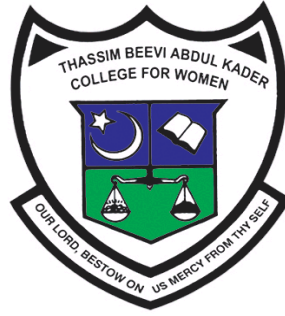


THASSIM BEEVI ABDUL KADER COLLEGE FOR WOMEN

A Minority Institution Sponsored by Seethakathi Trust, Chennai.
Recognized by DBT under Star College Scheme, Ministry of Science and Technology, Govt of India.
An Autonomous Institution Affiliated to Alagappa University, Karaikudi.
Accredited by NAAC with "A" Grade [CGPA: 3.16] & ISO 9001:2015 Certified Institution.
Recognized by UGC under 2(f) & 12 (B).
Kilakarai – 623517, Ramanathapuram District



DEPARTMENT OF NUTRITION AND DIETETICS

XXI ACADEMIC COUNCIL

30.05.2025

ANNEXURE - W

**DEPARTMENT OF NUTRITION AND DIETETICS
PG and UG SYLLABUS**

Vision:

The Department of Nutrition and Dietetics aims to empower and uplift women through excellence in education, research and Promote Entrepreneurial spirit among youngsters to inculcate innovative and ingenious bent of mind to be job creators and nation builders in the field of Nutrition and Dietetics.

Mission:

- The Programme develops the wholesome personality of the students by unifying their knowledge through Home Science discipline.
- Rendering the knowledge-based education to Nutrition and Dietetics students through high-quality teaching, training, and research mentorship and contributing service to professional, governmental and local community organizations.
- Transforming academic inputs to social benefits, nurturing the students for holistic development, extending community outreach for social upliftment, facilitating academia/ Industrial collaboration.

Programme Educational Objectives:

PEO1: To create and strengthen women leaders through disciplinary knowledge, professional skills and ethical sensitivity

PEO2: To transform students as successful entrepreneurs to face the modern challenges

PEO3: To nurture the students to invent, innovate and create solutions for current moral, ecological and economic issues

Programme Outcomes:

In completion of all under graduate and postgraduate Degree programmes, the students will be enabled with:

PO1: Disciplinary Knowledge: Acquiring knowledge of different dimensions in the related areas of study and identifying the assumptions that frame thinking and actions.

PO2: Effective Communication: Ability to share thoughts, ideas and applied skills of communications in its various perspectives through LSRW.

PO3: Research Skill and Critical Thinking: Ability to plan, execute and report the results of an experiment and to draw conclusions from evidences and the capability to apply analytical thought by following scientific approach to knowledge development.

PO4: Moral ethical awareness / Reasoning: Ability to embrace moral/ethical values in conducting one's life, about an ethical issues from multiple perspectives, and use ethical practices in all works and appreciating environmental and sustainability issues; and adopting unbiased and truthful actions in all aspects of work.

PO5: Information / Digital Literacy: Capability to use ICT in case of need and the ability to access, evaluate and use the relevant information.

PO6: Problem solving: Ability to apply their competence to solve non-familiar everyday problems in real life situations.

PO7: Self –directed and Lifelong Learning: Acquire the ability to engage in independent and lifelong learning through self-paced and self-directed learning to meet out the change in demands of work place through Knowledge/ Skill development/ Reskilling.

M Sc NUTRITION AND DIETETICS**[Two Year Regular Programme]**

(For Students Admitted from 2025-2026)

Programme Specific Outcomes:

On completion of the Post Graduate Programme, the student will be able to gain

- PSO1:** Apply the knowledge of the nutrition care process and promotes a high standard of nutrition care to clients in the field of Nutrition & Dietetics
- PSO2:** Solve the complex problems in the field of Clinical Nutrition and dietetics with an understanding of the societal, legal, and cultural impacts of the solution
- PSO3:** Translate nutrition needs into food choices and plan menus for community settings taking into consideration psychosocial economic and life stages
- PSO4:** Reflect upon his own performance and be a self-directed and life-long learner
- PSO5:** Become a successful entrepreneur, professional and pursue higher education
- PSO6:** To construct their own food and baking units and understand and identify the food safety issues at micro and macro levels
- PSO7:** Organize educational internship in reputed hospitals and food industries

PREAMBLE

Following are the changes done in the 2024-25 syllabus and the candidates who will join from 2025 -26 onwards will follow this syllabus.

The following changes have been introduced in the curriculum:

- In Semester I, the curriculum saw several updates to enhance the academic framework. A new course titled *Core I – Advanced Human Physiology* was introduced, replacing the previous *Advanced Food Chemistry* course. Additionally, within *Core IV – Research Methodology and Statistics*, the topic of *Research Report Writing and Interpretation* was added to Unit V to strengthen students' research skills. Furthermore, the content of Unit V in the Discipline Specific Elective I-a – *Public Health Nutrition* was revised to include important areas such as *Nutrition Education, Community-Based Nutrition Education, and Public Health Nutrition Frameworks*, enriching the course with relevant public health perspectives.
- In Semester II, several curriculum updates were made across various courses to enhance content relevance and depth. The Discipline Specific Elective I–b was retitled *Sensory Evaluation of Food*, with Units I, II, and III renamed to *Concept of Sensory Evaluation, Physiology of Sensory Perception, and Instrumental and Electronic Methods in Sensory Evaluation*, respectively. The Core V course, *Medical Nutrition Therapy I*, saw an update in Unit III to include topics on *Pulmonary Disease and Stress*. In Core VII, *Advanced*

Nutritional Biochemistry, Units I, II, and III were revised to reflect the latest advancements. The Discipline Specific Elective II-a, *Diet and Nutrition Counseling*, had its Unit IV revised to focus on *Nutrition Education*. Similarly, the Discipline Specific Elective II-b, *Food Packaging*, underwent revisions in Units I and II. Lastly, the Extra Credit course, *Scientific Writing for Project*, had content updates in Units I and V to strengthen students' research and writing skills.

- In Semester II, several curriculum updates were made across various courses to enhance content relevance and depth. The Discipline Specific Elective I-b was retitled *Sensory Evaluation of Food*, with Units I, II, and III renamed to *Concept of Sensory Evaluation*, *Physiology of Sensory Perception*, and *Instrumental and Electronic Methods in Sensory Evaluation*, respectively. The Core V course, *Medical Nutrition Therapy I*, saw an update in Unit III to include topics on *Pulmonary Disease* and *Stress*. In Core VII, *Advanced Nutritional Biochemistry*, Units I, II, and III were revised to reflect the latest advancements. The Discipline Specific Elective II-a, *Diet and Nutrition Counseling*, had its Unit IV revised to focus on *Nutrition Education*. Similarly, the Discipline Specific Elective II-b, *Food Packaging*, underwent revisions in Units I and II. Lastly, the Extra Credit course, *Scientific Writing for Project*, had content updates in Units I and V to strengthen students' research and writing skills.
- In Semester IV of the M.Sc. Nutrition and Dietetics programme, targeted content updates were made to enhance subject depth and specialization. For Core XIII – Geriatric Nutrition, the content of Units II and IV was revised to better address the evolving nutritional needs of the aging population. Similarly, the Extra Credit course – Diabetic Care and Education saw revisions in Units II and IV to provide more comprehensive insights into diabetes management and patient education. Additionally, a significant structural enhancement was introduced across the programme, with the inclusion of a new Unit VI in all course papers, aimed at expanding the scope of each subject and reinforcing advanced learning outcomes

PROGRAMME CODE: PND
PROGRAMME STRUCTURE
MSc-NUTRITION AND DIETETICS-(2025-26)

Semester	Subject Code	Course	Subject Title	Hour / Week	Credit	@SD/EN T/EMP	\$REG/ NAT/ GLO	CIA	ESE	Total Marks
I	JMNDC11	Core I	Advanced Human Physiology	6	5	SD	GLO	25	75	100
	JMNDC12	Core II	Advanced Human Nutrition	6	5	SD	GLO	25	75	100
	JMNDC13	Core III	• Integrated Course Advanced Food Microbiology	6	5	SD/EMP	GLO	25	75	100
	JMNDC14	Core IV	Research Methodology and Statistics	6	5	SD/EMP	GLO	25	75	100
	JMNDE1A JMND1B	DSE I	a. Public Health Nutrition b. Sensory Evaluation of food	6	5	SD/EMP	GLO GLO	25	75	100
	JMNDC15 JMNDX10	Extra Credit	Institutional Food Service Management / *Online Course (Food Nutrition for Healthy Living-Swayam)	-	2	SD/EMP	GLO	-	100	100
				TOTAL	30	25+2			125	375 + 100
II	JMNDC21	Core V	Medical Nutrition Therapy I	6	5	SD/EMP /ENT	GLO	25	75	100
	JMNDC22P	Core VI	Medical Nutrition Therapy I Practicals	6	5	SD/EMP /ENT	GLO	25	75	100
	JMNDC23	Core VII	Advanced Nutritional Biochemistry	6	5	SD/EMP	GLO	25	75	100
	JMNDC24	Core VIII	Nutrition Through Life Cycle	6	5	SD/EMP	GLO	25	75	100
	JMNDE2A/ JMND2B	DSE II	a. Diet and Nutrition Counseling/ b. Food Packaging	6	5	SD/EMP /ENT SD/EMP /ENT	GLO	25	75	100
	JMNDC25 JMNDX20	Extra Credit	Scientific Writing for Project / *Online Course (Maternal Infant Young Child Nutrition-Swayam)	-	2	SD/EMP	GLO	-	100	100
				TOTAL	30	25+2			125	375+ 100

III	JMNDC31	Core IX	Medical Nutrition Therapy II	6	5	SD/EMP/ENT	GLO	25	75	100
	JMNDC32P	Core X	Medical Nutrition Therapy II Practicals	6	5	SD/EMP/ENT	GLO	25	75	100
	JMNDC33	Core XI	• Integrated Course-Functional Foods and Nutraceuticals	6	5	SD/EMP/ENT	GLO	25	75	100
	JMNDC34P	Core XII	Food Analysis Practicals	6	5	SD/EMP/ENT	GLO	25	75	100
	JMNDE3A JMND3B	DSE III	a. Food Safety and Quality Control b.Sports Nutrition	6	5	SD/EMP/ENT	GLO	25	75	100
	JMESX3/ JMNDX3O	Extra Credit	Employability Skills / *Online Course (Mental Health and Nutrition-EDX)	-	2	SD/EMP	GLO	100	-	100
			TOTAL	30	25+2			125+100	375	500+100
IV	JMNDC41	Core XIII	Geriatric Nutrition	6	5	SD/EMP	GLO	25	75	100
	JMNDC42I	CorXIV	#Dietetic Internship in Hospital	6	5	SD/EMP	GLO	25	75	100
	JMNDC43DW	Core XV	Dissertation	12	5	SD/EMP	GLO	100	100	200
	JMNDX4 JMNDX4 O	Extra Credit	Diabetic Care and Education / *Online Course (Food science and Processing-Swayam)		2	SD/EMP/ENT	GLO	-	100	100
			Library	6						
			TOTAL	30	15+2			150	250+100	400+100
		GRAND TOTAL	120	90+ 8			525+100	1375+300	1900+400	

DSE –Discipline Specific Elective

*For online course credit alone will be assigned on submission of certificate obtained through appearing for online examination from EdX,Swayam, Spoken Tutorial, NPTEL and Coursera etc

@SD-Skill Development ENT-Entrepreneurship EMP-Employability

\$R-Regional N-National G-Global

Core I - Advanced Human Physiology

(For Students Admitted from 2025-2026)

Semester: I
Subject Code: JMND C11**Hours/week: 6**
Credit: 5**Course Objectives:**

1. To provide an in-depth understanding of the physiological processes at the cellular, tissue, organ, and system levels in the human body.
2. To explore the mechanisms of homeostasis, the regulation of body functions, and the physiological responses to internal and external stimuli.

Unit I**(18 hours)**

Cellular Compartmentalization & Membrane Structure: Overview of eukaryotic cell organization, organelles, and lipid bilayer properties; role of transport proteins and ion channels in cellular function.

Cell Cycle and Regulation: Mechanisms of cell cycle progression (G1, S, G2, M phases) and key regulatory checkpoints involving cyclins, CDKs, tumor suppressors, and proto-oncogenes.

Apoptosis and Autophagy: Pathways of programmed cell death (intrinsic, extrinsic) and cellular degradation mechanisms (autophagy) in health and disease.

Unit II**(18 hours)**

Neurophysiology: Structure and function of neurons and glial cells; action potentials, nerve impulses, and synaptic transmission. Resting membrane potential and ion channels in neural function. Brain regions and their roles: cortex, cerebellum, basal ganglia, and neural control of movement, sensation, and cognition.

Neurotransmitters: dopamine, serotonin, glutamate, GABA, and their impact on brain function.

Somatic and autonomic nervous systems: sympathetic and parasympathetic interactions and reflex arcs.

Unit III**(18 hours)**

Cardiovascular Physiology: Structure and function of heart, Mechanisms of heart contraction/relaxation, electrical activity (action potentials, ECG), and regulation of cardiac output, stroke volume, and heart rate.

Hemodynamics and Blood Pressure Regulation: Factors influencing blood flow, baroreceptor reflex, RAAS,

Vascular Physiology: Structure and function of arteries, veins, capillaries, endothelial function, and regulation of vascular tone. Microcirculation, Capillary Exchange

Unit IV**(18 hours)**

Pulmonary Anatomy and Mechanics: Structure of lungs, airways, ventilation mechanics, lung volumes, capacities, and the role of surfactant.

Gas Exchange and Transport: Diffusion across the alveolar-capillary membrane, oxygen and carbon dioxide transport, and the hemoglobin-oxygen dissociation curve.

Ventilation, Perfusion, and Control: Regulation of ventilation, ventilation-perfusion matching, hypoxic pulmonary vasoconstriction, and control of breathing through chemoreceptor and rhythm city.

Unit V (18 hours)

Hormone Function and Classification: Types of hormones (peptide, steroid, amine); mechanisms of action via cell surface and intracellular receptors; feedback loops (negative and positive).

Hypothalamic-Pituitary Axis: Hypothalamic regulation of pituitary hormones and their effects on target organs (thyroid, adrenal glands, gonads); hormonal control of growth, reproduction, and stress response.

Thyroid and Parathyroid Physiology: Synthesis, regulation, and effects of thyroid hormones; parathyroid hormone and calcium homeostasis.

Pancreatic and Adrenal Physiology: Insulin and glucagon in glucose metabolism; cortisol, aldosterone, and adrenal medullary hormones.

Unit VI

Questions related to the above units, from various competitive examinations to be solved. (To be discussed during the Skill Development Course hour)

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Understand the integration of physiological systems and their role in maintaining homeostasis under normal and pathological conditions.

CO2: Demonstrate a comprehensive understanding of the structure and function of major human organ systems.

CO3: Analyze physiological data and apply concepts of human physiology to real-life health scenarios.

CO4: Evaluate the impact of physiological dysfunctions and diseases on the human body.

CO5: Develop critical thinking skills to interpret and solve physiological problems related to health and disease.

Text Books:

1. Chatterjee C.C., *Human Physiology*, CBS Publishers & Distributors Pvt. Ltd, NewDelhi, 11th Edition, 2016.
2. H. Gurusurthy, H. K. Makari, S. V. Sowmya, H. S. Ravikumar Patil, *A Textbook of Human Physiology*, Dreamtech Press Publication, 1st Edition, 2020.

Reference Books:

1. H. Gurusurthy, H. K. Makari, S. V. Sowmya, H. S. Ravikumar Patil, *A Textbook of Human Physiology*, Dreamtech Press Publication, 1st Edition, 2020.
2. A.K.Jain, *Human Physiology for BDS*, Avichal Publication, 6th Edition, 2018.
3. Yalayaswamy N.N, *Human Anatomy and Physiology for courses in Nursing and Allied Health Sciences*, CBS Nursing Publication, 4th Edition, 2018.

Journals:

1. European Journal of Applied Physiology
2. Journal of Medical Sciences
3. The Journal of Laboratory and Clinical Medicine

E-Resources:

1. <https://www.pdfdrive.com/fundamentals-of-anatomy-and-physiology-for-nursing-and-healthcare-students-e176005292.html>
2. <https://www.pdfdrive.com/essentials-of-medical-physiology-6th-edition-e32299678.html>

3. <https://www.pdfdrive.com/essentials-of-anatomy-and-physiology-e25774384.html>
4. <https://www.pdfdrive.com/textbook-of-human-physiology-for-dental-students-d187617928.html>
5. <https://www.pdfdrive.com/essentials-human-physiology-e1543905.html>

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO								
CO1	9	9	3	3	1	9	3	37
CO2	9	9	3	9	1	9	3	43
CO3	9	9	3	9	1	9	3	43
CO4	9	9	3	3	1	9	3	37
CO5	9	9	3	9	1	9	3	43
Total	45	45	15	33	5	45	15	203

Low-1

Medium-3

High-9

Core II - Advanced Human Nutrition

(For Students Admitted from 2025-2026)

Semester: I

Subject Code: JMNDC12

Hours/week: 6

Credit: 5

Course Objectives:

1. To learn the role of nutrients in the human body and provide in depth understanding of nutritional science related topics in preparation of further studies
2. To examine the features of nutrients including food sources, digestion, absorption, transport, metabolism, excretion, deficiency and toxicity

Unit I

(18 hours)

Energy: Determination of energy value of food, Physiological fuel value, Relation between oxygen required and calorimeter value. Measuring total energy requirement. Factors affecting physical activity, Basal metabolic rate - Determination of basal metabolic rate by calculation energy requirement during work and thermic effect of food, Regulation of Energy Metabolism .

Unit II

(18 hours)

Carbohydrates: Review of nutritional significance of carbohydrates and changing trends in dietary intake of different types of carbohydrates and their implications, Dietary fibre - Types, Sources and role and mechanism of action. Chemical composition and physiological significance- Resistant starch, Fructo-oligosaccharides, Glycemic Index and Glycemic load.

Unit III

(18 hours)

Proteins: Protein Metabolism in muscle, Liver and Gastro Intestine, Amino acid and peptide transporters, Requirements and dietary guidelines, Therapeutic applications of amino acids, Peptides of physiological and nutritional significance. Protein quality: Biological value, protein efficiency ratio, and protein digestibility-corrected amino acid score (PDCAAS).

Lipids: Nutritional significance of fatty acids - Saturated fatty acid, Mono unsaturated fatty acid, Poly unsaturated fatty acid and Trans fatty acids. Functions and deficiency of Essential fatty acids, Role of n-3 and n-6 fatty acids, Nutritional Requirements and dietary guidelines for visible and invisible fats in diets.

Unit IV (18 hours)

Vitamins: Definition, Classification, Metabolism (Digestion, Absorption, Transport, Storage and elimination), Bioavailability and factors affecting bioavailability, Biochemical and physiological functions, Interaction with other nutrients, Pharmacological and therapeutic effects - Fat soluble vitamins: (A, D, E, K) and Water soluble vitamins (B1, B2, B3, B5, B6, B9, B12, Vitamin C).

Unit V (18 hours)

Minerals: Definition, Classification, Food Source, Metabolism (Digestion, Absorption, Transport, Storage and Elimination), Bioavailability and factors affecting bioavailability, Biochemical and physiological functions, Interaction with other nutrients, Pharmacological and therapeutic effects- Macro Minerals (Calcium, Phosphorous, Sodium, Potassium). Micro Minerals (Iron, Zinc, Selenium, Iodine and Fluorine).

Body fluid and electrolyte balance: Water distribution in the body, preformed and metabolic water; maintenance and regulation of fluid and electrolyte balance.

Unit VI

Questions related to the above units, from various competitive examinations to be solved.
(To be discussed during the Skill Development Course hour)

Course Outcomes:

After successful completion of this course, student will be able to

- CO1:** Relate human nutrition to the maintenance of health and the prevention of disease and understand the metabolic role of nutrients and their complex interrelationships
- CO2:** Identify the relationship between physiological structure, biochemical status and nutrient availability
- CO3:** Analyze the Bioavailability, excess and deficiency condition of all nutrients
- CO4:** Utilize current scientific literature to investigate nutrition and the valid use of supplements
- CO5:** Critically evaluate and derive requirements for specific nutrients and familiarize with the recent advances in human nutrition

Text Books:

1. Srilakshmi, *Nutrition Science*, New Age International Publishers, 8th Edition, 2019.
2. Bamji, M.S., Krishnaswamy K. Brahman G.N.V, *Textbook of Human Nutrition*, Oxford and IBHPublishing Co. Pvt. Ltd. New Delhi, 4th Edition, 2017.

Reference Books:

1. Rhonda M. Lane, *Human Nutrition: Navigating through the Maze*, Kendall / Hunt Publishing Co, U.S, 3rd Edition, 2019.
2. Denis M Medeiros and Wildman, *Advanced Human Nutrition*, Jones & Bartlett Learning, 4th Edition, 2018.
3. Kathleen Mahan and Sylvia Escort- Stump, *Food, Nutrition and Diet Therapy*, W.B.Saunders Company, 11th Edition, 2016.

Journals:

1. American Journal of Clinical Nutrition
2. Indian Journal of Nutrition and Dietetics
3. Journal of Clinical Nutrition and Food Science

E-Resources:

1. <https://www.pdfdrive.com/introduction-to-human-nutrition-2nd-edition-e1688125.html>.
2. <https://www.pdfdrive.com/introduction-to-human-nutrition-e8482943.html>
3. <https://www.pdfdrive.com/vitamin-and-mineral-requirements-in-human-nutrition-e28893.html>
4. <https://www.pdfdrive.com/vitamins-and-minerals-e162099106.html>
5. <https://www.pdfdrive.com/advanced-nutrition-and-dietetics-in-nutrition-support-e158466498.html>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	9	9	3	9	3	9	51
CO2	9	3	9	9	3	9	9	51
CO3	9	3	9	9	9	9	9	57
CO4	9	3	9	3	9	9	9	51
CO5	9	9	9	9	9	9	9	63
Total	45	27	45	33	39	39	45	273

Low-1

Medium-3

High-9

Core III - Advanced Food Microbiology

(For Students Admitted from 2025-2026)

Semester: I**Subject Code: JMND13****Hours/week: 6****Credit: 5****Course Objectives:**

1. To obtain knowledge about important genera of microorganisms associated with role of microorganisms in health and disease
2. To study microbiological examination of foods, microbiological quality control and quality schemes

Unit I**(18 hours)**

Introduction to Food Microbiology: Recent development of Food microbiology, Scope of food microbiology, General characteristics of microorganisms, Morphology, Classification, Motility, Nutrition, Respiration and reproduction - Bacteria, Viruses, Yeasts, Molds, Algae and Protozoa.

Unit II**(18 hours)**

Culture media: Advanced Culture Media Methods in Microbiology - Synthetic Biology Inspired Media, Defined Media for Synthetic Microbiomes, Metabolomics-Guided Media Optimization, High-Throughput Cultivation Platforms, Serum-Free and Animal Component-Free Media

Unit III**(18 hours)**

Microorganisms as food: Single cell protein, algae as food, and mycoprotein from fungi for use as food and feed, mushroom cultivation, concept of probiotics, prebiotics and synbiotics, different fermented foods (Sauerkraut, Sausages, Bread, Soy sauce, Idli, Tempeh, Poi, Dairy products -basic concepts of all briefly). Different microbial enzymes in food industry.

Unit IV (18 hours)

Food borne diseases: Bacterial food borne diseases - Staphylococcal intoxication, Botulism, Salmonellosis, Shigellosis, Enteropathogenic Escherichia Coli Diarrhoea, Clostridium Perfringens gastroenteritis, Bacillus cereus Gastroenteritis.

Viral Food borne diseases: Norwalk virus, Norovirus, Reovirus, Rotavirus, Astrovirus, Adenovirus, Parvovirus, Hepatitis A Virus.

Animal Parasites- Food borne diseases: Protozoa-Giardiasis, Amebiasis, Toxoplasmosis, Sarcocystosis, Cryptosporidiosis, Cysticercosis / Taeniasis. Roundworm: Trichinosis, Anisakiasis. Mycotoxins: Aflatoxicosis, Mycotoxicosis, Ergotism.

Unit V (18 hours)

Assessing the microbiological quality of food: Microbiological standards, Principles of GMP in food processing and Safety management at household and industrial level.

HACCP: An Effective Food Safety Assurance System, Benefits of HACCP, Principle of HACCP, Guidelines for Application of HACCP Principles, Case studies on HACCP implementation in food industries

Unit VI

Questions related to the above units, from various competitive examinations to be solved. (To be discussed during the Skill Development Course hour).

Course Outcomes:

After successful completion of this course, student will be able to

- CO1:** Recall the types of microorganisms in food processing and compare their characteristics and behaviour and understand the knowledge of sample preparation in microbiological analysis
- CO2:** Identify microorganisms in food fermentation product and describe their roles
- CO3:** Differentiate the roles of bacteria, mycotoxin, viruses and parasites to food borne diseases and compare pathogens that cause infection and intoxication
- CO4:** Explain the principles of food microbiology to evaluate food related cases in daily Application
- CO5:** Familiarize the concept of HACCP in Food Industry

Text Books:

1. William C.Frazier, *Food Microbiology*, Tata McGraw Hills Publishing Company Limited, Chennai, 5th Edition, 2017.
2. Virendra Kumar Pandey, *A Text Book of Food Microbiology*, INSC International Publishers, 2021.

Reference Books:

1. Matthews.K.R, *Food Microbiology an Introduction*, ASM Press, 4th Edition, 2017.
2. Adams, MR and Moss, MO, *Food Microbiology*, New Age International (P) Ltd, New Delhi, 2015.
3. Ray, B. and Bhunia, A, *Fundamental Food Microbiology*, CRC Press, 5th Edition, 2018.

Journals:

1. Journal of Food Microbiology
2. Journal of Food & Industrial Microbiology
3. International Journal of Food Microbiology

E-Resources:

1. <https://www.pdfdrive.com/food-microbiology-d55747381.html>
2. <https://www.pdfdrive.com/food-microbiology-e58597702.html>
3. <https://www.pdfdrive.com/fundamental-food-microbiology-fifth-edition-e175981800.html>
4. <https://www.pdfdrive.com/food-microbiology-an-introduction-e166783912.html>
5. <https://www.pdfdrive.com/foodborne-parasites-food-microbiology-and-food-safety-e15>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	3	9	9	3	9	9	51
CO2	9	3	9	3	9	3	9	45
CO3	9	3	9	9	9	9	9	57
CO4	9	9	9	9	9	9	9	63
CO5	9	3	9	3	9	9	9	51
Total	45	21	45	33	39	39	45	267

Low-1

Medium-3

High-9

Core IV-Research Methodology and Statistics

(For Students Admitted from 2025-2026)

Semester: I**Subject Code: JMND14****Hours /week: 6****Credit: 5****Course Objectives:**

1. To give an overview of the research methodology and explain the technique of defining a research problem, sampling design and different methods of data collections
2. To develop practical knowledge and skills to understand and carryout research projects

Unit I**(18 hours)**

Introduction to Research Methodology: Meaning, Objectives and Significance of research. Types of research and Research approaches and scientific methods. Criteria of good research.

Research process: Selection and formulation of research problem, Specifying objectives, Formulating hypothesis and Deciding variables, Limitations and delimitations of the problem.

Unit II**(18 hours)**

Defining the Research Problem: Concept and need, Identification of Research problem, defining and delimiting Research problem.

Research Questions and Hypothesis: Variables and their linkages, characteristics of good Hypothesis. Research question and formulation of hypothesis-directional and non-directional hypothesis.

Research design: Purposes of research design -Fundamental, Applied and action, Exploratory and descriptive, Experimental, Ex-post facto-Longitudinal and Cross sectional and Co-relational.

Unit III (18 hours)

Sampling design: Population and sample, Steps in sampling design, Criteria for selecting a sampling procedure, Different types of sampling techniques - Probability sampling, Random sampling, Purposive sampling, Stratified sampling and Non-probability sampling. Advantages and disadvantages of sampling. Power analysis and sample size calculation in experimental design.

Unit IV (18 hours)

Data Collection Tools: Characteristics of good tool, Types of tools and their uses - Observation, Questionnaire, Interview, Scaling method, Case study and Home visits. Reliability and validity of measuring instruments.

Use of online tools for data Collection: Survey conducted through Google form, Form plus, Survey sparrow.

Use of tools / techniques for Research: Methods to search required information effectively, Reference Management Software like Zotero/ Mendeley, Software for paper formatting like LaTeX Office, Software for detection of Plagiarism.

Unit V (18 hours)

Statistical Testing of Hypothesis: Define Hypothesis, Hypothesis statement, Hypothesis testing, Null hypothesis

Parametric Tests: Definition, Merits and demerits. Types and its applications-Student T test (Independent, Paired, Two-Tailed and One-Tailed Tests), Anova and Z-Test.

Non-Parametric Tests: Definition, Merits and demerits. Types and its applications Chi-Square Tests and Spearman's Rank correlation. Usage of Statistical Package for Social Science (SPSS) Software - (Interpretation of Findings).

Research Report Writing and Interpretation: Structure of a Research Report General guideline for writing research reports.

Unit VI

Questions related to the above units, from various competitive examinations to be solved. (To be discussed during the Skill Development Course hour).

Course Outcomes:

After successful completion of the course, student will be able to

CO1: Define and identify the knowledge of the scientific method, purpose and approaches to research

CO2: Illustrate the statistical techniques to research data for analyzing and interpreting data

CO3: Explain the types of research, with research process and research designs

CO4: Assess the appropriate sampling techniques for research work

CO5: Summarize the sampling process for data collection.

Text Books:

1. Kothari, C. R. and G. Garg, *Research Methodology: Methods and Techniques*, 4th Multi Colour Edition, New Age International Publishers, 2019.
2. Gupta, S.P., *Statistical Methods*, Sultana Chand and Sons & Deep Publications, 2019.

Reference Books:

1. Donna Mohr William Wilson Rudolf Freund, *Statistical Methods*, Elsevier Publisher, 4th Edition, 2021.

- Bordens, Kenneth; Abbott, Bruce Barrington, *Research Design and Methods: A Process Approach*, McGraw-Hill Education, 11th Edition, 2021.
- Das.N, *Statistical Methods*, McGraw Hill Education Publishers, 1st Edition, 2017.

Journals:

- Journal of Advanced Research
- Journal of Scientific Research
- Journal of Research in Medical Sciences

E-Resources:

- <https://explorable.com/research- methodology>
- <https://www.mbaknol.com/research-methodology/the-basic-types-of-research>
- <https://www.pdfdrive.com/fundamental-of-research-methodology-and-statistics-e19853056>
- <https://www.pdfdrive.com/spss-statistics-for-dummies-3rd-edition-e34460729.html>
- <https://www.pdfdrive.com/spss-survival-manual-a-step-by-step-guide-to-data-analysis-using- spss-for-windows-version-10-e158709797.html7137947.html>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	9	9	9	9	9	3	57
CO2	9	9	3	9	3	3	1	37
CO3	9	3	9	9	3	9	3	45
CO4	9	3	1	9	1	1	3	27
CO5	9	1	9	9	1	1	3	33
Total	45	25	31	45	17	23	13	199

Low-1

Medium-3

High-9

Discipline Specific Elective I -a. Public Health Nutrition

(For Students Admitted from 2025-2026)

Semester: I**Subject Code: JMNDE1A****Hours/week: 6****Credit: 5****Course Objectives:**

- To enable students to identify and contribute to the prevention of public health / social health problems in the country
- To equip students with workable knowledge to treat common illnesses at home

Unit I**(18 hours)**

Concept of Public Health Nutrition: Relationship between health and nutrition, Population Dynamics - Demography and Demographic cycle. Birth rates, Death rates, Growth rates and Demographic trends in India - Age pyramid, sex ratio and Human Development Index. Health care facility - Concept, functions. Role of public nutritionists, Primary Health Centre.

Unit II**(18 hours)**

Assessment of Nutritional Status: Methods of Nutritional Assessment - Nutritional anthropometry and Growth standards, Dietary and clinical assessment, Biochemical, Biophysical and Radiological assessment. Nutrition monitoring-Objectives and Agencies

engaged in nutrition monitoring. Nutritional surveillance -Key indicators of nutritional surveillance programme.

Unit III (18 hours)

Nutrition Intervention Programmes in India: Objectives and operation of Feeding Programmes - Chief Minister Noon Meal Programme (CMNMP) and Integrated Child Development Service (ICDS). National organization - ICMR, NIN, NNMB, CFTRI. International Organization - FAO, WHO, UNICEF, UNESCO, World Bank and package program of immunization.

Unit IV (18 hours)

Strategies to combat public nutrition problems: Protein energy malnutrition (PEM), Vitamin A deficiencies, Iron deficiency anemia (IDA), Iodine deficiency disorder (IDD), Zinc deficiency, Beriberi and Pellagra, Folic acid and B12 deficiency, Scurvy, Rickets, Osteomalacia, Fluorosis and Lathyrism. Nutritional guidelines for emergency situations.

Unit V (18 hours)

Nutrition Education: Need, Scope, Importance and Theories of nutrition education, Process of nutrition education.

Community-Based Nutrition Education: Designing, implementing, and evaluating community nutrition education programs. Role of schools, media, and healthcare systems in nutrition communication.

Public Health Nutrition Frameworks: Key principles and strategies in public health nutrition. Global and national approaches to nutrition policy and programs

Unit VI

Questions related to the above units, from various competitive examinations to be solved. (To be discussed during the Skill Development Course hour)

Course Outcomes:

After successful completion of this course, student will be able to

- CO1:** Define the concept of public health nutrition and discuss the challenges and scope of public health nutrition in India
- CO2:** Select and use appropriate modes of communication to obtain and share evidence based public health nutrition knowledge
- CO3:** Assess the nutritional status by using direct or indirect methods
- CO4:** Summarize the global, national, regional and state level prevalence of protein energy malnutrition
- CO5:** Formulate various teaching aids for extension education and educate the people and family regarding nutritional care.

Text Books:

1. Srilakshmi, B. *Nutrition Science*, New Age International Publisher, New Delhi, 6th Edition, 2017.
2. Suryatapas, *Textbook of Community Nutrition*, Academic Publishers, 2016.

Reference Books:

1. Park A, *Textbook of Preventive and Social Medicine*, Bhanot Publishers, 23rd Edition, 2015.
2. Boyle M.A, *Community Nutrition in Action: An Entrepreneurial Approach*. 7th Edition, Brooks Cole. 2016.
3. Sari Edelstein, *Nutrition in Public Health*, Jones and Bartlett Publishers, 4th Edition, 2017.

Journals:

1. American Journal of Clinical Nutrition
2. International Journal of Behavioral Nutrition and Physical Activity
3. Journal of Public Health Nutrition

E-Resources:

1. <https://www.pdfdrive.com/public-health-nutrition-e196546358.html>
2. <https://www.pdfdrive.com/community-and-public-health-nutrition-e60389853.html>
3. <https://www.pdfdrive.com/handbook-of-nutrition-and-immunity-e175896624.html>
4. <https://www.pdfdrive.com/handbook-of-anthropometry-physical-measures-of-human-form-in-health-and-disease-e165859751.html>
5. <https://www.pdfdrive.com/practical-public-health-nutrition-e191432662.html>

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	9	9	9	9	3	3	51
CO2	9	9	9	9	3	3	9	51
CO3	9	9	9	3	3	9	9	51
CO4	9	9	9	3	3	9	9	51
CO5	9	9	9	3	9	9	9	57
Total	45	45	45	27	27	33	39	261

Low-1 Medium-3 High-9

Discipline Specific Elective I-b. Sensory Evaluation of food

(For Students Admitted from 2025-2026)

Semester: I**Hours/week: 6****Subject Code: JMNDE1B****Credit: 5****Course Objectives:**

1. To study the sensory measurement of foods and design appropriate methods for the sensory testing of foods
2. To enable students to develop their skills in applying sensory methods to product development and communicating sensory messages

Unit I**(18 hours)**

Concept of Sensory Evaluation: Definition, importance, and applications of sensory evaluation in food science. Role of sensory evaluation in quality control, product development, and consumer preference.

Quality Attributes of Food: Sensory attributes: Appearance, texture, flavor, and taste. Factors affecting sensory perception: Cultural, physiological, and psychological influences.

Unit II**(18 hours)**

Physiology of Sensory Perception -Taste: Structure and function of taste organs (tongue, taste buds, papillae). Mechanism of taste perception: Sweet, salty, sour, bitter, and umami. Factors

affecting taste perception and sensitivity: Thresholds, individual variation, and taste modification.

Smell (Olfaction): Anatomy of the olfactory system and its role in flavor perception. Mechanisms of odor detection and the relationship between odor and taste. Factors influencing olfactory perception: Aging, health, and environmental factors

Texture: Sensory receptors involved in texture perception: Mechanoreceptors and thermo-receptors. Role of texture in food quality and consumer acceptance. Rheological properties of food and their relation to sensory texture.

Colour: Introduction and importance of colour, dimensions of colour and attributes of colour; gloss etc. Perception of colour.

Unit III

(18 hours)

Instrumental and Electronic Methods in Sensory Evaluation: Electronic Nose and Tongue:

Working principles and applications in food industry. Comparison between electronic and human sensory evaluation. Use of electronic sensory devices in food quality control.

Color Measurement: Importance of color in food quality and consumer preferences. Color measurement systems: Munsell, CIE, and Hunter systems. Instrumental methods for color assessment.

Texture Analysis: Instrumental techniques for texture evaluation (e.g., texture profile analysis, rheometers). Comparison between instrumental and sensory texture analysis. Applications of instrumental methods in food product development.

Unit IV

(18 hours)

Sensory Testing Methods-Descriptive Testing: Panel-based descriptive analysis: Profiling and scaling techniques, Sensory panels: Panelist selection, training, and management. Standardization of sensory testing conditions.

Discriminative Testing: Types of difference tests: Triangle test, paired comparison, ranking. Applications and limitations of discriminative tests in food quality assessment.

Affective Testing: Preference and acceptance tests: Hedonic scales, consumer surveys. Methods for measuring overall acceptability and liking of food products. Statistical analysis of affective testing results.

Unit V

(18 hours)

Applications of Sensory Evaluation in Food Industry: Product Development-Role of sensory evaluation in new product development and reformulation. Sensory evaluation during prototype testing and market launch. Feedback from consumers: Improving product formulations.

Regulatory Aspects of Sensory Evaluation: Ethical considerations and guidelines for conducting sensory tests. Sensory testing in food regulations and labeling claims

Unit VI

Questions related to the above units, from various competitive examinations to be solved. (To be discussed during the Skill Development Course hour).

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Define sensory evaluation and understanding of sensory evaluation and consumer testing methods and of their underlying principles

CO2: Apply sensory evaluation techniques in sensory assessment situations

CO3: Analyze the standard methods of sensory evaluation using essential techniques

CO4: Explain the human sensory perceptions, particularly the chemical and trigeminal senses

and their relevance to the evaluation of food and beverage sensory properties
CO5:Capacity to formulate foods that meet specified sensory requirements and which are intended to contribute to reduce community health concerns

Text Books:

1. Shakuntala Manay.N, Shadaksharaswamy.M,*Food Facts and Principles*,New Age International Publishers, 4th Edition, 2018.
2. Gorden.W.Fuller W, *New food product development: from concept to market place*, CRC Press Publishers, 3rd Edition, 2011.

Reference Books:

- 1.P.Carpenter, *Guidelines for Sensory Analysis in Food Product Development and Quality Control*, 2nd Edition, Springer Publication, 2020.
- 2.Lawless H.T, Hildegard Heymann, *Sensory Evaluation of Food Principles and Practices*,Springer Publisher, 2nd Edition, 2016.
- 3.Rao E. S, *Food Quality Evaluation*, Variety Books Publication, 2013.

Journals:

1. Asian Journal of Science and Technology
2. Journal Food Quality and Preference
3. Journal of Sensory Studies

E-Resources:

1. https://en.wikipedia.org/wiki/Sensory_analysis
2. www.intropsych.com/ch04_senses/gustation.html
3. <https://www.ffsqindia.org/sensory-analysis-in-quality-control.html>
4. <https://libguides.sjsu.edu/c.php?g=540267&p=3702020>
5. <https://library.stanford.edu/all/?q=%22Food+Sensory+evaluation.%22>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	3	9	9	9	3	9	51
CO2	9	9	9	9	9	9	9	63
CO3	9	3	9	3	9	9	9	51
CO4	9	3	9	9	9	3	3	45
CO5	9	9	9	9	9	9	9	63
Total	45	27	45	39	45	33	39	273

Low-1

Medium-3

High-9

Extra Credit - Institutional Food Service Management

(For Students Admitted from 2025-2026)

Semester: I**Subject Code: JMNDX1****Credit: 2****Course Objectives:**

- 1.To get acquainted with the various types of food service establishments and ability to plan meals and menus
- 2.To gain working knowledge of the main operating activities in a food institution and understand the rules for safety and sanitation in a food service

Unit I

Food service industries in India :Acts and responsibilities - Fables, foibles, fraud and fact - note on eating preference and misinformation, reliable information, source of reliable information, government information and regulations on healthful food program.

Unit II

Projecting and preserving nutrients during production, purchase, storage, cooking and serving. Types and function of menu, planning a menu according to food service type.

Unit III

Kitchen management: Principles of layout, determination of equipment - factors affecting the selection, criteria for selection, types of equipment, basic materials used in manufacture of equipment, installation and care of equipment, fuel saving techniques, physical planning – architectural features, floor, walls, lighting, plumbing and ventilation.

Unit IV

Food service: Methods and styles of service, table winding up, setting, presentation techniques, clearing and customer relations. Laws governing food service institutions -food laws, labour laws, laws concerning hygiene and safety.

Unit V

Environmental hygiene and sanitation: Hygiene in food plant hygiene, safety handling and Personal hygiene, to prevent procedure followed in food service establishment to prevent accidents, facilities and benefits to workers in each establishment.

Unit VI

Questions related to the above units, from various competitive examinations to be solved. (To be discussed during the Skill Development Course hour)

Course Outcomes:

After successful completion of this course, student will be able to

- CO1:** Recall the various types of food services and gain the knowledge about the Institutional food service management
- CO2:** Identify a variety of managerial, production, and service positions that are typical of the food service industry
- CO3:** Analyze the steps involved in menu planning and menu designing
- CO4:** Distinguish between commercial and institutional food service facilities
- CO5:** Develop general knowledge on the origin and development of food service in

hotels, restaurants and institutions

Text Books:

1. Mohini Sethi, *Institutional Food Management*, New Age International Publishers, 2nd Edition, 2016.
2. Mohinini Sethi, Surjeet Malhan, *Catering Management an Integrated Approach*, Wiley Eastern Ltd, 3rd Edition, 2018.

Reference Books:

1. Newman, Jacqueline M. *Chinese Buffets: A Trend Worth Exploring*, Flavor & Fortune, 2014.
2. June Payne-Palacio, *Foodservice Management: Principles and Practices*, Pearson Education, 13th Edition, 2019.
3. Chef Parvinder Singh Bali, *Food Production Operation*, OUP India Publisher, 3rd Edition, 2021.

Journals:

1. Journal of Food Science and Technology
2. Journal of Food Measurement and Characterization
3. Journal of Food Service Equipment

E-Resources:

1. <https://ncert.nic.in/textbook/pdf/lehe104.pdf>
2. <https://www.designcafe.com/guides/different-types-of-kitchen-layouts/>
3. https://www.brainkart.com/article/Definition-and-Types-of-Equipment_35155/
4. <https://www.hotelmanagementtips.com/types-of-food-service-styles/>
5. <https://psu.pb.unizin.org/hmd329/chapter/ch10/>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	3	3	9	9	3	9	45
CO2	9	9	9	3	9	9	9	57
CO3	9	9	9	3	9	3	9	51
CO4	9	9	3	9	9	3	9	51
CO5	9	3	9	9	3	9	9	51
Total	45	33	33	33	39	27	45	255

Low-1 Medium-3 High-9

Core V- Medical Nutrition Therapy I

(For Students Admitted from 2025-2026)

Semester: II**Subject Code: JMNDC21****Hours/week: 6****Credit: 5****Course Objectives:**

1. To study the concept of Medical Nutrition Therapy and understand the importance of team approach in therapeutic nutrition
2. To apply their knowledge and identify the techniques of planning, preparation and execution of therapeutic diets for the patients

Unit I**(18 hours)**

Nutritional care process in disease: Nutritional screening tools-Nutritional Assessment of Hospitalized and outdoor patients based on Anthropometric, Biochemical, Clinical and diet history of the patients - Methods of Dietary assessment - Identification of high risk patients - Implementation of nutritional care -Techniques and feeding substrates - Nutrition Education and dietary Counseling - Evaluation of nutritional care.

Unit II**(18 hours)**

Dietary management in obesity: Prevalence, Classification, Etiology complication, Diet modification, Dietary management and pharmacology treatment in Obesity.

Nutrition in weight management: BMI and body composition, Weight imbalance – overweight, underweight, unintentional weight loss.

Macro modification for stubborn weight: Atkins, Ketogenic diet, Paleo, Low-carb High fat diet. Hormones that control hunger and fat storage-ghrelin, leptin, insulin, cortisol, estrogen. Nutritional management of hormonal imbalance – PCOD, hypo and hyperthyroidism

Dietary management in Underweight: Etiology, Limitation, Complication and dietary management in Underweight.

Unit III**(18 hours)**

Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of fever and infection.

Fever: Typhoid, Malaria, H1N1, Dengue fever and chicken guinea, Covid-19, Role of Immune booster food in management of fever and infection.

Pulmonary disease: Chronic Obstructive Pulmonary Disease (COPD), asthma, pulmonary fibrosis and stress

HIV infection and AIDS: Epidemiology, Transmission of HIV, Defense pathophysiology, Clinical manifestations, HIV infection and other disease, Immunity and AIDS virus, Dietary management prevention and control.

Unit IV**(18 hours)**

Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of GI Disease.

Diseases of Esophagus and Stomach: Esophagitis, Dyspepsia, GERD, Peptic Ulcer, Gastritis & Gastroectomy, Dumping Syndrome.

Diseases of small and Large Intestine: Flatulence, Diarrhoea, Constipation, Hemorrhoids, Diverticular disease, Duodenal Ulcer, Inflammatory Bowel Disease- Crohn's disease Ulcerative Colitis - Irritable bowel syndrome. Role of FODMAP diet.

Malabsorption Syndrome: Celiac Sprue, Tropical Sprue, Steatorrhoea, Intestinal brush border deficiencies and Protein Losing enteropathy.

Unit-V**(18 hours)**

Etiopathophysiology, metabolic and clinical aberrations, Complications, Prevention and recent advances in the medical nutritional management of Liver, Gall bladder and pancreatic disorders.

Disease of Liver: Viral Hepatitis, Cirrhosis of Liver, Hepatic Encephalopathy, Wilson's disease & Liver Transplant.

Diseases of Gall bladder: Biliary Dyskinesia, Cholelithiasis, Cholecystitis, Cholecystectomy.

Disease of Pancreas: Acute pancreatitis, chronic pancreatitis and Zollinger- Ellison Syndrome and Gout.

Unit VI

Questions related to the above units, from various competitive examinations to be solved.

(To be discussed during the Skill Development Course hour).

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Define medical nutrition therapy and recall the etiology, physiologic and metabolic anomalies of acute and chronic diseases

CO2: Explain the therapeutic role of diet and nutritional care concerning weight management, fevers & infections and diseases of the gastrointestinal tract and hepatobiliary system

CO3: Assess the nutritional status of critically illness patients

CO4: Evaluate the nutritional care based on pathophysiology, prevention/ and treatment of the various diet-related disorders/ diseases

CO5: Develop practical skills for modify the diet as per the disease condition

Text Books:

1. Srilakshmi, B., *Dietetics*, New Age International (P) Ltd, 8th Edition, Chennai. 2019.

2. Joshi .A. Shubhaangini, *Nutrition and Dietetics*, 4th Edition, McGraw Hill Publication, New Delhi, 2015.

Reference Books:

1. L. Kathleen Mahan, Sylvia Escott Stump and Janice L Raymond, *Krause's Food & Nutrition Care Process*, 15th Edition, 2020.

2. Robinson, *Normal and Therapeutic Nutrition*, Oxford & LB Publishing, Calcutta & Bombay, 17th Edition, 1990.

3. Kathleen Mahan and Sylvia Escort Stump, *Food, Nutrition and Diet Therapy*, W.B.Saunders's Company, London, 14th Edition, 2016.

Journals:

1. The American Journal of Clinical Nutrition

2. Nutrition Abstracts and Reviews

3. The Indian Journal of Nutrition and Dietetics

E-Resources:

1. <https://www.pdfdrive.com/nutrition-dietetics-practice-and-future-trends-e176409703.html>

2. <https://www.pdfdrive.com/oxford-handbook-of-nutrition-and-dietetics-e185402365.html>

3. <https://www.pdfdrive.com/krauses-food-the-nutrition-care-process-e175336715.html>

4. <https://www.pdfdrive.com/clinical-nutrition-e186572457.html>

5. <https://www.pdfdrive.com/nutrition-health-and-disease-a-lifespan-approach-e189164494.html>

Course Outcomes	Programme Outcomes								
	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	9	9	3	9	9	9	9	57
CO2	9	9	9	9	9	9	9	9	63
CO3	9	9	9	3	9	9	9	9	57
CO4	9	9	9	9	9	9	9	3	57
CO5	9	9	9	3	9	9	9	9	57
Total	45	45	45	27	45	45	45	39	291

Low-1 Medium-3 High-9

Core VI -Medical Nutrition Therapy I Practicals

(For Students Admitted from 2025-2026)

Semester: II

Subject Code: JMNDC22P

Hours/week: 6

Credit: 5

Course Objectives:

- 1.To analyze and modify the menu to therapeutic demands
- 2.To develop the skills in selection of foods for modification of diet and plan menu for specific therapeutic conditions

List of Experiments :

(90 hours)

1. Standardization of common food preparation
2. Planning and preparing diet for Obesity
3. Planning and preparing diet for Underweight
4. Planning and preparing diet for Dengue fever
5. Planning and preparing diet for Covid-19 and Omicron Infection
6. Planning and preparing diet for Tuberculosis
7. Planning and preparing diet for HIV and AIDS
8. Planning and preparing diets for Peptic ulcer
9. Planning and preparing diet for Diarrhoea
10. Planning and preparing diet for Constipation
11. Planning and preparing diet for Crohn disease
12. Planning and preparing diet for Celiac Sprue
13. Planning and preparing diet for Viral hepatitis
14. Planning and preparing diet for Cholelithiasis
15. Planning and preparing diet for Cholecystitis

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Understand the importance of diet in health and disease conditions and explain the process of objective setting in the delivery of a nutritional care plan for a client

CO2: Emphasis skill development in planning therapeutic diets using food exchange lists

CO3: Explain the dietary essentials for recovery and maintenance of various systems

CO4: Compare and contrast derived nutritive value with RDA using software

CO5: Develop practical skills for modify the diet as per the disease condition

Text Books:

1. Gopalan C, RN. Ramasastrinand S.C. Balasubramanian, *Nutritive Value of Indian Foods*, National Institute of Nutrition, Hyderabad, 2018.
2. V.Vimala, *Advances in Diet therapy-Practical Manual*, New Age International Private Ltd, 2020.
3. *Clinical Dietetics Manual*, Indian Dietetic Association, 2nd Edition, 2018.

Reference Books:

1. Mahan L.K., Sylvia Escott-Stump - *Krause's Food Nutrition and Diet Therapy*, W.B.Saunders Company London, 14th Edition, 2016.
2. Robinson, *Normal and Therapeutic Nutrition*, Oxford & LBM Publishing, Calcutta, Bombay, 17th Edition, 1990.
3. MaimunNisha, *Diet Planning For Diseases*, Kalpaz Publication, 2016.

Journals:

1. Asia Pacific Journal Clinical Nutrition
2. European Journal of Clinical Nutrition
3. Journal of Nutrition and Dietetics

E-Resources:

1. <https://www.pdfdrive.com/manual-of-dietetic-practice-e175954283.html>
2. <https://www.pdfdrive.com/medical-nutrition-therapy-a-case-study-approach-e186656569.html>
3. <https://www.pdfdrive.com/applications-and-case-studies-in-clinical-nutrition-e185254994.html>
4. <https://www.pdfdrive.com/manual-of-dietetic-practice-e33501318.html>
5. <https://www.pdfdrive.com/manual-of-clinical-nutrition-management-e18838358.html>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	9	9	9	3	9	9	57
CO2	9	9	9	9	3	9	9	57
CO3	9	9	9	9	9	9	9	63
CO4	9	9	9	9	3	9	9	57
CO5	9	9	9	9	9	9	9	63
Total	45	45	45	45	27	45	45	297

Low-1

Medium-3

High-9

Core VII - Advanced Nutritional Biochemistry

(For Students Admitted from 2025-2026)

Semester: II
Subject code: JMND23**Hours/week: 6**
Credit: 5**Course Objectives:**

1. To provide students with a thorough understanding of the biochemical processes and metabolic pathways in living organisms
2. To equip students with the skills to apply biochemical concepts to real-world scenarios

Unit I**(18 hours)**

Enzymes: Nomenclature and Classification, Chemical nature and Properties, Factors affecting enzyme activity. Enzyme Specificity, Enzyme Inhibition, Coenzymes, Regulation of enzyme activity in the Living System, Application of enzymes in different field.

Acid -Base Regulation: Definitions (Acid, Base, pH, Blood pH, Acid Base Balance, Buffer and Blood Buffers), Henderson- Hassel Balch Equation, Transport and buffering of CO₂ in blood. Buffering of non-volatile acids, Acidosis, Alkalosis, Anion gap, Role of the kidney in acid base balance.

Unit II**(18 hours)**

Introduction to Metabolism – Anabolism and Catabolism, Types of Metabolic reaction. Methods employed to study metabolic reaction.

Metabolism and Regulation of Carbohydrates - Glycolysis, Pyruvate Dehydrogenase pathway (PDH), Krebs cycle (TCA), Gluconeogenesis, Glycogenesis, Glycogenolysis, Hexose Mono Phosphate (HMP) Shunt, Uronic acid pathway. Glycogen storage disorders.

Unit III**(18 hours)**

Metabolism of Amino acids: Amino acid Pool, Transamination Deamination, Metabolism of Ammonia, Urea cycle and its regulation. Metabolism of Phenyl Alanine, Tyrosine, Tryptophan, Histidine, Proline and Arginine. Inborn errors of amino acid metabolism.

Unit IV**(18 hours)**

Metabolism and Regulation of Lipids – Biosynthesis of fatty acids, Oxidation of fatty acids, Metabolism of Ketone bodies. Metabolism of cholesterol, Triglycerides and Phospholipids. Lipid storage disorders.

Unit V**(18hours)**

Nucleic acids: Biosynthesis of DNA (Replication) and RNA (Transcription), Protein Biosynthesis (Translation).

Biological oxidation-Electron Transport Chain (ETC) and Oxidative phosphorylation, Integration of Metabolism.

Unit VI

Questions related to the above units, from various competitive examinations to be solved.
(To be discussed during the Skill Development Course hour)

Course Outcomes:

After successful completion of this course, student will be able to

CO 1: Recall the biochemistry knowledge at the postgraduate level

CO 2: Apply the knowledge to Insight the interrelationships between various metabolic pathways

CO 3: Understand the basics of genetic material and their metabolism

CO 4: Assess an elaborate knowledge on Acid-Base regulation

CO5: Integrate their ideas on the application of enzymes in various fields

Text Books:

1. Dr.Kondreddy Rambabu, Dr.Pendyala Siva Kumar, Dr.Pendyala Kameswari, *Text Book of Biochemistry*, AITBS publishers, 2nd Edition, 2014.
2. Dr.U.Satyanarayana, U.Chakrapani, *Biochemistry*, Elsevier Publication, 5th Edition, 2017
3. J.L.Jain, Nithin Jain, Sunjay Jain, *Fundamentals of Biochemistry* (Multi Colour Ed), S.Chand Publisher, 7th Edition, 2017.

Reference Books:

1. Donald Voet, Judith G.Voet, *Biochemistry*, John Wiley and Sons Publishers, 4th Edition, 2016.
2. David L. Nelson, Michale m cox, Lehninger, *Principle of Biochemistry*, Macmillan Publishers, 7th Edition, 2017.
3. Victor Rod well, David Bender, P.Anthony W Peter Kennelly, Kathleen Botham, *Harper's Illustrated Biochemistry*, Lange Publishers, 30th Edition, 2017.

Journals:

1. Journal of Biological Chemistry
2. Journal of Applied Biochemistry
3. Journal of Nutritional Biochemistry

E-Resources:

1. <https://www.pdfdrive.com/nutritional-biochemistry-second-edition-e158739127.html>
2. <https://www.pdfdrive.com/introduction-to-nutrition-and-metabolism-fourth-edition-e167789063.html>
3. <https://www.pdfdrive.com/advanced-nutrition-and-human-metabolism-e186446303.html>
4. <https://www.pdfdrive.com/biochemistry-e187234482.html>
5. <https://www.pdfdrive.com/lehninger-principles-of-biochemistry-e158386180.html>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	9	3	3	1	9	9	43
CO2	9	9	3	9	1	9	9	49
CO3	9	9	3	9	1	9	9	49
CO4	9	9	3	3	1	9	9	43
CO5	9	9	3	9	1	9	9	49
Total	45	45	15	33	5	45	45	233

Low-1 Medium-3 High-9

Core VIII - Nutrition through Life Cycle

(For Students Admitted from 2025-2026)

Semester: II**Subject Code: JMNDC24****Hours/week: 6****Credit: 5****Course Objectives:**

1. To imparting knowledge on physiological changes in different age groups
2. To understand the nutritional needs of members at different age levels

Unit I**(18 hours)**

Nutrition during pregnancy: Stages of gestation, Maternal weight gain, Physiology of pregnancy, Nutritional requirements and Dietary guidelines during pregnancy, Nutrition related complications with special focus to adolescent pregnancy and general complications of pregnancy, Role of Exercise and Fitness during pregnancy.

Unit II**(18 hours)**

Nutrition during Lactation: Physiological adjustments during lactation, Hormonal controls and reflex action, Lactation concerning growth and health of infants, Physiology of milk production, Problems of breast feeding, Nutritional components of colostrum and mature milk, Special foods during lactation, Nutritional requirements and dietary guidelines during lactation. Galactagogues, Lactation Management in normal & special conditions.

Unit III**(18 hours)**

Nutrition during Infancy: Infant feeding and nutrient needs Feeding in early and late infancy and Feeding problems, Low birth weight and Preterm infants. Nutritional requirement, Supplementary feeding and weaning foods.

Nutrition in Preschool Children: Growth and development and Nutritional requirements, Nutrition for children with special health care needs, feeding problems, Factors to be considered for menu planning and packed lunch.

Unit IV**(18 hours)**

Nutrition in School going Children: Early and middle childhood, Growth and development, food habits, Nutritional needs and feeding, Packed lunch.

Nutrition in Adolescence: Physical growth, Physiological and psychological problems associated with pubertal changes, Nutritional needs eating disorders - Anorexia nervosa and Bulimia.

Unit V**(18 hours)**

Nutrition in Adult: Physiological and Psychosocial changes, Common nutritional concerns Nutritional requirements and dietary recommendation, Physical Activity in adulthood.

Nutrition in Elderly: Physiological and Psychosocial changes during old age, Aging Process, Nutritional requirements of the Elderly, Nutrition care and nutrition needs during illness and chronic conditions- Sensory loss, Oral health and GI functions, Neuromuscular and skeletal functions, Renal and cardiac function, Immuno - competence.

Unit VI

Questions related to the above units, from various competitive examinations to be solved.
(To be discussed during the Skill Development Course hour)

Course Outcomes:

After successful completion of this course, student will be able to

- CO1:** Gain knowledge about food pyramid, vegetarian diet, menu planning and nutritional needs during infancy to adolescents and explain the nutrition education for specific lifecycle stages
- CO2:** Identify and describe potential diseases and disorders, and their risk factors affecting nutrient needs at each state of the life cycle
- CO3:** Assess nutrition issues/ conditions, and recommend nutrition intervention/ support
- CO4:** Evaluate and plan strategies and diets for improving nutritional status of individuals at each stage of the life cycle
- CO5:** Design food plans to meet the needs of humans at various life cycle stages.

Text Books:

1. Bamji, M.S, Krishnaswamy K. Brahmam G.N.V, *Textbook of Human Nutrition*, Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi, 4th Edition, 2017.
2. Swaminathan, M. *Advanced Textbook on Food Science and Nutrition*, Vol:2, Reprinted, Bangalore Printing and publishing Co Inc., Bangalore, 2nd Edition, 2015.
3. Srilakshmi, *Dietetics*, New Age International Publishers, 8th Edition, 2019.

Reference Books:

1. Kathleen Mahan and Sylvia Escort- Stump, *Food, Nutrition and Diet Therapy*, W.B.Saunders's Company London, 11th Edition, 2016.
2. Susan G. Dudek, *Nutrition Essentials for Nursing Practice*, Lippincot Williams D Wilkias, Philadelphia, 2017.
3. Abraham, *Nutrition Through Lifecycle*, New Age International Private Limited, 2020.
4. JudithBrown, *Nutrition Through the Life Cycle*, Wadsworth Publication, 6th Edition, 2016.

Journals:

1. American Journal of Clinical Nutrition
2. Indian Journal Medical Research
3. Journal of Nutrition

E-Resources:

1. <https://www.pdfdrive.com/nutrition-through-the-life-cycle-nutrition-through-the-life-cycle-e58112526.html>
2. <https://www.pdfdrive.com/nutrition-through-the-life-cycle-e187862410.html>
3. <https://www.pdfdrive.com/essentials-of-life-cycle-nutrition-e185708272.html>
4. <https://www.pdfdrive.com/nutrition-through-the-life-cycle-fourth-edition-e157150036.html>
5. <https://www.pdfdrive.com/nutrition-through-the-life-cycle-e157415567.html>

Course Outcomes	Programme Outcomes								
	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	9	9	9	9	9	9	3	57
CO2	9	9	3	9	3	9	9	9	51
CO3	9	9	9	9	9	9	9	9	63
CO4	9	9	3	3	9	9	9	9	51
CO5	9	9	9	3	9	9	9	9	57
Total	45	45	33	33	39	45	39	39	279

Low-1 Medium-3 High-9

Discipline Specific Elective - II a. Diet and Nutrition Counseling

(For Students Admitted from 2025-2026)

Semester: II**Subject Code: JMNDE2A****Hours/week: 6****Credit: 5****Course Objectives:**

1. To understand the need for diet and nutrition counselling for various disease conditions.
2. To enrich knowledge on diet and nutrition counselling, its concept, purpose

Unit I**(18 hours)**

Introduction to Dietitian and IDA: Dietician – Definition and Educational qualification - Types of Dietician – Clinical, academic, research, specific, food service, public/ Community, industrial, consultant, sports, business etc. - Qualities, Role and responsibilities of Dietician - IDA – Objectives, membership; Registered Dietician – eligibility for R.D. exam

Unit II**(18 hours)**

Diet Counseling/ Nutrition Care Process (NCP) - importance, purposes and ethical principles
Steps in Diet counseling Process: Documentation – SOAP - Counseling Skills for a Dietitian; Tools of Dietitian; Guidelines for effective Counseling.

Unit III**(18 hours)**

Counseling Approaches - Meaning, Developing a counselling approach - Different Counselling Approaches – Psychoanalytical, behavioural, humanistic, Patient centered GALIDRAA approaches etc.

Unit IV**(18 hours)**

Nutrition Education - Meaning and importance, - Teaching Methods and aids used for Nutrition Education in the Community Teaching Methods – Lecture, Group discussion, Role Play, Storytelling, Demonstrations, Nutrition Exhibition, Marathon race etc Teaching Materials for patients – Models, pamphlets, leaflets, booklets etc.

Unit V**(18 hours)**

Use of Modern Technology in Diet Counseling - Use of Computers in Diet Counselling - Use of Computer Applications and Mobile Applications in Diet Counselling, Computer and mobile applications available for Diet Counselling - Pre requisites for setting up a Diet Counseling Center

Unit VI

Questions related to the above units, from various competitive examinations to be solved.
 (To be discussed during the Skill Development Course hour)

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Define Dietician and recall the qualities, role and responsibilities of a dietician

CO2: Explains the steps in diet and nutrition counseling

CO3: Analyze the skills in assessment of nutritional status of normal and diseased people

CO4: Assess practical skills in dietary counseling of various health and disease conditions

CO5: Develop teaching aids and uses computer applications and smart phones in diet counseling

Text Books:

1. Srilakshmi, B. —Dietetics, New Age International Publishes, New Delhi, 8th edition, 2018
2. Shubangini A Joshi, —Nutrition & Dietetics, 5th edition, 2022, McGraw hill Education India Pvt. Ltd.
3. IDA, Clinical Dietetics Manual, Elite Publishing House New Delhi, 2nd edition, 2018.

Reference Books:

1. Mahan, Mahan L.K., Sylvia Escott Stump, Krause's Food Nutrition and Diet Therapy, W.B.Saunders Company London, 14th Edition, 2016.
2. Linda Snetselaar —Nutrition Counselling Skills for the Nutrition Care Process, Jane and Bartlett Publishers, London, 4th edition, 2021.

Journals:

1. Journal of Nutrition Education and Behavior
2. British Journal of Guidance and Counseling
3. Journal of the Academy of Nutrition and Dietetics:

E-Resources:

1. <http://csefel.vanderbilt.edu/modules/module2/script.pdf>
2. <http://www.counselorindia.in/marriage-counseling.p>
3. <https://www.eatrightpro.org/practice/quality-management/nutrition-care-process>
4. <http://www.wageningenportals.nl/nutritionsecurity/topic/behaviour-change-and-nutrition-education>
5. <https://egyankosh.ac.in/bitstream/123456789/43392/1/Unit-3.pdf>

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	9	9	3	9	1	9	49
CO2	9	9	9	3	9	1	9	49
CO3	9	9	9	1	9	1	9	47
CO4	9	9	9	1	9	1	9	47
CO5	9	9	9	3	9	1	9	49
Total	45	45	45	11	45	5	45	241

Low-1

Medium-3

High-9

Discipline Specific Elective II –b. Food Packaging

(For Students Admitted from 2025-2026)

Semester: II**Subject Code: JMNDE2B****Hours/week: 6****Credit: 5****Course Objectives:**

1. To study the concept of food packaging materials and their application in food industry
2. To impart knowledge and skills related to designing packaging system in food products

Unit I**(18 hours)**

Introduction to Food Packaging: Definitions, Functions of packaging, Types of Packaging- Green packaging, Active packaging, Intelligent packaging, Aerosol packaging, Antimicrobial

packaging, Vacuum Packaging, Isothermal Packaging, Shrink packaging. Moisture Sorption Properties of Foods and Selection of Packaging Materials. Interactions between Packaging materials and Food and Equilibrium Relative Humidity (ERH) test of the food product.

Unit II (18 hours)

Introduction to Metal Packaging: Types of metal packaging (cans, containers) and their uses in the food industry.

Manufacturing Processes for Metal Packaging: Techniques like stamping, drawing, and coating.

Design and Innovation in Metal Packaging: Innovations in metal packaging for food preservation and sustainability. Understanding food safety regulations related to metal packaging (FDA, EFSA, etc.). Emerging trends in metal packaging, including sustainability and eco-friendly alternatives.

Unit III (18 hours)

Glass Packaging Materials: Introduction, Forming process Blow and Blow (B&B), Press and Blow (P&B), Narrow Neck Press and Blow (NNPB). Closures for Glass Containers, Closure functions, Food Container Closures - Closure to retain internal pressure, Closure to contain and protect contents, Closure to maintain vacuum inside container, Closure to secure contents inside container.

Unit IV (18 hours)

Modified Atmosphere Packaging: Definitions, Principles, Gases used in MAP - Carbon dioxide, Oxygen, Nitrogen, Carbon monoxide, Noble gases, Gas mixtures. Methods for creating MAP conditions, Equipment for MAP, Packaging for MAP applications. Microbiology of MAP. Safety of MAP, Controlled Atmospheric storage (CAP).

Unit V (18 hours)

Biodegradable and Recyclable Packaging Materials: Concept of Recyclable Materials for Packaging, Concept of Biodegradable Materials in Packaging, Types of Biodegradable and Recyclable Packaging Materials – Paper, Card, Board, Corn Starch, Biodegradable plastic and its types.

Labeling and Bar-coding: Printing of packages, bar codes and other marking. Sealing equipments, Labeling- RFID. Environmental and Eco issues and waste disposals, Packaging laws and regulations FDA, PFA.

Unit VI

Questions related to the above units, from various competitive examinations to be solved. (To be discussed during the Skill Development Course hour)

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Define food packaging and discuss the importance and functions of food packaging

CO2: Apply the principles of innovative packaging technologies for use with food products

CO3: Analyze the Chemical and physical properties of packaging materials

CO4: Evaluate different packaging materials based on various types of analysis in the laboratory

CO5: Create awareness on current issues related to quality and safety aspects of food packaging

Text Books:

1. Luciano Piergiovanni, Sara Limbo, *Food Packaging Materials*, Springer International Publishing, 2016.
2. Preeti Singh, Ali Abas Wani, Horst-Christian Landowska, *Food Packaging Materials: Testing & Quality Assurance*, CRC Press Publishers, 2017.

Reference Books:

1. Alexandru Mihai Grumezescu, Alina Maria Holban, *Food Packaging and Preservation*, Academic Press Publishers, 2018.
2. Dipak Kumar Sarker, *Packaging Technology and Engineering: Pharmaceutical Applications*, Wiley-Blackwell Publishers, 2020.
3. Cornelia Vasile, Morten Sivertsvik, *Food Packaging: Materials and Technologies*, MDPI AG Publisher, 2019

Journals:

1. Journal of Food Packaging
2. International Journal of Food Research
3. Journal of Packaging Technology and Research

E-Resources:

1. <https://www.pdfdrive.com/bio-based-materials-for-food-packaging-green-and-sustainable-advanced-packaging-materials-e176352009.html>
2. <https://www.pdfdrive.com/food-packaging-technology-sheffield-packaging-technology-e161258497.html>
3. <https://www.pdfdrive.com/food-packaging-and-preservation-e158425359.html>
4. <https://www.pdfdrive.com/food-packaging-and-preservation-e158425359.html>
5. <https://www.pdfdrive.com/food-packaging-principles-and-practice-3rd-edition-e175266330.html>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	3	9	9	3	3	9	45
CO2	9	3	9	9	9	3	9	51
CO3	9	9	9	9	9	9	9	63
CO4	9	9	9	3	9	9	9	57
CO5	9	9	9	3	9	9	9	57
Total	45	33	45	33	39	33	45	273
	Low-1		Medium-3			High-9		

Extra Credit - Scientific Writing for Project

(For Students Admitted from 2025-2026)

Semester: II**Subject Code: JMNDX2PW****Credit: 2****Course Objectives:**

1. To explain the structure of scientific writing, how to create a scientific writing, how to
2. make poster for scientific writing, how to make presentation for scientific writing, how to present scientific writing and how to read a scientific writing
3. To provide students with knowledge and skills on scientific research starting from

research proposal writing

Unit I

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

Unit II

How to formulate outlines: The reason for preparing outlines – as a guide for plan of Writing as skeleton for the manuscript.

Types of outline: Topic outline, Conceptual outline, Sentence outlines, Combination of topic and sentence outlines

Unit III

Drafting titles, subtitles, tables, illustrations: Tables as systematic means of presenting data in rows and columns and lucid way of indicating relationships and results.

Formatting tables: Title, Body stab, Stab column, Column head, Spanner head, Box head. Appendices: Use and guidelines.

Unit IV

The writing Process: Getting started, Use outline as a starting device, Drafting, Reflecting. Rereading: Checking organizations, Content, Clarity, Grammar, Brevity and precise in Writing, Drafting and Redrafting based on critical evaluation.

Unit V

Parts of dissertation/research report/Journal: Introduction, Review of literature, Methods, results and discussion, Summary and abstract, References.

Writing for grants: The question to be addressed, Rational and importance of the question being addressed, Empirical and theoretical framework, presenting pilot study/data or background information, Research proposal and time frame, Specificity of methodology, organization of different phases of study, expected outcome of study and its implications, Budgeting, Available infrastructure and resources and Executive summary.

Unit VI

Questions related to the above units, from various competitive examinations to be solved. (To be discussed during the Skill Development Course hour)

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Recall the strategies and reasons for publishing research and discuss the different types of scientific writing

CO2: Apply the knowledge on implementing outlines as a guide to plan the manuscript

CO3: Analyze and reflect on your thinking processes and growth to identify strategies for improving academic writing and language skills

CO4: Evaluate the drafting process based on the script outline and re- reading the content to precise the writing for project

CO5: Write a series of analytical, creative, and coherent writing projects, including original research with primary and secondary sources

Text Books:

1. Claudio Dr. Luz, *How to Write and Publish a Scientific Paper: The Step by Step Guide PaperBack*, Publisher, Dr. Luz Claudio, 2016.
2. Gastel Barbara and Day Robert, *How to Write and Publish a Scientific Paper*, Green wood Publisher, 8th Edition, 2016.

Reference Books:

1. Thomas C.George, *Research Methodology and Scientific Writing*, Ane Books Pvt.Ltd, 1st Edition, 2016.
2. Robert A. Day Barbara Gaste, *How to Write and Publish a Scientific Paper*, Green Wood Publisher, 8th Edition, 2016.
3. Wayne C. Booth Gregory G. Colomb Joseph M. Williams, *The Craft of Research*, 3rd Edition, Publisher University of Chicago, 2011.

Journals:

1. Scientific Journal
2. Journal of Writing Research
3. International Journal of Education Research

E-Resources:

1. <https://www.pdfdrive.com/from-research-to-manuscript-a-guide-to-scientific-writing-e185397339.html>
2. <https://www.pdfdrive.com/how-to-write-illustrate-a-scientific-paper-e158701474.html>
3. <https://www.pdfdrive.com/research-methodologies-for-beginners-e185804256.html>
4. <https://www.pdfdrive.com/handbook-of-scientific-proposal-writing-e165569300.html>
5. <https://www.pdfdrive.com/writing-convincing-research-proposals-and-effective-scientific-reports-e53393242.htm>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	3	9	9	9	1	9	49
CO2	9	3	9	9	9	3	9	51
CO3	9	9	9	9	9	9	9	63
CO4	9	9	3	3	3	1	3	31
CO5	9	9	9	3	9	3	3	45
Total	45	33	39	33	39	17	33	239

Low-1

Medium-3

High-9

Core IX- Medical Nutrition Therapy II

(For Students Admitted from 2025-2026)

Semester: III
Subject Code: JMNDC31**Hours/week: 6**
Credit: 5**Course Objectives:**

1. To gain knowledge on the physiological, metabolic and nutritional changes that occurs in non-communicable diseases
2. To impart the Knowledge of diet counseling to alleviate communicable and non-communicable diseases

Unit I**(18 hours)****Nutritional needs in Critical illness:** Define critical illness, Normal cellular processes, injury and response of cells to injurious agents, Nutrition in wound healing.**Surgery:** Pre and post-surgical dietary management. Special feeding Techniques-Enteral and Parental nutrition.**Burns, Sepsis and Trauma:** Etiology factors, sign and symptom, Complication, Dietary management and Physiological, metabolic response to injury.**Special Feeding Method:** Intravenous feeding, tube feeding, gastrostomy, jejunostomy – Meaning, objectives, Technique, Nutrients and Diet.**Unit II****(18 hours)****Dietary management of Cardio Vascular Diseases:** Etiology and Risk Factors and medical nutrition management for cardiovascular diseases -Dyslipidemias, Hypertension, Atherosclerosis and Myocardial Infarction (MI) and Congestive Cardiac Failure (CCF), Stroke Inter-relationship between Diet, Dietary management of Cardio vascular disease - Low fat, low cholesterol and medium chain triglyceride diet, Mediterranean Diet, Prudent diet. Kempner's rice diet, Dietary Approach to Stop Hypertension (DASH), Sodium intake in Hypertension.**Unit III****(18 hours)****Dietary management of Diabetes mellitus: Types of diabetes,** Etiology and Signs and Symptoms, medical nutrition management for Diabetes Mellitus. Factors affecting normal blood glucose levels, Impaired glucose homeostasis, Dietary management of Diabetes- Meal planning, Food exchange system, Glycemic index and glycemic load, Lifestyle modification and exercise to manage diabetes mellitus.**Unit IV****(18 hours)****Dietary management of Renal disorders:** Prevalence, Etiology and Risk Factors, nutrition management for renal disorders - Acute and chronic Glomerulonephritis, Nephrotic Syndrome, Acute Renal Failure (ARF), Chronic Renal Failure (CRF), End Stage Renal Disease (ESRD)-Dialysis and Kidney Transplant. Nephrolithiasis- Types of stones and diet in Nephrolithiasis - Acid and Alkaline Ash diet. Importance of protein nutrition in renal failure and uremia. Role of low protein, fluid restricted diet. Sodium and Potassium exchange list in diet planning of renal disorder patients.**Unit V****(18 hours)****Nutritional management in Cancer:** Prevalence, Etiology and Risk Factors, Clinical diagnostic tests and nutrition management for cancer-Carcinogenesis - pathogenesis and progression of cancer, Types Cancer therapies and treatment - side effects and nutritional implications, Dietary management of cancer, Role of neutropenic diet.

Unit VI

Questions related to the above units, from various competitive examinations to be solved. (To be discussed during the Skill Development Course hour)

Course Outcomes:

After successful completion of this course, student will be able to

- CO1:** Recall the etiology, symptoms and dietary management of degenerative disease and Integrate knowledge of research principles and methods associated with nutrition and dietetics practice
- CO2:** Apply the knowledge of medical terminology and medical abbreviations associated with nutrition related diseases and conditions
- CO3:** Assess the nutritional status of critically ill patients and formulate different therapeutic diets for various disease conditions
- CO4:** Demonstrate initiative and judgment using a professional, ethical and entrepreneurial approach advocating for excellence in nutrition and dietetics
- CO5:** Independently plan and execute a research project regarding nutrition and dietetics practice

Text Books:

1. Srilakshmi, B., *Dietetics*, New Age International (P) Ltd, Chennai, 8th Edition, 2019.
2. Shubhaangini Joshi, *Nutrition and Dietetics*, 4th Edition, McGraw Hill Publication, New Delhi, 2015.
3. Antia F.P. And Philip Abraham, *Clinical Nutrition and Dietetics*, Oxford University Press, 4th Edition, 2002.

Reference Books:

1. L. Kathleen Mahan, Sylvia Escott Stump and Janice L Raymond, *Krause's Food & Nutrition Care Process*, Saunders Publishers, 15th Edition, 2020.
2. Robinson, *Normal and Therapeutic Nutrition*, Oxford & LBM Publishing, Calcutta, Bombay, 17th Edition, 1990.
3. Kathleen Mahan and Sylvia Escort Stump, *Food, Nutrition and Diet Therapy*, W.B.Saunders's Company London, 14th Edition, 2016.

Journals:

1. Journal of Nutrition and Dietetics
2. Journal of Nutrition & Food Sciences
3. Journal of Nutrition and Metabolism

E-Resources:

1. [https://www.pdfdrive.com/nutrition-dietetics-practice-and-future-trends- e176409703.html](https://www.pdfdrive.com/nutrition-dietetics-practice-and-future-trends-e176409703.html)
2. [https://www.pdfdrive.com/oxford-handbook-of-nutrition-and-dietetics- e185402365.html](https://www.pdfdrive.com/oxford-handbook-of-nutrition-and-dietetics-e185402365.html)
3. <https://www.pdfdrive.com/krauses-food-the-nutrition-care-process-e175336715.html>
4. <https://www.pdfdrive.com/clinical-nutrition-e186572457.html>
5. [https://www.pdfdrive.com/nutrition-health-and-disease-a-lifespan-approach- e189164494.html](https://www.pdfdrive.com/nutrition-health-and-disease-a-lifespan-approach-e189164494.html)

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	9	9	3	9	9	9	57
CO2	9	9	9	9	9	3	9	57
CO3	9	9	9	9	9	9	9	63
CO4	9	9	9	9	9	3	9	57
CO5	9	9	9	3	9	9	9	57
Total	45	45	45	33	45	33	45	291

Low-1

Medium-3

High-9

Core X – Medical Nutrition Therapy II Practicals

(For Students Admitted from 2025-2026)

Semester: III

Subject Code: JMNDC32P

Hours/week: 6

Credit: 5

Course Objectives:

1. To apply their knowledge and identify the techniques of planning, preparation and execution of therapeutic diets
2. To formulate and administer appropriate dietary modifications and counseling for the patients

List of Experiments:

(90 hours)

1. Preparation of routine hospital diets in surgical conditions- Clear fluid, Full fluid and soft diet
2. Planning and preparing diet for Burns
3. Planning and preparing diet for Hypertension
4. Planning and preparing diet for Atherosclerosis
5. Planning and preparing diet for Myocardial Infarction
6. Planning and preparing diet for Congestive Heart failure
7. Planning and preparing diet for Type I diabetes Mellitus
8. Planning and preparing diet for Type II diabetes Mellitus
9. Planning and preparing diet for Gestational diabetes
10. Planning and preparing diet for Acute and Chronic Renal failure
11. Planning and preparing diet for Nephrolithiasis
12. Planning and preparing diet for Dialysis
13. Planning and preparing diet for Breast cancer
14. Planning and preparing diet for Lung cancer
15. Planning and preparing diet for Cervical Cancer

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Relate the causes, symptoms and onset of various types of degenerative diseases and describe the acquired skill development in planning therapeutic diets using food exchange list

CO2: Apply the skills for preparing appropriate therapeutic diets

CO3: Analyze the nutrient content of therapeutic diet

CO4: Assess the nutritional status using various nutritional assessment tools

CO5: Plan menu for the given disease condition and compare and contrast with R.D.A using

software

Text Books:

1. Gopalan C.,RN. Ramasastrinand S.C.Balasubra-manian, *Nutritive Value of Indian, Foods*, National Institute of Nutrition, Hyderabad, 2018.
2. V.Vimala, *Advances in Diet therapy-Practical Manual*, New Age International Private Ltd, 2020
3. *Clinical Dietetics Manual*, Indian Dietetic Association, 2nd Edition 2018.

Reference Books:

1. Mahan L.K, Sylvia Escott Stump, *Krause's Food Nutrition and Diet Therapy* W.B. Saunders Company London 14th Edition, 2016.
2. Robinson C.H., *Normal and Therapeutic Nutrition*, Mac Millan Publishing Co. Inc, New York, 17th Edition, 1990.
3. L. Kathleen Mahan, Sylvia Escott-Stump and Janice L Raymond, *Krause's Food & the Nutrition Care Process*, Saunders Publishers, 15th Edition, 2020.

Journals:

1. Asia Pacific Journal Clinical Nutrition
2. European Journal of Clinical Nutrition
3. International Journal of Nutrition and Dietetics

E-Resources:

1. <https://www.pdfdrive.com/manual-of-dietetic-practice-e175954283.html>
2. <https://www.pdfdrive.com/medical-nutrition-therapy-a-case-study-approach-e186656569.html>
3. <https://www.pdfdrive.com/applications-and-case-studies-in-clinical-nutrition-e185254994.html>
4. <https://www.pdfdrive.com/manual-of-dietetic-practice-e33501318.html>
5. <https://www.pdfdrive.com/manual-of-clinical-nutrition-management-e18838358.html>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	3	9	9	9	9	9	57
CO2	9	9	9	3	9	9	9	57
CO3	9	3	9	9	9	9	9	57
CO4	9	9	9	3	9	9	9	57
CO5	9	9	9	9	9	9	9	63
Total	45	33	45	33	45	45	45	291

Low-1 Medium-3 High-9

Core XI-Functional Foods and Nutraceuticals

(For Students Admitted from 2025-2026)

Semester: III

Subject Code: JMNDC33

Hours /week: 6

Credit: 5

Course Objectives:

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

preventive dietetic

Unit I (18 hours)

Historical perspective, classification, scope & future prospects. Applied aspects of the nutraceutical science, sources of nutraceuticals. Relation of Nutraceutical Science with other Sciences: Medicine, human physiology, genetics, food technology, chemistry and nutrition

Unit II (18 hours)

Microbes as Functional Foods: Probiotics, Prebiotics and synbiotics -Role, mechanism of action and health benefits.

Biotechnology and Functional Foods: Role of genetically modified organisms (GMOs), fermentation, and bioengineering in developing functional ingredients and bioactive compounds

Novel Functional Foods: Research into new functional ingredients from exotic fruits, vegetables, and marine sources. Examples include algae, mushrooms, and seaweed.

Unit III (18 hours)

Functional Components from Plant Sources: Dietary fiber - Types and sources -Physical and Physiological properties. Phenolic compounds-Phytoestrogens (Isoflavones, Lignans) Flavonoids – Quercetin, kaempferol, Flavones, Limonene, Flavonols-Catechin, Phenolic acid- Ellagic acid, Caffeic acid, Phytosterols and phytostenols, Saponins, Tannins, Carotenoids - Lycopene, Beta-carotene, Lutein and zeaxanthin.

Unit IV (18 hours)

Functional Components from Animal Sources: a. Proteins-Lactalbumin, Lactoglobulin, Lactoferrin, Immunoglobulins, b. Derived peptides-Casein, Phospho Peptides, Glycomacro peptides, c. Lactose. Mineral- Zinc, Selenium, Calcium.

Dietary lipids: Conjugated Linolenic Acid, Linoleic acid, Oleic acid, GLA, Omega 3 and Omega 6 Fatty Acids.

Unit V (18 hours)

Food as remedies: Nutraceuticals bridging the gap between food and drug, Nutraceuticals in treatment for cognitive decline, Obesity and Cardiovascular diseases, Nutraceutical remedies for common disorders like oral and gut health, Bone health and Diabetes mellitus, cancer. Immune boosting nutraceuticals for infections.

Unit VI

Questions related to the above units, from various competitive examinations to be solved. (To be discussed during the Skill Development Course hour)

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Retrieve the historical perspective of nutraceuticals and physiology of human nutrition and explain the importance of nutraceuticals in the context of the human well-being

CO2: Illustrate the occurrence, chemical nature and medicinal benefits of natural nutraceuticals belong to different phytochemical categories

CO3: Explain the functional components from Plant, Animal and microbial Sources.

CO4: Evaluate the standards of evidence required for efficacy and safety assessment of nutraceutical and functional foods

CO5: Summarize the application of Food biotechnology for improving the formulation of potential functional ingredients / foods will be mastered

Text Books:

1. Bagchi & Debasis & Preuss & HarryG. & Swaroop & Anand, *Nutraceuticals and Functional Foods in Human Health and Disease Prevention*, CRC Press, 2016.
2. RobertE.C. Wildman, Robert Wildman, Taylor C. Wallace, *Handbook of Nutraceuticals and Functional Foods*, by CRC Press, 2nd Edition, 2016.
3. Rotimi E. Aluko, *Functional Foods and Nutraceuticals*, Springer Science & Business Media, 2012

Reference Books:

1. Kavitha Sharma, Kanchan Mishra, and Kamal Senapati and Corina Danciu, *Bioactive Compounds in Nutraceutical and Functional Food for Good Human Health*, Springer Science, 2021.
2. Dilip Ghoshet al., *Innovation in Healthy and Functional Foods*, CRC Press, 2016.
3. Sareen S. Gropper, Jack L. Smith, *Advanced Nutrition and Human Metabolism*, Cengage Learning, 7th Edition, 2016.

Journals:

1. Nutraceuticals World
2. Journal of Medical Nutrition and Nutraceuticals
3. Journal of Nutraceuticals and Nutrition

E-Resources:

1. https://www.researchgate.net/publication/343846825_Nutraceuticals_History_Classification_and_Market_Demand
2. <https://www.pdfdrive.com/beneficial-microbes-in-fermented-and-functional-foods-e166059146.html>
3. <https://www.pdfdrive.com/chemical-and-functional-properties-of-food-components-third-edition-chemical-functional-properties-of-food-components-e188029045.html>
4. <https://www.pdfdrive.com/omega-3-fatty-acids-and-the-dha-principle-e161329463.html>
5. <https://www.pdfdrive.com/nutraceuticals-and-functional-foods-in-human-health-and-disease-prevention-e167230386.html>

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	3	9	3	3	9	9	45
CO2	9	3	9	3	9	9	9	51
CO3	9	3	9	3	3	9	3	39
CO4	9	3	9	3	3	9	3	39
CO5	9	3	9	9	9	9	9	57
Total	45	15	45	21	27	45	33	231

Low-1

Medium-3

High-9

Core XII - Food Analysis Practicals

(For Students Admitted from 2025-2026)

Semester: III
Subject Code: JMNDC34P

Hours/week: 6
Credit: 5

Course Objectives:

1. To develop skills on the quantification technique of various components present in food samples
2. To improve working ability in analytical laboratory instruments

List of Experiments:**(90 hours)**

1. Measurement of pH and preparation of buffer.
2. Determination of Acidity & pH in food sample/beverages.
3. Determination of Moisture in food sample.
4. Determination of Ash in food sample.
5. Determination of Fiber in food sample.
6. Determination of Total carbohydrates in food sample
7. Determination of Total Protein in food sample
8. Determination of Total Fat in food sample
9. Determination of Iodine Value in the food sample
10. Determination of Peroxide Value in the food sample
11. Determination of Rancidity in the food sample
12. Tests for adulterants in the food sample.
13. Determination of Vitamin C in food sample
14. Estimation of calcium in food sample
15. Estimation of Iron in food sample
16. Estimation of phosphorous in food sample
17. Demonstrations- Chromatography, Electrophoresis

Course Outcomes:**After successful completion of this course, student will be able to****CO 1:** Understand the technical terminology and scientific units related to food analysis**CO 2:** Implement the principles behind analytical techniques associated with food and the importance of accuracy and reproducibility in analysis**CO 3:** Analyze and compare various parameters such as pH, moisture, ash, nitrogen, protein, lipid, carbohydrate, etc. in food samples.**CO 4:** Evaluate the appropriate analytical technique when presented with a practical problem**CO 5:** Design an appropriate analytical approach to solve a practical problem.**Text Books:**

1. J.Jayaraman, *Dietary Guidelines for Indians, National Institute of Nutrition, Laboratory Manual in Biochemistry*, New Age International Limited, 1st Edition, 2006.
2. S. Sadasivam & A. Manickam, *Biochemical Methods*, New Age International Limited, 2nd Edition, 2005.
3. Yeshajahu Pomeranz & Clifton E.Meloan, *Food Analysis: Theory and Practice*, Springer Publication, 2002.

Reference Books:

1. David T Plummer, *An Introduction to Practical Biochemistry*, Tata McGraw- Hill Publishing Company Ltd., 3rd Edition, 2006.
2. Sathe A. Y, *A First Course in food analysis*, New Age International Limited, 1st Edition, 2012.
3. S.Suzanne Nielsen, *Food Analysis Laboratory Manual*, Springer Publication, 2nd Edition, 2015.

Journals:

1. Journal of Food and Drug Analysis
2. Journal of Agriculture and Food Chemistry
3. Journal of Food Composition and Analysis

E-Resources:

1. www.ug.edu.gh/nutrition-dietetics/courses/diet-212-food-analysis-practical
2. www.fssai.gov.in/Portals/0/Pdf/Manual_Fruits_Veg_25_05_2016.pdf
3. <https://www.elte.hu/en/Introduction-to-Food-Analysis>
4. <https://www.pdfdrive.com/chemical-food-analysis-practical-manual-e1091408.html>
5. <https://www.pdfdrive.com/manual-of-food-quality-control-e44738521.html>

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	9	9	3	1	9	9	49
CO2	9	9	3	3	1	3	3	31
CO3	9	9	9	9	1	9	9	55
CO4	9	9	3	3	1	9	9	43
CO5	9	9	3	9	1	3	9	43
Total	45	45	27	27	5	33	39	221

Low-1

Medium-3

High-9

Discipline Specific Elective III a. Food Safety and Quality Control

(For Students Admitted from 2025-2026)

Semester: III**Subject Code: JMNDE3A****Hours /week: 6****Credit:5****Course Objectives:**

1. To understand the importance of various issues related to food safety and quality control
2. To know about national and international food standards and their role in ensuring food quality and safety

Unit I**(18 hours)**

Food Safety: Need and importance of food safety in food industries, Factors affecting food safety.

Food Spoilage: Definition, types of food spoilage such as microbes, enzymes and insects, factors influencing food spoilage, Changes in food quality due to spoilage, Methods for detection of food spoilage; Concept of food preservation and the principles.

Unit II (18 hours)

Methods of evaluation of food quality: Sensory evaluation -Discrimination tests-Triangle test, duo-trio test, paired comparison. Rating tests -ranking test, hedonic rating test, numerical Scoring test, composite scoring. Sensitivity tests-threshold test, dilution test.

Objective technique-Physical method Penetrometer, Compress meter, Shortometer and Farinograph. Chemical Method- Nutrient Analysis. pH meter.

Microbiological methods of determining shelf life: Total plate count test and Serial dilution techniques.

Unit III (18 hours)

Food Adulterant: Common adulterants, tests to detect adulterants contaminants, naturally occurring toxins in food metallic pesticide and preservative contaminants. Non nutritive food components and their potential health effects, Polyphenols, Tannins, Phytoestrogens, Cyanogenic compounds, Lecithin, Saponins.

Unit IV (18 hours)

Government and trade standards for quality: Food laws and regulations - PFA , FPO and Food Safety Act 2006. BIS standards, Agmark standards, Compulsory National legislation Act, Essential Commodities Act, Consumer protection Act. International Standards for export, Codex Alimentarius, WTO, ISO, WHO and FAO, FSSAI, APEDA and MPEDA.

Unit V (18 hours)

Control of Food Quality- Introduction to Food Quality Control, Principles of Food Safety and Quality Assurance, Quality Control Measures in Food Production, Testing and Analysis for Food Quality, Quality Management Systems, Emerging Trends and Challenges in Food Quality Control.

Unit VI

Questions related to the above units, from various competitive examinations to be solved. (To be discussed during the Skill Development Course hour)

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Learn standards related to food safety and quality and understand the knowledge about International food safety legislation

CO2: Apply the knowledge on the requirements for compliance with national and International food standards

CO3: Demonstrate knowledge of quality management systems, their implementation and the practical steps needed for implementation

CO4: Conduct risk assessments of food safety problems including genetic modification

CO5: Critically evaluate the recent developments in the control of food safety

Text Books:

1. Pulikat Mathur, *Text book of Food Safety and Quality Control*, Orient Blacks wan Publisher, 2018.
2. Halde, *Objective Food Science and Safety standards*, Jain Brothers Publishers, 201

Reference Books:

1. Alli, I, *Food quality assurance: principles and practices*. CRC Press, 2019.
2. Alok kumar, *Fundamentals of food Hygiene, safety and quality*, Dream tech Press Publishers, 2019.

3. Lásztity, R, *Food Quality and Standards*, Eolss Publishers Company Limited, Vol-3,2009.

Journals:

1. Journal of Food Quality and Hazards Control
2. International Journal of Food Safety, Nutrition and Public Health
3. Journal of Food Safety

E-Resources:

1. <https://www.cliffsnotes.com/study-guides/biology/microbiology/food-microbiology/food-spoilage>
2. <https://hmhub.me/methods-food-evaluation>
3. <https://www.vedantu.com/biology/food-adulteration>
4. <https://www.mondaq.com/india/food-and-drugs-law/244880/laws-governing-the-food-industry-in-india-revisited>
5. <https://food.unl.edu/seven-principles-haccp>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	9	9	3	9	3	9	51
CO2	9	3	9	9	9	9	9	57
CO3	9	9	9	3	9	9	9	57
CO4	9	9	9	9	9	9	3	57
CO5	9	3	9	9	9	9	9	57
Total	45	33	45	33	45	39	39	279

Low-1

Medium-3

High-9

Discipline Specific Elective III b. Sports Nutrition

(For Students Admitted from 2025-2026)

Semester: III

Hours /week: 6

Subject Code: JMND E3B

Credit: 5

Course Objectives:

1. To understand the role of nutrients in athletic performance and provide an overview of dietary supplements to enhance performance
2. To study about the nutritional requirements of athletes with special needs

Unit I

(18 hours)

Nutrition for fitness and sports - Exercise for health promotion of Exercise guidelines Human energy requirements for exercise. Major human energy systems - Components of energy expenditure, Fatigue during exercise. Types of endurance sports; Energy & Macronutrient needs
 a) Types of endurance sports; body compositional standards b) Energy metabolism during endurance exercise & energy needs of endurance athletes.

Unit II

(18 hours)

Nutrition for weight loss in sports: Combat sports, individual events. Types and characteristics

- physiological needs, body composition and energy systems used. Macro and micronutrient requirements in training and competition. Hydration guidelines in weight class sports. Making weight- weight loss and gain in training and competition. Strategies to promote healthy weight loss in athletes.

Unit III (18 hours)

Macronutrient needs of endurance athletes: a. Sport specific nutritional guidelines. b) Carbohydrates-Type & Timing of carbohydrate ingestion, Glycogen loading techniques. c) Lipids- Use of ketogenic diets, Fat loading, strategies to enhance fat utilization/ Fat burners. d) Proteins-Requirements, Role of protein in endurance exercise

Unit IV (18 hours)

Micronutrient requirements of endurance athletes:

a) Vitamins & Minerals: Micronutrients that regulate energy metabolism, blood formation, bone health b) Antioxidant micronutrients c) Sports anemia and other sports specific micronutrient deficiencies d) Water & Electrolytes: Fluid & electrolyte requirements, Dehydration e) Fluid & electrolyte replacement strategies f) Sports drinks and sports gel

Unit V (18 hours)

Use of Nutritional supplements in strength/power sports: use, effects, efficacy and safety. Creatine monohydrate, Sodium bicarbonates, Nitrates, B-Alanine, Caffeine.

Protein supplements: Whey, Casein, Egg Albumen, Soy Protein, Pea Protein & Other Vegan Proteins/Protein Blends), Protein Bars, Protein shakes. Amino acid supplements - Amino Acid Supplements- BCAA, Glutamine, Arginine, Taurine. Fat burners, Ergogenic aids.

Unit VI

Questions related to the above units, from various competitive examinations to be solved. (To be discussed during the Skill Development Course hour)

Course Outcomes:

After successful completion of this course, student will be able to

- CO1:** Outline evidence based nutritional strategies to enhance recovery and understand the knowledge of physiological response to exercise affects nutritional requirements
- CO2:** Explain the relationship between exercise, nutrition and energy balance for the control of body composition and chronic disease risk factors
- CO3:** Interpret data to assess body composition changes in elite athletes and demonstrate an ability to use these guidelines to provide general nutrition advice for achieving or maintaining a healthy bodyweight
- CO4:** Evaluate dietary strategies to influence the health and performance of elite and recreational athletes
- CO5:** Communicate sports nutrition advice accurately and effectively to non-specialist audiences

Text Books:

1. Dan Benardot, *Advanced Sports nutrition*, Champaign, IL: Human Kinetics, 2021.
2. Sumati R. Mudambi, *Fundamentals of Foods, Nutrition and Diet Therapy*, New Age International Private Limited, 2020.

Reference Books:

1. Marie Spano, Laura Kruskall, D. Travis Thomas, *Nutrition for Sport, Fitness and Health*, Human Kinetics, 2017.
2. Anita Bean, *The Complete Guide to Sports Nutrition*, Bloomsbury Sport, 8th Edition, 2017
3. Don Mac Laren, *Advances in Sport and Exercise Science: Nutrition and Sport*, Published by Churchill Livingstone, Elsevier, 2007.

Journals:

1. British Journal of Sports Medicine
2. International Journal of Sport Nutrition and Exercise Metabolism
3. Journal of International Society of Sports Nutrition

E-Resources:

1. <https://www.pdfdrive.com/nutritional-applications-in-exercise-and-sport-nutrition-in-exercise-sport-e163327830.html>
2. <https://www.pdfdrive.com/nutrition-in-sport-e9596094.html>
3. <https://www.pdfdrive.com/nutrition-and-metabolism-in-sports-exercise-and-health-e178549344.html>
4. <https://www.pdfdrive.com/essentials-of-sports-nutrition-and-supplements-e175251805.html>
5. <https://www.pdfdrive.com/sports-nutrition-vitamins-and-trace-elements-second-edition-nutrition-in-exercise-sport-e156737603.html>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	3	9	9	3	9	3	45
CO2	9	3	3	9	3	9	9	45
CO3	9	3	9	3	3	9	3	39
CO4	9	3	9	9	3	9	9	51
CO5	9	9	9	3	3	3	9	45
Total	45	21	39	33	15	39	33	225

Low-1

Medium-3

High-9

Extra Credit-Employability Skills

(For Students Admitted from 2025-26)

Semester: III**Subject Code: JMEGX3P****Credit: 2****Course Objectives:**

1. Get ready the students for job market with good communication skill
2. Appear for interviews and make presentations confidently

Unit I**Behavioural Skill**

Personal Strength Analysis -Perception Management-Social Etiquette.

Unit II**Communication Skill**

Self-Introduction- Verbal Communication- Non-Verbal Communication-Campus to Work.

Unit III**I.T. Literacy**

MS-Word-File Conversion & Reducing File Size-Web browsers & Search Engines-Email-Mobile Application-Online CV.

Unit IV**Entrepreneurship Skill**

Need of becoming Entrepreneur-Ways to become a good Entrepreneur-Different Government Institutions/Schemes Promoting Entrepreneur-Day to day mechanism for maintaining an enterprise.

Unit V**Preparation to the World of Work**

Career Plan-Basic Professional Skill-Career Pathways-Search and Apply for a Job.

Self-Study Component:**1. Learn from the Experts – TED Talks on Career Development**

(Activity: Watch at least two TED Talks or expert interviews related to career building, communication skills, or entrepreneurship like Simon Sinek's "Start with Why" or Amy Cuddy's "Your Body Language May Shape Who You Are").

2. LinkedIn Profile Creation and Online CV

(Activity: Students must create or update their LinkedIn profile and generate a professional CV including educational background, skills, and career objectives using an online CV builder like Canva, Zety, or NovoResume).

3. Skill-Based Micro-Course Completion - Title: Digital Literacy and Beyond

(Enrol in a free online course (1–2 hours) from platforms like SWAYAM, NPTEL on topics such as: Resume writing, Time management, Basic Excel or MS Word)

Course Outcomes:

After successful completion of this course, student will be able to

CO 1: Identify a planned approach towards career

CO 2: Associate skills and interests with chosen career path

CO 3: Take part in group discussions

CO 4: Develop thinking ability

CO 5: Perceive personal interviews through mock interviews

Text Books:

1. M Esther, Doug Graham & Deepthi Lamahewa. "Trainer Manual for Soft Skills:Applied for Entry Level Occupation". WUSC-ASSET Project, Srilanka, 2019.
2. Lata, Pushp, and Kumar, Sanjay. *Communication Skills*, 2nd Edition. India, Oxford University Press, 2015.
3. Maluth, John Monyok. *Basic Computer Knowledge*. N.p., Independently Published, 2016.
4. Khanka, S S. *Entrepreneurial Development*. S Chand and Company Limited, New Delhi, 2001.

5. Ann, Mary Bailey. *Finding the Right Career Path: Wetfeet Insider Guide*. Wetfeet.Com Publisher, 2006.

Reference Books:

1. Rath, Tom, et al. *Strengths-Based Leadership: Great Leaders, Teams, and Why People Follow*. Philippines, Gallup Press, 2009.
2. Chaturvedi, P. D. *Business Communication: Concepts, Cases and Applications* (for Chaudhary Charan Singh University). N.p., Dorling Kindersley (India), 2011.
3. Morrison, Connie, and Wells, Dolores. *Computer Literacy BASICS*. United States, Cengage Learning, 2012.
4. *Promoting Entrepreneurship and Innovative SMEs in a Global Economy*. France, OECD Publishing, 2008.
5. Janson, Simone. *Wanted! The Job of Your Dreams – Better Career Choice Reorientation Job Application: Develop Your Skills Potential & Self-confidence, Discover Chances & Strategies, Achieve Goals*. Germany, Best of HR – Berufebilder, 2021.

Journals:

1. International Journal on Procedia-Social Sciences and Behaviour
2. e-Journal of Business Education & Scholarship of Teaching
3. Journal of Further and Higher Education

E- Resources:

1. <https://opentextbc.ca/organizationalbehavioropenstax/chapter/employee-abilities-and-skills/>
2. <https://courses.lumenlearning.com/wm-businesscommunicationmgrs/chapter/verbal-and-nonverbal-communication/>
3. <https://www.avantixlearning.ca/microsoft-word/reduce-file-size-large-word-documents-avoid-bloat-slowness-corruption-crashes/>
4. <https://support.microsoft.com/en-us/office/video-resumes-in-word-ce00832f-8388-4291-a417-0f70cd2e5914>
5. <https://gfgc.kar.nic.in/mccw-mysore/FileHandler/410-00295b1f-7b5c-49b1-ae68-3debdd957e67.pdf>
6. <https://learnenglish.britishcouncil.org/skills/listening>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	9	9	9	9	9	9	63
CO2	9	9	9	9	9	9	9	63
CO3	9	9	9	3	9	9	9	57
CO4	9	9	9	9	9	9	9	63
CO5	9	9	9	9	9	9	9	63
Total	45	45	45	39	45	45	45	309

Low-1 Medium-3 High-9

Core XIII -Geriatric Nutrition
(For Students Admitted from 2025-2026)

Semester: IV
Subject Code: JMNDC41

Hours /week: 6
Credit: 5

Course Objectives:

1. To provide in-depth knowledge on aging and nutrition care required during acute and chronic disease conditions
2. To provide an insight on the issues and problems related to geriatrics

Unit I

(18 hours)

Introduction to Ageing: Introduction to geriatric care-concept of gerontology. Ageing - Biology of ageing- Theories of ageing, Interaction between physiological and social processes in ageing. Drug, food, and nutrient reaction.

Dietetics of Geriatric Care: Nutritional requirement, Food requirement, dietary modification.

Unit II

(18 hours)

Issues and challenges of Ageing: Economic dependence/ poverty, Elderly in rural/ urban area. Abuse, Neglect, Abandonment, Physical, Health and Sensory problems. Crime against elderly, Retirement and related issues. Ageing sensory system and issues with falling. Common complaints during ageing.

Unit III

(18 hours)

Clinical Geriatric: Nutritional related problems of old age-osteoporosis, obesity, neurological dysfunction, Anaemia, Malnutrition and constipation. Infection and Immunity. **Degenerative disorders in elderly:** Dementia, Alzheimer, Parkinson's disease. Disorders of upper GIT, Disorders of lower GIT, Disorders of Liver, Disorders of Biliary system and pancreas. Infection of Respiratory system.

Unit IV

(18 hours)

Geriatric Guidance and Counselling: Definition, Principles, Dimensions, Process and techniques of counselling, counseling the older person, Common problems requiring counselling, Counselling under special situation.

Behavior therapy: Rational-emotive behavior therapy (REBT), Horticultural therapy. Music therapy and Art therapy and Bibliotherapy.

Unit V

(18 hours)

Social Geriatric: Role of Government in Socio –economic status of the elderly. Structure of geriatric service, models of geriatric service. Day hospital, day care centre, long stay care institution for old age people. Home for the aged, function of the day hospital staff and patients of day hospital. Ethical issues in geriatric medicine-age limits on health care. Life sustaining measures.

Unit VI

Questions related to the above units, from various competitive examinations to be solved. (To be discussed during the Skill Development Course hour).

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Gain Knowledge of Nutrition, Health and Gerontology and understand the process of

physical and social changes taking place during the elderly people life

CO2: Identify the nutritional implications of these changes in terms of nutrient and dietary requirements

CO3: Determine different techniques of nutritional assessment of the elderly

CO4: Examine the sensory problems and chronic degenerative disease during ageing

CO5: Develop the knowledge about geriatric guidance and counseling and write the role of Government and NGOs in economic status of geriatrics

Text Books:

1. Gary Cheuk, *Advanced Age Geriatric Care*, Springer International Publishing, 2018.
2. Srilakshmi.B, *Dietetics*, New Age International (P) Ltd, Chennai, 7th Edition, 2014.
3. Barbara Resnick, *Essentials of Clinical Geriatrics*, McGraw Hill Professional Publisher, 2017.

Reference Books:

1. Dale Avers, Guccione's *Geriatric Physical Therapy*, Book Aid International, 4th Edition, 2019.
2. Jacobs M, *Psychodynamic Counselling in Action*, Sage Publications, New Delhi, 4th Edition, 2015.
3. Trower, P, Jones, J, Dryden, W and Casey, A, *Cognitive Behavioural Counselling in Action*, Sage Publication, New Delhi, 2nd Edition, 2011.

Journals:

1. Journal of the Indian Academy of Geriatrics
2. Journal of Gerontology & Geriatric Research
3. Journal of Geriatric Psychiatry and Neurology

E-Resources:

1. https://samples.jbpub.com/9781284104479/Chapter_3.pdf
2. <https://www.helpguide.org/home-pages/aging-issues.htm>
3. <https://www.bacp.co.uk/media/1968/bacp-counselling-older-people-systematic-review.pdf>
4. [https://www.brainkart.com/article/Nutrition-Related-Problems-Of-Elderly\(Old-Age\)_2611/pdf](https://www.brainkart.com/article/Nutrition-Related-Problems-Of-Elderly(Old-Age)_2611/pdf)
5. https://www.jyotivas.org/pdf/e_content/sociology/3rd%20YearsAgeing%20%E2%80%93%20Role%20of%20NGO%E2%80%99S.pdf

Course Outcomes	Programme Outcomes							
	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	3	9	3	9	51
CO2	9	3	9	3	3	3	3	33
CO3	9	3	9	3	3	3	3	33
CO4	9	3	9	3	9	3	9	45
CO5	9	9	3	3	3	3	9	39
Total	45	27	39	15	27	15	33	201

Low-1 Medium-3 High-9

Core XIV - Dietetic Internship in Hospital

(For Students Admitted from 2025-2026)

Semester: IV
Subject Code: JMND42I**Hours/week: 6**
Credit: 5**Course Objectives:**

1. To gain knowledge in the functioning of a dietary department and hands-on experience in the roles and responsibilities of dietitians
2. To develop skills to assess patients' nutritional needs and plan suitable diets and diet counseling skills for patients

Aspects to be covered in the Dietary Internship training programs (90 hours)**Dietary internship training:**

1. Assessing the nutritional status and diet history of patients.
2. Planning diet sheets, preparing and providing guidance in the production of therapeutic diet.
3. Supervising the preparation of diets.
4. Getting feedback from patients regarding diets.
5. Understanding the layout of hospital dietary unit.
6. Acquiring practical knowledge in diet counselling.
7. Undertaking 3 case studies at hospital situation.
8. Acquiring practical knowledge in Online Dietetic Counselling Techniques

Guidelines:

- It is compulsory for all the students to complete the given institutional training Programme in a reputed institution for a period of 30 days.
- At the end of the course, each student has to submit a report as part of the training
- Internal marks will be awarded by the faculty of the department with whose guidance the report is prepared

Course Outcomes:**After successful completion of this course, student will be able to****CO1:** Identify nutrition-related problems and determine nutrition interventions and describe the work of inter professional teams and the roles of others with whom the registered dietician nutritionist collaborates in the delivery of food and nutrition services.**CO2:** Interpret the relevance of food and nutrition for the disease**CO3:** Analyze the food habits and brief about the dietary modification**CO4:** Discuss the impact of health care policy and different health care delivery systems on food and nutrition services to the consultant and Graduates will be prepared to pass the national level Registered level dietician examination**CO5:** Persuade the patients with appropriate online diet counselling techniques**Text Books:**

1. Srilakshmi, B., *Dietetics*, New Age International(P) Ltd, Chennai, 8th Edition, 2019.
2. Antia F.P. And Philip Abraham, *Clinical Nutrition and Dietetics*, Oxford University Press, 4th Edition, 2002.
3. A.Joshi Shubhaangini, *Nutrition and Dietetics*, 4th Edition, McGraw Hill Publication, New Delhi, 2015.

Reference Books:

1. L. Kathleen Mahan, Sylvia Escott Stump and Janice L Raymond, *Krause's Food the Nutrition Care Process*, Saunders Publishers, 15th Edition, 2020.
2. Robinson, *Norma land Therapeutic Nutrition*, 17th Edition, Oxford & LBM Publishing, Calcutta, Bombay, 1990.
3. Kathleen Mahan and Sylvia Escott Stump, *Food, Nutrition and Diet Therapy*, W.B.Saunders's Company London, 14th Edition, 2016.

Journals:

1. Journal of Nutrition and Dietetics
2. American Journal of Clinical Nutrition
3. Journal of Nutrition and Metabolism

E-Resources:

1. <https://www.pdfdrive.com/nutrition-dietetics-practice-and-future-trends-e176409703.html>
2. <https://www.pdfdrive.com/oxford-handbook-of-nutrition-and-dietetics-e185402365.html>
3. <https://www.pdfdrive.com/krauses-food-the-nutrition-care-process-e175336715.html>
4. <https://www.pdfdrive.com/nutrition-dietetic-internship-handbook-2012-13-e24766595.html>
5. <https://www.pdfdrive.com/manual-of-dietetic-practice-e33501318.html>

Course Outcome s	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	9	9	9	9	9	9	63
CO2	9	9	9	9	9	9	9	63
CO3	9	9	9	9	9	9	9	63
CO4	9	9	9	9	9	9	9	63
CO5	9	9	9	9	9	9	9	63
Total	45	45	45	45	45	45	45	315

Low-1 Medium-3 High-9

Core XV-Dissertation

(For Students Admitted from 2025-2026)

Semester: IV

Subject Code: JMNDC43DW

Hours /week: 12

Credit: 5

Course Objectives:

1. To develop skills in conducting a research study/ working project in the area of Nutrition and Dietetics
2. To learn the process of writing a dissertation/ project report

The dissertation is the final stage of the Master's degree and provides an opportunity to gain the necessary skills and knowledge in research project. It should demonstrate that students are skilled in area of research, setting research objectives, authoritative literature, devising an appropriate research methodology, analyzing the data, conclusions and if appropriate making relevant recommendations and indications of areas for further research.

The students will be guided and supervised by the teaching faculty of the Home Science department. After completing the dissertation, the report will be submitted for external evaluation. The students will have to appear for viva-voce for their thesis after the valuation by the external examiner

Course Outcomes:

After successful completion of this course, student will be able to

CO1: State a nutritional problem prevalent in local community settings and draft a research design for solving

CO2: Apply the appropriate nutritional concepts to research techniques.

CO3: Analyze the research problems in the field of nutrition and dietetics.

CO4: Examine the statistical tools for data collection and interpret results.

CO5: Create innovative solutions to existing nutrition problems in community.

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	9	9	9	9	9	9	63
CO2	9	9	9	9	9	9	9	63
CO3	9	9	9	9	9	9	9	63
CO4	9	9	9	9	9	9	9	63
CO5	9	9	9	9	9	9	9	63
Total	45	45	45	45	45	45	45	315

Low-1

Medium-3

High-9

Extra Credit - Diabetic Care and Education

(For Students Admitted from 2025-2026)

Semester: IV

Subject Code: JMNDX4

Credits: 2

Course Objectives:

1. To learn the common types of complications associated with multiple forms of diabetes
2. To learn the importance of nutrition and diet for optimal management of diabetes symptoms and conditions

Unit I

Overview of diabetes: Types and causes, sign and symptom, Diagnostic test, Macro vascular complication Macro vascular complication: Coronary artery disease, cerebral vascular and peripheral vascular disease – type, risk factors and intervention strategies. Micro vascular complication: Diabetes Eye disease, Neuropathy, Nephropathy – Disease stage, diagnosis and treatment. Other complications (foot, skin, gastrointestinal disorders, endocrine disease, psychological factors).

Unit II

Practical training: Anthropometry evaluation, Diet analysis, Diet review, Diet prescription, System entries, Calorific Values and Demonstration of equipment required in Diabetic clinic.

Patient education, Education Questionnaire and Recipe demo.

Unit III

Medical History and Medicine review: Foot examination, oro-dental care, care of acutely ill diabetic patient and care of amputated / infected limb. Care of diabetic patient undergoing Outpatient procedures like blood glucose estimation, Mono-filament test, CBGM etc.

Management of Diabetes: overview and importance of overall metabolic control, internationally recognized standards of care. The evidence for good control, physical assessment and laboratory assessment.

Unit IV

Diabetes Education and Self-Management: Goals and principles of diabetes self-management education (DSME), Models of diabetes education (AADE7 Self-Care Behaviors), Communication strategies and motivational interviewing., Role of the diabetes educator and multidisciplinary team, Tools and resources for patient education (apps, logs, educational materials), Cultural and psychosocial aspects in diabetic care.

Unit V

Organizing a Diabetic clinic: Being part of Multidisciplinary team, documenting and monitoring quality of care, assessing and reporting outcomes

Unit VI

Questions related to the above units, from various competitive examinations to be solved. (To be discussed during the Skill Development Course hour).

Course Outcomes:

After successful completion of this course, student will be able to

- CO1:** Recite and relating the knowledge of diabetes pathologies
- CO2:** Examine the modifications in nutrients and dietary requirements for therapeutic condition
- CO3:** Categorize the recent concepts in the dietary management of diabetes
- CO4:** Reflecting the skills in planning and preparation of therapeutic diets for diabetes
- CO5:** Solve the complications by diabetic care and education

Text Books:

1. Richard I.G. Holt, *Text book of Diabetes*, Wiley Blackwell Publication, UK, 5th Edition, 2017.
2. David Levy, *Practical Diabetes Care*, John Wilney Publisher, 4th Edition, 2018.
3. Shashank R Joshi, *Text Book of Diabetes*, Jaypee Brothers Medical Publishers, 2020

Reference Books:

1. Kumthekar Ajit.B, *Practical management of Diabetes*, Jaypee Brothers Medical Publishers, 2011.
2. Rudy Bilous, Richard Donnelly, Iskandar Idris, *Handbook of Diabetes*, Wiley Black Well Publication, 5th Edition, 2021.
3. Janet Titchener, *Diabetes Management: A Manual for Patient-Centred Care*, CRC Press, 1st Edition, 2020.

Journals:

1. Journal of Clinical Nutrition
2. Journal of Neuro inflammation
3. Journal of Pharmaceutical Health Care and Sciences

E-Resources:

1. <https://www.pdfdrive.com/american-diabetes-associations-standards-of-medical-care-in-diabetes-e38635770.html>
2. <https://www.pdfdrive.com/barriers-in-preventing-long-term-complications-among-patients-with-type-2-diabetes-mellitus-at-the-e75042570.html>
3. <https://www.pdfdrive.com/nutritional-management-of-diabetes-mellitus-practical-diabetes-e161197856.html>
4. <https://www.pdfdrive.com/nutritional-management-of-diabetes-mellitus-practical-diabetes-e161197856.html>
5. <https://www.pdfdrive.com/handbook-of-dsm-5-disorders-in-children-and-adolescents-e187750795.html>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO								
CO1	9	9	9	3	3	3	3	39
CO2	9	9	9	3	9	3	9	51
CO3	9	9	3	3	3	3	9	39
CO4	9	9	3	3	9	3	9	45
CO5	9	9	3	3	9	3	3	39
Total	45	45	27	15	33	15	33	213

Low-1

Medium-3

High-9

BSc NUTRITION AND DIETETICS
(Three Year Regular Programme)
 (For students admitted from 2025-26)

Programme Specific Outcomes:

On completion of the Under Graduate Programme, Student will be able to gain

PSO1: Acquiring knowledge in the discipline of Nutrition and Dietetics and applying the principles of the same to the needs of the community. Commitment to keep with current knowledge and practice guidelines relevant to Nutrition and Dietetics in order to enhance competency

PSO2: Develop research skills and scientific reasoning Skills in the field of Nutrition and Dietetics aimed at improving the quality of life of individuals and communities

PSO3: Ability to identify the National level Nutrition Health Issues, Fashion Psychology and promote awareness on Diet, Health and Design consultancy for the society

PSO4: Prepare students with professional competencies necessary for employment in institutions, industries and organizations related to their field of training or for self-employment and establish entrepreneurial activities in the areas of Foods, Nutrition and Dietetics

PSO5: Demonstrate knowledge, application and integration of principles of health promotion and disease prevention with Normal Nutrition, Medical Nutrition Therapy and Public Health Nutrition for varied populations

PSO6: Equip them to pursue higher studies leading to research and to become professionals in food science and dietetics

PSO7: Have a good scientific temper for the application of current scientific theories related to food science and nutrition

PREAMBLE

Following are the changes done in the 2024-25 syllabus and the candidates who will join from 2025-26 onwards will follow this syllabus.

The following changes have been introduced in the curriculum:

- In Semester I, the Core I – Food Science course content in Units IV and V was updated for greater relevance, and the Skill Enhancement Course I was renamed from Yoga for Holistic Health to Yoga for Holistic Health Practicals to emphasize practical, hands-on learning.
- In Semester II, the Surface Embellishments Practical course was replaced with Traditional Indian Food Products Practicals to emphasize indigenous culinary skills, and a new Common Value Added Course, Understanding India, was introduced to deepen cultural awareness.

- In Semester III, the AECC-III course *Food Microbiology* was replaced with an Internship to offer students real-world, hands-on experience. The Skill Enhancement Course III (SEC-III) introduced *Food Preservation Practicals* in place of the *Nutrition Garden Practical*, with a focus on essential food safety and storage techniques. Additionally, a new Multidisciplinary Course I titled *Indian Knowledge System on Food* was added to integrate traditional food practices into the academic curriculum. Furthermore, the Common Value Added Course II introduced *Environmental Science for Sustainable Development* to foster environmental awareness and promote sustainable practices among students
- In Semester IV, the Core VII course *Family Meal Management* was removed and replaced with *Dietetics I*, highlighting a more clinical and therapeutic focus in nutrition education. Similarly, Core VIII, *Family Meal Management Practicals*, was replaced with *Dietetics I Practicals* to provide students with hands-on experience in diet planning and management. The AECC-II course, *Dietary Internship*, was shifted to Semester VI, and in its place, *Food Microbiology* was introduced to strengthen foundational knowledge in the field. Additionally, a new Multidisciplinary Course II titled *Food Nutrition for Healthy Living* was added to promote wellness-oriented dietary practices. The Common Value Added Course III introduced *Digital and Technology Solution* to improve students' digital literacy and technological competence. For the Extra Credit component, *Entrepreneurship in Nutrition and Dietetics* replaced *Information, Education, and Communication Material in Education*, encouraging innovation and business skills within the nutrition discipline.
- In Semester V, the curriculum was further refined to enhance specialization and practical skills. The Core IX course, *Diet Therapy I*, was replaced with *Dietetics II*, offering advanced clinical nutrition knowledge. Similarly, Core X, *Diet Therapy I Practicals*, was replaced with *Dietetics II Practicals* to strengthen applied learning in therapeutic diet planning. Two new Multidisciplinary Courses were introduced: Course III, with options in *Family Resource Management* or *Maternal and Infant Nutrition*, and Course IV, offering choices between *Sports Nutrition* or *Food Safety and Standards*, catering to varied career paths. The Skill Enhancement Course V introduced *Food Adulteration Practicals* to develop skills in detecting and preventing food fraud. Additionally, the Common Value Added Course IV launched *Health and Wellness*, focusing on holistic personal and community well-being.
- Core-XII: *Diet Therapy II* has been shifted to Semester V. A new course titled *Dietetics and Techniques on Nutritional Assessment* has been introduced in its place. Multidisciplinary course V: A new multidisciplinary course, *National Health and Nutrition Programs & Policies / Herbal Nutrition*, has been introduced as part of the Semester V curriculum. Skill Enhancement Course-VI: *Food Adulteration Practical Tools* has been shifted to Semester V. In its place, a new course titled *Techniques for Nutrition Counseling Practicals* has been introduced in Semester VI. Extra Credit: The earlier course, *Waste Management in Food Industries*, has been replaced with *Sustainable Food Systems*, an online course offered through SWAYAM (*Food Science and Processing*). This course is now part of the Semester VI curriculum.

**PROGRAMME CODE: UND
PROGRAMME STRUCTURE**

Sem ester	Subject Code	Part	Course	Subject Title	Hours /Week	Credit	@SD /ENT /EMP	\$REG /NAT /GLO	CIA	ESE	Total Marks
I	JBLT11	I	Language-I	Tamil I -□□□□□□ □□□□□□□□□□ □□□□□□□□□□ □□□□	5	3	SD /ENT	REG /NAT /GLO	25	75	100
	JBLA11			BasicArabic-I							
	JBLHB11			/General Hindi(Basic)							
	JBLHA11			Hindi Grammar & Translation (Advanced)							
	JBLEB12	II	Language-II	Part II-English for Everyday communication (Basic) & Literature and Language for Life (Advanced)	5	3	SD/ EMP	/NAT /GLO	25	75	100
	JBLEA12										
	JBNDC11	III	Core- I	Food Science	6	6	SD /ENT	NAT /GLO	25	75	100
	JBNDC12P		Core-II	Food Science Practicals	6	4	SD /ENT/ EMP	NAT /GLO	25	75	100
	JBNDA13		AECCI	Basic Chemistry	4	4	SD /ENT/ EMP	NAT /GLO	25	75	100
	JBNDS14P	IV	SEC-I	Yoga for Holistic health Practicals	2	1	SD /EMP	NAT /GLO		50	50
	Library/Browsing			1							
	Remedial/Games			1							
	TOTAL			30	21				125	425	550
II	JBLT21	I	Language-I	Tamil -□□□□□□ □□□□□□□□□□ □□□□□□□□ /	5	3	SD /ENT	REG NAT /GLO	25	75	100
	JBLA21			Basic Arabic II/							
	JBLHB21			General Hindi- II							
	JBLHA21			Hindi prose, poem & Story(Advanced)							
	JBLEB22	II	Languages	Part-II English for Academic and social Interaction (Basic)	5	3	SD/ EMP	NAT /GLO	25	75	100
JBLEA22	Critical reading and Reflective Writing (Advanced)										

	JBNDNC21	III	Core-III	Human Nutrition	5	5	SD / EMP	NAT /GLO	25	75	100
	JBNDNC22		Core-IV	Human Physiology	5	5	SD/ EMP	NAT /GLO	25	75	100
	JBNDA23P		AECCH	Human Physiology Practicals	4	3	SD / EMP	NAT /GLO	25	75	100
	JBNDS24P	IV	SEC-II	Traditional Indian Food Products Practicals	2	1	SD /ENT/ EMP	NAT /GLO	-	50	50
	JBUI2V		CVAC I	Understanding India	2	2	SD	NAT		50	50
				Library/Browsing	1						
				Remedial/Games	1						
	JBNDX2/ JBNDX2O			Extra Credit – Food Hygenic and Sanitation/ *Online Course (Maternal Infant Young Child Nutrition-Swayam)	-	2	SD/ ENT/ EMP	NAT /GLO		100	100
				TOTAL	30	22+2			125	475+ 100	600+100
III	JBLT31 JBLA31 JBLA31 JBLHB31 JBLHA31	I	Language- I	Tamil III- □□□□□□□□□□ □□□□□□□ □□□□□□□□ / Classic Arabic Prose/ General Hindi- III Hindi Literature & Letter Writing (Advanced)	5	3	SD /EMP	REG /NAT /GLO	25	75	100
	JBLEB32			II	Language- II	Part- II Workplace English: Foundations of English communication skills (Basic) English for the Corporate World (Advanced)	5	3	SD/ EMP	NAT /GLO	25
	JBLEA32										
	JBNDNC31	III	Core-V	Nutritional Biochemistry	4	4	SD /EMP	NAT /GLO	25	75	100
	JBNDNC32P		Core-VI	Nutritional Biochemistry Practicals	4	2	SD /EMP	NAT /GLO	25	75	100
	JBNDA33I	IV	AECCH-III	Internship	4	4	SD/ ENT /EMP	NAT /GLO	25	75	100
	JBNDS34P		SEC-III	Food Preservation Practicals	2	1	SD /ENT /EMP	NAT /GLO	-	50	50
	JBMD31ND		MD I	Indian Knowledge System on Food	2	1	SD/ ENT /EMP	NAT /GLO	-	50	50

	JBES3V		CVAC II	Environmental science for sustainable development	2	2	SD/ENT	NAT/GLO	-	50	50
	JBXTN3	V	Extension Activities	NSS/CSS	2	2	SD/ENT	NAT/GLO	100	-	100
	JBNDX3/ JBNDX30		Extra Credit II	Marine Food Processing/ *Online course-Nutrition, Therapeutic and Health-NPTEL)	-	2	SD/ENT/EMP	NAT/GLO	-	100	100
				TOTAL	30	22+2			225	525+100	750+100
IV	JBLT41 JBLA41 JBLHB41 JBLHA41	I	Language-I	Tamil IV □□□□□□ □□□□□□□□□□ □□□□□□□□□□ □□□□□□□□□□ / Hadeeth General Hindi-IV(Basic) Computer and Hindi(Advanced)	5	3	SD/EMP	REG/NAT/GLO	25	75	100
	JBLEB42 JBLEA42	II	Language-II	Part-II Professional communication skills(Basic) Strategic communication for Global Careers(Advanced)	5	3	SD/EMP	NAT/GLO	25	75	100
	JBND41	III	Core-VII	Dietetics I	5	5	SD/ENT/EMP	NAT/GLO	25	75	100
	JBND42P		Core VIII	Dietetic I Practicals	4	4	SD/ENT/EMP	NAT/GLO	25	75	100
	JBND43		AECC IV	Food Microbiology	4	4	SD/ENT/EMP	NAT/GLO	25	75	100
	JBMD41ND		MD II	Food Nutrition for Healthy living	3	2	SD/ENT/EMP	NAT/GLO	-	50	50
	JBND44P		SEC-IV	Food Product Development Practicals	2	1	SD/ENT/EMP	NAT/GLO	-	50	50
	JBTD4V		CVAC III	Digital and Technology Solution	2	2	SD/ENT/EMP	NAT/GLO	-	50	50
	JBND44/ JBND40		Extra Credit III	Entrepreneurship in Nutrition and Dietetics/*Online Course-Food and Nutrition for Healthy Living-	-	2	SD/ENT/EMP	NAT/GLO	-	100	100

				Swayam							
				TOTAL	30	24+2			125	525+100	650+100
V	JBND51	III	Core-IX	Dietetics II	6	5	SD/ ENT /EMP	NAT /GLO	25	75	100
	JBND52P		Core-X	Dietetic Practicals II	6	5	SD/ ENT /EMP	NAT /GLO	25	75	100
	JBND53		Core-XI	Community Nutrition	6	5	SD/ ENT /EMP	NAT /GLO	25	75	100
	JBMD51ND A/ JBMD51NDB		MD III	Family Resource Management / Maternal and Infant Nutrition	4	3	SD/ ENT /EMP	NAT /GLO	25	75	100
	JBMD52ND A/ JBMD52NDB		MD IV	Sports Nutrition / Food Safety and Standard	4	3	SD/ ENT /EMP	NAT /GLO	25	75	100
	JBNDS54P	IV	SEC-V	Food Adulteration Practicals	2	1	SD/ ENT /EMP	NAT /GLO	-	50	50
	JBHW5V	IV	CVAC IV	Health and Wellness	2	2	SD/ ENT /EMP	NAT /GLO	-	50	50
	JBESX3		Extra Credit	Employability Skills/*Online Course(Mental Health and Nutrition-EDUX)	-	2	SD/ /EMP	NAT /GLO		100	100
	TOTAL				30	24+2			125	475+100	600+100
VI	JBND61	III	Core-XII	Techniques on Nutritional Assessment	6	6	SD/E NT /EMP	NAT /GLO	25	75	100
	JBND62		Core-XIII	Food Adulteration	6	6	SD/E NT /EMP	NAT /GLO	25	75	100
	JBND63I		Core-XIV	Dietary Internship	6	4	SD/ ENT /EMP	NAT /GLO	25	75	100
	JBND64PW		Core-XV	Project	5	4	SD/ ENT /EMP	NAT /GLO	25	75	100
	JBMD61ND A/ JBMD61NDB		MD V	National Health and Nutrition Programs Policies/ Herbal nutrition	4	3	SD/ ENT /EMP	NAT /GLO	25	75	100
	JBNDS65P	IV	SEC-VI	Tools and Techniques for Nutrition Counseling Practicals	2	1	SD/ ENT /EMP	NAT /GLO	-	50	50
	JBNDX6		Extra Credit	Sustainable Food Systems /*Online	-	2	SD/ ENT	NAT /GLO	-	100	100

				course(Food science and Processing-Swayam)			/EMP				
				Library/Browsing Centre	1	-			-	-	-
				TOTAL	30	24+2			125	425+100	550+100
				GRAND TOTAL	180	140+10			850	2850+500	3700+500

AECC-Ability Enhancement Compulsory Course
MD-Multidisciplinary course

SEC-Skill Enhancement Course
CVAP-Common Value Added Course

*For online certification credit alone will be assigned on submission of certificate obtained through appearing for online examination from Swayam, Spoken tutorial, EDX, NPTEL etc

@SD-Skill Development ENT-Entrepreneurship EMP-Employability
 \$R-Regional N-National G-Global

**AECC-Ability Enhancement Compulsory Course
 (Chemistry, Microbiology & Biotechnology department)**

Semester	Subject Code	Subject Title	Hours/Week	Credit	@SD/ENT/EMP	\$REG/NAT/GLO	CIA	ESE	Total Marks
I	JBCHA14	AECC-I Biochemistry I	4	4	SD/ENT/EMP	NAT/GLO	25	75	100
II	JBCHA24	AECC-II Biochemistry II	4	4	SD/ENT/EMP	NAT/GLO	25	75	100
I	JBMIA14	AECC-I Biochemistry	4	4	SD/ENT/EMP	NAT/GLO	25	75	100
I	JBBTA13	AECC-I Biochemistry	4	4	SD/ENT/EMP	NAT/GLO	25	75	100

Core-I Food Science

(For Students Admitted from 2025-26)

Semester: I**Subject Code: JBND11****Hours/week: 6****Credit: 6****Course Objectives:**

1. To gain knowledge of basic five food groups and nutritional composition
2. To learn about the factors influencing the cooking quality of different foods

Unit I**(18 hours)**

Food group: Basic food groups, functional food groups-energy yielding, body building and protective Foods, Food plate (USDA). Objectives of cooking. Study of various cooking methods - Dry heat method, Moist method Microwave cooking, Solar cooking methods and its advantages and disadvantages.

Unit II**(18 hours)**

Cereals - Classification, and nutritive value of cereals -Structure of wheat, composition and nutritive value of cereal and millets,

Cereal Processing: parboiling ,milling and polishing Effect of cooking and processing conditions on nutritive value of cereals; Byproducts of cereals and its utilization, principles of starch cookery, gelatinization and Role of cereals in cookery.

Pulses-, composition, nutritive value, Varieties of pulses and grams, Effect of cooking, Processing – Soaking, Germination and fermentation and its advantages, Role of pulses in cookery.

Nuts and Oilseeds: Nutritive value, Toxicants and Nut allergies.

Unit III**(18 hours)**

Meat: Classification, Nutritional Composition, Post-mortem Changes, Changes during cooking.

Egg: Types of eggs, Structure, Nutritional Composition, Quality of Eggs, Role of egg in cookery.

Poultry: Classification of Poultry, Nutritional Composition.

Seafood: Classification of Fish, Nutritive value, Selection Factors and principles of fish cookery.

Unit IV**(18 hours)**

Milk: Types of milk, Nutritional Composition.

Milk Processing– Pasteurization, Homogenization and Standardization of Milk, Milk Products, Changes during cooking and Role of milk in cookery

Fats and oils - Composition, Smoking Temperature, Rancidity, different methods used for oil extraction from oil seeds. Role of fats and oils in cookery.

Sugars cookery: Classification, Stages of sugar cookery, Crystallization and factors affecting crystallization, Role of sugar in cookery.

Unit V**(18 hours)**

Vegetables and Fruits: Classification, Nutritional Composition, Pigments - Water soluble and fat soluble. Selection and cooking methods, Changes during Cooking - Enzymatic Browning - Causes, Prevention and conservation of nutrients.

Beverages: Types of Beverages and its health benefits.

Spices- uses and their medicinal importance.

Evaluation of food Quality-Sensory Evaluation: Types of sensory test and its advantage

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Recall the different types of food groups and discuss the cooking methods adopting best practices

CO2: Determine the composition and nutritive value of different food groups and role of cookery

CO3: Analyze the physical and chemical changes occurring in different foodstuffs during various cooking process

CO4: Assess the principles in cooking and its effect on sensory attributes and nutrients

CO5: Summarize the effect of processing and storage on nutritional composition of foods

Text Books:

1. Shakuntala Manay N, Shadaksharaswamy M, *Food Facts and Principles*, New Age International Publishers, 4th Edition, 2018.
2. Srilakshmi. B, *Food science*, New Age International Publishers, New Delhi, 7th Edition, 2018.

Reference Books:

1. Fellows P J, *Food Processing Technology: Principles and practice*, CRC Wood Head Publishing Ltd., Cambridge, 4th Edition, 2016.
2. Berk.z, *Food Process Engineering and Technology*, Elsevier Academic Press, New York, 3rd Edition, 2018.
3. John M. de Man, *Food process engineering and technology*, Academic Press, Elsevier: London and New York, 3rd Edition, 2018.

Journals:

1. Journal of Food Science
2. Journal Nutrition and Food Science
3. Journal of Food Science and Technology

E-Resources:

1. <https://www.webrestaurantstore.com/article/454/types-of-cooking-methods.html>
2. https://millets.res.in/m_recipes/Nutritional_health_benefits_millets.pdf
3. <https://www.pearsonhighered.com/assets/samplechapter/0/1/3/4/0134204581.pdf>
4. <https://www.slideshare.net/ektabelwal/milk-36869317>
5. <https://www.slideshare.net/Supta2013/fruits-vegetables-33840373>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	1	3	9	3	1	9	35
CO2	9	3	1	3	3	1	3	23
CO3	3	3	3	9	9	1	3	31
CO4	9	3	3	9	3	3	1	31
CO5	3	3	9	9	1	1	9	35
Total	33	13	19	39	19	07	25	155

Low-1

Medium-3

High-9

Core-II Food Science Practicals

(For Students Admitted from 2025-26)

Semester: I**Subject Code: JBNDC12P****Hours/week: 6****Credit: 4****Course Objectives:**

- 1 To develop skills and techniques in food preparation with conservation of nutrients and palatability using desirable cooking methods.
- 2 To understand the scientific principles underlying in food preparation

List of Experiments:**(75 hours)**

- 1. Principles of Food Safety and Lab Management Techniques:** Measurement of Ingredients, Determination of Edible Portion, Food grouping-Discussion on nutritive value.
- Cereal Cookery:** Microscopic Examination of Starches, Gelatinization of starch
- 2. Preparation of Fermented Foods by using Cereals and Millets:** Idli, Appam, Dosai, Bajra Porridge.
- 3. Preparation of Granules:** Gluten Formation, Methods of Cooking - coarse and fine cereals.
- 4. Pulse cookery:** Factors affecting Pulse Cookery – Hard water, Soft water, Soaking, Addition of acid, Alkali, Enzyme, pressure cooking- Any whole gram and any dhal
- 5. Egg cookery:** Boiling and Parching, Omelet and Custard, Quality determination of Egg
- 6. Meat, fish and poultry:** Methods of Cooking, Common Recipes, Tenderization.
- 7. Milk cookery:** Problems in Milk Cookery and their Prevention, Milk preparations: Cheese, Curds, paneer, butter and Milk Kafir
- 8. Frying of Foods in Oil:** Smoking Temperature, Methods of Cooking.
- 9. Sugar cookery:** Stages of sugar cookery, Sugar Products.
- 10. Vegetables and Fruits:** Effect of acid, alkali and over cooking on vegetables containing different pigment and enzymatic browning in vegetables and fruits and any four methods of prevention, Color and Textural Changes on Cooking, Preparation of selected recipes.
- 11. Beverages:** Types and Preparation of beverage under the following types- refreshing, nourishing, stimulating, soothing and appetizing.
- 12. Fireless Cooking:** Puffed Rice, Peanut butter balls, Chocolate truffles, Veg Hung curd Sandwich, Fruit Sushi.
13. Determine the Heat emitted by the Food Sample
14. Determine the pH value and Brix value of the Food Sample
15. Determining the Water Absorption of the Packaging Material and water activity in a food samples.

Course Outcomes:**After successful completion of this course, student will be able to****CO1:** Know the concept of cooking techniques and describe use of equipment for food preparation**CO2:** Identify the different food groups and physical and chemical changes during cooking process**CO3:** Link the acquired skills in food handling techniques**CO4:** Evaluate the sensory analysis of recipes**CO5:** Prepare different recipes using basic food groups

Text Books:

1. MohiniSethi and EramS Rao, *Food Science – Experiments and Applications*, CBS Publishers, New Delhi, 2nd Edition, 2019.
2. Srilakshmi. B, *Food Science – Laboratory Manual*, Scitech Pubisher Pvt Ltd, Chennai, 6th Edition, 2015.

Reference Books:

1. Fellows P J, *Food Processing Technology: Principles and Practice*, CRC Wood head publishing Ltd., Cambridge, 4th Edition, 2016.
2. Brown A, *Understanding Food Principles and Preparation*, Wordsworth Publisher, London, 6th Edition, 2018.
3. Shalini Sehgal, *A Laboratory Manual of Food Analysis*, 2016.

Journals:

1. International Journal of Food Science and Technology
2. Current Nutrition and Food Science
3. Advance Journal of Food Science and Technology

E-Resources:

1. www.myrecipes.com/recipe/cereal-milk-bars(Ex-2)
2. <https://pulses.org/recipes/best-of-india>(Ex-6)
3. <https://www.slideshare.net/powerofknowledge3/egg-cookery>(Ex-7)
4. <https://in.pinterest.com/lindaruis/meat-fish-and-poultry/> (Ex-8)
5. [https://www.tarladalal.com/recipes-using-milk-doodh-full-fat-milk-buffalo-milk-full-cream milk-514](https://www.tarladalal.com/recipes-using-milk-doodh-full-fat-milk-buffalo-milk-full-cream-milk-514)(Ex-9)

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	3	1	9	3	9	3	37
CO2	3	9	1	9	1	1	3	27
CO3	9	9	1	3	1	3	3	29
CO4	3	9	1	9	1	1	1	25
CO5	3	3	9	3	1	1	9	29
Total	27	33	13	33	07	15	19	147

Low-1

Medium-3

High-9

Skill Enhancement Course I-Yoga for Holistic Health

(For Students Admitted from 2025-26)

Semester: I**Subject Code:JBNDS14P****Hours/week: 2****Credit:1****Course Objectives:**

1. To enhance physical and mental health of the students
2. To develop discriminating mind through practicing meditation

List of Yoga Practices:

1. **Loosening Exercises:** Simplified yogic exercise (5 Hours)
2. **Asanas:** (10 Hours)

Standing Asana

Thadasanam, Eka Pada Asanam, Chakrasanam, Uthkadasanam, Trikonasanam.

Sitting Asana

Dhandasanam, Padhmasanam, Vajrasanam, Sukasanam, Siddasanam, Parvathasanam, Yogamudra, Mandugasanam, Mahamuthra, Jannusirasasanam, Pakchimooth asanam, Usthasanam, Vakrasanam, Tholungasanam, Gomukhasanam.

Lying Asana - Lying on the Stomach:

Bhujangasana, Salabhasana, Dhanurasanam, Navukasanam, Makrasanam,

Lying Asana - Lying on the Back:

Ardha Pavana Mukthasanam, Pavana Mukthasanam, Suptha Vajrasanam, Matsyasanam, Uddhana Padasana, Navasanam, Sarvangasanam, Halasanam, Cakrasanam, Savasanam.

3. Mudras (5 Hours)

Namaskar Mudra, Chin Mudra, Vayu Mudra, Suniya Mudra, Prithivi Mudra, Surya Mudra, Varuna Mudra, Prana Mudra, Apana Mudra, Apana Vayu Mudra, Linga Mudra, Adhi Mudra, Kesari Mudra, Aswini Mudra.

4. Pranayama (5 Hours)

Suga poorva Pranayama, NadiSuthi, Ujjayi, Sheetali, Sheetkari, Kapalabhati,

5. Meditation (5 Hours)

Simple Meditation, Transcendental meditation

Course Outcomes:

After successful completion of this course, student will able to

CO 1: Understand the physical body and health concepts

CO2: Apply and practice physical and mental stability in daily life

CO3: Outline self-discipline and self-control in modern culture

CO4: Integrate moral values

CO5: Attain a higher level of consciousness

Text Books:

1. BKS Iyengar, *Yoga the Path to Holistic Health: The Definitive Step-by-Step Guide*, DK Publisher, 1st Edition, 2016.
2. Thathuvagnani Vethathiri Maharishi, *Simplified Physical Exercise*, Vethathiri Publications, 48th Edition, 2018.
3. Vethathiri Maharishi, *Yoga for Modern Age*, Vethathiri Publications, 2015.

Reference Books:

1. Matthews, A., Kaminoff, L, *Yoga Anatomy*, United States: Human Kinetics, 2021.
2. Ashwani Kumar, *Yoga: A way of life*, New Delhi: KhelSahitya Kendra, 2016.
3. Clark, B, *The Complete Guide to Yin Yoga: The Philosophy and Practice of Yin Yoga*, Canada: Wild Strawberry Productions, 2019

Journals:

1. International Journal of Yoga
2. Journal of yoga and Physiotherapy
3. International Journal of Yoga Therapy

E-Resources:

1. <https://www.artofliving.org/in-en/yoga/yoga-poses/sun-salutation>
2. <https://www.sonakshidhamijayoga.com/>
3. <https://mysticalbee.com/types-of-yoga-mudras-their-significance-to-health/>
4. <https://www.easyayurveda.com/2012/11/11/types-of-pranayama-effect-on-health-through-an-ayurveda-microscope/amp/>
5. <https://www.insider.com/types-of-meditation>

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	9	9	9	9	9	9	63
CO2	9	9	9	9	9	9	3	57
CO3	9	9	9	9	9	9	9	63
CO4	9	9	9	9	9	9	9	63
CO5	9	9	9	9	9	9	9	63
Total	45	45	45	45	45	45	39	309

Low-1

Medium-3

High-9

Core-III – Human Nutrition

(For Students Admitted from 2025-2026)

Semester: II**Subject Code: JBND21****Hours/week: 5****Credit: 5****Course Objectives**

1. To understand the role of nutrient in the maintenance of good health and acquire knowledge on functions of nutrients
2. To study nutrition deficiencies and their prevention and understand the principles of nutrition, understand the relationship between food, nutrition and health

Unit I**(15 hours)**

Energy: Unit of measurement, Direct and indirect calorimeter, Determination of energy value of food, Total energy requirement, Factors affecting physical activity. Basal Metabolic rate-determinants of Basal metabolic rate - Factors affecting basal metabolic rate - Resting energy expenditure, Thermic effects of food - Factors affecting the thermic effects of food - Energy requirements of adults expressed in terms of Reference man and Reference woman and Energy requirements for different age groups.

Unit II**(15hours)**

Carbohydrates: Classification, Functions, Source of carbohydrate. Digestion and absorption and requirements of Carbohydrates. Regulation of blood sugar, Hormonal controls of carbohydrates in the body.

Dietary Fibre-Soluble and Insoluble fibres, Sources of fibre. Role of fibre in human nutrition.

Unit III (15hours)

Proteins: Classification, Sources, Functions of proteins and amino acids. Digestion, Absorption and requirements of Protein. Evaluation of protein quality. Deficiency– PEM

Lipids - Definition, Classification, Functions, Sources of Fats. Digestion, absorption and requirements of fat

Essential fatty acids: Source, Role of EFA, Deficiency of Essential fatty acids.

Unit IV (15 hours)

Fat Soluble Vitamins: Vitamin A, D, E and K: Functions, requirements, sources, requirements and deficiency.

Water Soluble Vitamins: Thiamine, Riboflavin, Niacin, Vitamin B6, Folic acid, Vitamin B12 Biotin and Pantothenic acid, Vitamin C: Functions, requirements, sources, requirements and deficiency.

Unit V (15hours)

Macro Minerals: Calcium, Phosphorous, Magnesium, Potassium, Sodium and Chloride Distribution in the body, Sources, functions, requirements and deficiency.

Micro / Trace Minerals: Iron, Iodine, Zinc, Fluoride and Copper Distribution in the body; Food sources, functions, requirements and deficiency.

Water: Water balance, Water compartment and physiological variation. Dehydration, Intoxication

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Find the basic nutrients for human wellbeing and summarizing the types and role of micro and macro-nutrients

CO2: Illustrate the metabolic role of nutrients and their complex interrelationships

CO3: Inspect the functions, sources and requirements of Basic Nutrients for human beings

CO4: Conclude the importance of Macronutrients and Micronutrients

CO5: Discuss the various methods of energy determination

Text Books:

1. Srilakshmi B., *Nutrition Science*, New Age International(P) Ltd, Publishers, 5th Edition, 2019.
2. Mahtab, S. Bamji, Kamala Krishnaswamy and G.N.V Brahmam, *Text Book of Human Nutrition*, Oxford and IBH Publishing Company, 4th Edition, 2019.

Reference Books:

1. Jim Mann, A. Stewart Truswell., *Appetite: Essentials of Human Nutrition*, Oxford University Press, 2007.
2. Allison A. Yates, Bernadette P. Marriott, Diane F. Birt, Virginia A. Stalling., *Present Knowledge in Nutrition Basic Nutrition and Metabolism*, Elsevier Science, 2020.
3. Swaminathan, M., *Essentials of Foods and Nutrition*, Volume I and II Ganesh and Co Publisher, 2015.

Journals:

1. American Journal of Clinical Nutrition
2. British Journal of Nutrition
3. The Indian Journal of Nutrition and Dietetics

E-Resources:

1. <https://www.pdfdrive.com/introduction-to-human-nutrition-2nd-edition-e1688125.html>.
2. <https://www.pdfdrive.com/introduction-to-human-nutrition-e8482943.html>
3. <https://www.pdfdrive.com/vitamin-and-mineral-requirements-in-human-nutrition-e28893.html>
4. <https://www.pdfdrive.com/vitamins-and-minerals-e162099106.html>
5. <https://www.pdfdrive.com/advanced-nutrition-and-dietetics-in-nutrition-support-e158466498.html>

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	9	9	9	9	3	9	57
CO2	9	9	9	3	9	3	9	51
CO3	9	9	9	9	9	9	9	63
CO4	9	9	9	9	9	9	9	63
CO5	9	9	9	9	9	9	9	63
Total	45	45	45	39	45	33	45	297

Low-1

Medium-3

High-9

Core-IV-Human Physiology

(For Students Admitted from 2025-26)

Semester: II**Subject Code: JBNDC22****Hours/week: 5****Credit: 5****Course Objectives:**

1. To understand the composition and functions of blood, blood coagulation, blood transfusion, blood groups
2. To understand and comprehend the anatomy and physiology of various human system and glands

Unit I**(12hours)****Cell Structure and functions****Basic concepts** –Anatomical positioning of various organs in the human body,**Blood:** Composition and Functions, Blood clotting and its Significance, Blood Groups, Blood Transfusion and its Importance.**Lymphatic system-** Lymph, Lymph Glands and its Functions.**Unit II****(12 hours)****Cardiovascular system:** Structure of Human Heart and Functions, Cardiac Cycle, EGC and its Importance.**Respiratory System** -Respiratory Organs -Structure and their Functions -Mechanism of Respiration.**Unit III****(12 hours)****Digestive System:** Brief Description of Organs of the Gastrointestinal Tract, Accessory Organs of Digestion – Structure and function of Liver, Gall bladder and Pancreas.**Excretory system:** Structure and Function of Organs of Urinary System, Mechanism of Urine Formation.

Skin: Structure, Functions and Regulation of Body Temperature.

Unit IV

(12 hours)

Nervous System – Elementary Anatomy of Nervous System and Reflexes.

Brain: Brain Anatomy, Functions of Different Parts of the Brain in Brief, Autonomic, Sympathetic and Parasympathetic Nervous System.

Special Senses – Eye, Ear, Nose and Tongue - Structure and Functions

Unit V

(12 hours)

Reproductive system: Reproductive System of Male and Female, Menstrual Cycle, Menarche and Menopause, Fertilization.

Endocrine system: Listing of Endocrine Glands and Location, Functions of Thyroid, Parathyroid, Adrenal, Pancreas and Pituitary glands.

Course Outcomes:

After successful completion of this course, student will be able to

CO 1: Recall the anatomy of various organs in the human system and explain their role in the maintenance of healthy individuals

CO2: Apply the knowledge to understand the functions of various organs in the human system

CO 3: Analyze the Physiological changes at different stages of life

CO 4: Compare how the functions of organs are integrated to maximum efficiency

CO 5: Summarize the importance of hormones in various organs of the human system

Text Books:

1. Chatterjee C.C., *Human Physiology*, CBS Publishers & Distributors Pvt. Ltd, NewDelhi,11th Edition,2016.
2. H. Gurumurthy, H. K. Makari, S. V. Sowmya, H. S. Ravikumar Patil, *A Textbook of HumanPhysiology*, Dreamtech Press Publication, 1st Edition,2020.

Reference Books:

1. H. Gurumurthy, H. K. Makari, S. V. Sowmya, H. S. Ravikumar Patil , *A Textbook of HumanPhysiology*, Dreamtech Press Publication, 1st Edition,2020.
2. A.K.Jain, *Human PhysiologyforBDS*, Avichal Publication, 6th Edition, 2018.
3. Yalayyaswamy N.N, *Human Anatomy and Physiology for courses in Nursing and Allied HealthSciences*, CBS Nursing Publication, 4th Edition, 2018.

Journals:

1. European Journal of Applied Physiology
2. Journal of Medical Sciences
3. The Journal of Laboratory and Clinical Medicine

E-Resources:

1. <https://www.pdfdrive.com/fundamentals-of-anatomy-and-physiology-for-nursing-and-healthcare-students-e176005292.html>
2. <https://www.pdfdrive.com/essentials-of-medical-physiology-6th-edition-e32299678.html>
3. <https://www.pdfdrive.com/essentials-of-anatomy-and-physiology-e25774384.html>
4. <https://www.pdfdrive.com/textbook-of-human-physiology-for-dental-students-d187617928.html>
5. <https://www.pdfdrive.com/essentials-human-physiology-e1543905.html>

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	9	3	3	1	9	3	37
CO2	9	9	3	9	1	9	3	43
CO3	9	9	3	9	1	9	3	43
CO4	9	9	3	3	1	9	3	37
CO5	9	9	3	9	1	9	3	43
Total	45	45	15	33	5	45	15	203

Low-1 Medium-3 High-9

Ability Enhancement Compulsory Course II Human Physiology Practicals

(For Students Admitted from 2025-26)

Semester: II

Subject Code: JBND A23P

Hours/week:4

Credit:3

Course Objectives:

1. To acquire skills to analyze blood and urine samples
2. To get expertise in handling instruments and acquire basic knowledge on first aid

List of Experiments:

(75 hours)

Blood Analysis

1. Determination of Haemoglobin
2. Determination of Blood group and RH factor
3. Determination of Blood Clotting

Urine Analysis

4. Analysis of normal urine
5. Analysis of abnormal constituents in urine
6. Estimation of urine sugar
7. Estimation of urine albumin
8. Estimation of urine bile salt

Demonstrations

9. Clinical examination of B.P
10. Clinical examination of respiratory system
11. Enumeration of arterial pulse
12. Demonstration of first aid

Course Outcomes:

After successful completion of this course, student will be able to

CO 1: Understand the human physiological aspect of organs and distinguish the components of blood and urine

CO 2: Apply knowledge to practice to handle tools related to blood analysis

CO 3: Analyze the biochemical values on blood and urine by different experiments

CO 4: Compare the normal and abnormal biochemical values on blood and urine

CO 5: Create an awareness on First aid practice

Text Books:

1. Dr.U.Satyanarayana, U.Chakrapani, *Biochemistry*, Elsevier Publication, 5thEdition,2017.
2. D.M.Vasudevan, S.Sreekumari, Kannan Vaidiyanathan, *Textbook of Biochemistry for Medical Students*, Jaypee Publication, 9th Edition, 2019.

Reference Books:

1. David L.Nelson, Michael M.Cox Lehninger, *Principle Biochemistry*, MacmillanPublishers, 7thEdition, 2017.
2. VictorRodwell, David Bender, P.AnthonyWeil, PeterKennelly, KathleenBotham,*Harper's IllustratedBiochemistry*, Lange Publishers, 30th Edition,2017.
3. Donald Voet, Judith G.Voet, *Biochemistry*, John Wileyand Sons Publisher, 4th Edition, 2016.

Journals:

1. European Journal of Applied Physiology
2. Journal of Medical Sciences
3. The Journal of Laboratory and Clinical Medicine

E-Resources:

1. <https://www.pdfdrive.com/a-textbook-of-practical-physiology-e175223735.html>
2. <https://www.pdfdrive.com/practical-textbook-of-biochemistry-for-medical-students-e187182647.html>
3. <https://www.pdfdrive.com/laboratory-protocols-in-applied-life-sciences-d157736244.html>
4. <https://www.pdfdrive.com/textbook-of-human-physiology-for-dental-students-d187617928.html>
5. <https://www.pdfdrive.com/essentials-human-physiology-e1543905.html>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	9	3	3	1	3	9	37
CO2	9	9	3	3	1	3	3	31
CO3	9	9	3	3	1	3	3	31
CO4	9	9	3	3	1	3	3	31
CO5	9	9	3	3	1	3	9	37
Total	45	45	15	15	5	15	27	167

Low-1
Medium-3
High-9

Skill enhancement Course II - Traditional Indian Food Products Practicals

(For Students Admitted from 2025-26)

Semester: II**Subject Code: JBNDS24P****Hours/week:2****Credit:1****Course Objectives:**

1. To develop practical skills in identifying ingredients and preparing a variety of traditional Indian food products across regions.

- To promote understanding of the cultural, nutritional, and economic significance of traditional Indian cuisine through hands-on experience

List of Experiments:

(30 hours)

- Preparation of Staple Foods:** Cook basic Indian staples such as steamed rice, dal, chapati, and vegetable curry using traditional methods.
- Identification and Use of Indian Spices and Herbs:** Identify 15 commonly used spices and herbs; demonstrate dry roasting and grinding to make a spice blend (e.g., garam masala or sambhar powder).
- Traditional Dairy Product Processing:** Prepare ghee from butter and paneer from curdled milk; discuss their uses in Indian cooking.
- Cooking with Millets and Pulses:** Prepare one traditional millet-based dish (e.g., ragi dosa or bajra khichdi) and one pulse-based dish (e.g., chana masala).
- Preparation of Indian Chaats and Snacks:** Make a regional chaat item (e.g., bhel puri or pani puri) and a fried snack (e.g., pakora or samosa).
- Preparation of Baked or Roasted Indian Snacks:** Prepare a baked or roasted snack such as khakhra, mathri, or murukku.
- Traditional Indian Beverages:** Prepare at least two beverages like lassi, buttermilk (chaas), or lemon sherbet.
- Fermented Beverages:** Prepare and ferment kanji (carrot or beet-based) or a similar traditional probiotic drink.
- Preparation of Traditional Indian Sweets:** Make two sweets from different regions (e.g., laddus and rasgulla or jalebi and barfi).
- Festival/Festive Thali Preparation:** Prepare a simple traditional festive thali (plate) including one sweet, one main dish, one side dish, and one beverage—highlight cultural significance.

Course Outcomes:

After successful completion of the course, students will be able to:

- CO1:** Identify and utilize a wide variety of traditional Indian ingredients including spices, grains, pulses, and dairy products.
- CO2:** Demonstrate hands-on skills in preparing staple, festive, and regional Indian food items using traditional cooking techniques.
- CO3:** Recognize the regional and cultural diversity of Indian cuisine through food preparation and tasting activities.
- CO4:** Understand the health and nutritional benefits of traditional Indian food products.
- CO5:** Appreciate the socio-economic and cultural significance of traditional foods during festivals and daily life.

Text books:

- Achaya, K.T. *Indian Food: A Historical and Cultural Introduction*. Oxford University Press, 2019.
- Wickramasinghe, Priya, & Rajah, Carol Selva, *Indian Food: A Guide to the Region's Best Recipes*. Tuttle Publishing, 2020.

- Tamang, J. P., *Ethnic Fermented Foods and Alcoholic Beverages of India: Science History and Culture*. Springer Nature, 2020.

Reference books:

- Banerji, C. *Eating India: An Odyssey into the Food and Culture of the Land of Spices*. Bloomsbury, 2007.
- Ved, S. *Tiffin: 500 Authentic Recipes Celebrating India's Regional Cuisine*. Roli Books, 2018.
- Sen, C. T., *Feasts and Fasts: A History of Food in India*. Reaktion Books, 2015..

Journals:

- Journal of Ethnic Foods
- Journal of Scientific and Engineering Research
- Digest: A Journal of Foodways and Culture

E-Resources:

- https://ayushportal.nic.in/pdf/Food_Recipes_From_AYUSH.pdf
- <https://jsaer.com/download/vol-10-iss-5-2023/JSAER2023-10-5-216-228.pdf>
- https://www.fssai.gov.in/upload/knowledge_hub/9582262a819e8764cdBook_Tadke_bina_Zaika_14_06_2022.pdf
- <https://www.itrhd.com/magazine/special-issue1.pdf>
- https://icar-nrri.in/wp-content/uploads/2023/05/final_book_ldas.pdf

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	1	3	9	3	1	9	35
CO2	9	3	1	3	3	1	3	23
CO3	3	3	3	9	9	1	3	31
CO4	9	3	3	9	3	3	1	31
CO5	3	3	9	9	1	1	9	35
Total	33	13	19	39	19	07	25	155

Low-1 Medium-3 High-9

Common Value Added Course I - Understanding India
(For Students Admitted from 2025-2026)

Semester: II
Subject Code: JBUI2V

Hours/week: 2
Credit: 2

Course Objective:

- To introduce students to the historical milestones in India's freedom struggle and Indian knowledge systems.
- To provide an interdisciplinary understanding of India's geography, social structure, cultural narratives, and political evolution.

Unit I (6hours)

History of India: India's freedom struggle: An introduction to Indian knowledge systems: Indian First War of Independence, Non-Cooperation Movement in Indian Independence, Quit India Movement, Civil Disobedience Movement

Unit II (6hours)

Geography of India: India's Geographical overview with neighbors - India and its relationship with neighbouring countries -Types of diversities in India -Geographical diversities of India

Unit III (6hours)

Communicating Culture:Oralnarratives:Myths,talesandfolklore-IntroductiontotheTribal Cultures of India - Indian Oral narrative, myths, tales & folklore - Tribal cultures of India - Odisha's Special Development Councils

Unit IV (6hours)

Indian Social Structure: Continuity and change of the Indian Social Structure: Caste, Community, Class and Gender - Continuity and change in social structure in India - Caste. Class and Gender in India - Indian Caste and Communities

Unit V (6hours)

Understanding Indian Polity: The evolution of State in India: Nature and origin Interpreting India: Traditional, Modern and Contemporary Constitution as a living document - The evolution of Indian state - changing the Nature of Indian state - The traditional, modern and contemporary India - Constitution of India.

Course Outcomes :

After successful completion of this course, student will be able to

- CO1:** Identify key events in India's freedom movement and explain their impact on national identity.
- CO2:** Analyze the geographical diversity of India and its influence on regional and international relations.
- CO3:** Interpret Indian myths, oral traditions, and tribal cultures as a means of understanding cultural heritage.
- CO4:** Evaluate the changing nature of India's social structure in relation to caste, class, community, and gender.
- CO5:** Demonstrate knowledge of the Indian Constitution and understand the evolution of India's polity from traditional to contemporary governance.

Text Books:

1. Chandra, B.*India's Struggle for Independence*, 1st Ed., Penguin Books India, 2000.
2. Dikshit, Ramesh Dutta.*Political Geography: Politics of Place and Spatiality of Politics*, 1st Ed., Macmillan Education, 2020.
3. Thapar, Romila.*Interpreting Early India: A Historical Perspective*, 1st Ed., Oxford University Press, 1992.
4. Deshpande, Satish.*Contemporary India: A Sociological View*, 1st Ed., Penguin Books, 2003.
5. Basu, D.D.*Introduction to the Constitution of India*, 21st Ed., LexisNexis, 2013.

Reference Books:

1. Ramesh Dutta Dikshit, Political Geography: Politics of Place and Spatiality of Politics, Macmillan Education, 2020.
2. Austin, Granville. *The Indian Constitution: Cornerstone of a Nation*, 1st Ed., Oxford University Press, 1999.
3. Uberoi, Patricia. *Family, Kinship and Marriage in India*, Oxford University Press, 1993.
4. Blackburn, Stuart H. *Oral Epics in India*, University of California Press, 1986.
5. Grover, B.L. & Mehta, A.A. *A New Look at Modern Indian History*, Revised Ed., S. Chand Publishing, 2006.
6. Ambedkar, B.R. *Annihilation of Caste*, Self-published, 1936.

Journals:

1. Caste in Contemporary India” – *Sociological Bulletin*
2. Indian Journal of Political Science
3. Economic and Political Weekly (EPW)

E-Resources:

1. <https://iksindia.org>
2. <https://ndl.iitkgp.ac.in/>
3. <https://epgp.inflibnet.ac.in/>
4. <https://legislative.gov.in/constitution-of-india>
5. <https://bharatavani.in>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	3	1	1	3	9	9	3	29
CO2	1	3	3	9	1	3	9	29
CO3	3	1	9	3	9	1	3	29
CO4	3	1	3	9	1	3	1	21
CO5	1	9	3	1	3	1	3	21
Total	11	15	19	25	23	17	19	129

Low-1

Medium-3

High-9

Extra Credit I-Food Hygiene and Sanitation

(For Students Admitted from 2025-26)

Semester: II**Subject Code: JBNDX2****Credit: 2****Course Objectives:**

1. To educate the students, ensuring the trace ability of food control and to protect the consumer from health hazards
2. To educate the students in helping the operating conditions for food business applications

Unit I

Introduction to sanitation and hygiene: Food Sanitation and Principles of Sanitation Personnel Hygiene.

Unit II

Personal hygiene & safety: Necessity for personal hygiene, Health of staff, Personal appearance, Sanitary practice habits-Protective clothing- Safety at the work place.

Unit III

Sanitary procedures in food industry: Importance of sanitary procedures in Food processing - Cleaning procedures – Cleaning in place cleaning out place.Cleaning and sanitizing and their importance.

Unit IV

Pest control with respect to food safety: Importance, Classification of pest, Effect of pesticides on pest & their methods of application, precaution to be taken while handling pesticides.

Unit V

Pre-requisite procedures in food industry: Good Manufacturing Practice (GMP), Good Hygienic Practice (GHP), Total Quality Management and Hazard Analysis and Critical Control Points (HACCP).

Course Outcomes:

After successful completion of this course, student will be able to

- CO1:** Recall the importance of hygiene and sanitation in food industry and understand the knowledge relating to the significance of pest control
- CO2:** Identify measures/procedures that will reduce or eliminate accidents in food preparation and service areas
- CO3:** Analyze the pre-requisite procedures in food industry
- CO4:** Evaluate the standards and procedures for keeping the facilities and equipment sanitary
- CO5:** Provide the special Training of supervisory personnel in sanitation procedures

Text Books:

1. Marriott, N. G., & Gravani, R. B, *Principles of Food Sanitation*. New York, N.Y: Springer, 2018.
2. Forsythe, S. J., & Hayes, P. R, *Food Hygiene, Microbiology and HACCP*. Dordrecht: Springer Publisher, 2020.

Reference Books:

1. In Hui, Y. H., In Bruinsma, B. L, In Gorham, J. R., In Nip, W., In Tong, P. S, & In Ventresca, P,
2. *Food Plant Sanitation*. London: CRC Press, 2017.
3. *Fundamentals of Food Hygiene, Safety and Quality* India, I K International Publishing House Pvt.Limited, 2019.
4. Norman G. Marriott and Robert B. Gravani, *Principles of Food Sanitation*, Aspen Publisher, 5th Edition, 2006.

Journals:

1. Journal of Food Safety and Hygiene
2. Journal of Food Safety
3. Journal of Health care and Hygiene

E-Resources:

1. www.food.gov.uk
2. www.foodsafetymagazine.com/
3. www.eathshala.nic.in
4. www.epgp.inflibnet.ac.in
5. <https://archive.fssai.gov.in/home/safe-food-practices/Food-Safety-and-hygiene-Requirements.html>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	3	3	3	3	3	3	27
CO2	3	9	9	3	1	3	3	31
CO3	3	3	9	9	1	3	9	37
CO4	3	3	3	9	3	3	9	33
CO5	9	3	9	3	9	3	9	45
Total	27	21	33	27	17	15	33	173

Low-1 Medium-3 High-9

Core V -Nutritional Biochemistry

(For Students Admitted from 2025-26)

Semester: III**Subject Code: JBND31****Hours /week: 4****Credit: 4****Course Objectives:**

1. To understand the chemical characteristics of different classes of nutrients with reference to their Physical Properties, and to relate this to their functions in the body
2. To establish the basic principles of metabolism and its regulation

Unit I**(12hours)**

Carbohydrates: Definition and Classification, Structure, Properties of monosaccharides. Monosaccharides- Glucose, Fructose, Galactose. Disaccharides – Maltose, Lactose, Sucrose. Polysaccharides– Starch, Glycogen. Carbohydrates Metabolism- Glycolysis, PDH pathway, TCA cycle.

Unit II**(12hours)**

Amino Acids : Definition, Classification, Structure, Properties and Functions. Metabolism of amino acid – General aspects (Transamination, Deamination, Decarboxylation), Metabolism of ammonia, Urea Cycle.

Proteins - Definition, Classification, Structure, Properties and Functions, Biological importance of Peptides.

Unit III**(12hours)**

Lipids: Definition, Functions, Classifications. Fatty acid – Definition, Classification, Physical and Chemical properties. Triglycerides, Phospholipids, Glycolipids, (Definition, Functions, Classifications, Properties) Steroids (Elementary Level). Beta oxidation of Fatty acids. Synthesis and utilization of ketone bodies.

Unit IV (12hours)

Nucleic acid: Structure of DNA & RNA. Biological oxidation – Electron transport chain, Oxidative phosphorylation.

Enzymes: Definition, classification, enzyme specificity, enzyme inhibition, factors affecting enzyme activity, Co-enzymes and Iso-enzymes.

Unit V (12hours)

Vitamins: Biochemical functions of Fat soluble and Water-soluble vitamins.

Minerals: Biochemical Functions of Macro nutrients (Ca,P,Mg,Na,K,Cl,S) and Micro nutrients (Fe, Cu, I, Mn, Zn, Mo, Co, Se, Cr,Fl).

Interrelationship between nutrients: Protein – Energy, Vitamin - Vitamin, Vitamin -Mineral and Mineral– Mineral.

Course Outcomes:

After successful completion of this course, student will be able to

CO 1: Recall the biochemical mechanisms of nutrition and metabolism and understand the knowledge of the principles of Biochemistry

CO 2: Apply the knowledge to recognize the classification, structure and functions of macromolecules

CO 3: Integrate the anabolic and catabolic pathways of all metabolic cycles

CO 4: Assess the chemistry of micronutrients and their biochemical role

CO 5: Summarize the activity of enzymes and co-enzymes in all metabolic pathways

Text Books:

1. Dr.U.Satyanarayana,U.Chakrapani, *Biochemistry*, Elsevier Publication, 5th Edition,2017.
2. D.M.Vasudevan, S.Sreekumari, Kannan Vaidyanathan, *Textbook of Biochemistry for Medical Students*, Jaypee Publication, 9th Edition, 2019.

Reference Books:

1. David L.Nelson , Michael M.Cox Lehninger, *Principle Biochemistry*, Macmillan Publishers,7th Edition, 2017.
2. VictorRodwell,DavidBender,P.AnthonyWeil,PeterKennelly,KathleenBotham, *Harper's Illustrated Biochemistry*, Lange Publishers, 30th Edition, 2017.
3. Donald Voet, Judith G.Voet, *Biochemistry*, John Wileyand Sons Publisher, 4th Edition, 2016.

Journals:

1. Journal of Biochemistry
2. Journal of Medical Biochemistry
3. Journal of Nutritional Biochemistry

E-Resources:

1. <https://www.pdfdrive.com/biochemistry-e187234482.html>
2. <https://www.pdfdrive.com/textbook-of-biochemistry-for-medical-students-e186671773.html>
3. <https://www.pdfdrive.com/lippincotts-biochemistry-6th-edition-e41485405.html>
4. <https://www.pdfdrive.com/textbook-of-biochemistry-e14983388.html>
5. <https://www.pdfdrive.com/lehninger-principles-of-biochemistry-e189596394.html>

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	9	3	3	1	9	9	43
CO2	9	9	3	9	1	9	9	49
CO3	9	9	3	9	1	9	3	43
CO4	9	9	3	3	1	9	9	43
CO5	9	9	3	9	1	9	3	43
Total	45	45	15	33	5	45	33	221

Low-1

Medium-3

High-9

Core VI Nutritional Biochemistry Practicals

(For Students Admitted from 2025-26)

Semester:III

Subject Code: JBNDC32

Hours/week:4

Credit:2

Course Objectives:

1. To develop skills in both qualitative and quantitative analysis techniques.
2. To gain expertise in handling apparatus, equipment, and instruments, and understanding their applications.

QUALITATIVE TEST

(26 Hours)

1. Reaction of Monosaccharide's – Glucose, Fructose.
2. Reaction of Di-saccharides - Lactose, Maltose, Sucrose.
3. Reactions of amino acids – Tyrosine, Tryptophan, Cysteine, Methionine.
4. Reactions of fats and oils – General reactions of lipids.
5. Determining the pH of different nutritional and biochemical samples.

QUANTITATIVE TEST

(26 Hours)

6. Preparation of starch from potato.
7. Preparation of Casein from milk
8. Extraction of Lipids by Soxhlet's method
9. Estimation of Glucose by Benedicts Titrimetric method.
10. Determination of the Moisture content
11. Determination of Total Ash Content

DEMONSTRATION

(8 Hours)

12. Chromatography
13. UV –Spectrophotometer

Course Outcomes:

After successful completion of this lab course, student will be able to

CO 1: Understand and follow safety rules and regulations in the biochemistry lab to perform experiments safely.

CO 2: Apply knowledge to conduct qualitative analysis of macromolecules in various samples.

CO 3: Measure parameters such as pH, moisture, ash content, and other factors in food samples.

CO 4: Estimate the quantity of nutrients in various food samples through quantitative techniques.

CO 5: Gain practical knowledge in using advanced analytical instruments for biochemical analysis.

Text Books:

1. Javin Bishnu Gogoi, *Simplified Practical Manual of Biochemistry*, Jaypee Publication, 2nd Edition, 2021.
2. Singh S.P *Practical Manual of Biochemistry*, CBS Publication, 2nd Edition, 2019.

Reference Books:

1. Soundravally Rajendran, Pooja Dhiman *Biochemistry Practical Manual*, Elsevier Publication, 1st Edition, 2019.
2. Geetha Damodaran K, *Practical Biochemistry*, Jaypee Brothers, 2nd Edition, 2016.
3. Rafi Mohammed, *Manual of Practical Biochemistry*, Orient Blackswan Pvt Ltd, 3rd Edition, 2020.

Journals:

1. Journal of Analytical Biochemistry
2. The International Journal of Biochemistry
3. Journal of Nutritional Biochemistry

E -Resources:

1. <https://www.pdfdrive.com/practical-textbook-of-biochemistry-for-medical-students-e187182647.html>
2. <https://www.pdfdrive.com/principles-and-techniques-of-practical-biochemistry-and-molecular-biology-e188304313.html>
3. <https://www.pdfdrive.com/practical-biochemistry-e187196416.html>
4. <https://www.pdfdrive.com/laboratory-techniques-in-biochemistry-and-molecular-biology-vol-4-e184893598.html>
5. <https://www.pdfdrive.com/viva-in-biochemistry-e187670022.html>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	9	3	3	1	3	9	37
CO2	9	9	3	3	1	3	3	31
CO3	9	9	3	9	1	3	3	37
CO4	9	9	3	3	1	3	3	31
CO5	9	9	3	9	1	3	3	37
Total	45	45	15	27	5	15	21	173

Low-1

Medium-3

High-9

Ability Enhancement Compulsory Course III – Internship
(For Students Admitted from 2025-26)

Semester:III
Subject Code: JBNDA33I

Hours /week:4
Credit:4

Course Objectives:

1. To provide hands-on experience in food processing, quality control, and food service management.
2. To develop technical and managerial skills relevant to food industries, institutions, and bakeries.

1. Food Industry Internship

- Introduction to food processing techniques
- Raw material selection and procurement
- Production line operations
- Food preservation methods
- Packaging and labeling standards
- Quality control and assurance practices
- Food safety regulations (FSSAI, HACCP, ISO)
- Waste management and sustainability practices

2. Institutional Food Service Internship

- Large-scale meal planning and production
- Nutritional analysis of institutional meals
- Food safety and hygiene in institutional settings
- Cost control and inventory management
- Kitchen equipment handling and maintenance
- Customer service and feedback evaluation
- Exposure to hospital, corporate, and educational food services

3: Bakery Internship

- Fundamentals of baking science and ingredient functions
- Production of bread, cakes, pastries, and cookies
- Use of baking equipment and technology
- Quality assessment of bakery products
- Shelf-life extension techniques
- Food safety and sanitation in bakery operations
- Innovation in bakery product development

The section to clearly explain the selection process for students based on their interests and career goals.

Evaluation Criteria:

1. **Internship Report (30%)** – A detailed report on tasks performed, learning outcomes, and challenges faced.
2. **Supervisor's Evaluation (40%)** – Assessment of performance, punctuality, teamwork, and technical skills.
3. **Presentation/Viva (30%)** – Oral presentation on internship experiences and key takeaways

Recommended Internship Locations:

- Food manufacturing units (Dairy, snacks, beverages, ready-to-eat foods)
- Institutional kitchens (Hospitals, schools, corporate cafeterias)
- Commercial bakeries and artisanal baking units
- Research and development (R&D) departments in food industries

Course Outcomes:

CO1: Understanding of industrial food processing, institutional meal planning, and bakery operations.

CO2: Practical exposure to food safety regulations and quality control procedures.

CO3: Development of problem-solving, teamwork, and professional skills in food-related sectors.

CO4: Ability to apply academic knowledge to real-world scenarios in the food industry.

CO5: Translate academic learning into practical applications through hands-on experience in food industries, enhancing employability and industry readiness.

Course Outcome s	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	9	9	9	9	9	9	63
CO2	9	9	9	9	9	9	9	63
CO3	9	9	9	9	9	9	9	63
CO4	9	9	9	9	9	9	9	63
CO5	9	9	9	9	9	9	9	63
Total	45	45	45	45	45	45	45	315

Low-1

Medium-3

High-9

Skill Enhancement Course – III Food Preservation Practicals

(For Students Admitted from 2025-26)

Semester: III**Subject Code: JBNDS34P****Hours /week: 2****Credit: 1****Course Objectives:**

1. To study the importance microorganisms in food preservation and acquire knowledge on different preservation techniques used to enhance the shelf span of food product.
2. To know the household methods of preserving food.

Unit I**(6 hours)****Preservation by sugar****Preparation of Jam:** Mixed fruit jam, Apple jam, Guava jam, Pineapple jam**Preparation of jelly:** Apple jelly, Guava jelly, Tutti-frutti.**Unit II****(6 hours)****Preparation of Squash:** Pineapple squash, Orange squash, Sappota squash and Grape squash. Fruit preserves- Fruit bar, Ginger murabha.

Determining the pH value of the Palm neera

Unit III**(6 hours)****Preservation by salt:** Pickles – Onion pickle, Mango pickle, Garlic Pickle, Dried fish

Vathalvadakam- Cluster bean *vathal*, Brinjal, Bitter gourd, Ladies finger *Vadamkam*- Rice, sago.

Unit IV (6 hours)

Preparation of Spice products: Tomato sauce, Tomato ketchup

Unit V (6 hours)

Preservation by fermentation Saurekaurat, Curd, Lassi, Wine

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Define food preservation and indicate the different types natural and chemical preservatives used for food preservation

CO2: Apply the methods of preserving foods by adding salt (*Vathal Vadakkam*)

CO3: Demonstrate on different methods of food preservation techniques

CO4: Evaluate the different preparation methods of spice products

CO5: Formulate the different preparation methods of fermented products

Text Books:

1. *Laboratory Manual of Fruit and Vegetable Products* (Classic Reprint), Published by FB&C Limited, 2018.
2. Mohammad U. H. Joardder, Mahadi Hasan Masud, *Food Preservation in Developing Countries: Challenges and Solutions*, Springer International Publisher, 2019

Reference Books:

1. Gary S. Tucker, *Food Preservation and Bio deterioration*, Wiley Publishers, 2016.
2. Fereidoon Shahidi, *Handbook of Antioxidants for Food Preservation*, Wiley-Blackwell, 2015.
3. Srilakshmi B, *Food Science*, New Age Publication, Delhi, 8th Edition, 2019.

Journals:

1. Journal of Food & Microbiology
2. Journal of Food Processing & Technology
3. Journal of Food Processing & Preservation

E-Resources:

1. www.newfoodmagazine.com
2. www.nzifst.org.nz
3. www.itrhd.com
4. <https://www.tarladalal.com/tomato-ketchup-tomato-sauce-homemade-tomato-ketchup-40725r>
5. <http://ecoursesonline.iasri.res.in/mod/page/view.php?id=5168>

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	9	3	3	9	3	9	45
CO2	9	9	9	3	3	3	9	45
CO3	9	9	9	9	3	3	9	51
CO4	9	9	9	9	3	3	9	51
CO5	9	9	9	9	3	3	9	51
Total	45	45	39	33	21	15	45	243

Low-1

Medium-3

High-9

Multidisciplinary Course I- Indian Knowledge System on Foods
(For Students Admitted from 2025-2026)

Semester:III

Hours/week: 2

Subject Code: JBMD31ND

Credit: 1

Course Objectives:

1. To explore and understand the Indian Knowledge system in the context of the diverse Indian food culture
2. To understand the traditions of the food-related customs, rituals, and daily practices in Indian households across various regions.

Unit I

(6 hours)

Introduction to Indian Knowledge Systems and its importance:Traditional diets and food culture (Food anthropology) and regional diets of North India (Jammu, Kashmir, Ladakh, Punjab, Haryana, Uttarakhand) and South India (Tamil Nadu, Kerala, Andhra Pradesh, Telangana, Puducherry, Karnataka).

Unit II

(6 hours)

Traditional diets and food culture (Food anthropology) and *regional* diets of Central India (Uttar Pradesh, Madhya Pradesh) and Western India (Gujarat, Maharashtra, Rajasthan, Goa).

Unit III

(6 hours)

Traditional diets and food culture (Food anthropology) and regional diets of anthropology regional diets of East India (West Bengal, Bihar, Odisha)

Unit IV

(6 hours)

Traditional diets and food culture (Food anthropology) and regional diets of North east India (Assam, Mizoram, Manipur, Meghalaya, Sikkim, Nagaland, Tripura, Arunachal Pradesh)

Unit V

(6 hours)

Traditional diets and food culture (Food anthropology) of specific religions of India (Muslims, Parsi, Buddhist, Sikhs and any other local communities).

Course Outcomes:

After successful completion of this course, student will be able to

CO1:Understand the Indian Knowledge System in the context of diverse food cultures, including customs, rituals, and traditions across different regions of India.

CO2:Analyze regional food cultures of various parts of India, identifying unique dietary patterns and the cultural significance of food practices.

CO3:Explore the role of food anthropology in understanding traditional diets and how these customs have evolved across different Indian communities.

CO4:Examine the impact of religion and community on food practices, focusing on th influence of Muslims, Parsis, Buddhists, Sikhs, and indigenous communities on India's culinary traditions.

CO5:Apply knowledge of Indian food traditions to appreciate and engage with the cultural diversity in contemporary Indian society, promoting a deeper connection with the nation's culinary heritage.

Text Books:

1. Iyer, U., Sharan, M., Maniar, A., & Bhangaokar, R. *Indian Knowledge Systems (IKS): A Family and Community Sciences Perspective*. Kaav Books Publications, 2023.
2. Achaya, K. T. *The Illustrated Foods of India*. Oxford University Press, 2008
3. Achaya, K. T. *Indian Food: A Historical Companion*. Oxford University Press, 1994

Reference Books:

1. Nambiar, V. (Ed.), *Indian Food Anthropology and the Eat Right Movement- Volume 1. Selective & Scientific Books*, 2021
2. Sen, C. T., *Feasts and fasts: A history of food in India*. Reaktion Books. 2014.

Journals:

1. Journal of Food Science and Technology (JFST)
2. Indian Journal of Research in Food Science and Nutrition (FoodSci)
3. Indian journal of Food Industry

E-Resources:

1. Indian Knowledge Systems :: (iksindia.org) <https://www.nimh.nih.gov/>
2. Centre for Indian Knowledge Systems (ciks.org) <https://pmc.ncbi.nlm.nih.gov/>
3. <https://repository.cimmyt.org/bitstreams/11caa7da-f515-46cd-ab64-96922dd8ad53/download>
4. https://webstor.srmist.edu.in/web_assets/downloads/2021/implemented-indian-traditional-knowledge-systems.pdf
5. <https://www.nature.com/articles/s43247-022-00543-1>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	9	3	3	9	3	9	45
CO2	9	9	9	3	3	3	9	45
CO3	9	9	9	9	3	3	9	51
CO4	9	9	9	9	3	3	9	51
CO5	9	9	9	9	3	3	9	51
Total	45	45	39	33	21	15	45	243

Low-1 Medium-3 High-9

Common value added course II– Environmental Studies for Sustainable Development
(For Students Admitted from 2025-26)

Semester: III
Subject Code: JBES3V

Hours / week: 2
Credits: 2

Course Objectives:

1. To introduce students to the principles of sustainable development, environmental conservation, and the global efforts supporting ecological balance and human well-being.
2. To develop awareness and practical understanding of biodiversity, pollution control, natural resource management, and the role of institutions in promoting sustainability.

Unit I (6 hours)

Sustainable Development Goals (SDGs) – Introduction, History, 17 SDGs, Agenda 21, Earth Summit, eight Millennium Development Goals (MDGs), UN Sustainable Development Summit, Paris Agreement on Climate Change.

On ground activity: Plant and maintain a sapling

Unit II (6 hours)

The concept of Environmental studies – Introduction, Definition, Scope and importance
 Natural Resources – Forest, Marine, Wet land, Water and Land Resources, Food resources; changes caused by agriculture and overgrazing; effects of fertilizer and pesticide.
 Energy resources – use of alternate energy resources; Role of individual in conservation of natural resources.

Ecosystems – Concept – Structure and function of an ecosystem, producers, consumers and decomposers, Energy flow; food chains; food webs and ecological pyramids.

Unit III (6 hours)

Land and Marine Biodiversity conservation - Introduction, Definition, biodiversity- Land and marine, threats to biodiversity: habitat loss, poaching of wildlife, endangered and endemic species of India, In- situ and Ex- situ conservation of biodiversity (Turtle Hatchery), Wildlife Protection Act, Forest Conservation Act. Birds Sanctuary in Ramanathapuram, Gulf of Mannar Bioreserve, Mangrove Forest and Ecotourism in Ramanathapuram district

Field trip: Gulf of Mannar National Park

Unit IV (6 hours)

Environmental Pollution and its Prevention – Definition, causes, effects and control measures of air, water, and soil pollution. Climate change, global warming, acid rain, ozone layer depletion. Environment Protection Act – Air and Water (Prevention and Control of Pollution) Act, Solid Waste management

On-ground activity: Coastal clean up

Unit V (6 hours)

Role of research institutes in sustainable livelihood – Population growth; Education for Women, Balanced Diet, Menstrual hygiene, Role of ICAR-CMFRI, CSIR-MARS, KVK, and UNICEF in the development of sustainable food resources.

Course Outcomes:

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

CO1: Understand the history, goals, and importance of the Sustainable Development Goals (SDGs) and related global initiatives

CO2: Recognize the value of natural resources and ecosystems

CO3: Learn why biodiversity matters, what harms it, and how to protect plants and animals, especially in places like the Gulf of Mannar.

CO4: Understand what causes pollution and how we can prevent it through laws and personal actions.

CO5: Know how research centers and organizations help people live better through food, health, and education programs.

Text Books:

1. ErachBharucha, *Environmental studies for undergraduate courses*, University Grant commission, New Delhi, 202
2. Kumaraswamy K., *Environmental Studies*, Jazym Publications, 2013.

References Books:

1. Arumugam N. and Kumaresan B., *Environmental Studies*, Saras publications, 20
2. Dr. Biswarup Mukherjee., *Fundamentals of Environmental Biology*, Silver line Publications, 2008
3. Dr. D. K. Asthana & Dr. Meera Asthana, *A Text Book of Environmental Studies*, S Chand & Co Ltd, Revise Edition, 2006.

Journals:

1. Journal of Environmental Studies and Sciences
2. Journal of environmental sciences
3. Nature climate change

E- Resources:

1. <https://nptel.ac.in/courses/127/105/127105018/>
2. <https://sdgs.un.org/goals>
3. <http://eprints.cmfri.org.in/14270/>
4. <https://nios.ac.in/online-course-material/sr-secondary-courses/enviornmental-science-asp>
5. https://rajneeshrajoria.weebly.com/uploads/4/9/0/6/49069889/environmental_science_birm301.pdf
6. <https://nios.ac.in/media/documents/srsec314newE/PDFBIO.EL24.pdf>
7. <https://nios.ac.in/media/documents/srsec314newE/PDFBIO.EL25.pdf>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	3	1	1	3	9	9	3	29
CO2	1	3	3	9	1	3	9	29
CO3	3	1	9	3	9	1	3	29
CO4	3	1	3	9	1	3	1	21
CO5	1	9	3	1	3	1	3	21
Total	11	15	19	25	23	17	19	129

Low-1 Medium-3 High-9

Extra Credit II - Marine Food Processing
(For Students Admitted from 2025-26)

Semester: III**Subject Code: JBNDX30****Credit: 2****Course Objectives:**

1. To comprehend the value and necessity of marine products, as well as the compositional and technological aspects of marine foods
2. To explore a processed marine product

Unit I

Marine Environmental Science: Marine Eco-system, Marine Pollution, Marine Food Sources.

Unit II

Evaluation of Marine Food Qualities: Processing of fish- crab, prawns, and seaweeds. Postharvest quality changes, post-harvest losses, Methods for assessing and preventing losses.

Unit III

Microbiology of fish products: Storage and Handling, Preservation – freezing techniques and irradiation process, value addition, preparation of fish products (fermented fish, fish products, fish soups, fish powder, prawn powder and cutlets), seaweed products like pickles and hydrocolloids.

Unit IV

Nutritional benefits of marine resources: fish, fish oil, seaweeds and other marine sources.

Unit V

Packaging and labeling: Importance of packaging and labeling, Packaging functions, Packaging materials, Requisites of good packages.

Course Outcomes:

After successful completion of this course, student will be able to

- CO 1:** Recall the factors that influence the quality and shelf-life of seafood and explaining the marine ecosystem
- CO2:** Identify losses due to post-harvest, processing, and storage
- CO3:** Analyze the nutritional advantages of marine products
- CO4:** Solve spoilage problem by using various preservation and packaging techniques
- CO5:** Evaluate the shelf life by experimenting with different processing and packaging methods

Text Books:

1. Ozogul, Y. *Innovative technologies in seafood processing*. CRC Press, 2016.
2. Borda, D., Nicolau, A. I., & Raspor, P, *Trends in fish processing technologies*. CRC Press.2017.

Reference Books:

1. Genç, İ. Y., Esteves, E., & Diler, A., *Handbook of Seafood*. Nova Science Publishers, 2016.
2. Sahoo, J., & Chatli, M. K., *Textbook on Meat, Poultry and fish technology*. Daya Publishing House.
3. Iqbal, A, *Microbiology of marine food products*, Burlington, Ontario: Delve Publishing,2021

Journals:

1. Journal of food processing and Technology
2. Journal of Fisheries Science.com
3. Journal of Aquatic Food Product Technology

E-Resources:

1. <https://www.slideshare.net/pramodgpramod/marine-pollution-76857615>
2. <https://www.slideshare.net/ShoebullIslam/methods-of-quality-assessment-of-fish->

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3. <https://www.slideshare.net/sridevi244/contamination-preservation-spoilage-of-fish>
4. https://www.powershow.com/view/12558ndiym/nutritional_value_of_seafood_powerpoint_ppt_presentation
5. https://krishi.icar.gov.in/jspui/bitstream/123456789/25122/1/16_Seafood%20packaging.pdf

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	3	3	3	1	1	3	23
CO2	9	3	9	3	1	1	3	23
CO3	3	3	9	9	3	3	9	39
CO4	3	3	3	9	3	1	9	31
CO5	9	3	3	9	3	1	3	31
Total	33	15	21	33	11	7	27	147

Low-1 Medium-3 High-9

Core -VII Dietetics I

(For Students Admitted from 2025-26)

Semester-IV

Subject Code: JBNDC41

Hours/Week:5

Credit: 5

Course Objectives:

1. To understand the foundation sciences which underpin therapeutic dietetic practice, the principles of disease prevention and health promotion, the principles of therapeutic intervention practice
2. To understand the organization, management and provision of health care both in the hospital and in primary care

Unit I

(18 hours)

Diet therapy: Basic concepts of diet therapy, Principles of planning diet, Therapeutic adaptations of normal diet, principles of therapeutic diets.

Routine Hospital Diets: clear fluid, full fluid, soft and normal diet, Pre-operative and post-operative diets.

Special feeding techniques – Parenteral and Enteral feeding

Dietitian: Role of dietitians in Nutritional care , planning diet counseling.

Unit II

(18 hours)

Nutritional care for weight management: Obesity – types, etiology, Symptoms, complications and principles of dietary management.

Underweight: Etiology, complications and principles of dietary management.

Unit III

(18 hours)

Deficiency Diseases - Definition, Classification, Examples

PEM , Vitamin A deficiency, Anemia- Causes, Types, symptoms and diet management.

Nutritional care for febrile condition: Typhoid, Malaria and Tuberculosis- Causes, symptoms, metabolic changes in fever and dietary management.

Unit IV (18 hours)

Nutritional care for diseases of the Gastro Intestinal tract: Peptic ulcer, Gastritis, Constipation, diverticulosis, Diarrhea, Mal-absorption syndrome, Celiac sprue, Tropical sprue, Lactose intolerance, Inflammatory Bowel Disease, Irritable Bowel Syndrome, Gastro esophageal reflux disease (GERD)- Etiology, Symptoms, Complications and Principles of dietary management.

Unit V (18 hours)

Nutritional care for liver disease and biliary system disorders: Jaundice, Cirrhosis of liver, Viral Hepatitis, Hepatic Encephalopathy, Role of alcohol in liver disease- etiology, symptoms, complications and principles of dietary management.

Diseases of Gall Bladder and Pancreas: Cholelithiasis, Cholecystitis, Cholecystectomy, Acute and chronic Pancreatitis- Etiology, Symptoms, Complications and Principles of dietary management.

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Recollect the principles of planning diet and discuss the role of dietician and basic concept of diet therapy

CO2: Determine the routine hospital diets, special feeding techniques

CO3: Point out the etiology, symptoms and complications for any life style disease

CO4: Assess the nutritional requirement for acute and chronic illness

CO5: Plan a whole day menu for the acute and chronic illness

Text Books:

1. Srilakshmi, B, *Dietetics*, New Age International(P) Ltd, Chennai, 7th Edition,2019.
2. Shubhaangini Joshi, *Nutrition and Dietetics*, McGraw Hill publication, New Delhi, 3rd Edition, 2017.

Reference Books:

1. Sumati R. Mudambi, M. V. Rajagopal, *Fundamentals of Foods, Nutrition and Diet Therapy*, Published by New, 2015.
2. Ann M. Coulston, Carol J. Boushey, Linda Delahanty, Mario Ferruzzi, *Nutrition in the Prevention and Treatment of Disease*, Published by Elsevier2017.
3. A. Sharma ,*Principles of Therapeutic Nutrition and Dietetics*, CBS Publishers & Distributors,2017.

Journals:

1. The American Journal of Clinical Nutrition
2. Nutrition Abstracts and Reviews
3. The Indian Journal of Nutrition and Dietetics

E-Resources:

1. <https://itcollege.ac.in/itdc/wp-content/uploads/2020/10/DR-neelam-Kumari.pdf>
2. <https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/medical-nutrition-therapy-for-weight-loss>
3. <https://www.nhp.gov.in/healthyliving/healthy-nutrition>
4. http://www.lllnutrition.com/mod_III/TOPIC12/m121.pdf

5. <https://slideplayer.com/slide/6183777/>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	9	9	3	3	3	9	45
CO2	3	3	3	3	1	3	9	25
CO3	9	9	9	1	1	1	9	39
CO4	9	3	9	1	1	3	9	35
CO5	3	3	9	3	3	3	9	33
Total	33	27	39	11	09	13	45	177

Low-1 Medium-3 High-9

Core -VIII Dietetics I Practicals

(For Students Admitted from 2025-2026)

Semester-IV

Subject Code: JBND42P

Hours/Week:4

Credit: 4

Course Objectives:

1. To understand the modifications in nutrient requirements for various diseases
2. To acquire skills in the preparation of therapeutic diets

Unit I

(12 hours)

1. Planning and preparation of fluid food - clear fluid and full fluid.
2. Planning and preparation of recipes for soft diet, mechanical and pureed
3. Planning, preparation of recipes using protein concentrates and sugar substitutes.

Unit II

(12 hours)

1. Planning, preparation and calculation of diet for Obesity
2. Planning, preparation and calculation of diet for Underweight
3. Planning, preparation and calculation of diet for Protein Energy Malnutrition

Unit III

(12 hours)

1. Planning, preparation and calculation of diet for Anaemia
2. Planning, preparation and calculation of diet for Typhoid & Malaria
3. Planning, preparation and calculation of diet for Tuberculosis

Unit IV

(12 hours)

1. Planning, preparation and calculation of diet for Peptic Ulcer
2. Planning, preparation and calculation of diet for Diarrhoea & Constipation
3. Planning, preparation and calculation of diet for Inflammatory and Irritable Bowel Syndrome

Unit V

(12 hours)

1. Planning, preparation and calculation of diet for jaundice & Cirrhosis of liver
2. Planning, preparation and calculation of diet for Cholelithiasis and Cholecystitis
3. Planning, preparation and calculation of diet for Acute and Chronic Pancreatitis

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Describe the importance of menu for different illness and explain the need of menu modification

CO2: Apply the therapeutic diets using food exchange lists.

CO3: Structure the dietetic practices followed in Indian hospital

CO4: Detect the nutritive value of Indian foods

CO5: Calculate a whole day menu for acute and chronic illness

Text Books:

1. Amin Gasmi, *Diet Therapy for Digestive Diseases-Practical Guide for Nutritionists* Independently Published, 2020.
2. Gopalan C., RN. Ramasastri and S.C. Balasubra-manian, "*Nutritive Value of Indian Foods*", National Institute of Nutrition, Hyderabad, 2021.

Reference Books:

1. Brenda Davis, *Kick Diabetes Essentials: The Diet and Lifestyle Guide*, Healthy Living Publications, 2019
2. Joan Gandy, *Manual of Dietetic Practice* published by Wiley, 2019
3. Kathleen D. Bauer, Doreen Liou, *Nutrition Counselling and Education Skill Development*, Published by Cengage Learning, 2020.

Journals:

1. The American Journal of Clinical Nutrition
2. Nutrition Abstracts and Reviews
3. The Indian Journal of Nutrition and Dietetics

E-Resources:

1. www.mntinc.org
2. www.nutritionaltherapy.com
3. www.mnpgdpg.org
4. http://www.lllnutrition.com/mod_III/TOPI12/m121.pdf
5. <https://slideplayer.com/slide/6183777/>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	3	9	3	3	3	9	39
CO2	9	3	9	3	3	3	9	39
CO3	9	3	9	3	3	3	9	39
CO4	3	3	3	1	3	1	9	23
CO5	9	3	9	3	3	3	9	39
Total	39	15	39	13	15	13	45	179

Low-1

Medium-3

High-9

Ability Enhancement Compulsory Course IV-Food Microbiology

(For Students Admitted from 2025-2026)

Semester: IV**Subject Code: JBND43****Hours /week: 4****Credit: 4****Course Objectives:**

1. To understand the key concept of food microbiology and study in growth of microorganisms
2. To highlight the microorganisms present in food and study the methods for preservation of foods

Unit I**(12hours)**

Introduction to Food microbiology & Characteristics of Microorganisms in Food: History and Development of Food Microbiology -Definition and Scope of food microbiology. Classification of microorganisms and Nomenclature -Characteristics and morphology of microorganisms- Bacteria, Fungi, Algae, Yeast and Virus - Importance of microorganisms in food.

Unit II**(12 hours)**

Microbial Growth in Food: Microbial Growth Characteristics- Bacterial growth curve- Factors affecting the growth of microorganisms in food. Intrinsic Factors: Nutrient Content and pH, Redox Potential, Antimicrobial Barrier and Water Activity. Extrinsic Factors: Relative Humidity, Temperature and Gaseous Atmosphere.

Unit III**(12 hours)**

Microbiology spoilage in foods: Microbiology of Plant based Foods- Contamination, Spoilage and Preservation of Vegetables and Fruits, Cereals and Cereal Products, Pulses, Nuts and oilseeds, Sugar and Sugar Products, Microbiology of animal based Foods: Milk and Milk Products, Meat and Meat Products, Sea foods, Egg and Poultry and Canned Foods.

Unit IV**(12 hours)**

Control of Microorganisms in Foods: Principles and methods of preservation- High temperature, low temperature, drying, Fermentation- Importance of LAB, *Saccharomyces cerevisiae*, Radiation, chemical Preservatives, Bio preservatives, Hurdle technology, Active packaging, Novel processing technology. Quality assurance: Microbiological quality standards of food. Government regulatory practices and policies. FDA, EPA, HACCP, ISI, NABL.

Unit V**(12 hours)**

Food Intoxication and Food infection: Classification of food borne disease, Foods involved, Diseases outbreak, Preventive and control measures.

Intoxication: Botulism and Staphylococcal intoxication.

Infection: *Salmonellosis*, *Clostridium Perfringens* illness, *Bacillus cereus*, *Ecoli*, *Shigellosis*, *Yersinia* and *Streptococcus faecalis*.

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Understand the different microorganisms that can cause spoilage of foods and be able to detect them and explain the occurrence and interactions of microorganisms with food

CO2: Illustrate the role of microorganisms in food safety

CO3: Experiment the techniques in control of food spoilage

CO4: Evaluate the methods of quality and microbiological control of foods

CO5: Develop skills useful to detect the microorganisms in food

Text Books:

1. William C. Frazier, *Food Microbiology*, Tata McGraw Hills Publishing Company Limited, Chennai, 2017.
2. Virendra Kumar Pandey, *A Text Book of Food Microbiology*, INSC International Publishers, 2021.

Reference Books:

1. Matthews.K.R, *Food microbiology an Introduction*, 4th Edition, ASM Press, 2017
2. Adams, MR and Moss, MO, *Food Microbiology*, New Age International (P) Ltd., New Delhi, 2015.
3. Ray, B. & Bhunia, A, *Fundamental Food Microbiology*, 5th Edition, CRC Press, 2018.

Journals:

1. Journal of Food Microbiology
2. Journal of Food & Industrial Microbiology
3. International Journal of Food Microbiology

E-Resources:

1. <https://www.pdfdrive.com/food-microbiology-d55747381.html>
2. <https://www.pdfdrive.com/food-microbiology-e58597702.html>
3. <https://www.pdfdrive.com/fundamental-food-microbiology-fifth-edition-e175981800.html>
4. <https://www.pdfdrive.com/food-microbiology-an-introduction-e166783912.html>
5. <https://www.pdfdrive.com/foodborne-parasites-food-microbiology-and-food-safety-e157137947.html>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	9	9	9	9	9	9	63
CO2	9	9	9	9	3	9	9	57
CO3	9	3	9	9	9	9	9	57
CO4	9	3	9	9	9	9	9	57
CO5	9	9	9	3	3	9	9	51
Total	45	33	45	39	33	45	45	285

Low-1

Medium-3

High-9

Multi Disciplinary Course II -Food Nutrition for Healthy living

(For Students Admitted from 2025-2026)

Semester: IV
Subject Code: JBMD41ND**Hours : 3**
Credit: 2**Course Objectives:**

1. To understand the fundamental principles of nutrition and their impact on overall health and well-being.
2. To analyze the role of macronutrients and micronutrients in maintaining a balanced diet and preventing deficiencies.
3. To evaluate dietary guidelines and nutrition recommendations for different life stages and health conditions.

Unit I**(9 Hours)**

Fundamentals of Nutrition: Definition and scope of nutrition
Macronutrients (Carbohydrates, Proteins, Fats) – functions, sources, and daily requirements
Micronutrients (Vitamins and Minerals) – functions, sources, and deficiencies.
Water and its role in the human body.
Basics of digestion, absorption, and metabolism

Unit II**(9 Hours)**

Nutritional Requirements Across the Life Cycle: Nutritional needs for different age groups: infants, children, adolescents, adults, and elderly
Maternal nutrition: nutrition during pregnancy and lactation and Nutrition for special populations: athletes, individuals with chronic diseases
Dietary modifications for different physiological conditions and Role of nutrition in growth, development, and aging.

Unit III**(9 Hours)**

Diet and Health: Balanced diet: concept, components, and importance and Dietary guidelines and Recommended Dietary Allowances (RDA)
Role of diet in the prevention and management of lifestyle diseases (obesity, diabetes, cardiovascular diseases, osteoporosis) and Importance of dietary fiber and functional foods
Food fortification and supplementation.

Unit IV**(9 Hours)**

Food Safety and Public Health Nutrition: Food hygiene and safety measures, Common food contaminants and adulterants and Food laws and regulations (FSSAI, Codex Alimentarius, WHO guidelines), Public health nutrition programs and policies in India and Role of nutrition education in community health.

Unit V**(9 Hours)**

Practical Applications of Nutrition: Meal planning for different age groups and health conditions, Nutrition labeling and food choices
Weight management strategies and diet modifications and Importance of physical activity in nutrition and health and Emerging trends in nutrition (nutrigenomics, plant-based diets, personalized nutrition).

Course Outcomes:**After successful completion of this course, student will be able to****CO1:** Explain the fundamental concepts of nutrition, including macronutrients, micronutrients, and their role in maintaining health.**CO2:** Analyze the nutritional requirements across different life stages and the impact of diet on growth, development, and aging.

- CO3:** Evaluate the relationship between diet, lifestyle, and the prevention of chronic diseases such as obesity, diabetes, and cardiovascular disorders.
- CO4:** Apply knowledge of food safety, hygiene, and public health nutrition policies to ensure healthy food choices and practices.
- CO5:** Develop meal plans and dietary strategies to promote overall well-being, considering special nutritional needs and emerging trends in nutrition.

Text Books ;

1. Whitney, E., & Rolfes, S. R. *Understanding nutrition* Cengage Learning. 15th Edition 2019.
- 2.Sizer, F., & Whitney, E. *Nutrition: Concepts and controversies* (Cengage Learning, 15th Edition, 2020).
3. Gibney, M. J., Lanham-New, S. A., Cassidy, A., & Vorster, H. H. *Introduction to human nutrition* (3rd ed.). Wiley-Blackwell, 2019.

Reference Books:

1. Brown, J. E. *Nutrition through the life cycle* (6th ed.). Cengage Learning. (2017).
2. Gibney, M. J., Margetts, B. M., Kearney, J. M., & Arab, L. *Public health nutrition*. Wiley-Blackwell. (2013).

Journals:

1. Indian Journal of Nutrition and Dietetics
2. Journal of Food Science and Technology (JFST) nutrition.
3. Food Science Journal

E-Resources:

1. <http://www.informaticsjournals.com/index.php/ijnd>
2. <https://www.emeraldgrouppublishing.com/journal/nfs>
3. <https://www.cambridge.org/core/journals/public-health-nutritio>
4. <https://www.nios.ac.in/media/documents/srsec321newE/321-E-Lesson-4.pdf>
5. <https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/TechnologyVocational/NutritionForHealthyLiving120.pdf>

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	3	3	3	3	1	9	31
CO2	9	3	3	9	3	1	9	37
CO3	9	3	3	9	3	3	9	39
CO4	9	9	9	3	9	3	9	51
CO5	9	3	3	9	3	9	9	45
Total	45	21	21	33	21	17	45	203
	Low-1		Medium-3			High-9		

Skill Enhancement Course –IV Food Product Development Practicals

(For Students Admitted from 2025-2026)

Semester: IV**Subject Code: JBNDS44P****Hours /week: 2****Credit: 1****Course Objectives:**

1. To know the notion of new product development.
2. To prepare new products based on unique dietary needs, utility, convenience of use, and adaptation of current traditional Indian meals.

List of Experiments:**(30 hours)**

1. Study on Trends and innovation in food markets.
2. Study on New product development process - from concept to deployment including market analysis, product design, development, quality and sensory assessment, and marketing.
3. Separation of Liquid sample at various speed
4. Experiment on Properties, roles and applications of coloring, flavoring, additives and functional ingredients in foods.
5. Experiment on Properties, roles and development of food packaging for food products
6. Experiment on Quality and sensory testing for food products and evaluation of food shelf life
7. Experimental study of dehydration of vegetable preparation and standardization of Cream Milk
8. Evaluating the Food structure using a microscope
9. Formulate the new food product.
10. Preparing the new food Product.
11. Marketing the new food Product.

Course Outcomes:**After successful completion of this course, student will be able to****CO1:** Define and interpreting the significance of dietary changes in the development of new products**CO2:** Identify a product's quality and sensory characteristics;**CO3:** Examine the food packaging in foods**CO4:** Construct the food product based on your knowledge of food ingredients and functional foods**CO5:** Assess the theoretical and practical knowledge in order to reproduce existing food products**Text Books:**

1. Fuller, G. W, *New Food Product Development: From Concept to Marketplace*, 3rd Edition, 2016
2. Vieira, M. M. Sustainable Innovation in Food Product Design. L. Pastrana, & J. Aguilera (Eds.). Springer International Publisher, 2021.

Reference Books:

1. Chávez-gonzález, M. L., Buenrostro-figueroa J & Aguilar, C. N, *Hand Book of Research on Food Science and Technology*, 2019.
2. Fuller, g. W, *New Food Product Development: from Concept to Marketplace*, 3rd Edition, 2016.
3. Beckley, J. H., Herzog, L. J., & Foley, M. M, *Accelerating New Food Product Design and Development*, Wiley Publishers, 2017.

Journals:

1. International Journal of Food Science and Technology
2. International Journal of Food Engineering
3. Food Technology

E -Resources:

1. <https://iastate.pressbooks.pub/foodproductdevelopment/>
2. <http://www.brookfieldengineering.com/https://nzifst.org.nz/resources/foodproductdevelopment/Chapter-3-1-2.htm>
3. <https://worldwidescience.org/topicpages/s/shelf+life+determination.html>
4. <https://courses.lumenlearning.com/boundless-marketing/chapter/packaging/>
5. <https://forto.com/en/blog/modes-transportation-explained-best/>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	3	9	3	9	1	9	43
CO2	3	1	1	9	1	3	3	21
CO3	3	1	3	9	1	3	3	23
CO4	3	3	3	9	3	3	9	33
CO5	9	3	3	9	9	3	9	45
Total	27	11	19	39	23	13	33	165

Low-1 Medium-3 High-9

Common value Added Course III – Digital and Technology Solution

(For Students Admitted from 2025-26)

Semester: IV

Subject Code: JBBDT4V

Hours/week: 2

Credit: 2

Course Objectives:

1. To introduce key concepts in operating systems, communication systems, digital tools, and emerging technologies.
2. To equip students with skills in e-commerce, cybersecurity, and innovative technologies for effective problem-solving and governance.

Unit I

(6 Hours)

Operating Systems: Types and Functions. Problem Solving: Algorithms and Flowcharts.
Communication Systems: Principles, Model & Transmission Media, Computer Networks & Internet:
 Concepts & Applications, WWW, Web Browsers, Search Engines, Messaging, Email, Social Networking.

Unit II

(6 Hours)

Computer Based Information System: Significance & Types. E-commerce & Digital Marketing: Basic Concepts, Benefits & Challenges. Digital India & e-Governance: Initiatives, Infrastructure, Services and Empowerment.

Unit III (6 Hours)

Digital Financial Tools: Unified Payment Interface, Aadhar Enabled Payment System, USSD, Credit/Debit Cards, e-Wallets, Internet Banking, NEFT/RTGS and IMPS, Online Bill Payments and PoS. Cyber Security: Threats, Significance, Challenges, Precautions, Safety Measures, & Tools, legal and ethical perspectives.

Unit IV (6 Hours)

Emerging Technologies & their applications: Overview of Cloud Computing, Big Data, Internet of Things, and Virtual Reality.

Unit V (6 Hours)

Emerging Technologies & their applications: Blockchain & Cryptocurrency, Robotics, Machine Learning & Artificial Intelligence, 3-D Printing. Digital Signatures

Course Outcomes:

After successful completion of this course, students will be able to

CO1: Understand key digital concepts

CO2: Apply e-commerce and digital marketing concepts

CO3: Analyze digital financial tools and cyber security

CO4: Explain emerging technologies and their applications

CO5: Evaluate the impact of emerging technologies

Text Books:

1. Pramod Kumar, Anuradha Tomar, R. Sharmila, "*Emerging Technologies in Computing - Theory, Practice, and Advances*", Chapman and Hall / CRC, 1st Edition, 2021
2. V. Rajaraman, "*Introduction to Information Technology*", PHI, 3rd Edition, 2018
3. E. Balagurusamy, "*Fundamentals of Computers*", Tata Mc GrawHill, 2nd Edition, 2011
4. Behrouz A. Forouzan, "*Data Communications and Networking*", McGraw Hill, 4th Edition, 2007,

Reference Books:

1. Rajkumar Buyya, James Broberg, and Andrzej Gosciniński, "*Cloud Computing-Principals and Paradigms*", Wiley, 2011
2. Stuart Russel and Peter Norvig, "*Artificial Intelligence - A Modern Approach*", Pearson Education, 3rd Edition, 2010
3. Samuel Greengard, "*Internet of Things*", The MIT Press, 2015
4. C.S.V. Murthy, "*E-Commerce Concept, Models & Strategies*", Himalaya Publishing House, 2015
5. Hurwith, Nugent Halper, Kaufman, "*Big Data for Dummies*", Wiley & Sons, 1st Edition, 2013

Journals:

1. <https://dl.acm.org/journal/osr>
2. <https://www.ijcaonline.org/>
3. <https://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=9739>

E-Resources:

1. <https://nptel.ac.in/courses/106106144>
2. <https://www.managementstudyguide.com/information-systems.htm>
3. <https://onlinecourses.nptel.ac.in/noc22-cs35>

4. <https://www.simplilearn.com/big-data-basics-article>
5. <https://experiments.withgoogle.com/collection/ai>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	3	1	3	1	3	3	3	17
CO2	3	1	3	1	3	3	3	17
CO3	3	1	3	1	3	3	3	17
CO4	3	1	3	1	3	3	3	17
CO5	3	1	3	1	3	3	3	17
Total	15	5	15	5	15	15	15	85

Low-1 Medium-3 High-9

Extra Credit III – Entrepreneurship in Nutrition and Dietetics

(For Students Admitted from 2025-2026)

Semester:IV

Subject Code: JBNDX4

Credit: 2

Course Objectives:

1. To facilitate the student in identification and exploration of entrepreneurial opportunities and basic understanding about business economics.
2. To support the students in the development of knowledge and skill related to success in entrepreneurial activities in the field of nutrition and dietetics.

Unit I

Introduction to Entrepreneurship: Definition of Entrepreneurship and Business, Evolution of entrepreneurship in today's economy, Definition of success, entrepreneurial attributes, traits, skills for success, Understand the needs of target markets related to food service, dietetics, public health, and potentially viable business ideas

Unit II

Types of Entrepreneurships: Small business entrepreneurs, Large company entrepreneurs, Scalable startup entrepreneur, Researcher Entrepreneur, Hustler Entrepreneur, Innovative Entrepreneurs, Social Entrepreneurs, Trading/Marketing/Manufacturing Entrepreneurs, Lifestyle Entrepreneurs, and Intrapreneurs

Unit III

Skills for Entrepreneurship: State the skills required to be an entrepreneur: Budgeting, communication, time management, problem solving, creative thinking, leadership, management, decision making, networking, collaboration, public speaking, Other requirements for an entrepreneur: assets, values and attitudes, qualities, roles demands, Barrier to entrepreneurship. Examples of successful traits of successful business/entrepreneurs in the area of nutrition and dietetics

Unit IV

Customer identification: Environmental scan, Competitive assessment, Marketing strategies - 3 Cs of Marketing (company, customers, and competitors). How to have a Successful Marketing

Plan Components of a Successful Marketing Plan, Examples of marketing strategies in the area of nutrition and dietetics (Local/national and global). SWOT analysis of Brands

Unit V

Dietitians as an entrepreneur: Establishing – making a mark, Practice roles, Overcoming the challenges through holistic approach, dealing with nutritional non-compliance, Skills and competencies required working in wellness Settings

Course Outcomes:

After successful completion of this course, student will be able to

- CO 1:** Define key concepts related to entrepreneurship, business, and success in the field of nutrition and dietetics.
- CO 2:** Classify different types of entrepreneurships and their relevance in the nutrition and dietetics sector.
- CO 3:** Apply essential entrepreneurial skills such as budgeting, communication, leadership, and decision-making to develop a business plan.
- CO 4:** Analyze market trends, customer needs, and competitive strategies to create effective marketing and business development plans.
- CO 5:** Evaluate challenges and opportunities in nutrition entrepreneurship and develop innovative strategies for success.

Text Books:

1. Chowdhry Ajay. Just Aspire: Notes on Technology, Entrepreneurship and the Future. Harper Collins India. 2023.
2. Payne-Palacio, J., & Theis, M., *Foodservice Management: Principles and Practices*, Pearson.,13th Edition ,2019
3. Duyff, R. L., *Academy of Nutrition and Dietetics Complete Food and Nutrition Guide*,Houghton Mifflin Harcourt.5th Edition,2017.

Reference Books:

1. Vishal Gupta. Research Handbook on strategic Entrepreneurship. Edward Elgar Publishing Ltd. 2023.
2. KP Sudheer and Sangeetha K Prathap. Introduction to Entrepreneurship Development in Food Processing. CRC Press. 2021.
3. Morris, M. J., & Spring, C., Entrepreneurship in Action: A Retail Dietetics Perspective. Academy of Nutrition and Dietetics.,2021.

Journals:

1. Nutrition & Dietetics
2. Journal of the Academy of Nutrition and Dietetics.
3. Nutrition Journal

E-Resources:

1. <https://emeritus.org/blog/entrepreneurship-to-entrepreneurship-skills/>
2. <https://dietitiansondemand.com/exploring-entrepreneurship-for-dietitians/>
3. <https://www.betterup.com/blog/entrepreneurial-skills>
4. <https://www.sba.gov/business-guide/manage-your-business/conduct-market-research-competitor-analysis>
5. https://www.nedpg.org/?utm_source=chatgpt.com

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	9	3	3	1	3	9	37
CO2	9	9	3	3	1	3	3	31
CO3	9	9	3	9	1	3	3	37
CO4	9	9	3	3	1	3	3	31
CO5	9	9	3	9	1	3	3	37
Total	45	45	15	27	5	15	21	173

Low-1

Medium-3

High-9

Core-IX Dietetics II

(For Students Admitted from 2025-26)

Semester: V**Subject Code: JBNDC51****Hours/week: 6****Credit: 5**

Course Objectives:

1. To gain insight into the different nutrition related diseases and skills on preparation of different therapeutic diets, understand the basic concepts, principles, components and importance of health
2. To obtain knowledge about various diseases and control measures

Unit I

(18 hours)

Diet for cardiovascular system disorders: Etiology, Types, symptoms, complications, diagnostic test and principles of diet management for hyperlipidemia, Hypertension, Atherosclerosis, Ischemic Heart Disease, Congestive Cardiac Failure.

Role of fat in development of atherosclerosis- High fibre, low fat, sodium restricted diet. Nutrient and druginteraction in cardio vascular diseases

Unit II

(18 hours)

Diet for Diabetes mellitus: Etiology, types, symptoms, complications, diagnostic test and principles of

diet management for Diabetes Mellitus - IDDM & NIDDM, Dietary Modifications with and without insulin - Food Exchange List –Glycemic Index and its use. Macronutrient modification -dietary carbohydrate to protein ratio of the diet.

Unit III

(18 hours)

Diet for Renal disorder and disease: Etiology, types, symptoms, complications, diagnostic test and principles of diet management for Glomerulonephritis- Nephrotic Syndrome, Acute and Chronic Renal failure. Dialysis.

Renal calculi, Acid and alkali producing foods - Use of sodium and potassium exchange lists.

Unit IV

(18 hours)

Inborn errors of metabolism: Etiology, symptoms, complications, diagnostic test and nutritional management of Phenylketouria (PKU), Galactosemia and Maple syrup urine disease, Gout

Allergies: Food allergy and intolerance – Mechanism, Factors influencing, symptoms, tests for Allergy, Nutritional care and Elimination diet.

Unit V**(18 hours)**

Diet for Cancer: Etiology, types, symptoms, complications, diagnostic test and principles of diet management for Cancer- Nutritional problems of Cancer therapy - Role of food in prevention of cancer. **Therapeutic diet chart preparation & Dietary counseling:** Clients and counselors, client responsibility, attributes of a successful counselor, steps in counseling process, counselling guidelines.

Diet to enhancing immunity: Etiology, symptoms, complications, Diagnostic, Role of food in preventing COVID and omicron infection, Immune boosting foods for covid.

Course Outcomes:

After successful completion of this course, student will be able to

- CO1:** Recall the clinical condition of therapeutic condition and describe the modifications in nutrients and dietary requirements for therapeutic condition
- CO2:** Implement the foods to specific disease pathologies that require diet modification in order to restore homeostasis in patients
- CO3:** Analyze the nutritional and food requirements for different therapeutic conditions
- CO4:** Assess the knowledge on etiology, clinical manifestation, metabolic aberrations and complications linked with adverse food reactions
- CO5:** Build recent concepts in dietary management of different diseases and preparation of therapeutic diets for various disease

Text Books:

1. F.P. Antia, *Clinical Dietetics & Nutrition*, Oxford University Press, New Delhi, 2018.
2. Srilakshmi, B., *Dietetics*, New Age International (P) Ltd, Chennai, 7th Edition, 2019.

Reference Books:

1. Shubhangini A. Joshi, *Nutrition and Dietetics*, Oxford University Press, New Delhi, 4th Edition, 2015.
2. Krause and Mahan, *Food, Nutrition and Diet therapy*, W.B. Saunders Company, London, 6th Edition, 2016.
3. Akansha Yadav, Monika Arora, Swayam Siddha, *Practical Manual of Nutrition and Dietetics*, Kalpaz Publications, 2019.

Journals:

1. The American Journal of Clinical Nutrition
2. Nutrition Abstracts and Reviews
3. The Indian Journal of Nutrition and Dietetics

E-Resources:

1. <https://www.nin.res.in>
2. <https://www.elsevier.com>
3. <https://www.barnesandnoble.com>
4. <https://www.ebooksread.com>
5. <https://www.cabi.org>

Course Outcomes	Programme Outcomes								
	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	9	9	9	9	9	9	9	63
CO2	9	9	9	9	9	9	9	9	63
CO3	9	9	9	9	9	9	9	9	63
CO4	9	9	9	9	9	9	9	9	63
CO5	9	9	9	9	9	9	9	9	63
Total	45	45	45	45	45	45	45	45	315

Low-1

Medium-3

High-9

Core - X Dietetics II Practicals

(For Students Admitted from 2025-2026)

Semester: V

Subject Code: JBND52P

Hours/week: 6

Credit: 5

Course Objectives:

- To understand the therapeutic diets for various diseases – Diabetes, CVD, Hypertension, Renal disease and GI problems
- To know the importance and principles of dietetics as a distinct therapy for diseases and gain knowledge on the types and role of dietitians

List of Experiments:

(90 hours)

- Planning, preparation and calculation of diet for Hyperlipidemia
- Planning, preparation and calculation of diet for Hypertension
- Preparation and calculation of diet in Atherosclerosis
- Planning, preparation and calculation of diet for High fiber
- Planning, preparation and calculation of diet for Type I Diabetes mellitus
- Planning, preparation and calculation of diet for Type II Diabetes mellitus
- Planning, preparation and calculation of diet for Low sodium diet
- Planning, preparation calculation of diets for Glomerulonephritis
- Planning, preparation and calculation of diet for Acute and chronic Renal Failure
- Planning, preparation and calculation of diet for Renal calculi
- Planning, preparation and calculation of diet for Gout
- Planning, preparation and calculation of diet for Allergy
- Planning, preparation and calculation of diet for Cancer
- Planning, preparation and calculation of diet for Burns
- Planning, preparation and calculation of immune boosting diet for covid.

Course Outcomes:

After successful completion of this course, student will be able to

- CO1:** Identify the discovered diets during the different therapeutic conditions and interpret normal health to therapeutic conditions
- CO2:** Inspect skill development in planning therapeutic diets using food exchange lists
- CO3:** Choose an accurate dietary assessment, calculate the nutritional requirements, plan appropriate nutritional care, and explain the process of objective setting in the delivery of a nutritional care plan for a client
- CO4:** Compare the calculated nutrients with RDA
- CO5:** Generate the plan menu for low immunity people

Text Books:

1. *Clinical Dietetics Manual*, Indian Dietetic Association, 2018.
2. Gopalan C., RN. Ramasastry and S.C. Balasubramanian, "*Nutritive Value of Indian Foods*", National Institute of Nutrition, Hyderabad, 1977.

Reference Books:

1. Shubhangini A. Joshi, *Nutrition and Dietetics*, Oxford University Press, 4th Edition, 2015.
2. Krause and Mahan– *Food, Nutrition and Diet therapy*, W.B. Saunders company, London, 6th Edition, 2016.

Journals:

1. The American Journal of Clinical Nutrition
2. Nutrition Abstracts and Reviews
3. The Indian Journal of Nutrition and Dietetic

E-Resources:

1. <https://www.nin.res.in>
2. <https://www.elsevier.com>
3. <https://www.barnesandnoble.com>
4. <https://www.ebooksread.com>
5. <https://www.cabi.org>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	9	9	9	9	9	9	63
CO2	9	9	9	9	9	9	9	63
CO3	9	9	9	9	9	9	9	63
CO4	9	9	9	9	9	9	9	63
CO5	9	9	9	9	9	9	9	63
Total	45	45	45	45	45	45	45	315

Low-1

Medium-3

High-

Core-XI - Community Nutrition
(For Students Admitted from 2025-2026)

Semester: V
Subject Code: JBNDC53

Hours /week:6
Credit:5

Course Objectives:

1. To enable students to impart nutrition education among rural and needy people
2. To acquaint knowledge regarding food security and government and international program running in the field of community nutrition

Unit I

(18 hours)

Community health concept: Definition and brief study of community, family, village and block. Definition, dimension and determinant of health, positive health, health situation in India, Relationship between health and nutrition. Role of public nutritionist in health care delivery. Health Indices: fertility indicator, vital statistics, mortality, morbidity and demographic indicator, Human development Index, Reproductive health index. IMR, MMR, birth rate, sex ratio, poverty level. Concept of disease, causation (Agent, host, environmental factors) concept and control & prevention, modes of intervention

Unit II

(18 hours)

Strategies to overcome malnutrition: Measures to overcome malnutrition-Increased agricultural production and nutritious foods and nutrition gardens, food technology, food fortification and enrichment, nutrition education, nutrition intervention programmes.

Assessment of nutritional status: Direct assessment - Diet surveys, anthropometric, clinical and biochemical estimation. Indirect assessment- Food balance sheet, ecological parameters and vital statistics.

Unit III

(18 hours)

Nutrition Education: Meaning, nature and importance of Nutrition education to the community and lessons to be taught. Methods of education- use of audiovisual aids Use of computers to impart nutrition education – power point presentation, e-learning, Organization of Nutrition education programmes: Principles of planning, executing and evaluating nutrition education programmes.

Unit IV

(18 hours)

National and International agencies in uplifting the nutritional status – Introduction to Nutrition and Public Health Role of agencies in addressing malnutrition and food security FAO, WHO, UNICEF, CARE, ICMR, ICAR, CSIR, CFTRI. NIN, NNMB CFTRI, DFRL and NIPCCD, ICDS, SLP and MOM **Evaluation and Impact of Nutrition Programs** Methods for assessing nutritional status Challenges in implementing nutrition program Case studies on successful nutrition interventions

Unit V

(18 hours)

Nutritional intervention programmes to combat malnutrition: School Lunch Programme, CMNMP, ICDS relevant apps used in community, National Nutritional Anaemia Prophylaxis Programme, National Prophylaxis Programme against Vitamin A Deficiency Diseases, Goitre Control Programme. National Nutrition policy, National food security, National nutrition policy

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Identify the nutritional problems in India and gain knowledge on measures to overcome malnutrition

CO2: Articulate the greater exposure to assessment of nutritional status

CO3: Analyze knowledge about assessment of nutrition education

CO4: Assess the concepts of health and epidemiology of communicable diseases

CO5: Create awareness on nutritional programmes in national and international organizations

Text Books:

1. Swaminathan, M., *Essentials of Food and Nutrition*, Bangalore Printing and Publishing Co. Ltd, Bangalore, 2017.
2. Srilakshmi, B., *Nutrition Science*, New Age International Publication, New Delhi, 2019.

Reference Books:

1. Park, A. Park's, *Textbook of Preventive and Social Medicine*, Bharat Publishers, 19th Edition 2009.
2. Bamji M.S, Prahlad Rao N, Reddy V., *Text book of Human Nutrition*, Oxford and PBH Publishing Co Pvt Ltd, New Delhi, 4th Edition, 2019.
3. Norman J. Temple and Nelia Steyn, *Community Nutrition for Developing Countries*, AU Press and UNISA, 2016.

Journals:

1. Journal of Nutrition and Health
2. Journal of Preventive Nutrition and Food Science
3. Journal of Nutrition Today

E-Resources:

1. <https://www.medicosrepublic.co>
2. <https://ashesleftbehind.blogspot.com>
3. <https://www.ncbi.nlm.nih.gov>
4. <http://www.ignouhelp.in> > ignou-mscdfs
5. <https://guides.lib.utexas.edu>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	9	9	3	3	3	3	39
CO2	9	9	9	3	3	9	1	43
CO3	9	9	9	9	3	9	9	57
CO4	9	9	9	9	1	3	3	43
CO5	9	9	9	3	3	3	3	39
Total	45	45	45	27	13	27	19	221

Low-1

Medium-3

High-9

Multidisciplinary course -III a. Family Resource Management

(For Students Admitted from 2025-2026)

Semester:V**Subject Code: JBMD51NDA****Hours /week:4****Credit: 3****Course Objectives:**

1. To educate student about management in the family as well as in other sphere of life
2. To make student aware about maximum utilization of their resources to meet their goals

Unit I**(12hours)****Management:** Definition, principles and elements involved in management,**Process:** planning, controlling and evaluation. Motivation in management. (Introduction to values, goals and standards)**Management Concepts-** Goals and Values – their relationship to decision making.**Unit II****(12hours)****Standard of Living:** Definition, constituents – Means for raising the standard of living of families. **Decision Making:** Steps, importance, types of decisions, Habitual versus Conscious decision making. Individual and group decisions, resolving conflicts in group decisions.**Resources:** Human and non-human resources. Characteristics of Resources, how they are utilized to achieve family goals.**Unit III****(12hours)****Family:** Concept, Role, life cycle changes and stages of family life cycle.**Work Simplification:** Definition, importance, Mundel's classes of change**Time Management:** Time Demands during different stages of the family life cycle, Time cost, Factors to be considered in making time and activities plans.**Unit IV****(12 hours)****Energy Management:** Relation of energy to the stages of the family life cycle, Fatigue – Forms and effects of fatigue.**Family Income:** Definition, Types - Money, Real and Psychic income, various ways of improving the income of the family, Family finance management, family budget – Definition and meaning, importance of budgeting, steps, factors affecting the budget. Engle's Law of Consumption.**Unit V****(12hours)****Savings:** Meaning, objectives, Needs for savings in the family, types of savings institutions and schemes. Post Office Savings Account Recurring Deposit (RD) Account, Time Deposit (TD) Account Sukanya Samriddhi Yojana (SSY)**Consumer:** Meaning and definition of consumer, consumer rights. Problems faced by the consumer. Consumer behavior and purchasing decisions Consumer Protection Act (CPA) and legal provisions**Course Outcomes:****After successful completion of this course, student will be able to****CO1:** Define the principles and elements involved in management**CO2:** Apply the concepts of management process in family**CO3:** Distinguish the different aspects of human and non-human resources**CO4:** Assess knowledge about the standard of living and decision making process

CO5: Manage the different forms of resources

Text Books:

- 1.Varghese,M.A et al. – –*Home Management*”, New Age International (P) Limited, Publishers New Delhi.2nd Edition, 2017.
- 2.Batra, Sonia, and Seetharaman P, *An Introduction to Family Resource Management* India, CBS Publishers & Distributors, 2015.

Reference Books:

- 1.Moore Tami James, Asay Sylvia M., *Home Management*, SAGE Publications, Inc, 3rd Edition, 2017.
- 2.Seetharaman P.et. al, *An Introduction to Family Resource Management*, Publisher CBS,2019.
- 3.Tami James Moore, Sylvia M. Asay, *Family Resource Management*, Publisher CBS,2017.

Journals:

- 1.Research Journal of Family, Community and Consumer Sciences.
- 2.Journal of Family and Consumer Sciences
- 3.The Journal of Asian Regional Association for Home Economics

E-Resources:

- 1.www.joe.org
- 2.www.sciencelinks.jp
- 3.www.ecoursesonline.iasri.res.in
- 4.https://en.wikipedia.org/wiki/Energy_management
- 5.https://www.investopedia.com/terms/s/savings.asp

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	1	1	9	3	9	9	41
CO2	9	9	1	3	1	3	1	27
CO3	9	9	3	1	9	3	3	37
CO4	9	9	1	1	1	1	9	31
CO5	9	9	3	1	3	1	3	29
Total	45	37	09	15	17	17	25	165

Low-1 Medium-3 High-9

Multidisciplinary course -III b. Maternal and Infant Nutrition
(For Students Admitted from 2025-2026)

Semester: V

Subject Code: JBMD51NDB

Hours : 4

Credit : 3

Course Objectives:

1. To understand the nutritional requirements during pregnancy, lactation, and infancy for optimal maternal and child health.
2. To assess the impact of maternal nutrition on fetal growth, birth outcomes, and early childhood development.

Unit I

(12 hours)

Importance of maternal and infant nutrition. Relationship between latest RDA 2020.

Physiological and biochemical changes during pregnancy.

Unit II

(12 hours)

Nutritional needs of pregnant woman. Maternal nutrition and foetal outcome. Complications of pregnancy and their dietary management. Physiological changes in lactation. Nutritional requirements of lactating mothers.

Unit III

(12 hours)

Nutrition during infancy, growth and development of infant. Nutritional needs of infants. Breast feeding, advantages of breast milk and guidelines for breast feeding. Code on breast feeding and marketing of formulae foods.

Unit IV

(12 hours)

Feeding of preterm babies, Low term babies, advantages and disadvantages of Artificial feeding, weaning and supplementary feeding. Feeding of premature babies, National guidelines on infant and young child feeding practices. Regulation of marketing of breast-milk substitutes (India).

Unit V

(12 hours)

Special Considerations in Maternal and Infant Nutrition: Nutritional Challenges in High-Risk Pregnancies and Common Infant Nutritional Disorders and their management, Nutritional Care for Mothers and Infants in Special Conditions and Current Trends and Innovations in Maternal and Infant Nutrition, Government Policies and Public Health Interventions

Course Outcomes:

After successful completion of this course, student will be able to

- CO1:** Explain the physiological and nutritional requirements during pregnancy and lactation.
- CO2:** Assess the impact of maternal nutrition on fetal growth, birth outcomes, and infant health.
- CO3:** Describe the composition, benefits, and recommendations for breastfeeding and complementary feeding.
- CO4:** Evaluate common nutritional deficiencies and disorders in mothers and infants and suggest appropriate interventions.
- CO5:** Analyze national and global policies, programs, and guidelines related to maternal and infant nutrition.

Text Books:

1. Semba RD & Bloem MW. Nutrition and Health in Developing Countries, 2nd edition. New Jersey: Humana Press, 2008
2. Brown, JE. Nutrition through the life cycle, 3rd edition. Belmont, CA: Thomas Higher Education.

Reference Books:

1. Kaufman M. Nutrition in Promoting the Public's Health. Sudbury, MA: Jones and Bartlett, 2007.
2. King FS & Burgess A. Nutrition for Developing Countries. Oxford: Oxford University Press, 2008.

Journals :

1. Maternal and Child Health Journal
2. Maternal and Child Health & Nutrition (PLOS Collection)
3. The American Journal of Maternal Child Nursing

E-Resources:

1. <https://www.unicef.org/nutrition/maternal>
2. <https://www.nutritionintl.org/our-work/how-we-help/maternal-and-newborn-health/>
3. <https://iiphg.edu.in/images/pdfs/Projects/Supervisors%20Manual%20-%20English.pdf?t=1683532606>
4. <https://www.harvestplus.org/wp-content/uploads/2022/04/Nutrition-Guidelines-for-maternal-Infant.pdf>
5. <https://dhsprogram.com/pubs/pdf/FR106/09Chapter09.pdf>

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	3	3	1	3	1	3	23
CO2	9	9	9	1	3	9	3	43
CO3	9	9	9	3	9	9	3	51
CO4	9	9	9	3	3	9	3	45
CO5	3	3	9	3	9	9	9	45
Total	39	33	39	11	27	37	21	207

L

Low-1

Medium-3

High-9

Multidisciplinary Course -IV a. Sports Nutrition

(For Students Admitted from 2025-2026)

Semester : V**Subject Code: JBMD52NDA****Hours : 4****Credit : 3****Course Objectives:**

1. To understand the role of nutrition in enhancing athletic performance, endurance, and recovery.
2. To analyze the nutritional requirements of athletes based on different sports, training phases, and energy demand and develop personalized diet plans and hydration strategies to optimize sports performance and prevent injuries.

Unit I**(12 hours)**

Sports nutrition and physical fitness Overview of sports nutrition, Definition and scope, training and exercise, nutrition guidelines and principles. Basic nutrients for sports persons. Physical fitness - principles, types and components Techniques and methods of measuring physical fitness

Unit II**(12 hours)**

Body composition and energy balance concept Body composition in different physiological conditions and factors affecting it and methods of assessing body composition. Energy – energy concept and factors affecting energy and methods of measuring energy intake and expenditure and concept of energy balance.

Unit III**(12 hours)**

Nutrient metabolism and fluid management Macronutrients in Sports Nutrition - Carbohydrates: Types, role, timing, and loading strategies. Proteins: Requirements, sources, timing, and muscle

protein synthesis, Fats: Types, roles, and their use as energy during exercise. Micronutrients and Hydration. Key vitamins and minerals for athletes, Electrolyte balance and its importance - Hydration strategies and fluid replacement

Unit IV

(12 hours)

Nutritional Strategies for Training and Competition Pre-exercise nutrition - Intra-exercise nutrition - Post-exercise recovery nutrition and special considerations for different sports (endurance, strength, team sports, etc). Sports nutrition products - supplements related to energy metabolism - weight reduction, Botanical and herbal supplement. Ergogenic aids and their efficacy - Safety, regulations, and ethics. Special nutritional consideration for women athletes, young teen athletes, athletes with diabetes, vegetarian athletes. Specific nutrition for gymnastics and weight lifters, skiers and cyclists, swimming and skating. Addressing eating disorders and disordered eating in athletes.

Unit V

(12 hours)

Emerging Trends and Research in Sports Nutrition, ethics and Professional Practice Advances in sports nutrition research - Current trends in dietary practices among athletes. Future directions in sports nutrition. Professional responsibilities of a sports nutritionist- Ethical considerations in sports nutrition counselling. Working with a multidisciplinary team (coaches, trainers, medical staff).

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Understanding the Fundamentals of Sports Nutrition and Physical Fitness

CO2: Analyzing Body Composition and Energy Balance

CO3: Exploring Nutrient Metabolism and Fluid Management

CO4: Implementing Nutritional Strategies for Training and Competition

CO5: Exploring Emerging Trends and Professional Ethics in Sports Nutrition

Text Books

1. Jeukendrup, A., & Gleeson, M., *Sport nutrition* 4th ed., Human Kinetics (2024).

2. Fink, H. H., Burgoon, L. A., & Mikesky, A. E. *Practical applications in sports nutrition* 7th ed. 2023.

Reference Books :

1. Dunford, M., & Doyle, J. A. *Nutrition for sport and exercise*, Cengage, 4th edition, 2019.

2. Muth, N. D., & Zive, M. M. *Sports nutrition for health professionals*, F.A. Davis Company, 2nd edition, 2020.

Journals:

1. International Journal of Sport Nutrition and Exercise Metabolism
2. Journal of the International Society of Sports Nutrition
3. Frontiers in Nutrition – Sport and Exercise Nutrition

E-Resources:

1. <https://us.humankinetics.com/products/sport-nutrition-4th-edition>
2. <https://www.eatrightstore.org/product-type/books/sports-nutrition-a-handbook-for-professionals-6th-edition>
3. <https://www.jblearning.com/catalog/productdetails/9781284284300>
4. <https://www.davcollegekanpur.ac.in/assets/ebooks/Ped/Sports%20Nutrition.pdf>

5. <https://www.ucd.ie/t4cms/Sports%20Nutrition%20Talk%20UCD%20seminar.pdf>

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	3	3	1	1	3	1	21
CO2	9	9	3	1	9	3	1	25
CO3	9	9	3	1	3	3	1	31
CO4	9	9	9	3	3	1	3	37
CO5	9	3	3	9	3	9	9	45
Total	45	33	21	15	19	19	15	159

Low-1 Medium-3 High-9

Multidisciplinary course -IV b. Food Safety and Standard

(For Students Admitted from 2025-2026)

Semester: V
Subject Code: JBMD52NDB

Hours: 4
Credit: 3

Course Objectives:

1. To understand the principles of food safety, hygiene, and sanitation in food production and handling.
2. To analyze food laws, regulations, and standards to ensure compliance with national and international guidelines and develop strategies for food quality control, risk assessment, and prevention of food borne illnesses.

Unit I

(12 hours)

Food hygiene concepts Importance of food hygiene and sanitation in a) Community setting, b) Hospital setting and c) Food businesses Selection and purchase of food a) Receiving and storing food safely b) Preparing and holding food safely c) serving safe food d) storing cooked food safely e) - Personal Hygiene

Unit II

(12 hours)

Food safety and contaminants -biological, physical or chemical nature. a) Importance in food security and associate different contaminants with risks and relevance to food safety and food safety. b) Precautions against contamination Risk Analysis c) Know and define risk analysis d) HACCP system, characterize each phase and apply the system to case studies – collective restoration

Unit III

(12 hours)

Storage temperatures; relative humidity of the environment; presence and concentration a) Identify temperatures in food processing and conservation; b) Identify the humidity reference values; c) Identify the importance of air quality in food hygiene. d) Importance of water and sanitation as an important element in food, hygiene and health promotion. e) Strengthening sustainable WASH programming (UNICEF / WHO guidelines)

Unit IV**(12 hours)**

Pest control and waste management a) Insect, rodent and bird infestation b) Use of pesticides and Integrated pest management c) Waste disposal- Solid waste, Liquid waste, ETP

Unit V**(12 hours)**

Food Standards -Legal and regulatory documents related to food safety a) Codex b) FSSAI c) Food Hygiene and Safety Audits d) Define audit and phases of an audit.

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Explain the fundamental concepts of food safety, hygiene, and sanitation in food processing and handling.

CO2: Analyze food laws, standards, and regulatory frameworks at national and international levels to ensure food safety compliance.

CO3: Identify various food hazards, including biological, chemical, and physical contaminants, and their impact on public health.

CO4: Apply food quality control measures, risk assessment techniques, and food safety management systems (e.g., HACCP, ISO).

CO5: Develop strategies to prevent foodborne illnesses and ensure safe food practices in different food industries and households.

Text Books :

1. Mortimore, S., & Wallace, C. *Food industry briefing series: HACCP – A practical approach* (3rd ed.). Springer. (2013).
2. Marriott, N. G., & Gravani, R. B. *Principles of food sanitation* (6th ed.). Springer. (2018).
3. Luning, P. A., Bango, F. D., & Rovira, J. *Safety in the agri-food chain* (2nd ed.). Wageningen Academic Publishers. (2020).

Reference Books :

1. Motarjemi, Y., & Lelieveld, H. (Eds.). *Food safety management: A practical guide for the food industry*. Academic Press, (2013).
2. Schmidt, R. H., & Rodrick, G. E.. *Food safety handbook* (2nd ed.). Wiley-Blackwell(2017).
3. Unnevehr, L. J. (Ed.). *Food safety and quality standards in international trade: Tools, public policies, and private initiatives*. Springer. (2015).

Journals:

1. Journal of Food Science and Technology (JFST) – Springer & AFSTI
2. Food Control – Elsevier
3. Indian Journal of Food Safety and Standards

E-Resources:

1. <https://www.foodsafety.gov/.in>
2. <https://www.fsis.usda.gov/food-safety/safe-food-handling-and-preparation/food-safety-basics>
3. <https://fsqservices.com/food-safety-resources>
4. https://www.fssai.gov.in/upload/uploadfiles/files/Compendium_Food_Additives_Regulations_20_12_2022.pdf
5. <https://niftm-t.ac.in/pmfme-sna/images/Handbook/M8PPT.pdf>

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	9	9	3	3	1	3	37
CO2	3	9	9	3	3	9	3	39
CO3	9	9	9	3	9	3	3	45
CO4	9	9	9	3	9	3	3	45
CO5	9	9	9	3	9	3	9	51
Total	39	45	45	15	33	19	21	217

Low-1 Medium-3 High-9

Skill Enhancement Course - V Food Adulteration Practicals
(For Students Admitted from 2025-2026)

Semester: V

Subject Code: JBND54P

Hour/week:2

Credit: 1

Course Objectives:

1. To educate about common food adulterants and their detection
2. To enable students to familiarize about the testing methods for adulteration

List of Experiments:

Unit I

(6 hours)

1. Detection of Vanaspati in ghee or butter.
2. Detection of Kasserri flour in basin (gram flour).
3. Detection of Metanil yellow in turmeric.
4. Colour measurement and analysis in Fresh and Processed Foods

Unit II

(6 hours)

1. Detection of aregmone oil in edible oil.
2. Detection of chicory in coffee.
3. Detection of adulteration in m

Unit II

(6 hours)

1. Detection of adulteration in spices.
2. Detection of adulteration in honey.
3. Detection of adulteration in grains/grain-based flours.

Unit IV

(6 hours)

1. Testing adulteration of cereal and cereal products
2. Testing adulteration of pulses
3. Testing adulteration of sugars & Preserves

Unit V

(6 hours)

1. Testing adulteration of Beverages.
2. Testing adulteration of condiments
3. Determination of Ash content in Dry edible samples
4. Quantification of Macronutrient and micronutrient in the food samples such as cereals, Millets and other foods

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Highlight the common food adulterants and discuss the advantage and disadvantages of food adulterants

CO2: Summarize the knowledge in the aspects of adulteration

CO3: Explain the various adulterants used in food samples by testing the samples

CO4: Investigate the food adulteration by its qualitative analysis

CO5: Create awareness about adulteration by finding the chemical materials present in food substances

Text Books:

1. Shyam Narayan Jha, *Rapid Detection of Food Adulterants and Contaminants-Theory and Practice* Central Institute of Post-Harvest Engineering and Technology, India, 2016.
2. Pearson D, *The Chemical Analysis of Foods*, Longman Group Ltd, 7th Edition, 2019.

Reference Books:

1. Battershall Jesse P, *Food Adulteration and Its Detection*, Public, USA, 2017.
2. L. N. Hegde, *Quality Control in Fruits and Vegetables*, Discovery Publishing House Private Limited, 2016.
3. R Siva Kiran, *Manual for Detection of the Common Food Adulterants*, Create Space Publishers, 1st Edition, 2015.

Journals:

1. Journal of the International Society of Sports Nutrition
2. Journal of Sports Medicine
3. Clinical Journal of Sports Medicine

E-Resources:

1. www.jissn.biomedcentral.com
2. www.topendsports.com
3. www.sportsnutritionociety.org
4. <http://egyankosh.ac.in/bitstream/123456789/33697/1/Practical%20-13.pdf>
5. <https://vikaspedia.in/health/health-campaigns/beware-of-adulteration/methods-for-detection-of-common-adulterants-in-food>.

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	3	9	9	3	3	3	39
CO2	3	3	9	3	3	3	9	33
CO3	9	9	9	9	3	3	3	45
CO4	9	3	9	3	1	3	3	31
CO5	9	3	9	9	3	3	1	37
Total	39	21	45	33	13	15	19	185

Low-1

Medium-3

High-9

Common Value Added course IV- Health and Wellness
(For Students Admitted from 2025-2026)

Semester: V

Subject Code: JBHW5V

Hours/week: 2

Credit: 2

Course Objectives:

1. To understand the importance of a healthy lifestyle and familiarize students on physical and mental health
2. To increase awareness of various diseases associated with lifestyle and enable understanding of stress management

Unit I

(6 hours)

Introduction to health & wellness: Define, differentiate health and wellness, Importance of health and wellness education, Local, demographic, societal issues, factors affecting health and wellness.

Unit II

(6 hours)

The Role of Essential Nutrients in a Balanced Diet: Diet and nutrition for health & wellness, Essential components of balanced diet for healthy living, Specific reference to the role of carbohydrates, proteins, fats, vitamins & minerals. Malnutrition.

Unit III

(6 hours)

Unhealthy Eating Habits, and Lifestyle Factors on Body Systems: Processed foods, unhealthy eating habits, Body systems, common diseases, Sedentary lifestyle and its risk of disease, stress, anxiety, and depression.

Unit IV

(6 hours)

Management of health and wellness: Healthy foods for prevention, progression of Cancer, Hypertension, Cardiovascular, Types of Physical Fitness and its Health benefits.

Unit V

(6 hours)

Spirituality and mental health: Role of Yoga, asanas, meditation in maintaining health and wellness, Role of sleep in maintenance of physical, mental health.

Course Outcomes:

After successful completion of this course, student will be able to

- CO1:** Explain the principles of physical, mental, and emotional well-being and their role in overall health.
- CO2:** Assess the impact of diet, physical activity, and lifestyle habits on health and disease prevention.
- CO3:** Identify stressors and implement effective coping mechanisms to enhance mental and emotional well-being.
- CO4:** Apply knowledge of health policies, disease prevention, and wellness programs to advocate for community health.
- CO5:** Explore alternative and complementary health practices, including mindfulness, fitness, and self-care techniques.

Text Books:

1. Raheena, S. *Health and Wellness: A Practical Approach*. CBS Publishers & Distributors, 2nd Edition, 2019
2. Tariq, M. *Food and Health: The Interlinking of Nutrition and Wellness*. Springer, 1st Edition, 2020.
3. Pood, V., & Gopinath, S., *Foundations of Health and Wellness*. Wiley-Blackwell, 1st Edition, 2021.

Reference Books:

1. Bouchard, C., Blair, S. N., & Haskell, W. L., *Physical Activity and Health*. Human Kinetics, 2007
2. Attached, E., & Fernandez, M., *Mental Health Workbook*. Independently published, 2021.
3. Lorick, N. *Mental Health Workbook for Women: Exercises to Transform Negative Thoughts and Improve Wellbeing*. Rockridge Press, 2022
4. Nyambichu, C., & Lumiri, J. *Lifestyle Diseases: Lifestyle Disease Management*. Independently published, 2018.

Journals:

1. Journal of Nutrition and Health Sciences
2. Health Promotion International
3. American Journal of Health Promotion

E-Resources:

1. <https://www.who.int/health-topics>
2. <https://www.nimh.nih.gov/>
3. <https://pmc.ncbi.nlm.nih.gov/>
4. <https://pmc.ncbi.nlm.nih.gov/>
5. <https://portal.ct.gov/-/media/DMHAS/SkillBuilding/Dana/Health-and-Wellness-FULL-Revised.pdf>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	9	9	9	9	9	9	63
CO2	9	9	9	9	9	9	3	57
CO3	9	9	9	9	9	9	9	63
CO4	9	9	9	9	9	9	9	63
CO5	9	9	9	9	9	9	9	63
Total	45	45	45	45	45	45	39	309

Low-1

Medium-3

High-9

Extra Credit- Employability Skills
(For Students Admitted from 2025-26)

Semester: V
Subject Code: JBESX5

Credit: 2

Course Objectives:

1. To create awareness on the skills necessary for getting, keeping and being successful in a profession
2. To expose the students to leadership and team-building skills

Unit I

Introduction to Soft Skill.

Unit II

Self-management.

Unit III

Critical thinking development.

Unit IV

Reflective thinking and writing.

Unit V

Group work and Peer to peer interaction.

Course Outcomes:

After successful completion of this course, student will be able to

CO 1: Recognize prioritizing tasks

CO 2: Construct personal strategies for independent learning

CO 3: Communicate clearly and precisely to interested audience in a range of different contexts

CO 4: Consider and respect others' point of view in offering constructive feedback to others

CO 5: Lead team while working for a task

Text Book:

1. Alfredo, Becky and Alison. *Soft Skills (Academic Guide and Teaching Materials)*. Shoo fly publishing, Ukraine, 2015.

Reference Books:

1. Rao, Manchanahalli Satyanayana. *Soft skills-enhancing employability: connecting campus with corporate*. IK International Pvt Ltd, 2010.
2. Verma, Shalini. *Enhancing employability@ soft skills*. Pearson Education India, 2012.

Journals:

1. International Journal of Trend In Scientific Research and Development
2. International Journal of Evaluation and Research in Education (IJERE)
3. International Journal on Industry and Higher Education

E-Resources:

1. <https://www.exeter.ac.uk/ambassadors/HESTEM/resources/General/STEMNET%20Employability%20skills%20guide.pdf>
2. http://psydilab.univer.kharkov.ua/resources/ucheba/softskills/Chapter_1_Introduction.PDF

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	9	9	9	9	9	9	63
CO2	9	9	9	9	9	9	9	63
CO3	9	9	9	9	9	9	9	63
CO4	9	9	9	9	9	9	9	63
CO5	9	9	9	9	9	9	9	63
Total	45	45	45	45	45	45	45	315

Low-1

Medium-3

High-9

Core XII-Techniques on nutritional assessment
(For Students Admitted from 2025-2026)

Semester: VI

Hours/week: 6

Subject Code: JBNDC61

Credit: 6

Course Objectives:

1. To Familiarize students with anthropometric, biochemical, clinical, and dietary assessment techniques used to evaluate nutritional status.
2. To Equip students with the ability to analyze and interpret nutritional assessment data to identify malnutrition and health risks.

Unit I**(18 hours)**

Introduction to Nutritional Assessment Definition, scope, and importance of nutritional assessment Purpose of nutritional assessment in public health and clinical settings Types of nutritional assessment: Direct and Indirect methods Overview of malnutrition, under nutrition, and over nutrition Nutritional surveillance and monitoring systems

Unit II**(18 hours)**

Anthropometric Assessment Principles and importance of anthropometry Common anthropometric measurements: Height, weight, BMI, MUAC, head circumference, skinfold thickness Reference standards: WHO growth charts, NCHS standards, NHANES Interpretation of anthropometric indices: Wasting, stunting, underweight, obesity classification Errors in anthropometric measurements and standardization techniques.

Unit III**(18 hours)**

Biochemical and Clinical Assessment Biochemical markers for nutritional status assessment: Protein status: Serum albumin, transferrin, prealbumin Micronutrient status: Iron, Vitamin A, Vitamin D, Zinc, Iodine Lipid profile: Cholesterol, triglycerides, HDL, LDL Blood glucose and HbA1c for carbohydrate metabolism.

Clinical signs and symptoms of nutritional deficiencies: Vitamin and mineral deficiency disorders, Symptoms of protein-energy malnutrition (PEM), Clinical examination techniques for detecting deficiencies

Unit IV**(18 hours)**

Dietary Assessment Methods - Methods of dietary assessment: 24-hour dietary recall Food frequency questionnaire (FFQ) Diet history method Food diary and weighed food records Strengths and limitations of different dietary assessment methods Use of food composition tables

and databases Dietary diversity scores and diet quality indices Challenges in dietary data collection and interpretation

Unit V

(18 hours)

Assessment of Energy Expenditure and Body Composition Methods to estimate energy requirements: Basal Metabolic Rate (BMR) and Total Energy Expenditure (TEE) Doubly labelled water method Indirect calorimetric Techniques for body composition assessment: Bioelectrical impedance analysis (BIA) Dual-energy X-ray absorptiometry (DXA) Skinfold measurements and fat mass estimation MRI and CT scan for body composition Application of nutritional assessment in different population groups (children, pregnant women, elderly, athletes).

Course Outcomes:

After successful completion of this course, student will be able to

CO 1: Understand the Principles of Nutritional Assessment

CO 2: Explain the importance and scope of nutritional assessment in different settings..

CO 3: Demonstrate Proficiency in Anthropometric Measurements

CO 4: Analyze Biochemical and Clinical Indicators of Nutritional Status.

CO 5: Assess the reliability of different dietary assessment methods in practical settings.

Text Books:

1. Willett, W. *Nutritional Epidemiology*. Oxford University Press, 3rd Edition, 2013.
2. Whitney, E., & Rolfes, S. R. *Understanding Nutrition* Cengage Learning 16th Edition, 2022.
3. Gropper, S. S., Smith, J. L., & Carr, T. P. *Advanced Nutrition and Human Metabolism* Cengage Learning, 8th Edition, 2022.

Reference Books:

1. Gibson, R. S. *Principles of Nutritional Assessment* (2nd ed.). Oxford University Press 2005.
2. Lee, R. D., & Nieman, D. C. *Nutritional Assessment* (7th ed.). McGraw-Hill Education (2019).
3. Mahan, L. K., Raymond, J. L., & Krause, M. V. *Krause's Food & the Nutrition Care Process*, 15th Edition, Elsevier, 2020.

Journals:

1. The Journal of Nutrition
2. Public Health Nutrition
3. Nutrition Reviews

E-Resources:

1. <https://www.coursera.org/learn/food-and-health>
2. <https://www.nutrition.gov>
3. <https://www.who.int/health-topics/nutrition>
4. <https://www.ncbi.nlm.nih.gov/books/NBK580496/>
5. https://uomustansiriyah.edu.iq/media/lectures/2/2_2021_05_26!05_04_42_PM.pdf

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	9	3	3	1	9	3	37
CO2	9	9	3	9	1	9	3	43
CO3	9	9	3	9	1	9	3	43
CO4	9	9	3	3	1	9	3	37
CO5	9	9	3	9	1	9	3	43
Total	45	45	15	33	5	45	15	203

Low-1 Medium-3 High-9

Core XIII Food Adulteration

(For Students Admitted from 2025-2026)

Semester: VI

Subject Code: JBND62

Hours/week:6

Credit:6

Course Objectives:

- To impart knowledge in the legislative aspects of adulteration.
- To educate about standards and composition of foods and role of consumer

Unit I

(18 hours)

Food adulteration: Definition, Classification, Health hazards caused by various adulterants - Critical levels of metals in various foods, Food Adulteration Act.

Unit II

(18 hours)

Composition and quality criteria for plant foods: Food grains, Fruits & Vegetables, Fats and Oils, Spices and condiments, Beverages- Alcoholic & Non-Alcoholic.

Unit III

(18 hours)

Composition and quality criteria for animal foods: Egg, Milk and Milk Products & Flesh Foods.

Unit IV

(18 hours)

Composition & quality criteria for Sugar and Sugar products, Preserves & Tin Foods.

Unit V

(18 hours)

Food additives: Introduction, Classification- Antioxidants, Preservatives, Emulsifiers, Stabilizers, sweeteners, thickening agents, chelating agents, curing agents, leavening agents, anti-caking agents, colouring agents, flavouring agents.

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Know the standards for quality assessment and food safety against adulteration for various foods and understand the adulteration of common foods and their adverse impact on health

CO2: Relate the concept of adulteration in food products.

CO3: Detect the adulteration in food samples

CO4: Comprehend certain skills of detecting adulteration of common foods

CO5: Familiarize with critical assessment and control points for quality assurance.

Text Books:

1. Jonathan Rees, *Food Adulteration and Food Fraud*, published by Reaktion Books, 2020.
2. Jesse P. Battershall, *Food Adulteration*, Outlook Verlag Publisher, 2020.

Reference Books:

1. Colin Wrigley, *Cereal Grains: Assessing and Managing Quality*, Wood Head Publishing, 2016.
2. Shalini Sehgal, *A laboratory Manual of Food Analysis*, Tata McGraw-Hill Publishers, 2016.
3. Madan L Verma, *Biotechnological Approaches in Food Adulterants*, CRC Press, 2020.

Journals:

1. Journal of American Chemical Society
2. Journal of Food Science
3. International Journal of Food Studies

E-Resources:

1. <https://www.vedantu.com/biology/food-adulteration>
2. <https://www.slideshare.net/EshfaqBhatt/sensory-evaluation-of-fruits-and-vegetables>
3. <https://en.engormix.com/poultry-industry/articles/poultry-meat-quality-t34396.htm>
4. <https://www.czarnikow.com/blog/quality-control-measures-in-sugar>
5. <https://www.who.int/news-room/fact-sheets/detail/food-additives>

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	3	9	3	3	3	9	39
CO2	9	3	9	9	3	3	9	45
CO3	9	3	3	3	3	3	3	27
CO4	9	3	9	9	3	3	9	45
CO5	9	3	3	3	3	3	3	27
Total	45	15	33	27	15	15	33	183

Low-1

Medium-3

High-9

Core XIV - Dietetic Internship in Hospital

(For Students Admitted from 2025-2026)

Semester: IV**Subject Code: JBND63I****Hours /week: 5****Credit: 4****Course Objectives:**

1. To gain knowledge in the functioning of a dietary department and hands-on experience in the roles and responsibilities of dietitians
2. To develop skills to assess patients' nutritional needs and plan suitable diets and diet counseling skills for patients

Aspects to be covered in the Dietary Internship training programs**(90 hours)****Dietary internship training:**

1. Assessing the nutritional status and diet history of patients.
2. Planning diet sheets, preparing and providing guidance in the production of therapeutic diet.
3. Supervising the preparation of diets.

4. Getting feedback from patients regarding diets.
5. Understanding the layout of hospital dietary unit.
6. Acquiring practical knowledge in diet counselling.
7. Under taking 3 case studies at hospital situation.
8. Acquiring practical knowledge in Online Dietetic Counselling Techniques

Guidelines:

- ❖ It is compulsory for all the students to complete the given institutional training Programme in a reputed institution for a period of 30 days.
- ❖ At the end of the course, each student has to submit a report of the training
- ❖ Internal marks will be awarded by the faculty of the department with whose guidance the report is prepared

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Identify nutrition-related problems and determine nutrition interventions and describe the work of inter professional teams and the roles of others with whom the registered dietician nutritionist collaborates in the delivery of food and nutrition services

CO2: Interpret the relevance of food and nutrition for the disease

CO3: Analyze the food habits and brief about the dietary modification

CO4: Discuss the impact of health care policy and different health care delivery systems on food and nutrition services to the consultant and Graduates will be prepared to pass the national level Registered level dietician examination

CO5: Persuade the patients with appropriate online diet counselling techniques

Text Books:

1. Srilakshmi, B., *Dietetics*, New Age International (P) Ltd, Chennai, 8th Edition, 2019.
2. Antia F.P. And Philip Abraham, *Clinical Nutrition and Dietetics*, Oxford University Press, 4th Edition, 2002.
3. A.Joshi Shubhaangini, *Nutrition and Dietetics*, 4th Edition, McGraw Hill Publication, New Delhi, 2015.

Reference Books:

1. L. Kathleen Mahan, Sylvia Escott Stump and Janice L Raymond, *Krause's Food the Nutrition Care Process*, Saunders Publishers, 15th Edition, 2020.
2. Robinson, *Norma land Therapeutic Nutrition*, 17th Edition, Oxford & LBM Publishing, Calcutta, Bombay, 1990.
3. Kathleen Mahan and Sylvia Escort Stump, *Food, Nutrition and Diet Therapy*, W.B.Saunders's Company London, 14th Edition, 2016.

Journals:

1. Journal of Nutrition and Dietetics
2. American Journal of Clinical Nutrition
3. Journal of Nutrition and Metabolism

E-Resources:

1. <https://www.pdfdrive.com/nutrition-dietetics-practice-and-future-trends-e176409703.html>
2. <https://www.pdfdrive.com/oxford-handbook-of-nutrition-and-dietetics-e185402365.html>
3. <https://www.pdfdrive.com/krauses-food-the-nutrition-care-process-e175336715.html>
4. <https://www.pdfdrive.com/nutrition-dietetic-internship-handbook-2012-13-e24766595.html>
5. <https://www.pdfdrive.com/manual-of-dietetic-practice-e33501318.html>

6.

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	9	9	9	9	9	9	63
CO2	9	9	9	9	9	9	9	63
CO3	9	9	9	9	9	9	9	63
CO4	9	9	9	9	9	9	9	63
CO5	9	9	9	9	9	9	9	63
Total	45	45	45	45	45	45	45	315

Low-1

Medium-3

High-9

Core XV-Project

(For Students Admitted from 2025-2026)

Semester: IV**Subject Code: JBND64PW****Hours /week: 5****Credit: 4****Course Objectives:**

1. To develop skills in conducting a research study/ working project in the area of Nutrition and Dietetics
2. To learn the process of writing a project report

The Project is the final stage of the Bachelor degree and provides an opportunity to gain the necessary skills and knowledge in research project. It should demonstrate that students are skilled in area of research, setting research objectives, authoritative literature, devising an appropriate research methodology, analyzing the data, conclusions and if appropriate making relevant recommendations and indications of areas for further research.

The students will be guided and supervised by the teaching faculty of the Home Science department. After completing the dissertation, the report will be submitted for external evaluation. The students will have to appear for viva-voce for their project after the valuation by the external examiner

Course Outcomes:**After successful completion of this course, student will be able to****CO1:** State a nutritional problem prevalent in local community settings and draft a research design for solving**CO2:** Apply the appropriate nutritional concepts to research techniques.**CO3:** Analyze the research problems in the field of nutrition and dietetics**CO4:** Examine the statistical tools for data collection and interpret results**CO5:** Create innovative solutions to existing nutrition problems in community

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	9	9	9	9	9	9	63
CO2	9	9	9	9	9	9	9	63
CO3	9	9	9	9	9	9	9	63
CO4	9	9	9	9	9	9	9	63
CO5	9	9	9	9	9	9	9	63
Total	45	45	45	45	45	45	45	315

Low-1

Medium-3

High-9

Multi disciplinary Course V- a. National Health and Nutrition Programs and Policies

(For Students Admitted from 2025-2026)

Semester: VI**Subject Code: JBMD61NDA****Hours /week: 4****Credit: 3****Course Objectives:**

1. To understand the history, development and current state of health and nutrition policies.
2. To identify the key health and nutrition programmes, goals, strategies, outcomes, and framework.

Unit I**(12 hours)**

Universal Health Coverage Universal health Coverage – World Health Organization Universal Health Coverage Policies by GOI -National Health Mission Goals and Objectives ; National Rural Health Mission (NRHM), National Urban Health Mission (NUHM)

Unit II**(12 hours)**

Health Systems in India National Health and Nutrition Programs and Policies by the Ministry of Health and Family Welfare: Overview, Organograms, programs and their objectives (MAA, JSY, JSSK and others), Understanding the Principles Health and Nutrition Programme Management a. Design b. Plan c. Implementation, d. Operation monitoring, e. Surveillance, and f. Evaluation

Unit III**(12 hours)**

Health Economics a. Macroeconomics b. Microeconomics c. Understand the effectiveness and cost efficiency of Health and Nutrition budgets of the past 5 years compared to the burden of disease, Overnutrition, undernutrition and micronutrient malnutrition d. Cost-benefit, Cost-effectiveness, and cost efficiency

Unit IV**(12 hours)**

National Nutrition Mission of India: POSHAN 2.0 National Health and Nutrition Programs and Policies by the Ministry of Women and Child Development : Overview, Organograms, programs and their objectives Integrated Child Development Services Scheme. Universalization of ICDS

with quality, b. ICDS in Mission mode, c. Objectives & target groups, d. Monitoring system e. Mode of implementation, f. Administrative setup, g. Coverage and compliance, h. Impact 1. PM POSHAN- Mid-Day/ Nutritious Meal Program.

Unit V

(12 hours)

National Programs to Combat Micronutrient Malnutrition Anemia Mukta Bharat (Nutritional Anaemia Control Program, National Iron Plus Initiative (NIPI, I-NIPI) National Deworming Campaign Vitamin A: Vitamin A Prophylaxis Program (VAPP) Iodine: National Iodine Deficiency Disorders Control Program (NIDDCP), Universal Salt Iodization (USI), Double Fortified Salt (DFS) Diarrhoea Control Program: Role of Zinc, ORS Fluorosis Control Program Rising Burden of Non-Communicable Diseases Public Health strategies to control NCDs NPCDCS: Objectives and Key Strategies.

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Understand the historical evolution, objectives, and framework of national health and nutrition policies and programs in India.

CO2: Analyze the structure and implementation of key health and nutrition programs, including their goals, strategies, and impact.

CO3: Evaluate the cost-effectiveness and efficiency of health and nutrition budgets using health economics principles.

CO4: Assess the role of government initiatives in combating malnutrition, micronutrient deficiencies, and non-communicable diseases.

CO5: Develop evidence-based recommendations for enhancing health and nutrition policies through critical evaluation and monitoring frameworks.

Text Books:

1. Srilakshmi, B. *Nutrition Science*, New Age International Publisher, New Delhi, 6th Edition, 2017.
2. Suryatapas, *Textbook of Community Nutrition*, Academic Publishers, 2016.

Reference Books:

1. Park A, *Textbook of Preventive and Social Medicine*, Bhanot Publishers, 23rd Edition, 2015.
2. Boyle M.A, *Community Nutrition in Action: An Entrepreneurial Approach*. 7th Edition, Brooks Cole. 2016.
3. Sari Edelstein, *Nutrition in Public Health*, Jones and Bartlett Publishers, 4th Edition, 2017.

Journals:

1. American Journal of Clinical Nutrition
2. International Journal of Behavioral Nutrition and Physical Activity
3. Journal of Public Health Nutrition

E-Resources:

1. <https://www.pdfdrive.com/public-health-nutrition-e196546358.html>
2. <https://www.pdfdrive.com/community-and-public-health-nutrition-e60389853.html>
3. National Health Mission (nhm.gov.in)
4. Guidelines on PM POSHAN SCHEME.pdf (education.gov.in)
5. Anaemia Mukta Bharat :: National Health Mission (nhm.gov.in)

Course Outcomes	Programme Outcomes								
	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	9	9	9	9	9	3	3	51
CO2	9	9	9	9	9	3	3	9	51
CO3	9	9	9	9	3	3	9	9	51
CO4	9	9	9	9	3	3	9	9	51
CO5	9	9	9	9	3	9	9	9	57
Total	45	45	45	45	27	27	33	39	261

Low-1 Medium-3 High-9

Multi disciplinary Course V –b.Herbal Nutrition

(For Students Admitted from 2025-2026)

Semester: VI

Hours /week: 4

Subject Code: JBMD61NDB

Credit: 3

Course Objectives:

1. To gain knowledge on common herbs used as food, their botanical classification and culinary use
2. To acquire knowledge on herbs and their drug interactions, toxicity and herbal product regulations

Unit I

(12 hours)

Definition of herb, herbal Nutrition, Selection, identification and authentication of herbs, Processing of herbal raw material. Introduction to Medicinally important Plant parts: Fruits, Leaves, Stem and its modifications (underground and aerial), Roots. Importance of medicinal plants – role in human health care – health and balanced diet.

Unit II

(12 hours)

Study of some medicinally important families with reference to systematic position. Diagnostic features and medicinal uses only: Meliaceae, Myrtaceae, Apiaceae, Asclepiadaceae, Solanaceae, Lamiaceae, Euphorbiaceae, Zingiberaceae, Musaceae and Poaceae. Cultivation methods – Crop protection – Harvesting – Storage and Protection – Marketing and utilization - Export of medicinally important (General aspects).

Unit III

(12 hours)

Nutritional content of common Indian herbs, Phenolic content, Carotenoids, minerals and essential oils. Significance of common herbs, culinary herbs, cooking methods of herbs – Basil, Cherril, Chimes, Cilantro, Dill, Mint, Oregano, Parsley, Rosemary, Sage, Tarrangon, Thyme, Lemongrass.

Unit IV

(12 hours)

Plants in day today life – Ocimum sanctum, Centella asiatica, Solanum trilobatum, Cassia auriculata, Aloe vera. Nutritive and medicinal value of some fruits (Guava, Sapota, Orange, Mango, Banana, Lemon, Pomegranate) and vegetables - Greens (Moringa, Solanum nigrum) Cabbage.

Unit V**(12 hours)**

Common herbal dietary supplements, possible side effects and drug interactions – Black cohosh, Cranberry, Curcumin, Echinacea, Garlic, Ginkobiloba, Gingeng, Goldenseal, Greentea extract, Kava-kava, Milk thistle, Saw pal,etto, St.John’s wort, Valerian, Phrmacokineics of herbal supplements.

Course Outcomes:

After successful completion of this course, student will be able to

CO1:Understand the principles of herbal nutrition and its significance in promoting overall health and wellness.

CO2:Recognize key medicinal plants and their bioactive compounds that contribute to human nutrition.

CO3:Evaluate the role of herbal nutrition in disease prevention, immunity enhancement, and management of metabolic disorders.

CO4:Apply knowledge of herbal nutrition in formulating balanced diets and functional foods for different health conditions.

CO5:Examine the safety, efficacy, and regulatory aspects of herbal nutrition based on scientific evidence.

Text Books:

1. **Shanbhag, V. N., & Joshi, S. A.** (2019). *Herbal Nutrition and Therapeutics*. Himalaya Publishing House. ISBN: 978-9353168519.
2. **Aliyu, H.M.** (2024). *Fundamentals of Herbal and Therapeutic Nutrition: A Practical Approach*. Independently published. ISBN: 978-1234567890.
3. **Balch, P.A., & Bell, S.** (2023). *Prescription for Nutritional Healing, Sixth Edition: A Practical A-to-Z Reference to Drug-Free Remedies Using Vitamins, Minerals, Herbs & Food Supplements*. Avery Publishing.

Reference Books:

1. **Chevallier, A.** (2016). *Encyclopedia of Herbal Medicine: 550 Herbs and Remedies for Common Ailments*. DK Publishing.
2. **Singh, R. H., & Rastogi, S.** (2014). *Evidence-Based Practice in Traditional Medicine: Perspectives, Challenges and Future Trends*. Springer. ISBN: 978-8132215399.

Journals:

1. Phytotherapy Research
2. Journal of Herbal Medicine
3. Journal of Dietary Supplements

E resources:

1. <http://repo.upertis.ac.id/1889/1/Encyclopedia%20Of%20Herbal%20Medicine.pdf>
2. [https://repository.poltekkesaltim.ac.id/1148/1/Handbook%20of%20Medicinal%20Herbs%20\(%20PDFDrive%20\).pdf](https://repository.poltekkesaltim.ac.id/1148/1/Handbook%20of%20Medicinal%20Herbs%20(%20PDFDrive%20).pdf)
3. <https://www.adcbp.in/files/ADCBP-Technical-Magazine-21-22-Diet,Herbs-and-Immunity.pdf>
4. <http://www.naturaldatabase.com> last accessed on April 2, 20
5. <https://www.aafp.org/pubs/afp/issues/2017/0715/p101.html>

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	3	9	3	3	9	9	45
CO2	9	3	9	3	9	9	9	51
CO3	9	3	9	3	3	9	3	39
CO4	9	3	9	3	3	9	3	39
CO5	9	3	9	9	9	9	9	57
Total	45	15	45	21	27	45	33	231

Low-1 Medium-3 High-9

Tools and Techniques for Nutrition Counseling Practicals

(For Students Admitted from 2025-2026)

Semester: VI

Hours /week: 2

Subject Code: JBNDS65P

Credit: 1

Course Objectives:

1. To equip students with practical skills in dietary counseling techniques using real-life and simulated case scenarios.
2. To enable students to apply behavioral models, communication strategies, and digital tools in nutrition counseling practice

List of Experiments:

(30 hours)

1. **Demonstration and Role-Play of Counseling Skills:** Practice effective communication techniques including empathy, active listening, and rapport building through role-play scenarios.
2. **Nutritional Assessment of a Case Study:** Perform dietary assessments using tools such as 24-hour recall, food frequency questionnaire, and anthropometric measurements (e.g., BMI).
3. **Implementation of Counseling Stages:** Conduct a simulated counseling session incorporating the three core stages: problem exploration, goal setting, and follow-up planning.
4. **Application of Behavior Change Models:** Analyze client behavior using models such as the Health Belief Model or Transtheoretical Model to formulate intervention strategies.
5. **Culturally-Sensitive Counseling Session:** Develop and deliver a dietary counseling session that addresses cultural beliefs, food practices, and client preferences.
6. **Motivational Counseling and Resistance Handling:** Practice motivational interviewing techniques and strategies to manage client resistance (e.g., reframing, reflecting, shifting focus).
7. **Group Counseling Session Planning and Execution:** Organize and facilitate a group counseling session on a specific nutrition-related health issue (e.g., diabetes, obesity).

8. **Design and Use of Teaching Aids:** Create visual or interactive teaching aids (e.g., posters, flashcards) and use them effectively in a mock counseling session.
9. **Integration of Digital Tools in Nutrition Counseling:** Explore, evaluate, and demonstrate the use of diet and nutrition mobile applications or software for client monitoring and education.
10. **Development of a Personalized Nutrition Action Plan:** Prepare an individualized diet counseling plan including goal-setting and a SMART action plan tailored to a client's nutritional needs.

Course Outcomes:

After successful completion of this course, student will be able to

- CO1:** Demonstrate core counseling skills including empathy, active listening, and client engagement.
- CO2:** Apply dietary assessment methods to analyze the nutritional status of individuals.
- CO3:** Use behavior change models and counseling frameworks to guide clients toward healthier food choices.
- CO4:** Plan and conduct individual and group counseling sessions tailored to specific nutritional needs and cultural backgrounds.
- CO5:** Develop and utilize appropriate teaching aids and digital tools for effective nutrition education and follow-up.

Text Books:

1. Srilakshmi, B. —Dietetics, New Age International Publishes, New Delhi, 8th edition, 2018
2. Shubangini A Joshi, —Nutrition & Dietetics, 5th edition, 2022, McGraw hill Education India Pvt. Ltd.
4. IDA, Clinical Dietetics Manual, Elite Publishing House New Delhi, 2nd edition, 2018.

Reference Books:

1. Mahan, Mahan L.K., Sylvia Escott Stump, Krause's Food Nutrition and Diet Therapy, W.B.Saunders Company London, 14th Edition, 2016.
2. Linda Snetselaar —Nutrition Counselling Skills for the Nutrition Care Process, Jane and Bartlett Publishers, London, 4th edition, 2021.

Journals:

1. Journal of Nutrition Education and Behavior
2. British Journal of Guidance and Counseling
3. Journal of the Academy of Nutrition and Dietetics:

E-Resources:

1. <http://csefel.vanderbilt.edu/modules/module2/script.pdf>
2. <http://www.counselorindia.in/marriage-counseling.p>
3. <https://www.eatrightpro.org/practice/quality-management/nutrition-care-process>
4. <http://www.wageningenportals.nl/nutritionsecurity/topic/behaviour-change-and-nutrition-education>
5. <https://egyankosh.ac.in/bitstream/123456789/43392/1/Unit-3.pdf>

Course Outcomes	Programme Outcomes							
	CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	3	9	1	9	49
CO2	9	9	9	3	9	1	9	49
CO3	9	9	9	1	9	1	9	47
CO4	9	9	9	1	9	1	9	47
CO5	9	9	9	3	9	1	9	49
Total	45	45	45	11	45	5	45	241
	Low-1			Medium-3			High-9	

Extra credit V- Sustainable Development goals in Food Systems

(For Students Admitted from 2025-2026)

Semester: VI

Subject Code:JBNDX6

Credit: 2

Course objectives:

1. To understand the role of sustainable food systems in ensuring food security, nutrition, and environmental sustainability.
2. To analyze strategies and policies for developing resilient, efficient, and eco-friendly food systems.

Unit I

Food Systems: Overview Defining Food Systems (production to consumption including food waste) Food system development paradigm Global and National Food Systems Industrial Food System Local Food System and nutrition anthropology (Tailoring food systems investments to specific context). Overview of food value chains in India for various food groups. Spatial typology for food system analysis- GIS mapping for food vulnerability

Unit II

Sustainable diets: Importance of food systems approach for meeting SDG goals and improving diet quality and health Sustainable diets for all: A key to meeting the SDGs Impact of Biodiversity, Environment and Climate on Sustainable diets Impact of Equity and fair trade on Sustainable diets Eco-friendly local and seasonal foods Cultural heritage, skills (Food Anthropology) Food and Nutrient needs, Food security – (availability, accessibility, affordability, utilization and stability).

Unit III

Healthy Diets: Understanding dietary diversity Guidelines for measuring household and individual dietary diversity Household Dietary diversity score (HDDS), Women's' Dietary diversity score (WDDS), Minimum acceptable diets (MAD), Minimum Dietary diversity (MDD).

Unit IV

Promoting Nutrition: Sensitive Agriculture Overview of nutrition sensitive agriculture Horticulture and healthy diets 6 169 Shift incentives toward the foods that are most lacking in

diets globally (fruits, vegetables, legumes) Innovations in biofortification, newer technologies for producing nutritious foods including grow your own food (Terrace/kitchen gardening, hydroponics etc.) Implement environmentally sound production practices Future of food Shaping a climate smart global food system

Unit V

Food environments: Understanding physical, economic, political and socio-cultural contexts in which consumers engage with the food system to make their decisions about acquiring, preparing and consuming food. Urban diets and food systems: Trends, challenges and opportunities for policy action. Rural diets and food systems: Trends, challenges and opportunities for policy action

Course Outcomes:

After successful completion of this course, student will be able to

- CO1:** Demonstrate an understanding of sustainable food production, processing, distribution, and consumption and their impact on food security and nutrition.
- CO2:** Assess the environmental consequences of conventional and sustainable food systems, including resource use, carbon footprint, and waste management.
- CO3:** Critically evaluate global and national policies, frameworks, and strategies for developing sustainable and resilient food systems.
- CO4:** Propose innovative and practical solutions for enhancing sustainability in food production, supply chains, and consumption patterns.
- CO5:** Advocate for sustainable dietary choices, ethical food sourcing, and responsible consumption to support long-term food security and environmental health.

Text Books:

1. Fan, S. (2016). Reshaping the Global Food System for Sustainable Development. *Food Policy in 2015-2016*, IFPRI.
2. Herforth, A., Ahmed, S., Declerck, F., Fanzo, J., & Remans, R. (2017). Creating Sustainable, Resilient Food Systems for Healthy Diets. *UNSCN*, 42, 15-22.
3. Gillespie, S., & van den Bold, M. (2017). Agriculture, Food Systems, and Nutrition: Meeting the Challenge. *Global Challenges*, DOI: 10.1002/gch2.201600002.

Reference books:

1. Global Panel on Agriculture and Food Systems for Nutrition. (2017). Urban Diets and Nutrition: Trends, Challenges, and Opportunities for Policy Action (Policy Brief No. 9). London, UK.
2. Food Safety and Standards Authority of India (FSSAI). (2017). Transforming the Food Safety and Nutrition Landscape in India. Retrieved from
3. Miraglia, M., Marvin, H. J. P., Kleter, G. A., Battilani, P., Brera, C., Coni, E., & Cubadda, F. et al. (2009). Climate Change and Food Safety: An Emerging Issue with Special Focus on Europe. *Food and Chemical Toxicology*, 47(5), 1009-1021.

Journals:

1. *Frontiers in Sustainable Food Systems*
2. *Journal of Agriculture, Food Systems, and Community Development (JAFSCD)*
3. *Journal of Sustainable Food Systems*

E Resources:

1. <https://openknowledge.fao.org/server/api/core/bitstreams/b620989c-407b-4caf-a152-f790f55fec71/content>
2. <https://www.frontiersin.org/journals/sustainable-food-systems>
3. <https://iopscience.iop.org/collections/erl-230405-193>
4. <https://agroecology.ucsc.edu/about/publications/Teaching-Organic-Farming/PDF-downloads/3.4-sustainable-ag.pdf>
5. <https://www.giz.de/expertise/downloads/bmz-sustainable-agri-food-systems.pdf>

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	3	9	9	9	1	9	49
CO2	9	1	9	9	3	1	9	41
CO3	3	3	9	9	9	1	3	37
CO4	3	9	3	3	9	1	9	37
CO5	9	3	3	3	9	3	3	33
Total	33	19	33	33	39	7	33	197

Low-1

Medium-3

High-9

FIRST SEMESTER
(Only For Microbiology Department Students)
Ability Enhancement Compulsory Course - Biochemistry
(For Students Admitted from 2025-2026)

Semester: I
Subject code: JBMBA13

Hours/week: 4
Credit: 4

Course objectives

1. To understand the structure, function, and metabolism of essential biomolecules, including carbohydrates, lipids, proteins, and nucleic acids.
2. To explore the principles of enzyme activity, energy production in biological systems, and key metabolic pathways.

Unit I (12 Hours)

Introduction to Biochemistry – Definition, scope, and importance in life sciences. Relationship with other branches of science (Microbiology, Biotechnology).

Carbohydrates - Definition, classifications, Properties, Biochemical importance.

Lipids – Definition, classifications, Properties Fatty acids - Definition, classification, Biochemical importance.

Unit II (12 Hours)

Amino Acids – Definition, Classifications, Properties, Biochemical importance.

Proteins – Definition, Classifications, Structure (primary, secondary, tertiary and quaternary), Properties, Biological importance of peptides.

Unit III (12 Hours)

Enzymes – Definition, Classification, Properties, Factors Affecting Enzyme Activity, Enzyme Specificity, Enzyme Inhibition – Competitive, non-competitive, feedback inhibition. Coenzymes – Definition, classification and function. Application of Enzymes in various fields.

Unit IV (12 Hours)

Nucleic Acids – Definition, Functions, and Components of Nucleotides and nucleosides. DNA & RNA – structure, function and types. Differentiate DNA and RNA.

Unit V (12 Hours)

Energy in Biological Systems – Carbohydrate Metabolism – Glycolysis, PDH, TCA cycle, Lipid Metabolism – β -oxidation of fatty acids, Protein & Nitrogen Metabolism – Transamination, Deamination, Urea cycle, Electron Transport Chain & Oxidative Phosphorylation,

Course Outcomes:

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

CO 1: Explain the importance of biochemistry in life sciences and its connection with microbiology, biotechnology, and medicine.

CO 2: Describe the types, properties, and functions of carbohydrates, lipids, amino acids, and proteins in biological systems.

CO3: Understand the role of enzymes in biochemical reactions and analyze factors affecting

their activity.

CO4: Illustrate the energy production process through metabolic pathways like glycolysis, the TCA cycle, and oxidative phosphorylation.

CO5: Explain the structure and function of DNA and RNA in genetic information storage, protein synthesis, and cell regulation.

Text Books:

1. Dr. U. Satyanarayana, U. Chakrapani, *Biochemistry*, Elsevier Publication, 5th Edition, 2017.
2. Dr. Kondreddy Rambabu, Dr. Pendyala Siva Kumar, Dr. Pendyala Kameswari, *Textbook of Biochemistry*, AITBS Publishers, India, 2nd Edition, 2014.

References Books:

1. David L. Nelson, Michael M. Cox Lehninger *Principles of Biochemistry*, Macmillan Publishers, 7th Edition, 2017.
2. Victor Rodwell, David Bender, P. Anthony Weil, Peter Kennelly, Kathleen Botham, *Harper's Illustrated Biochemistry*, Lange Publishers, 30th Edition, 2017.
3. Donald Voet, Judith G. Voet, *Biochemistry*, John Wiley and Sons Publishers, 4th Edition, 2016.

Journals:

1. International Journal of Biochemistry and Biophysics
2. International Journal of Biochemistry and Molecular Biology
3. International Journal of Biological and Chemical Sciences

E-Resources:

1. <https://www.pdfdrive.com/biochemistry-e187234482.html>
2. <https://www.pdfdrive.com/textbook-of-biochemistry-for-medical-students-e186671773.html>
3. <https://www.pdfdrive.com/lippincotts-biochemistry-6th-edition-e41485405.html>
4. <https://www.pdfdrive.com/textbook-of-biochemistry-e14983388.html>
5. <https://www.pdfdrive.com/lehninger-principles-of-biochemistry-e189596394.html>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	9	3	3	1	9	3	37
CO2	9	9	3	3	1	9	3	37
CO3	9	9	3	3	1	9	3	37
CO4	9	9	3	3	1	9	3	37
CO5	9	9	3	3	1	9	3	37
Total	45	45	15	15	5	45	15	185

Low-1

Medium-3

High-9

FIRST SEMESTER
(Only For Chemistry Students)
Ability Enhancement Compulsory Course - Biochemistry –I
(For Students Admitted from 2025-2026)

Semester: I
Subject code: JBCHA14

Hours/week: 4
Credit: 4

Course Objectives:

- 1.To understand the chemical characteristics of different classes of nutrients with reference to their physical properties, and to relate this to their functions in the body
- 2.To establish the basic principles of metabolism and its regulation

Unit I (12 hours)

Carbohydrates – Definition, Functions, classifications, structure, physical and chemical properties, Biochemical importance.

Unit II (12 hours)

Amino acids -Definition, Functions, Classifications, Structure, Physical and chemical properties, Biochemical importance.

Proteins - Definition, Functions, Classifications, Structure (primary, secondary, tertiary and quaternary), Physical and chemical properties, Biological importance of peptides.

Unit III (12 hours)

Lipids– Definition, Functions, classifications. Fatty acids-Definition classification, physical and chemical properties. Triglycerides, Phospholipids, glycolipids, steroid-outline study

Unit IV (12 hours)

Nucleic acids - Definition, Functions, and Components of Nucleotides and nucleosides. DNA & RNA –structure, function and types. Differentiate DNA and RNA.

Unit V (12 hours)

Vitamins - Definition, Classifications and Biochemical importance. **Minerals** - Definition, classifications and Biochemical importance. Interrelationship between Vitamin-Vitamin, Vitamin-Mineral.

Course Outcomes:

After successful completion of this course, student will be able to

- CO 1:** Relate the physical and chemical properties of various biomolecules and understand the knowledge of the principles of Biochemistry
- CO 2:** Apply the knowledge to recognize the classification, structure and functions of Macromolecules
- CO 3:** Integrate the properties of all Macromolecules.
- CO 4:** Inspect and understand the basics of genetic material
- CO 5:** Summarize the chemistry of micronutrients and their biochemical role

Text Books:

1. Dr.U.Satyanarayana, U.Chakrapani, *Biochemistry*, Elsevier Publication, 5th Edition, 2017.
2. Dr.Kondreddy Rambabu, Dr.Pendyala Siva Kumar, Dr.Pendyala Kameswari, *Textbook of Biochemistry*, AITBS Publishers, India, 2nd Edition, 2014.

References Books:

1. David L. Nelson, Michael M. Cox Lehninger *Principles of Biochemistry*, Macmillan Publishers, 7th Edition, 2017.
2. Victor Rodwell, David Bender, P. Anthony Weil, Peter Kennelly, Kathleen Botham,
3. *Harper's Illustrated Biochemistry*, Lange Publishers, 30th Edition, 2017.
4. Donald Voet, Judith G. Voet, *Biochemistry*, John Wiley and Sons Publishers, 4th Edition, 2016.

Journals:

1. International Journal of Biochemistry and Biophysics
2. International Journal of Biochemistry and Molecular Biology
3. International Journal of Biological and Chemical Sciences

E-Resources:

1. <https://www.pdfdrive.com/biochemistry-e187234482.html>
2. <https://www.pdfdrive.com/textbook-of-biochemistry-for-medical-students-e186671773.html>
3. <https://www.pdfdrive.com/lippincotts-biochemistry-6th-edition-e41485405.html>
4. <https://www.pdfdrive.com/textbook-of-biochemistry-e14983388.html>
5. <https://www.pdfdrive.com/lehninger-principles-of-biochemistry-e189596394.html>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	9	3	3	1	9	3	37
CO2	9	9	3	3	1	9	3	37
CO3	9	9	3	3	1	9	3	37
CO4	9	9	3	3	1	9	3	37
CO5	9	9	3	3	1	9	3	37
Total	45	45	15	15	5	45	15	185

Low-1

Medium-3

High-9

SECOND SEMESTER

(Only for Chemistry Students)

Ability Enhancement Compulsory Course - Biochemistry –II

(For Students Admitted from 2025-2026)

Semester: I**Subject Code: JBCHA24****Hours/week: 4****Credit: 4****Course Objectives:**

1. To understand how enzymes work and regulate key metabolic pathways for carbohydrates, amino acids, proteins, lipids, and nucleic acids.
2. To learn about biological oxidation, including the electron transport chain and oxidative phosphorylation, and their role in energy production in cells.

Unit I**(12 hours)****Enzymes-** Definition, classification, properties, Factors influencing enzyme action. Enzyme

specificity, enzyme inhibition, Application of enzymes in different field. Coenzyme, types of coenzymes and its role in carbohydrate metabolism.

Unit II (12 hours)

Metabolism of Carbohydrates: Introduction to Metabolism, Metabolism of Carbohydrates- glycolysis, PDH, TCA, Gluconeogenesis, Glycogenesis, Glycogenolysis, HMP Shunt, Uronic acid pathway.

Unit III (12 hours)

Metabolism of Amino acids and Proteins: Proteolytic enzymes endopeptidase and exopeptidase. Decarboxylation, Deamination, Transamination, Urea cycle. Metabolism of Phenyl Alanine, Tyrosine, Tryptophan, Histidine, Proline and Arginine.

Unit IV (12 hours)

Metabolism of Lipids: Biosynthesis of fatty acids, Oxidation of fatty acids, Ketogenesis. Metabolism of cholesterol, triglycerides and phospholipids.

Unit V (12 hours)

Nucleic acid: Biosynthesis of DNA and RNA, Protein.

Biological oxidation: ETC and Oxidative phosphorylation.

Course Outcomes:

After successful completion of this course, student will be able to

CO 1: Recall the metabolic pathways of various biomolecules and understand the activity of enzymes and co-enzymes in all metabolic pathways

CO 2: Apply the knowledge to recognize the anabolic and catabolic pathways of all metabolic cycles

CO 3: Calculate and understand the energy production in every metabolic pathway.

CO 4: Inspect and understand the dogma of life.

CO 5: Summarize the Energy calculation for all metabolic pathways

Text Books:

1. Dr. U. Satyanarayana, U. Chakrapani, *Biochemistry*, Elsevier Publication, 5th Edition, 2017.

2. Dr. Kondreddy Rambabu, Dr. Pendyala Siva Kumar, Dr. Pendyala Kameswari, *Textbook of Biochemistry*, AITBS publishers, India, 2nd Edition, 2014.

References Books:

1. David L. Nelson, Michael M. Cox Lehninger, *Principles of Biochemistry*, Macmillan Publishers, 7th Edition, 2017.

2. Victor Rodwell, David Bender, P. Anthony Weil, Peter Kennelly, Kathleen Botham, *Harper's Illustrated Biochemistry*, Lange Publishers, 30th Edition, 2017.

3. Donald Voet, Judith G. Voet, *Biochemistry*, John Wiley and Sons Publishers, 4th Edition, 2016.

Journals:

1. International Journal of Biochemistry and Biophysics
2. International Journal of Biochemistry and Molecular Biology
3. International Journal of Biological and Chemical Sciences

E-Resources:

1. <https://www.pdfdrive.com/biochemistry-e187234482.html>
2. <https://www.pdfdrive.com/textbook-of-biochemistry-for-medical-students-e186671773.html>
3. <https://www.pdfdrive.com/lippincotts-biochemistry-6th-edition-e41485405.html>
4. <https://www.pdfdrive.com/textbook-of-biochemistry-e14983388.html>
5. <https://www.pdfdrive.com/lehninger-principles-of-biochemistry-e189596394.html>

Course Outcomes	Programme Outcomes							Total
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	9	9	3	3	1	9	3	37
CO2	9	9	3	3	1	9	9	43
CO3	9	9	3	3	1	9	3	37
CO4	9	9	3	3	1	9	3	37
CO5	9	9	3	3	1	9	3	37
Total	45	45	15	15	5	45	21	191

Low-1

Medium-3

High-9

SECOND SEMESTER

(Only For Biotechnology Students)

Ability Enhancement Compulsory Course Biochemistry

(For Students Admitted from 2025-2026)

Semester: I**Subject code: JBBTA13****Hours/week: 4****Credit: 4****Course objectives:**

1. To understand the structure, function, and metabolism of essential biomolecules, including carbohydrates, lipids, proteins, and nucleic acids.
2. To explore the principles of enzyme activity, energy production in biological systems, and key metabolic pathways.

Unit I**(12 Hours)**

Introduction to Biochemistry – Definition, scope, and importance in life sciences. Relationship with other branches of science (Microbiology, Biotechnology).

Carbohydrates - Definition, classifications, Properties, Biochemical importance.

Lipids – Definition, classifications, Properties Fatty acids - Definition, classification, Biochemical importance.

Unit II**(12 Hours)**

Amino Acids – Definition, Classifications, Properties, Biochemical importance.

Proteins – Definition, Classifications, Properties, Structure (primary, secondary, tertiary and quaternary), Biological importance of peptides.

Unit III (12 Hours)

Enzymes – Definition, Classification, Properties, Factors Affecting Enzyme Activity, Enzyme Specificity, Enzyme Inhibition – Competitive, non-competitive, feedback inhibition. Coenzymes – Definition, classification and function. Application of Enzymes in various fields.

Unit IV (12 Hours)

Nucleic Acids – Definition, Functions, and Components of Nucleotides and nucleosides. DNA & RNA –structure, function and types. Differentiate DNA and RNA.

Unit V (12 Hours)

Energy in Biological Systems –Carbohydrate Metabolism – Glycolysis, PDH, TCA cycle, Lipid Metabolism – β -oxidation of fatty acids, Protein & Nitrogen Metabolism – Transamination, Deamination, Urea cycle, Electron Transport Chain & Oxidative Phosphorylation,

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

- CO 1:** Explain the importance of biochemistry in life sciences and its connection with microbiology, biotechnology, and medicine.
- CO 2:** Describe the types, properties, and functions of carbohydrates, lipids, amino acids, and proteins in biological systems.
- CO3:** Understand the role of enzymes in biochemical reactions and analyze factors affecting their activity.
- CO4:** Illustrate the energy production process through metabolic pathways like glycolysis, the TCA cycle, and oxidative phosphorylation.
- CO5:** Explain the structure and function of DNA and RNA in genetic information storage, protein synthesis, and cell regulation.

Text Books:

1. Dr.U.Satyanarayana, U.Chakrapani, *Biochemistry*, Elsevier Publication, 5th Edition, 2017.
2. Dr.Kondreddy Rambabu, Dr.Pendyala Siva Kumar, Dr.Pendyala Kameswari, *Textbook of Biochemistry*, AITBS Publishers, India, 2nd Edition, 2014.

References Books:

1. David L. Nelson, Michael M. Cox Lehninger *Principles of Biochemistry*, Macmillan Publishers, 7th Edition, 2017.
2. Victor Rodwell, David Bender, P.AnthonyWeil, Peter Kennelly, Kathleen Botham,
3. *Harper's Illustrated Biochemistry*, Lange Publishers, 30th Edition, 2017.
4. Donald Voet, Judith G.Voet, *Biochemistry*, John Wiley and Sons Publishers, 4th Edition, 2016.

Journals:

1. International Journal of Biochemistry and Biophysics
2. International Journal of Biochemistry and Molecular Biology
3. International Journal of Biological and Chemical Sciences

E-Resources:

1. <https://www.pdfdrive.com/biochemistry-e187234482.html>
2. <https://www.pdfdrive.com/textbook-of-biochemistry-for-medical-students-e186671773.html>
3. <https://www.pdfdrive.com/lippincotts-biochemistry-6th-edition-e41485405.html>
4. <https://www.pdfdrive.com/textbook-of-biochemistry-e14983388.html>
5. <https://www.pdfdrive.com/lehninger-principles-of-biochemistry-e189596394.html>

Course Outcomes	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
CO1	9	9	3	3	1	9	3	37
CO2	9	9	3	3	1	9	3	37
CO3	9	9	3	3	1	9	3	37
CO4	9	9	3	3	1	9	3	37
CO5	9	9	3	3	1	9	3	37
Total	45	45	15	15	5	45	15	185

Low-1

Medium-3

High-9

VALUE ADDED PROGRAMME IN FOOD PROCESSING AND PRESERVATION

(For Students Admitted from 2025-2026)

(Six Months Programme)

Paper	Subject Code	Subject title	Contact Hours	Credit	ESE Marks
I	JCFP1	Food Processing and Preservation	30	2	100
II	JCFP2P	Food Processing and Preservation Practicals	50	3	100
		Total	80	5	200

Paper I - Food Processing and Preservation

(For Students Admitted from 2025-2026)

Subject Code: JCFP1**Hours: 30****Credit: 2****Course Objectives:**

1. To develop skill and techniques in food preparation with conservation of nutrients and palatability using desirable cooking methods
2. To understand the scientific principles underlying food preparation.

Unit I**(6 hours)**

Food preservation: Meaning, Definition and objectives, Importance, Brief history and traditional methods of food preservation, Asepsis and aseptic handling of foods.

Unit II**(6 hours)**

Microbial application in food preservation: Principles involved in the microbial decomposition of food and self-decomposition of foods. Growth curve of microbial culture and its application in food preservation.

Unit III**(6 hours)**

Asepsis techniques: Asepsis or keeping out micro organisms – Definition and different Techniques applied for asepsis

Unit IV (6 hours)

Removal of microorganisms - Use of different filters and other techniques to remove microorganisms. Maintenance of anaerobic conditions to create and prevent the entry of oxygen in foods.

Unit V (6hours)

Heat Applications and preservative methods: Use of high temperature, Use of low temperature, Drying or dehydration. Use of chemical preservatives and food additives and Irradiation. Other methods of food preservation, Definitions and differentiation between food poisoning and infection, causes and types of food poisoning and infections.

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Define food preservation and understand the basic knowledge of microbial application in foodpreservation

CO2: Apply the knowledge in preserving foods by laboratory and household measures

CO3: Demonstrate on different methods of food preservation techniques

CO4: Evaluate the microbial quality of foods

CO5: To make the students understand the basic principles underlying food Preservation

Text Books:

1. Shakuntala Manay.N, Shadaksharaswamy.M, *Food Facts and Principles*, New Age International Publishers, 4th Edition, 2018.
2. Srilakshmi.B, *Food science*, New Age International Publishers, New Delhi, 8th Edition, 2019.
3. Anju singh, *Handbook food preservation*, Agrotech Press, 2017.

Reference Books:

1. Fellows P J, *Food Processing Technology: Principles and Practice*, CRC Wood head PublishingLtd.,Cambridge, 4th Edition, 2016.
2. M. Shafiur Rahman, *Handbook of food preservation*,CRC Press, 2nd Edition,2007.
3. Megyesi, Jennifer Lynn, *The joy of keeping a root cellar: canning, freezing, drying, smoking,and Preserving the harvest*, Skyhorse Publication,2010.

Journals:

1. Journal of Food & Microbiology
2. Journal of Food Processing & Technology
3. Journal of Food Processing & Preservation

E-Resources:

1. www.newfoodmagazine.com
2. www.nzifst.org.nz
3. www.itrhd.com
4. <https://www.tarladalal.com/tomato-ketchup-tomato-sauce-homemade-tomato-ketchup-40725r>
5. <http://ecoursesonline.iasri.res.in/mod/page/view.php?id=5168>

**Paper II- Food Processing and Preservation
Practicals**

(For Students Admitted from 2025-2026)

Subject Code: JCFP2P

**Hours:50
Credit: 3**

Course Objectives:

1. To develop skills and techniques in food preparation with conservation of nutrients and palatability using desirable cooking methods
2. To understand the scientific principles underlying in food preparation.

Unit I

(10 hours)

Preservation by Sugar Preparation of Jam: Mixed fruit jam, Apple jam, Guava jam, Pineapple jams
Preparation of jelly: Apple jelly, Guava jelly

Unit II

(10 hours)

Preparation of Squash: Pineapple squash, Orange squash, Sappota squash and Grape squash.
Fruit preserves- fruit bar, Petha (Pumpkin sweet), Ginger murabha.

Unit III

(10 hours)

Preservation by salt: Pickles – Onion pickles, Mango pickle, Garlic Pickle, Dried fish
Vathal vadakam- cluster bean vathal, brinjal, bittergourd, ladies finger
Vadamkam- Rice, sago

Unit IV (10 hours)

Preparation of Spice products: Tomato sauce, tomato ketchup

Unit V

(10 hours)

Preservation by fermentation: Vinegar, Curd, Lassi, Thokla

Course Outcomes:

After successful completion of this course, student will be able to

- CO1:** Define food preservation and understand the basic knowledge of microbial application in food preservation
- CO2:** Apply the knowledge in preserving foods by laboratory and household measures
- CO3:** Analyze the practical knowledge on principles and methods of preservation
- CO4:** Enable students to do recipes based on preservation methods
- CO5:** Make the students understand the basic principles underlying food preservation

Text Books

1. Nirmal K.Sinha and Jiwan S.Sidhu, Handbook of fruits and fruit processing", Wiley-lackwell, 2012.
2. Anju singh, Handbook food preservation, Agrotechpress, 2017.
3. Srilakshmi.B, Food science, New Age International Publishers, New Delhi, 8th Edition, 2019.

Reference Books:

1. Verma L.R and Joshi V.K, *Post harvest technology of fruits and vegetables, Handling, Processing, fermentation and waste management*, Wiley-Blackwell Publishers, 2011.
2. Nirmal K.Sinha and Jiwan S.Sidhu,, *Handbook of vegetables and vegetables processing* , Wiley-Blackwell Publishers, 2012.

3. Fereidoon Shahidi, Handbook of Antioxidants for Food Preservation, Wiley- Blackwell Publishers,2015.

Journals:

1. Journal of Food & Microbiology
2. Journal of Food Processing & Technology
3. Journal of Food Processing & Preservation

E-Resources:

1. www.newfoodmagazine.com
2. www.nzifst.org.nz
3. www.itrhd.com
4. <https://www.tarladalal.com/tomato-ketchup-tomato-sauce-homemade-tomato-ketchup-40725r5>.<http://ecoursesonline.iasri.res.in/mod/page/view.php?id=516>

VALUE ADDED PROGRAMME IN CLINICAL DIETETICS

(For Students Admitted from 2025-2026)

(Six Months Programme)

Paper No	Subject Code	Subject Title	Contact Hours	Credit	External Marks
I	JCCD1	Clinical Dietetics	30	2	100
II	JCCD2P	Clinical Dietetics Practicals	50	3	100
		Total	80	5	200

Paper I – Clinical Dietetics

(For Students Admitted from 2025-2026)

Subject Code: JICCD1

Hours:30

Credit: 2

Course Objectives:

1. To understand the foundation sciences which underpin therapeutic dietetic practice, the principles of disease prevention and health promotion, the principles of therapeutic intervention practice.
2. To understand the organization, management and provision of healthcare both in the hospital and in primary care.

Unit I

(6 hours)

Diet therapy: Principles of planning diet, nutritional care process, Basic concepts of diet therapy Therapeutic adaptations of normal diet, principles of therapeutic diets

Routine Hospital Diets: clear fluid, full fluid, soft and normal diet, Pre-operative and post-operative diets Special feeding techniques - parenteral and enteral feeding

Dietitian: Role of dietitians in Nutritional care, planning diet counseling.

Unit II

(6 hours)

Nutritional care for weight management: Obesity - Aetiology, assessment, types, complications and principles of diet management

Underweight: Aetiology, limitations, complications and principles of diet management.

Unit III

(6 hours)

Nutritional care for deficiency disorders: PEM and Vitamin A deficiency and Anemia- Causes, Types, symptoms and diet management.

Nutritional care for febrile condition: Typhoid, Malaria and Tuberculosis- Causes, symptoms, metabolic changes in fever and dietary management.

Unit IV

(6 hours)

Nutritional care for diseases of the Gastro Intestinal tract: peptic ulcer, gastritis, constipation, diverticulosis, Diarrhea, Mal absorption syndrome, celiac spur, tropical spur, lactose intolerance, Inflammatory Bowel Disease, Irritable Bowel Syndrome - Aetiology, symptoms, complications and principles of diet management.

Unit V

(6 hours)

Nutritional care for diseases of liver and biliary system: Jaundice, Cirrhosis of liver, Viral Hepatitis, Hepatic Encephalopathy, Role of alcohol in liver disease- Aetiology, symptoms, complications and principles of diet management.

Diseases of Gall Bladder and Pancreas – Cholelithiasis, Cholecystitis, Cholecystectomy, Acute and chronic Pancreatitis- Aetiology, symptoms, complications and principles of diet management.

Course Outcomes:

After successful completion of this course, student will be able to

- CO1:** Recollect the principles of planning diet and discuss the role of dietician and basic concept of diet therapy
- CO2:** Determine the routine hospital diets, special feeding techniques
- CO3:** Point out the etiology, symptoms and complications for any life style disease
- CO4:** Assess the nutritional requirement for acute and chronic illness
- CO5:** Plan a whole day menu for the acute and chronic illness

Text Books:

1. Srilakshmi, B., *Dietetics*, New Age International (P) Ltd, Chennai. 8th Edition, 2019.
2. Antia F.P. And Philip Abraham, *Clinical Nutrition and Dietetics*, Oxford University Press, 4th Edition. 2002.
3. Shubhaangini Joshi, *Nutrition and Dietetics*, 4th Edition, McGraw Hill Publication, New Delhi, 2015.

Reference Books:

1. L. Kathleen Mahan, Sylvia Escott-Stump and Janice L Raymond, *Krause's Food & the Nutrition Care Process*, Saunders Publishers, 15th Edition, 2020.
2. Robinson, *Normal and Therapeutic Nutrition*, Oxford & LBM Publishing, Calcutta, Bombay, 17th Edition, 1990.
3. Kathleen Mahan and Sylvia Escott- Stump, *Food, Nutrition and Diet Therapy*, W.B. Saunder's Company London, 14th Edition, 2016.

Journals:

1. Journal of Nutrition and Dietetics
2. Journal of Nutrition & Food Sciences
3. Journal of Nutrition and Metabolism

E-Resources:

1. <https://www.pdfdrive.com/nutrition-dietetics-practice-and-future-trends-e176409703.html>
2. <https://www.pdfdrive.com/oxford-handbook-of-nutrition-and-dietetics-e185402365.html>
3. <https://www.pdfdrive.com/krauses-food-the-nutrition-care-process-e175336715.html>
4. <https://www.pdfdrive.com/clinical-nutrition-e186572457.html>
5. <https://www.pdfdrive.com/nutrition-health-and-disease-a-lifespan-approach-e189164494.html>

Paper - II Clinical Dietetics Practicals

(For Students Admitted from 2025-2026)

Subject Code: JCCD2P**Hours: 50****Credit: 3****Course Objectives:**

1. To understand the modifications in nutrient requirements for various diseases.
2. To acquire skills in the preparation of therapeutic diets.

Unit I**(10 hours)**

Plan appropriate diets to fulfill nutritional needs in pregnancy, Lactation, preschool children Adolescent boys and girls, adult and old age groups.

Unit II**(10 hours)**

Plan appropriate Routine Hospital Diets - clear fluid, full fluid, soft and normal diet, Pre-operative and post-operative diets, Special feeding techniques - parenteral and enteral feeding.

Unit III**(10 hours)**

Plan appropriate diet for PEM and Vitamin A deficiency, Anemia and Fever conditions.

Unit IV**(10 hours)**

Plan appropriate diet for Obesity, Underweight, Jaundice, and liver diseases

Unit V**(10 hours)**

Plan appropriate diet for Peptic ulcer, Heart disease and Diabetic patients.

Course Outcomes:

After successful completion of this course, student will be able to

- CO1:** Describe the importance of menu for different illness and explain the need of menu modification
- CO2:** Apply the therapeutic diets using food exchange lists.
- CO3:** Structure the dietetic practices followed in Indian hospital
- CO4:** Detect the nutritive value of Indian foods
- CO5:** Calculate a whole day menu for acute and chronic illness

Text Books:

1. Gopalan C., RN. Ramasastri and S.C. Balasubra-manian, *Nutritive Value of Indian Foods*, National Institute of Nutrition, Hyderabad, 2018.

2. V.Vimala, *Advances in Diet therapy-Practical Manual*, New Age International Private Ltd,2020.
3. *Clinical Dietetics Manual*, Indian Dietetic Association, 2nd Edition,2018.

Reference Books:

1. Mahan L.K., Sylvia Escott-Stump - *Krause's Food Nutrition and Diet Therapy* W.B.Saunders Company London 14th Edition, 2016.
2. Robinson C.H., *Normal and Therapeutic nutrition*, Mac millan Publishing Co.Inc, Newyork, 17thEdition, 1990.

Journals:

1. Asia Pacific Journal Clinical Nutrition
2. European Journal of Clinical Nutrition
3. International journal of Nutrition and Dietetics

E-Resources:

1. <https://www.pdfdrive.com/manual-of-dietetic-practice-e175954283.html>
2. <https://www.pdfdrive.com/medical-nutrition-therapy-a-case-study-approach-e186656569.html>
3. <https://www.pdfdrive.com/applications-and-case-studies-in-clinical-nutrition-e185254994.html>
4. <https://www.pdfdrive.com/manual-of-dietetic-practice-e33501318.html>
5. <https://www.pdfdrive.com/manual-of-clinical-nutrition-management-e18838358.html>

DIPLOMA IN BAKERY AND CONFECTIONERY SYLLABUS
One year Programme (2025-2026)

One year60 credit
Per semester30 credit
Semester I
18 Credit -Skill Education
12 Credit -General Education
Semester II
18 Credit -Skill Education
12 Credit -Project

PROGRAMME STRUCTURE

Sem	Subject Code	Subject	Credit	Hours/week	CIA	ESE	Total Marks
I	JDBC11	Bakery Theory I	5	5	40	60	100
	JDBC12	Confectionery Theory I	5	5	40	60	100
	JDBC13P	Bakery Practicals I	4	8	40	60	100
	JDBC14P	Confectionery Practicals I	4	8	40	60	100
	JDBC15	Entrepreneurial Skills and Productivity	4	4	-	50	50
	JDBC16PW	Mini Project	8	8	-	100	100
	Total		30	38	160	390	550
Sem	Subject Code	Subject	Credit	Hours/week	CIA	ESE	Total Marks
II	JDBC21	Bakery Theory II	6	6	40	60	100
	JDBC22	Confectionery Theory II	6	6	40	60	100
	JDBC23P	Bakery Practicals II	3	6	40	60	100
	JDBC24P	Confectionery Practicals II	3	6	40	60	100
	JDBC25PW	Major project	12	12	-	100	100
	Total		30	36	160	340	500
GRAND TOTAL			60	74	320	730	1050

Bakery Theory I

(For Students Admitted from 2025-2026)

Semester: I
Subject Code: JDBC11**Hours/week: 5**
Credit: 5**Course Objectives:**

1. To acquire properties and functions of the basic ingredients used in baked goods
2. To enable students to employ safe food handling practices using contemporary guideline

Unit I**(18 hours)****Introduction:** Scope of Bakery & Confectionery; Bakery terms; Organization chart of Bakery. Role of bakery ingredient.**Wheat and wheat processing and role of bran and germ:** Flours: Different types of flours available, constituents of flours, PH Value of flour, water absorption power of flour, gluten, diastatic capacity of flour, grade of flour; Raw material required for bread making: Role of flour, water, yeast, salt - Sugar, milk and fats.**Unit II****(18 hours)****Bread making process:** Straight dough method; Characteristics of good bread - External characteristics - volume, symmetry of shape; internal characteristics - color, texture, aroma, clarity and elasticity; Bread faults and their remedies; Yeast – An elementary knowledge of Baker's yeast; Effect of over and under fermentation; Bread improvers Oven & Baking. Baking temperatures for bread.**Unit III****(18 hours)****Rheological science: Dough rheology;** Rheological measurements; Fundamental rheological measurements; Factors affecting dough rheology; Wheat grains and rheology; Composite flour technology and rheology; Influence of ingredients towards rheology; Rheological effect on proofing, baking and final texture of bread.**Unit IV****(18 hours)****Cake and Cookie making:** Production of cakes and cookies/biscuits; Types of biscuit dough's – Developed dough, short dough's, semi-sweet, enzyme modified dough and batters –importance of the consistency of the dough.**Unit V****(18 hours)****Bakery layout** – The required approvals for setting up of a Bakery – Government procedure and laws - Selection of site - Selection of equipment. - Layout design - Electricity. Quality control of raw material and finished products.**Course Outcomes:**

After successful completion of this course, student will be able to

CO1: Outline the various properties of raw materials in bakery and confectionery industries**CO2:** Discuss methods involved in manufacture of bakery products**CO3:** Compile technical knowledge in bakery**CO4:** Explain the physical factors of dough**CO5:** Know the importance of proper food plant design and safety**Text Books:**

1. Ashokkumar, Y, *Textbook Of Bakery And Confectionery*, PHI Learning Pvt. Ltd. 2018.

2. Mathuravalli, S. M. D, *Handbook of Bakery and Confectionery*, CRC Press, 2021.
3. Bali, P. S., *Theory of Bakery*, Oxford University Press, 2018.

Reference Books:

1. In Matz, S. A, *Bakery: technology and engineering*. New Delhi: Medtech Scientific International Pvt. Ltd, 2019.
2. *The Complete Technology Book on Bakery Products Baking Science with Formulation & Production*, 4th Revised Edition, by NIIR Board of Consultants & Engineers, 2020.
3. Gupta, A. K, *Textbook of Bakery and Confectionery*, Daya Publishing House, a division of Astral International Pvt. Limited, 2021.

E- Resources:

1. <https://pediiaa.com/>
2. <https://opentextbc.ca/ingredients/chapter/milling-of-wheat/>
3. <https://www.delish.com/cooking/g21790771/types-of-bread/>
4. <https://www.britannica.com/topic/baking>
5. <https://www.slideshare.net/OdeyemiBayonle/theory-of-baking>

Confectionery Theory I (For Students Admitted from 2025-2026)

Semester: I

Subject Code: JDBC12

Hours/week: 5

Credit: 5

Course Objectives:

1. Illustrate advanced classical and contemporary pastry and confectionery techniques
2. To study the basic principles involved in different ingredients used in confectionery products

Unit I (15 hours)

Confectionery products: Definition, importance of sugar confectionery and flour confectionery. Types of confectionery products-chocolate boiled sweets caramels toffees. Fondant manufacturing process. Spoilage of confectionery products. Good manufacturing practices (GMP) in baking and confectionery industries. Sanitation and safety

Unit II (15 hours)

Chocolate work: Uses of cocoa and chocolate in confectionery. Sugar boiled confectionery. Different types of sugar candies and jellies. Amorphous confectionery; crystalline confectionery: candy. Role of flour, sugar, shortening & eggs- An elementary knowledge of properties and use of moistening agents

Unit III (15 hours)

Icings and frozen dessert: importance and varieties of icings; Fondants; Ganache; Filling and frostings. Churned frozen desserts; Ice cream: Composition, types, making process; still frozen desserts.

Unit IV (15 hours)

Sugar confectionery: Nutritional significance; manufacture and forms of sugar; different stages of sugar cookery; Principles of sugar confectionery production; Types of sweets; Gelatin sweets; Toffee and caramels; Hard-boiled sweets; Cooling.

Unit V**(15 hours)**

Food additives: Introduction to food additives; Role of food additives in confectionery; Food colors; Artificial sweeteners; Preservatives; Anti-caking agents; Flavoring agents.

Course outcomes:

After successful completion of this course, student will be able to

CO1: Explain the different ingredients used in confectionery

CO2: Demonstrate working knowledge of Chocolate and Sugar confectionery

CO3: Understand Food Microbiology, Food Contamination and Spoilage

CO4: List down the steps in preparing Icings and frozen dessert.

CO5: Elaborate the role of food additives in bakery and confectionery

Text Books:

1. Hofberger, R., Hartel, R. W., von Elbe, J. H., *Confectionery Science and Technology*, Springer International Publishing, 2017.
2. Ashokkumar, Y., *Textbook of Bakery and Confectionery*, PHI Learning Pvt.Ltd., 2018.
3. Mathuravalli, S. M. D., *Handbook of Bakery and Confectionery*. CRC Press, 2021.

Reference Books:

1. Edwards, W. P. *The Science of Bakery Products*, United Kingdom: Royal Society of Chemistry, 2015.
2. Bali, P. S., *Theory of Bakery*, Canada: Oxford University Press, 2018.
3. Gupta, A. K., *Textbook of Bakery and Confectionery*, Daya Publishing House, a division of Astral International Pvt. Limited, 2021.

E- Resources:

1. <https://www.emsland-group.de/product-solutions/food-innovation/confectionery>
2. <http://www.corbion.com/food/confectionery/applications/soft-sugar-confectionery>
3. <https://www.bettycrocker.co.uk/how-to/how-to-make-fondant-icing>
4. <https://www.who.int/news-room/fact-sheets/detail/food-additives>
5. <https://india.oup.com/product/theory-of-bakery-and-patisserie>

Bakery Practical I

(For Students Admitted from 2025-2026)

Semester: I**Subject Code: JDBC13P****Hours/week: 8****Credit: 4****Course Objectives:**

1. To gain the working principle of equipments used in baking
2. To understand the working criteria of different factors involved in setting up and operating a baking unit

List of Experiments:

1. Study of bakery equipment - Identification and uses of equipment – large, small and utilities.
2. Study of bakery ingredients- Types of flour, Sugar, Nuts and Dry fruits, Shortenings, leavening etc.
3. Experiment on Quality Checking of Flour and Yeast.
4. Practicing Mixing Methods- Kneading, stirring, whipping, creaming.
5. Preparation of Bread Loafs- Whole wheat bread, Brown bread, Fruit bread and milk bread.

6. Preparation of Simple yeast fermented products- Bread Rolls and Sour dough.
7. Preparation of Cakes with and without icing (Rubbing, Creaming, Whisking).
8. Preparation of Flavored Breads- Basic Buns & Tomato Rolls.
9. Preparation of Rich Yeast Fermented Breads - Fermented doughnuts.
10. Visit to bakery unit.

Course Outcomes:

After successful completion of this course, student will be able to

CO1: Identify and differentiate the small and large equipment in bakery

CO2: Identify and check for quality of different types of ingredients used in bakery

CO3: Prepare and Present yeast fermented products

CO4: Prepare and Present flavored breads

CO5: Prepare and Present Breakfast breads

Text Books:

1. Jagarlamudi, L., *Bakery and Confectionery Products: Processing, Quality Assessment Packaging and Storage Techniques*, New India Publishing Agency, 2019.
2. Chlebana, R. A., *The Advanced Art of Baking and Pastry*. United Kingdom: Wiley, 2017.

Reference Books:

1. Sharma, D., *Experimental and Analytical Bakery*, Daya Publishing House, 2016.
2. O'Donnell, K., *Bakery Production Handbook*. Xlibris US, 2016.

E- Resources:

1. <https://www.ckitchen.com/blog/2019/1/bakery-equipment-lists.html>
2. <https://www.kingarthurbaking.com/recipes/the-easiest-loaf-of-bread-youll-ever-bake-recipe>
3. <https://www.bakingkneads.com/how-to-decorate-a-cake-without-frosting/>
4. <https://www.wiley.com/en-us/Practical+Baking%2C+5th+Edition-p>
5. <https://www.bakersjournal.com/company/practical-baker-2543/>

Confectionery Practical I

(For Students Admitted from 2025-2026)

Semester: I

Subject Code: JDBC14P

Hours/week: 8

Credit: 4

Course Objectives:

1. To acquire core concepts in Confectionery products and methodology through hands-on development
2. To study the basic principles in sweet-based products

List of Experiments:

1. Preparation of Basic Cake Making- Plain Sponge & Swiss Rolls.
2. Preparation of Biscuits & Cookies.
3. Preparation of Basic Pastry- Puff Pastry & Jamtart.
4. Preparation of Icings and Toppings - Fondant & Fudge.
5. Preparation of caramels and candies.
6. Preparation of Indian confectionery: Rasgulla, Gulab Jamun, Barfi, Kheer.
7. Preparation of Puddings and Desserts.

8. Preparation of Ice Cream.
9. Preparation of Marshmallow & lemon meringue.
10. Preparation of Toffees.

Course outcomes:

After successful completion of this course, student will be able to

CO1: Define and explain different pastries and derivatives

CO2: Make plan & identify the different ingredients to prepare different icing

CO3: Prepare and Present international cakes and puddings

CO4: Prepare and Store Ice Creams, Toffees and Indian Sweets

CO5: Ability to work with chocolate and sugar to create design, plates and show pieces

Text Books:

1. Davidson, I., *Biscuit, Cookie and Cracker Production: Process, Production and Packaging Equipment*, Elsevier Science, 2018.
2. Chlebana, R. A., *The Advanced Art of Baking and Pastry*, Wiley, 2017.

Reference Books:

1. Hartel, R. W., Vonelbe, J. H., Hofberger, R., *Confectionery Science and Technology*, Springer International Publishing, 2017.
2. *Hand Book of Confectionery With Formulations*, Engineers India Research Institute, 2007.

E- Resources:

1. https://www.brainkart.com/article/Preparation-of-Biscuits-and-Cookies_35199/
2. <https://www.thekitchn.com/how-to-make-soft-chewy-caramel-candies-cooking-lessons-from-the-kitchn-180832>
3. <https://www.thebookseller.com/feature/recipe-lemon-meringue-marshmallows-338733>
4. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4573112/>
5. <https://www.shiksha.com/hospitality-travel/bakery-confectionery-chp>

Entrepreneurial Skills and Productivity

(For Students Admitted from 2025-2026)

Semester: I

Subject Code: JDBC15

Hours/week: 4

Credit: 4

Course Objectives:

1. To understand the importance of entrepreneurship in enterprise
2. To acquire the concept of investment in Business

Unit I

(12 hours)

Concept of Entrepreneurship- Entrepreneur - Entrepreneurship - Enterprises: Conceptual issue Entrepreneurship vs. management, Entrepreneurial motivation. Performance & record, Role & function of entrepreneurs in relation to the enterprise & relation to the economy, Source of business ideas, Entrepreneurial opportunities, the process of setting up a business.

Unit II

(12 hours)

Project Preparation & Marketing Analysis- Qualities of a good entrepreneur, SWOT and risk analysis. Concept Application of PLC, Sales & Distribution management.

Difference between small scale & large scale business, Market survey, Method of marketing, Publicity and advertisement, Marketing mix.

Unit III (12 hours)

Institution's Support- Preparation of project. Role of various schemes and institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/non-financing support agencies to familiarize with the policies /programmes, procedure & the available scheme.

Investment Procurement- Project formation, Feasibility, Legal formalities i.e., Shop act, Estimation & costing, Investment procedure - Loan procurement - Banking processes.

Unit IV (12 hours)

Benefits- Personal/ Workman - Incentive, Production linked Bonus, Improvement in living standard.

Affecting Factors- Skills, Working aids Automation, Environment and Motivation - How it improves or slows down productivity.

Unit V (12 hours)

Comparison with Developed Countries- Comparative productivity in developed countries (viz. Germany, Japan and Australia) in select industries, e.g. Manufacturing, Steel, Mining, Construction etc. Living standards of those countries, wages.

Personal Finance Management- Banking processes, Handling ATM, KYC registration, safecash handling, Personal risk and insurance.

Course Outcomes:

After successful completion of this course, student will be

able to CO1: Acquire the knowledge to create a new business

plans CO2: Understand the functions of entrepreneur

CO3: Improve the entrepreneurship skills

CO4: Risk assessment of entrepreneur

CO5: Explore the financial management in an enterprise

Text Books:

1. Neck, C. P., Murray, E. L., Neck, H. M. *Entrepreneurship :The Practice and Mindset*, SAGE Publications, 2020.
2. *Entrepreneurship: Concepts, Methodologies, Tools, and Applications*, IGI Global, 2017
3. Bygrave, W. D., Zacharakis, A., *Entrepreneurship*, Wiley, 2019.
4. Organisation for Economic Co-operation and Development, *Better Use of Skills in the Workplace-Why It Matters for Productivity and Local Jobs*. Paris: OECD Publishing, 2017.

Reference Books:

1. Shepherd, D. A., Hisrich, R. D., Peters, M. P. *Entrepreneurship*. McGrawHill Education, 2018.
2. Bamford, C. E., & Bruton, G. D., *Entrepreneurship: The art, science, and process for success*. McGraw-Hill Education, 2016

E- Resources:

1. <https://leverageedu.com/blog/entrepreneurship-development/>

2. <https://www.vedantu.com/commerce/entrepreneurship-development-process>
3. https://edurev.in/studytube/Concept-of-Entrepreneurship-Development-Entreprene/deddfbd8-e29e-4e4c-8375-0968debc7bb3_t
4. <https://www.unido.org/our-focus/advancing-economic-competitiveness/entrepreneurship-development>.
5. <https://harappa.education/harappa-diaries/introduction-to-entrepreneurship-development/>

Mini Project

(For Students Admitted from 2025-2026)

Semester: I

Subject Code: JDBC16PW

Hours/week: 8

Credit: 8

Course Objectives:

To mentor the students with contemporary guidelines to design and conduct original and ethical research. They should be able to write a dissertation in the APA format. The research done can either be empirical/data based [quantitative/qualitative] or it can be in the form of a critical review of research and theory.

Recommended Readings:

APA manual for dissertation

Evaluation: Viva jointly by one internal and one external examiner.

Bakery Theory II

(For Students Admitted from 2025-2026)

Semester: II

Subject Code: JDBC21

Hours/week: 6

Credit: 6

Course Objectives:

1. To enable students about the functions and principles of ingredients, tool and equipment used.
2. To develop interpersonal skills in various baking procedures.

Unit I

(15hours)

Introduction to fundamental ingredients: Classification-perishables, Market survey of equipment & Equipment; Non-perishables, Semi-perishable; Selection, storage (hygiene); wheat grain structure, functionality of wheat flour components and bakery ingredients; quality testing of wheat flour and bakery products; rheology and chemistry of dough; bread industry and processes; soft wheat products and processes

Unit I

(15hours)

Breads: Classification of baking and pastry breads, Bread Rolls; Basic Procedures; Variations of Bread.

Biscuits: Classification baking various types of biscuits; Basic procedure in production.

Types of biscuits: Salted, Ice-Box, Piping, Rolling, Macrons, Tarts,

Unit III

(15hours)

Cakes: Classification baking cakes; Basic procedure Faults in baking cakes - identification and rectification. Decorative, Non-decorative cakes.

Chocolates: Fundamentals of the science of chocolate. Established industry standards in - Tempering, Moulding, modeling, enrobing, filling, show pieces, stencils, chocolate couverture.

Unit IV (15hours)

Icing and Pastries: Classification Preparing and applying various types of icing; basic procedure; tools and equipment. Flaky and Puff Preparing various mixtures, types of pastes and mixtures. Biscuits, Cheese straws; Cream Rolls

Unit V (15hours)

Accounting Procedures: Purchasing and sales Maintaining accounts procedure in a unit, Maintenance of accounts; Calculation of -selling & cost price, calculating selling price, gross profit, net profit. Taxes, Preparing invoices statement of account.

Course outcomes:

After successful completion of this course, student will be able to

CO1: Highlight the processing methods used in baking and confectionery industries

CO2: Know about the various types of food products made using baking technology

CO3: Have a basic idea about baking and confectionery manufacture and quality control

CO4: Know about the importance of each ingredient in the bakery and how it affects the overall product and its sensory and quality parameters.

CO5: Able to start a small scale bakery and confectionery unit.

Text Books:

1. Ashokkumar, Y., *Textbook of Bakery and Confectionery*, PHI Learning Pvt. Ltd, 2018.
2. Mathuravalli, S. M. D., *Handbook of Bakery and Confectionery*. CRC Press.2021.
3. Bali, P. S., *Theory of Bakery*, Oxford University Press,2018.

Reference Books:

1. Edwards, W. P., *The Science of Bakery Products*. United Kingdom: Royal Society of Chemistry, 2015.
2. Paul, V., *Textbook of Bakery and Confectionery*. Germany: Lap Lambert Academic Publishing, 2016.
3. Jagarlamudi, L., *Bakery and Confectionery Products: Processing, Quality Assessment Packaging and Storage Techniques*, New India Publishing Agency, 2019.

E- Resources:

1. https://www.researchgate.net/publication/341660500_Perishable_and_non-perishable_food_products_roles_in_environment-_A_review
2. https://snscourseware.org/snsrcas/files/CW_5d25a0d5bc884/Unit%20IV.docx
3. <https://www.craftybaking.com/learn/baked-goods/pastry/problems-and-solutions>
4. <http://gbpssi.in/admin/coursepack/MBR517Lect01.pdf>
5. [https://stclaircollege.ca/courses/bpa200-baking-pastry-cakes-decorating-theory- ii](https://stclaircollege.ca/courses/bpa200-baking-pastry-cakes-decorating-theory-ii)

Confectionery Theory II
(For Students Admitted from 2025-2026)

Semester: II
Subject Code: JDBC22

Hours/week: 6
Credit: 6

Course Objectives:

1. To understand the fundamentals in problem-solving techniques in a professional and profitable business environment in Bakery and Confectionery
2. Develop skill to analyze food quality parameters used in bakery and confectionary

Unit I (18hours)

Introduction to bakery and confectionery: Fundamentals of Food Production; Fundamentals of Food & Beverage Service; Fundamentals of Bakery; Fundamentals of Confectionery; Hygiene and Sanitation; Commodities and Costing.

Unit II (18hours)

Pastry Art Management: Introduction to Culinary Science; Baking Sweetbreads; Professional Baking Sweetbreads; Bakery Operations Management; Baking Microbiology; Baked Foods-Product Development; Baking Technology; Professional Baking Tarts & Pastries; Baked Foods Functional Ingredients & Allergens.

Unit III (18hours)

Culinary science: Culinary Fundamentals – organization, terminologies & cooking methods; Nutrition, Hygiene and Safety; Culinary Management - Menu Planning, Engineering & Costing; Introduction to Culinary & Hospitality Business; Indian Cuisines & Food Culture; Product Knowledge; Balanced Diet & Allergens; Culinary Management - Purchasing & Cost Control; Beverage and Wine Knowledge.

Unit IV (18hours)

Advanced confectioneries: Baking Arts; Biscuits, Tortes and Cakes; Frozen Desserts; Plated Desserts; Chocolate showpieces and Sugar Arts; Truffles; Advanced Breads; Modern Cake Designs; Sensory Development; Nutrition, Labeling; Food Safety and Sanitation.

Unit V (18hours)

Sensory science: 5 senses in human beings; taste system; olfaction; sensory process; sensory evaluation: uses; plan; requirement; sensory analysis booths; sensory methods-discriminative descriptive; hedonic preference; selection of panel members; sensory methods- triangle test; duo – trio test; paired comparison test.

Course Outcomes:

After successful completion of this course, student will be able to:

- CO1:** Understand the importance and role of various ingredients used in bakery and confectionary
- CO2:** Explain the importance of food costing and costing techniques.
- CO3:** Understand the different types of biscuits, cookies and their methods of manufacturing
- CO4:** Develop standard recipes and adjust the quantities using adjustment factor
- CO5:** Understand the different types of sugar confectionary products and their process products.

Text Books:

1. Ashokkumar, Y., *Textbook of Bakery And Confectionery*, PHI Learning Pvt. Ltd, 2018.
2. Mathuravalli, S. M. D., *Handbook of Bakery and Confectionery*. CRC Press, 2021.
3. Hofberger, R., Hartel, R. W., von elbe, J. H., *Confectionery Science and Technology*. Springer International Publishing, 2017

Reference Books:

1. Hartel, R. W., Elbe, J. H., & Hofberger, R. *Confectionery Science and Technology*, 2018.
2. Culinary Institute of America, *Baking and pastry: Mastering the art and craft*, 2016.
3. Paul, V., *Textbook of Bakery and Confectionery*. Germany: Lap Lambert Academic Publishing, 2016.
4. Talbot, G., *Science and technology of enrobed and filled chocolate, confectionery and bakery products*. Oxford, Wood head Publishing, 2019.

E- Resources:

1. <https://www.uou.ac.in/sites/default/files/slm/HM-301.pdf>
2. <http://www.chifss.in/pdf/FSMS-Guidance-Documents-Biscuits-Breads-Cakes-Draft-V6-for-website.pdf>
3. [https://www.intracen.org/uploadedFiles/intracenorg/Content/Exporters/Exporting_Better/Quality_Management/AssetPDF/FINAL%20Food%20safety%20and%20GHP%20-%20Gambia\(2\).pdf](https://www.intracen.org/uploadedFiles/intracenorg/Content/Exporters/Exporting_Better/Quality_Management/AssetPDF/FINAL%20Food%20safety%20and%20GHP%20-%20Gambia(2).pdf)

Baking Practicals II

(For Students Admitted from 2025-2026)

Semester: II**Subject Code: JDBC23P****Hours/week: 6****Credit: 3****Course Objectives:**

1. To equip the professional standards of baking principles
2. To gain knowledge about the quality assessment of bakery products on storage and the different finishing techniques in bakery products.

List of Experiments:

1. Group discussion on selection, storage and use of; Perishable Non-perishable Semi-perishable ingredients.
2. Demonstration and practice of the following: Rubbing in method, creaming method, Whisking method
3. Preparation of Bread Loafs- Currant Loaf, Masala Bread, Raisin Bread.
4. Preparation of Simple yeast fermented products- Bread Sticks, hand and Soft Rolls
5. Preparation of Butter sponge, Caramel cake, Madeira cake, Victoria cake.
6. Preparation of International Bread French Bread, Chelsea Buns.
7. Preparation of Flavored Breads – Hot cross buns & Garlic rolls.
8. Preparation of Rich Yeast Fermented Breads -Brioche & Savarin
9. Preparation of Laminated Yeast breads- Danish Pastry & Croissants
10. Preparation of Burger Buns & Pizza Base.

Course Outcomes:**After successful completion of this course, student will be able to**

- CO1:** Explore the concepts and processes required to produce a selection of specialty breads to include yeast/gluten breads and enriched dough
- CO2:** Demonstrate the ingredients of different 3 cakes and baking procedure
- CO3:** Design preparation methods to finishing techniques
- CO4:** Acquire skills in the preparation of food
- CO5:** Demonstrate mastery of all basic baking formulas necessary to manage a pastry operation or department.

Text Books:

1. Jagarlamudi, L., *Bakery and Confectionery Products: Processing, Quality Assessment Packaging and Storage Techniques*: India: New India Publishing Agency, 2019.
2. Chlebana, R. A., *The Advanced Art of Baking and Pastry*. United Kingdom: Wiley, 2017.

Reference Books:

1. Patil, H. *Standardization of sugar-based bakery and confectionery products*. , Lap Lambert academic Publisher, 2019.
2. Paul, V. *Textbook of Bakery and Confectionery*. Germany: Lap Lambert Academic Publishing, 2016.

E- Resources:

1. <https://whatsarahbakes.com/baking-secrets/mixing-methods/the-rubbing-in-method/>
2. <https://www.britannica.com/topic/Chelsea-bun>
3. <https://bakerpedia.com/processes/puff-pastry/>
4. <https://www.pearsonhighered.com/assets/preface/0/1/3/5/013524014X.pdf>
5. https://www.nios.ac.in/media/documents/swayam/Home_Science_Hospitality_training_Schedule_voc/training_schedule_bakery_and_confectionery256.pdf

Confectionery Practicals II

(For Students Admitted from 2025-2026)

Semester: II

Subject Code: JDBC24P

Hours/week: 3

Credit: 6

Course Objectives:

1. To learn evolving technologies equip for effective and patisserie operations.
2. To obtain the knowledge in various strategies in sensory analysis of products.

List of Experiments:

1. Preparation of Madeira Cake, Rock Cake and Fruit Cake.
2. Preparation of Fatless Sponge.
3. Preparation of piping biscuits and cherry knobs.
4. Preparation of Macarons and cream fingers.
5. Preparation of Choux Pastry.
6. Preparation of Puff Pastry & flaky pastry.
7. Preparation of veg patties and chicken patties.
8. Preparation of Marzipan.
9. Preparation of Bavarois.
10. Study on role of hygiene in products.

Course Outcomes:

After successful completion of this course, student will be able to:

- CO1:** Explore with innovation the concepts of composition, taste, design, texture and current trends for pastry through practical skills and related theory.
- CO2:** Develop techniques to adapt classical dishes and confectionery products to a contemporary style.
- CO3:** Evaluate and apply the techniques necessary to create a comprehensive range of chocolate work.
- CO4:** Creative modern plated desserts, and individual pastry products.
- CO5:** Ability to work with chocolate and sugar to create design, plates and showpieces

Text Books:

1. Davidson.I., *Biscuit, Cookie and Cracker Production: Process, Production and Packaging Equipment*, Elsevier Science, 2018.
2. Chlebana, R. A, *The Advanced Art of Baking and Pastry*, Wiley, 2017.

Reference Books:

1. Hartel, R. W., Vonelbe, J. H., Hofberger, R, *Confectionery Science and Technology*, Springer International Publishing, 2017.
2. Amit Kumar Gupta, *Textbook of Bakery and Confectionery*, Generic Publisher, 2021

E- Resources:

1. https://bharatskills.gov.in/pdf/E_Books/BakeryConfectionary2sem_TP.pdf
2. <https://www.wikihow.com/Make-Marzipan>
3. <https://bromabakery.com/foolproof-macaron-recipe-step-by-step/>
4. <https://www.allrecipes.com/recipe/258264/vanilla-madeira-cake/>
5. <https://www.education.vic.gov.au/Documents/school/principals/management/exconfecti on ery.pdf>

Major Project

(For Students Admitted from 2025-2026)

Semester: II

Subject Code: JDBC25PW

Hours/week: 12

Credit: 12

Course Objectives:

To mentor the students with contemporary guidelines to design and conduct original and ethical research. They should be able to write a dissertation in the APA format. The research done can either be empirical/data based [quantitative/qualitative/mixed methods] or it can be in the form of a critical review of research and theory.

Recommended Readings:

APA manual for dissertation

Evaluation: Viva jointly by one internal and one external examiner.

Curriculum Cell Recommendations

CIA MARKS EVALUATION REFORMS (2025-26)

CIA COMPONENTS FOR UG & PG (THEORY)

CIA SPLIT FOR UG	Marks	CIA SPLIT FOR PG	Marks
Test Average	15	Test Average	15
Attendance	5	Attendance	5
Quiz I Year / Assignment II Year / Seminar III Year	2.5	Seminar	2.5
Classroom participation	2.5	Classroom participation	2.5
Total	25	Total	25
Note: Conduct two internal tests for each course paper			

CIA COMPONENTS FOR UG & PG (PRACTICAL)

CIA SPLIT FOR UG & PG	Marks
Test Average	15
Record	5
Attendance	5
Total	25
Note: Conduct two internal tests for each course	

Evaluation criteria for e-Quiz

e-Quiz	No. of Questions :
	20 MCQs
Game-based software application	2.5 Marks
Google Forms	
ERP software	
Note: Conduct the e-quiz anyone mode of the above method. One e-quiz assessments for each semester	

Evaluation criteria for Assignment -UG I Year & II Year

Assignment	2.5 Marks
Scrapbook preparation	
Model making	
Poster making	
Case study with certificate	
Note: Anyone mode of the above method & one assignment for each semester	

Evaluation criteria for Seminar PG I & II Year, UG III Year

Seminar	2.5 Marks
Video making	
Audio integration with PPT	
YouTube upload	
Note: Anyone mode of the above method & one seminar for each semester	

Evaluation criteria for Classroom participation - All UG & PG classroom participation

Classroom Participation	2.5 Marks
Extempore activity	
Group discussion	
Tutorial learning	
Note: Anyone mode of the above method	