJECTIVE:

To enable the students

- To understand the relationship between lipid, carbohydrate, protein and mineral metabolism.
- To learn about the therapeutic uses of carbohydrates protein and fat in prevention of non-communicable disease.
- To get insights in the inborn errors of metabolism

COURSE OUTCOMES:

After studying this paper, the students would know

CO No.	CO STATEMENT
CO1	The essentials of nutrients in growth and development of humans
CO2	The importance of major nutrients in maintaining human health and leading active lifestyle
CO3	The enhancement of nutritional quality of the diet.
CO4	Identify the various types & sources of food borne illness and methods of prevention.
CO5	The role of nutrients in health and diseases.

UNIT 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 and body composition with the changing energy balance, Regulation of food intake- role of hunger and satiety centers. Energy balance and obesity.

UNIT 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

UNIT III:

PROTEIN – Historical review of protein metabolism, Amino acid patterns in protein & 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.

UNIT IV:

LIPIDS—Concepts of visible and invisible fats, EFA, SFA, MUFA, PUFA, omega-6 to omega-3 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.

UNIT 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,

TEXT BOOKS:

1. Satyanarayana, U., & Chakrapani, U. (2013). *Biochemistry*, Book and Allied Pvt. Ltd., Kolkata.
2. Wardlaw, G. M., Byrd-Bredbenner, C., Moe, G., Berning, J. R., & Kelley, D. S. (2013). *Wardlaw's perspectives in nutrition*. McGraw-Hill.
3. Williams, S. R. (2004). *Nutrition and diet therapy. Nutrition and diet therapy*.
- 4.Sizer, F., Whitney, E., & Webb, F. (2003). *Nutrition Concepts and Controversy*, Thomas Wadsworth, Australia. 9th edition.
5. 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 &Febiger Philadelphia, A Waverly Company. Eighth edition.
6. Mahan, L.K., & Stump, S.E. (2002). *Krause's Food Nutrition and Diet Therapy*. W.B. Saunder's company, Philadelphia. 10th edition.

REFERENCES:

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

E- LEARNING RESOURCES:

www.nutrition.gov – Service of National agricultural library, USDA

www.nal.usdfa.gov/fnic - Food and nutrition information center

www.fantaproject.org- Fanta technical assistance for nutrition

<http://dietary-supplements.info.nih.gov> – Officer of dietary supplements, national institute of health.

MAPPING (CO/PSO):

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	2	2	3	3	3	3
CO5	2	2	2	3	3	2
Average	2.6	2.6	2.8	3	3	2.8

PEDAGOGY:

Lecture, Journal Reviewing, Power point presentations, Assignments and Discussions

ADVANCED FOOD SCIENCE PRACTICAL**CREDIT: 3****SEMESTER :1****YEAR :1****HOURS PER WEEK :10****COURSE OBJECTIVES:**

To enable the students

Comprehend the knowledge gained on characteristics and properties of foods during cooking Apply the properties of food in various food processing and preparations Analyse the factors affecting cooking quality of foods

Create appropriate food preparation and processing methods to ensure quality standards.

COURSE OUTCOME:

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

CO No.	CO Statement
CO1	Gain knowledge on sensory analysis and cereal cookery concept
CO2	Understand the properties of various food.
CO3	Analyze the cooking quality of foods and apply knowledge in food industries.
CO4	Identify and understand the Physical characteristics.
CO5	Revise appropriate food preparation and processing methods to ensure standards in food industry.

UNIT -1

1. Sensory method –

Analysis of taste sensitivity-Threshold test Duo –Trio test
Multiple sample difference

2. Starch

Microscopic structure and gelatinization. Factors affecting gelatinization –sag test. Gluten formation

UNIT -2

1. PULSE

Factors affecting cooking quality

2. FRUIT

Enzymatic browning Pectin test Firmness of gel

UNIT -3

1. VEGETABLE

Various method of cooking fat soluble and water-soluble pigment.

2. MILK

Detecting the presence of starch, soda, starch, urea in milk sample. pH of milk sample. Effect of acid on milk Maillard reaction.

UNIT -4

1. SUGAR

Relative sweetness of sugar- sucrose, maltose, lactose, fructose, dextrose, glucose, artificial sweeteners Stages of sugar cookery

Effect of dextrose, jaggery, honey and cream of tartar on sucrose.

2. FATS AND OIL

Smoking point – Groundnut oil, coconut oil, Gingelly oil, Olive oil, Vanaspati, Ghee, Refined Sunflower oil, Rice bran oil.

Cooking temperature and fat absorption- – Groundnut oil, coconut oil, Gingelly oil, Refined Sunflower oil, Rice bran oil.

UNIT -5

1. PHYSICAL PROPERTIES

- a. Thousand grain weight
 - b. Thousand grain volume
 - c. Hydration capacity
 - d. Hydration index
 - e. Swelling capacity
 - f. Specific gravity
 - g. Seed displacement test
 - h. Viscosity - Line spread test, Viscometer.
2. Adulteration

TEXT BOOKS:

Srilakshmi B. (2015). Food Science, New Age International (P) Ltd. Publishers.

Potter N. and Hotchkiss J.H. (1996). Food Science, Fifth ed., CBS Publishers and Distributors, New Delhi
 Avantinasharma (2017). Text book of food science and Technology. CBS Publisheres
 and distributes ltd. 3rd Edition.

Reddy S M. (2015). Basic Food science and technology. New Age International publishers. 2ND edition.

REFERENCES:

Swaminathan A (1979) . Food Science And Experimental Foods, Ganesh And Company Madras. 3rd edition.

Bennion, Marion and O. Hughes (2001). Introductory Foods. Edi: mac millian N. Y. 1st edition.

Eskein . (2012). Biochemistry of Food. Elsievier publications Desrosier, N.W. and James N.

(2007). Technology of food preservation.

AVI Publishers.

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](#)

Mapping of CO with PSO:

CO/PSO	PSO1	PSO2	PSO3	PSO 4	PSO 5	PSO 6
CO1	3	3	2	3	3	2
CO2	3	3	3	2	3	3
CO3	3	2	3	3	3	3
CO4	3	3	3	2	2	3
CO5	3	3	2	3	3	2
Average	3	2.8	2.6	2.8	2.8	2.6

PEDAGOGY

Experiments, Planning recipes , Group Discussion, Assignments, .

1.5 ELECTIVE GENERIC /DISCIPLINE
CENTRIC II FOOD PROCESSING AND
TECHNOLOGY

CREDIT: 3
SEMESTER :1
YEAR :1
HOURS PER WEEK :10

COURSE OBJECTIVES:

To enable the students:

1. Understand the science behind processing of foods and its impact on nutritive value of food stuffs.
2. Acquire in-depth knowledge on production of processed food products and the waste utilization techniques.
3. Understand the changes in physicochemical properties of foods due to processing condition.
4. Understand the various parameters related to post-harvest technology.

COURSE OUTCOME:

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

CO No.	CO Statement
CO1	The concepts and principles of food processing.
CO2	The various processed food products from plant and animal sources.
CO3	The by-products utilization from food processing.
CO4	The systematic knowledge of basic and applied aspects in food processing and technology.
CO5	The various post-harvest technologies for different food products

UNIT-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.

UNIT-II

Cereal Processing and Technology:

Rice: parboiling, milling and pearling; Processing and milling of wheat, maize, barley, oats and rye.

Millet: processing of millets;

Cereal Products: Flours and its quality; Processed products of rice, wheat and maize; By products utilization; breakfast cereals and extrusion; Effect of processing on nutritive value of cereals; changes in physiochemical properties of cereal starch and protein due to processing.

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.

UNIT-III

Vegetables Processing and Technology:

Pigments: Classification, effects on processing of vegetables; Preliminary processing of vegetables;

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

Fruits Processing and Technology:

Concept of maturity, ripening and senescence; Methods of fruit processing technologies: traditional and new methods.

Fruit products: fermented and nonfermented; Effect of processing on nutritive value and physiochemical properties of fruits;

Browning reactions: types and mechanism; prevention methods; Fruit waste utilization.

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

UNIT-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 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.

UN

IT-

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.

TEXTBOOKS

Shakuntala Manay N ShadakCheraswamyM . (2004) Food Facts and Principles. New age publisher . 2nd edition.

Roday S. (2011) .Food Science. Oxford publication . 1st edition.

B Srilakshmi (2015)Food science. New Age Publishers. 6th edition. Fellows P.(2000). Food Processing Technology, 2nd Edition.

Woodhead Publishing Limited and CRC Press LLC. 1st edition.

Avantina Sharma. (2017).Text book of food science and Technology. CBS Publisheres and distributes ltd. 3rd edition.

REFERENCES

Raocg . (2006).Essentials of food process engineering . PHI learning private ltd. Janet D

Ward and Larry Ward.(2006). Principles of Food Science . Stem Publishers. 4th edition.

Srivastava R P and Kumar S. (2006) Fruits and Vegetables Preservation- Principles and Practices. International Book Distributing Co. 3rd edition.

W B Crusess.(2004). Commercial Unit and Vegetable Products.

W.V. Special Indian Edition, PubAgrobios India . 2nd edition. Forsythe S J and Hayes P R (1998). Food Hygiene,

Microbiology and HACCP. GaitersburgMaryland Aspen.

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

ELEARNING 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/technical_paper_phl.pdf

<https://www.nutsforlife.com.au/resource/nuts-and-processing/> <https://www.fssai.gov.in/>

MAPPING (CO/PSO):

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	3	3	2	2	2
CO2	3	3	2	2	3	2
CO3	2	3	2	1	2	2
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3
Average	2.8	3	2.6	2.2	2.6	2.4

PEDAGOGY:

Lecture, Journal Reviewing, Power point presentations, Assignments and Discussions

1.5 ABILITY ENHANCEMENT COURSE -SOFT SKILL 1 PRINCIPLES OF MENU PLANNING

UNIT-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.

UNIT-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.

UNIT-III

Adolescence: Changes of growth characteristics of adolescents. Nutritional needs of the adolescents.

Adults: Nutrition for adults. Basis for requirement. Nutrition and work efficiency.

UNIT-IV: NUTRITION IN PREGNANCY

ICMR Nutrient allowances, Dietary guidelines. Common nutrition related problem of pregnancy and Lactation.

UNIT-V

Geriatric -Nutrition allowances - Dietary Guidelines -- psycho social and economical factors 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.

REFERENCES BOOKS

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.

Jacalyn J. McComb, Reid Norman, et al.,The Active Female: Health Issues Throughout

the Lifespan 2010, Human press.

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.

Antia, F.P., 1992, Clinical Dietetics and Nutrition Oxford University Press, New Delhi.

Corinne, R.H., 1996, Normal and therapeutic nutrition, Mcmalian Co., New York. Davidson, S.R. and Passmore J.F., 1989, Human Nutrition and Dietetics, ELBS

London.

Mahan, K.L., and Stump, S.E., 1996, Krauses Food, Nutrition and Diet therapy M.B. Saunders Co., USA.

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, Will and Wilson Publishing, London.

Bamji et al(1996), Textbook of Human Nutrition Oxford and IBH Publishing co. Pvt. Ltd. Delhi.

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.

Mahan, K.L., and Stump, S.E., 1996, Krauses Food, Nutrition and Diet therapy M.B. Saunders Co., USA.

E- LEARNING RESOURCES

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

MAPPING (CO/PSO):

CO/PO	PSO 1	PSO2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	3	3	2	2	2
CO2	3	3	2	2	3	2
CO3	2	3	2	1	2	2
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3
Average	2.8	3	2.6	2.2	2.6	2.4

PEDAGOGY:

Lecture, Journal Reviewing, Power point presentations, Assignments and Discussions

1.6 ELECTIVE GENERIC /DISCIPLINE CENTRIC II PRACTICAL
FOOD PROCESSING AND TECHNOLOGY

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)

SKILL ENHANCEMENT COURSE 1

COMPUTER IN NUTRITION RESEARCH

Course objective

1. Understand the basics of computer and its applications
2. Gain knowledge to use computers
3. Develop skills to apply computer based technology in Food science and Nutrition

Course Out Comes

1. The student will gain knowledge on computer applications.
2. The knowledge on Operating system and MS Office will be enhanced
3. Acquire knowledge on computer networks.
4. To gain knowledge on computer networking system and apply in the field of food science, nutrition and research.

UNIT I

Introduction to Computers History of Development of Computers, Main Frame, Minis, Micros and Super Computer Systems, Binary numbers, Bits, Bytes, CPU, Input and Output Devices, Recent software's in field of food and Nutrition .

UNIT II

Operating Systems and MS Office Introduction to Operating Systems, Windows Applications MS Word, MS Excel. MS Access and MS PowerPoint

UNIT III

Nutrition software and websites, e-journals in Food Science and Nutrition, Use of SPSS.

UNIT IV

Application of Computers in Food Science and Nutrition -Power point presentation, nutrient and diet calculations, nutrition education and counselling,

REFERENCES

Balagurusamy. E (2008) Computing Fundamentals and C Programming, Tata McGraw Hill Education Private Limited, New Delhi.

Bansal.S.K (2004) Text Book of Information Technology , APH, Publishing Corporation.

Andrew S. Tanenbaum (2009) IV Edition, Computer Networks, Pearson

Education And Dorling Kindersley Publishers, Delhi.

James F. Kurose and Keith W Ross (2008) III Edition, Computer Networking. A Top-Down Approach Featuring the Internet, Pearson Education and Dorling Kindersley Publishers, Delhi.

Ralf Steinmetz and KlaraNahrstedt (2011) Multimedia- Computing, Communications and Applications, Pearson Education and Dorling Kindersley Publishers, Delhi

MAPPING (CO/PSO):

CO/PO	PSO 1	PSO2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	3	3	2	2	2
CO2	3	3	2	2	3	2
CO3	2	3	2	1	2	2
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3
Average	2.8	3	2.6	2.2	2.6	2.4

PEDAGOGY:

Lecture, Journal Reviewing, Power point presentations, Assignments and Discussions

MICRONUTRIENTS

CREDITS: 4

COURSE OBJECTIVES

1. To enable the students to learn the functions, deficiency symptoms, food sources and requirements of the different micro nutrients.
2. To gain knowledge of nutrients requirement and management of micronutrients during various stages of life and disease
3. To gain insight about recent concept and findings in field of nutrition and application of the same to prevent disease

COURSE OUTCOMES:

On completion of the course the students will be able to...

CO No.	CO Statement
CO1	Evaluate the specific role of functional foods and nutraceuticals in prevention of degenerative disease.
CO2	Understand the importance of micronutrients in growth and development of humans.
CO3	Analyse the importance of diet in maintaining human health to combat nutrient deficiency in the community
CO4	Gain in-depth knowledge of the physiological and metabolic functions of vitamins and minerals and their implications
CO5	Analyse the recent advances in the field of micronutrient and research for the welfare of the community

UNIT I:

15 hours

Distribution in the body; functions, effects of deficiency, food sources, requirement and recent research of macro minerals - Calcium, Phosphorous, Magnesium, Potassium, Sodium and Chloride.

UNIT – II

15 hours

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 -Selenium, cobalt, chromium, silicon, boron and nickel. Selenium and Vitamin E relationship, Chromium and glucose tolerance factor.

UNIT III:

15 hours

Distribution in the body, functions, food sources, requirement, deficiency, toxicity and recent research of Fat-Soluble Vitamins A, DE and K

UNIT IV:

15 hours

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 B6, choline and inositol.

UNIT V:15 hours

RECENT CONCEPTS IN NUTRITION:

- 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.

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) “Perspectives 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.

REFERENCE BOOK

1. Brown, J.E. (2002), “Nutrition Now”, 3rd edition, Wadsworth Thomson Learning New York.
2. Maurice, E. Shils, James A. Olson, Moshe shike, (2000), “ Modern Nutrition in Health and Disease”, 8th Edition, Vol I and II, Lea & Febiger 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 RoadBangalore – 560 018.

E-LEARNING RESOURCES:

- <https://www.udemy.com/share/1027yA/>
- [WHO | The e-learning platform Nutrition Knowledge Hub launch WFP Nutrition's Learning Platform - UN World Food Programme Nutrition Online Courses | Coursera](#)
- [E-Learning Programs \(nestlenutrition-institute.org\)](http://E-Learning Programs (nestlenutrition-institute.org))

- [WFP Nutrition's Learning Platform | Humanitarian Library](#)

Mapping: (CO/PSO)

CO/PS O	PS O1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	3	3	3	2	3
CO2	3	3	3	3	2	3
CO3	3	3	3	3	2	3
CO4	3	3	3	3	2	3
CO5	3	3	3	3	2	3
Average	3	3	3	3	2	3

PEDAGOGY (TEACHING METHODOLOGY):

Group Discussion, Case study, seminar, journal reviewing, Assignments, PowerPoint presentations.

FOOD MICROBIOLOGY

LEARNING OBJECTIVES (LOs)

This course will enable the student to:

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

Unit I

Introduction to Food Microbiology

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

Unit II

Factors Affecting Food Safety

Physical Hazards, Biological, Hazards, Chemical Hazards, Microorganisms in Foods, Bacteria, Fungi, Yeasts, Moulds, Viruses, Parasites, Recent Concerns of Food Safety Prions, Concern of Genetically Modified Foods. Concern of Dioxin-Contaminated Foods. HACCP system and food safety used in controlling microbiological hazards.

Unit III

Microbiology of Air, Water, Soil and Food

Microbiology of Air, Water and soil, Sources of food contamination, Factors Affecting the growth of Microorganisms–Nutrition, Oxygen, Temperature, Moisture Requirement– The concept of Water Activity, Osmotic Pressure, Hydrogen Ion Concentration- pH and light. Control and Destruction of Microorganisms.

Unit IV

Factors Responsible for food Spoilage

Chemical Changes due to Spoilage-cereals and cereal products, Fruits and Vegetables, Soft Drinks, Fruits Juices, Fruit Preserves and Miscellaneous Products, Milk and Milk Products, Meat, Poultry and Poultry Products, Fish and Other Sea Food.

Unit V

Food Borne infections and Diseases

Food Borne Diseases–types, Definition–intoxication infection, Food Borne Intoxications–Staphylococcal Poisoning, Bacillus Cereus Poisoning and Botulism. Food Borne Infections–Salmonellosis, Shigellosis (Bacillary dysentery), Vibrio Parahaemolyticus Gastroenteritis, Enteropathogenic, E. coli Diarrhoea, Hepatitis A and Shellfish Poisoning. Food Borne Diseases Due to Naturally occurring Toxicants–Lathyrism, Veno-occlusive Disease (VOD), Epidemic Dropsy

REFERENCE:

- Atlas, M. Ronald (1995). Principles of Microbiology, 1st Edition, Mosby-Year Book, Inc., Missouri, U.S.A.
- Frazier, W.C. (1998). Food Microbiology, McGraw-Hill Inc., 4th Edition.
- Roday, S. (1999). Food Hygiene and Sanitation, 1st Edition, Tata McGraw Hill, New Delhi.
- Joshua, A.K. (2000). Microbiology, Popular Book Depot, Madras.
- Adams & Moss (2000). Food Microbiology, Panima Publishing Corporation, New Delhi.
- Ananthanarayan, 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:

CO1 Trace the history of food microbiology, and the basic concept of Food Microbiology, Food Safety, Foods, Food Spoilage, and Food Hazards.

CO2 Identify the different types of microbes and sources of microbial spoilage and contamination of food.

CO3 Analyse the role of microbes in food spoilage, Biotechnology and fermented foods, Indicators of food safety and quality.

CO4 Deduct different microbes and recommend the various measures to prevent the spoilage.

CO5 Propose the latest procedures adopted in various food operations to prevent food-borne disorders and legal aspects involved in these areas.

Mapping

Core–Food Microbiology											
C O	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)

- To 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 metabolic pathways. Become proficient for specialization in nutrition
- Understand integration of cellular level metabolic events to nutritional disorders and imbalances.

Unit I

Carbohydrates - Structure and its properties- Monosaccharide- glucose, fructose, Galactose, Disaccharides- Maltose, Lactose, sucrose. Polysaccharides- Starch and glycogen. Carbohydrate metabolism- Glycolysis, Gluconeogenesis, Glycogenesis, TCA cycle.

Unit II

Protein - Structure and properties. Deamination, transamination, decarboxylation, urea cycle. Nutritional classification of protein and amino acids, determination of nutritive value of proteins- PER, Digestibility coefficient, BV, NPR, NPU, Chemical score, nitrogen balance, supplementation of protein.

Unit III

Lipids - Lipid- properties of lipid. Iodine, saponification and peroxide value. Lipid metabolism- β oxidation of fatty acids.

Unit IV

Vitamins & Minerals

Vitamins: Structure, biochemical properties, functions and sources. Fluid, electrolyte and acid base balance.

Minerals: Structure, biochemical properties, functions and sources.

Unit V

Enzymes & Co-enzymes

Enzymes- Definition, classification of enzymes and factors influencing enzyme action. Co-enzyme- Definition and its types. Structure and function of DNA- transcription and replication. Structure and function of RNA- types- mRNA, rRNA and tRNA.

REFERENCE

- Arumugam, (1994). Elements of Biochemistry. Saras Publication.

- Ambika Shanmugam, (1998). Fundamentals of Biochemistry. Karthik Offset Printers.
- Reghuramulu, N., Madhavan Nair, and K. Kalyanasundaram, S. (1983). A Manual of Laboratory Techniques. NIN, ICMR.
- Plummer D.T (1987). An Introduction to Practical Biochemistry, 3rd Edition. McGraw-Hill Book Co.
- Cantrow A. and Trumper, (1975). A Manual of Laboratory Techniques. Clinical Bio-Chemistry, M.W.B. Saunders Co.
- Swaminathan, M. (1986). Bio-Chemistry for Medical Teachers. Harold Valley, Clinical Bio-Chemistry.

COURSE OUTCOMES

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

- CO1 Trace the history of food microbiology, and the basic concept of Food Microbiology, Food Safety, Foods, Food Spoilage, and Food Hazards.
- CO2 Identify the different types of microbes and sources of microbial spoilage and contamination of food.
- CO3 Analyse the role of microbes in food spoilage, Biotechnology and fermented foods, Indicators of food safety and quality.
- CO4 Deduct different microbes and recommend the various measures to prevent the spoilage.
- CO5 Propose the latest procedures adopted in various food operations to prevent food-borne disorders and legal aspects involved in these areas.

Mapping

Core- Nutritional Biochemistry											
C O	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)

MISSU

TECHNIQUES IN FOOD ANALYSIS

CREDITS: 4

OBJECTIVES:

To enable students to:

- Learn the techniques of estimating the quantity of different nutrients present in food.
- To enable the students to get practical experience in the laboratory and develop the skills to undertake research work

COURSE OUTCOME:

On successful completion of the course the student will be able to-

CO No.	CO STATEMENT
CO 1	Understand safety rules for the laboratory and demonstrate various instruments used for food analysis.
CO 2	Acquire skills to prepare and standardize various solutions to conduct experiments for food analysis.
CO 3	Acquire skills in ashing of foods and preparing ash solution to analyse mineral contents in food.
CO 4	Demonstrate quantitative analysis of various nutrients in foods i.e. crude fibre, moisture, Vit -C, calcium, phosphorus, iron, etc.
CO 5	Demonstrate experiments to check estimation of protein, fat content and Pigment Analysis

Unit – I

(15 HRS)

Introduction to Laboratory Practices – laboratory safety and hygiene- personal protective equipment (PPE), handling of chemicals Ethics in laboratory products.

Instrumental Techniques – Working principles, Operating Procedure, care and maintenance of the equipment's Autoclave, Hot Air Oven, pH Meter, Electronic Weighing Balance, Centrifuge,

Hot Plate, Spectrophotometer, Water Bath, Muffle Furnace, Viscometer, IR Moisture Analyzer, Colorimeter

Unit – 2 (8 HRS)

Preparation and Standardization of Solution – Types of solutions, Solution preparation process.

Unit – 3 (12 HRS)

Ashing of Food (Thermogravimetric Method) – Standardization and Preparation of Ash Solution, Materials and Equipment, Steps in Process of ashing procedure, Analysis.

Unit – 4 (25 HRS)

Food Analysis Experiments – Estimation of – Moisture Content – Thermogravimetric Analysis -Air Oven Method and Infrared Radiation (IR) Moisture Analyzer Method, Crude Fibre– Gravimetric Method, Iodine Number of oils – Wij’s Method, Acid Number of oils - Titrimetric Method, Peroxide Value of oils - Titrimetric Method, Ascorbic Acid – 2, 6- Dichloroindophenol Titrimetric Method, Calcium -Precipitation Titrimetric Method, Iron – Wong’s Method, Phosphorus–Colorimetric Method

Unit – 5 (15 HRS)

Demonstration Experiments - Estimation of protein content in food by Kjeldahl method, Estimation of fat content in food by Soxhlet method, Pigment Analysis by Paper Chromatography Techniques

TEXT BOOKS AND REFERENCES:

- S. Suzanne Nielsen (2017). Food Analysis Laboratory Manual. Springer International Publishing. Third Edition.
- S. Suzanne Nielsen (2017). Food Analysis. Springer International Publishing. Fifth Edition.
- Otles, S. (2005). “Methods of Analysis of Food Components and Additives” CRC Press, USA.
- Ranganna, S. (2001). “Handbook of Analysis and Quality Control for Fruit and Vegetable Products”. Tata-McGraw- Hill, India. 2nd edition.
- Sadasivam, S and Manickam, A (1997). “Biochemical Methods”. New Age International Publishers, New Delhi. 2nd Edition.
- Jayaram, I, (1996), “Laboratory Manual in Biochemistry”, New Age International Publishers, New Delhi. Fifth ed.
- Raghuramulu, N, Nair K.M & Kalayanasundaram, S.A, (1983), “Manual of Laboratory Techniques”, National Institute of Nutrition, ICMR.

Mapping: (CO/PSO)

CO/PSO	PSO	PSO	PSO	PSO	PSO	PSO
	1	2	3	4	5	6
CO1	3	2	3	0	3	2
CO2	2	3	3	0	3	1
CO3	2	3	3	0	3	1
CO4	3	3	3	1	3	3
CO5	3	3	3	1	3	3
Average	2.6	2.8	3	2	3	2

PEDAGOGY

Demonstration, Experiments, Activities as assignment, Group Discussion, Observation and Interpretation

PERSPECTIVES OF HOME SCIENCE**OBJECTIVES:**

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

SPECIFIC OBJECTIVES OF LEARNING:

On successful completion of these units, students are expected:

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

COURSE OUTCOME:

On successful completion of the course the student will be able to-

CO No.	COSTATEMENT
CO 1	Understand the concept of Extension Education and its importance
CO 2	Comprehend the key aspects of human growth and development and realize the importance of mastering developmental tasks of each life span stage
CO 3	Understand the basic concepts of Textile and Clothing
CO 4	List personal goals and values, set living standards
CO 5	Understand the meaning of Guidance and Counselling and Career perspectives in Home Science

UNIT – 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.

UNIT – 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 Retarded and Giftedness. Rehabilitation.

UNIT – III Textiles and Clothing

Classification and General properties textile fibres. Processing and manufacture of Cotton, Silk, Wool and Rayon fibres. Yarn: Classification. Fabric construction - woven, non-woven and knitted fabric. Clothing: selection for the family.

UNIT – 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 colours and colour schemes.

UNIT – V-Guidance and Counselling

Meaning, nature, types and scope of guidance and counselling, Various steps and techniques of Guidance and counselling, Need and importance of educational guidance.

TEXTBOOKS:

1. Jha, J.K. (2002). *Encyclopaedia 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*. New Delhi: New Age International Pvt. Ltd.
4. Premlata Mullick (2016). *4th Edition*. Kalyani Publishers.

REFERENCES:

1. Serene and Ahlawat 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.

Mapping: (CO/PSO)

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	1	3	3	1	3
CO2	3	2	3	3	2	3
CO3	3	2	3	3	1	3
CO4	3	2	3	3	1	3
CO5	3	1	3	3	1	3
Average	3	1.6	3	3	1.2	3

PEDAGOGY

Lecture, PowerPoint Presentation, Demonstration, Group Discussion, Assignment, Library Visits, Seminars, and Oral & Written Revision

MSU

SCIENTIFIC WRITING AND PRESENTATION SKILLS

COURSE OBJECTIVES

- To gain knowledge in scientific writing and presentation skills.
- To understand the principles for oral presentations.
- To gain in-depth knowledge on research paper publication

COURSE OUTLINE

UNIT I: Scientific Writing

- Abstract, full paper, clinical update, manuscripts.
- Process of copy-editing journals.

UNIT II: Presentation Skills

- Thematic, poster, oral, principles to be followed for presentation.

UNIT III: Computer Application for Research

- Use of Internet in Research: Websites, search engines, E-journal, and E-library – INFLIBNET, SHODHGANGA.
- Plagiarism: Citation and acknowledgement, reproducibility and accountability, software available in the market for plagiarism.

UNIT IV: Data Analysis and Interpretation

- Data Analysis Techniques: Learn quantitative and qualitative data analysis techniques.
- Results Interpretation: Develop skills in interpreting research findings and effectively communicating the significance and implications of the results.

UNIT V: Report Writing

- Writing Process: Understand the stages of the writing process, including prewriting, drafting, revising, and editing, to produce coherent and well-structured research.
- Citation and Referencing: Learn and apply appropriate citation styles, such as APA format.

RECOMMENDED TEXTBOOKS

1. Best, J.W. and Kahn, J.V. (2000). *Research in Education*, 7th Edition. Prentice Hall of India Pvt. Ltd., New Delhi.

- Campbell, W.G. *Form and Style in Thesis Writing*. Houghton Mifflin Company, Boston.

REFERENCE BOOKS

- Koul, L. *Methodology of Educational Research*, 3rd edition. Vikas Publishing House Pvt. Ltd., New Delhi.
- John, W.B. and James, V.K. (2000). *Research in Education*, 7th Edition. Prentice Hall of India Pvt. Ltd., New Delhi.
- Elhance, D.N., Veena, and Elhance, and Agarwal, B.M. (2005). *Fundamentals of Statistics*, 48th edition. Kitab Mahal, Allahabad.
- Sadhu, A.N., and Amarjit Singh (1992). *Research Methodology in Social Sciences*. Himalaya Publishing House, Gurgaon, Mumbai.

JOURNALS

- Journal of academic writing.

Course Outcome

CONo	CO STATEMENT
CO1	Develop a framework for scientific writing.
CO2	Describe, Compare and Interpret various means for poster, oral presentation and copyediting.
CO3	Evaluate the use of websites, search engine, E-journals and E-library for research
CO4	Propose the Authenticity of the Research Article Using Plagiarism Checking Software

Mapping of CO with PSO

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	3	3	1	3	1
CO2	3	3	3	3	1	2
CO3	3	3	3	3	1	1
CO4	3	3	3	3	1	1
AVERAGE	3	3	3	2.5	1.5	1.25

KEY: Strongly Correlated-3 Moderately Correlated-2 Weakly

Corelated-1No Correlation-0

Fieldwork - (Internship Training in hospital- one month)

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 interns 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 students individually.

COURSE OUTCOME

- **CO1:** analyse the internship training in the hospital.
- **CO2:** Experience in the hospitals provides the opportunity to observe in action.
- **CO3:** Internships can speed up the process of moving towards career goals.
- **CO4:** Students will develop professional aptitude, strengthen personal character, and gain greater access to opportunities.
- **CO5:** Understand that internships are a way to show commitment to professionalism, self-improvement, and excellence.

Mapping

Internship Training											
C O	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 /STUDY TOUR - REPORT

- Students are required to attend their fieldwork locations and complete assignments as listed on the Assignments Due Date according to the schedule directed by the department.
- A study tour is a credit-bearing course in which the majority of the academic work is accomplished through group study and travel outside the campus. A summary of the study tour will be submitted to the department.

COURSE OUTCOME

- **CO1:** The students will observe and analyses theories used to identify solutions for a specific project or case report.
- **CO2:** Understand that field reports facilitate the development of data collection techniques.
- **CO3:** Understand that observation skills allow them to understand how theory applies to real-world situations.
- **CO4:** Students will use methods of observing professional practice that challenge or refine existing theories.
- **CO5:** Students will make their own observations, order their experiences, make decisions, and set their own priorities.

Mapping

Field Work											
C O	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)

SEMESTER IV

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 individuals performing the work.

UNIT I: Introduction to Ergonomics

- Definition, History, and Evolution of Ergonomics.
- Scope of Ergonomics in home and other occupations.
- Nature of work in household 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

- 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 cardiovascular and musculoskeletal systems.
- 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, Cardiovascular, and Respiratory system.
- Thermoregulatory system.
- Endurance and muscular strength.
- Skill, Maximal work, Speed.
- Factors affecting physiological reactions during work.
- Workload and posture.

UNIT V: Cardio-Respiratory Fitness

- Anthropometric measurements and Physical Fitness Index.
- Body composition:
 - Body fat %, Body surface area, lean body mass by skinfold method, and Somatotyping.
- Maximum aerobic capacity using modified Harvard test (Queens College test).
- Determination of workload using heart rate and oxygen consumption:
 - Treadmill, stepstool, Heart rate, and oxygen consumption.
- Pulse rate, Time and motion study.
- Energy cost.
- Assessment of Physical work capacity (PWC).

References

1. Astrand P.O. and Rodahl K.: *Textbook of Work Physiology*, McGraw Hill, New York.
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*, Taylor and Francis, London.
5. Wilson J.R. and Corlett N.: *Evaluation of Human Work. A Practical Ergonomics Methodology*, Taylor and Francis, London.
6. Pheasant Stephan: *Body space, Anthropometry, Ergonomics and the Designs at Work*, Taylor & Francis, London.

COURSE OUTCOMES

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

- **CO1:** Explain the psychology of human behaviour as it relates to workplace safety.
- **CO2:** Identify ergonomic hazards and recommend appropriate controls.
- **CO3:** Relate the human and workplace factors that contribute to ergonomic hazards.
- **CO4:** 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											
C O	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)

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

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 techniques, 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 contaminants: Biological contaminants, Pesticide residues, veterinary drug residues, and heavy metals.

Unit III: Food Additives and Residues

- Direct Additives: Preservatives, Nitrate, Nitrite, 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.

Unit IV: Common Adulterants and Standards

- 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.

Unit V: Laws and Regulations

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

REFERENCES

1. Giridarilal Sidappa, G.S., and Tandon, G.L. (1979). *Preservation of Fruits and Vegetables*, ICAR, New Delhi.
2. FPO (1955). *Quality Control*.
3. Horace, D. Graham (1980). *The Safety of Foods*, 2nd Edition, AVI Publishing Co. Inc, Westport.
4. Julie Miller-Jones (1992). *Food Safety*, Eagan Press.
5. Lewis M.J. (1987). *Physical Properties of Food and Processing Systems*, Ellis Harwood Ltd., England.
6. Piggott, J.R. (1984). *Sensory Analysis of Foods*, Elsevier Applied Science Publisher, New York.

COURSE OUTCOMES

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

- **CO1:** Explain safety and quality management systems that ensure integrity throughout the food chain.
- **CO2:** Discuss the practical applications of Laboratory Information Management Systems in the food industry.
- **CO3:** Understand the quality management standards, philosophies, and frameworks.
- **CO4:** Know about risk management strategies employed in the food industry.
- **CO5:** Understand 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

PROJECT & VIVA-VOCE

Students are encouraged to work on Individual Projects to gain acquaintance with real-life problem-solving and hands-on experience. The outcomes of the projects will be submitted as a report, and viva voce shall be conducted for each student individually.

COURSE OUTCOME

- **CO1:** The project gives students the opportunity to experience real research.
- **CO2:** Students will develop greater problem-solving skills.
- **CO3:** Students will gain a better understanding of research methods.
- **CO4:** Deeper understanding of the discipline of the research.
- **CO5:** Better understanding of career and educational paths.

Mapping

Project Viva Voce											
C O	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)

HOSPITAL ADMINISTRATION

LEARNING OBJECTIVES (LOs)

This course will prepare the students to:

- Provide improvement of an organization.

UNIT – I: Introduction

- Management: Definition, Principles, Functions, and Role.
- Management as science, art, and profession.
- Contribution of Taylor, Henry Fayol, and Elton Mayo in the area of management.

UNIT – II: Planning and Decision Making

- Planning: Definition, importance of planning.
- Steps in planning, types of planning.
- Limitations of planning.
- Types of plans: Objectives, Hierarchy of objectives.
- MBO – Process, Benefits, Problems & Limitations.
- Policies & Procedures: Characteristics of sound policy & procedures.
- Decision Making process: Making effective decision.

UNIT – III: Organizing

- Organization structure.
- Role, Features of good organization structure.
- Departmentation, bases of departmentation.
- Span of management, centralization & decentralization – Factors determining degree of decentralization.

UNIT – IV: Directing

- Motivation: Definition, Importance.
- Motivation Theories: Maslow, Herzberg, McGregor's motivation theories.
- Job enrichment, Job enlargement, Job rotation, Job satisfaction.
- Leadership: Definition, Qualities of a leader.
- Leadership styles – power orientation, Managerial Grid, Tridimensional Grid.
- Communication: Communication process, oral, written & Nonverbal communication.
- Formal & Informal communication, barriers in communication, making communication effective.

UNIT – V: Controlling

- Definition, Importance of control.
- Steps in controlling, essentials of effective control system.
- Management by exception, Benefits of management by exception.

REFERENCES

1. L.M. Prasad, *Principles & Techniques of Management*, Sultan Chand & Sons.
2. Dinkar & Tagore, *Business Management*.
3. Koontz Z & 'O' Donnel, *Essentials of Management*.
4. Tripathi & Reddy, *Principles of Management*.

COURSE OUTCOMES

- Recognize the principles of authority, leadership, behaviour of individuals and teams.
- Translate management and organizational behaviour theories into practice that will result in organizational effectiveness, efficiency, and human resource development.
- Understand themselves and other people at work and will be able to learn how to create effective work groups at workplaces and become effective employees in all domains of managerial work they do in the future.

Mapping

Core–Hospital Management											
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

Tests for Assessment of Food Quality

1. Qualitative tests for detection of adulterants
2. Test for assessment of purity of water
3. Test for assessment of quality of milk and milk products
4. Test for assessment of quality of cereals/milletts
5. Test for assessment of quality of pulses
6. Test for assessment of quality of fats and oils
7. Test for assessment of quality of meat/fish products
8. Test for assessment of quality of canned/bottled fruits and vegetables

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.
- **CO3:** Understand the quality management standards, philosophies, and frameworks.
- **CO4:** Understand tests for assessment of food quality.
- **CO5:** Understand the key regulatory issues that ensure food safety and quality.

Mapping

Food Quality Control 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)