DEPARTMENT OF NUTRITION AND DIETETICS

UNIQUE FEATURES OF SYLLABI

Nutrition Knowledge enriches life-oriented courses in the Nutrition and Dietetics with strong foundation of nutrition science applications in different Home Science branches. Thus representing on interdisciplinary field that prefers young learners for achieving Goals in their – Profession.

Skill Enhancement course such as Yoga for holistic health in I semester, Surface Embellishment practical in II semester, Kitchen garden practical in III semesters has been included. In Food Safety and Quality Control, the methods of evaluation of food adulterants and toxic constituents are included.

Research Methodology and Statistics - Reference Management Software like Zotero/Mendeley, Software for paper formatting like LaTeX/MS Office, Software for detection of Plagiarism topics has been included and Usage of Statistical Package for Social Science (SPSS) Software - (Interpretation of Findings) has been included which is used to gather, assess, and analyze information about students' research interests.

In Medical Nutrition Therapy I - The Atkins, Ketogenic, Paleo, Low-carb High-fat diet,Covid-19 and the Role of Immune Booster Food in the Management of Fever and Infection topics, as well as the Role of FODMAP diet included, to assist students in preparing and planning nutrition-rich foods that boost the immune system, which is highly recommended in the current situation.

In Food Packaging Technology -Vaccum Packaging, Isothermal Packaging, Shrink packaging. Moisture Sorption Properties of Foods and Selection of Packaging Materials.

In Functional Foods and Nutraceuticals - Quality Assurance of probiotics and safety topic and Immune boosting nutraceuticals for infections has been included.

With the Integration of employability and entrepreneurship, the Indian fashion and apparel Industry needs design professionals with in-depth knowledge & skills relating to design innovation and technology. There is also a domestic and international requirement for Indian designers to come up with original inputs. The present challenges for the upcoming design professionals to demonstrate their personal design philosophy, perpetuate innovation and creativity. This will enable the industry to come up to the global standards to apply the knowledge of designing in various fields

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 YearRegularProgramme]
(For Students Admitted from 2024-2025)

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 inthe field of Nutrition & Dietetics
PSO2: Solve the complex problems in the field of Clinical Nutrition and dietetics with an understanding ofthe 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 uponhis 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 inreputedhospitals and food industries

PREAMBLE

Following are the changes done in the 2023-24 syllabus and the candidates who will join from 2024 -25 onwards will follow this syllabus.

The following changes have been introduced in the curriculum:

- In Semester - I, Core III Advanced Food Microbiology Unit -II -Content was changed with Advanced topic such as Advanced Culture Media Methods in Microbiology etc.
- In Semester- I, Discipline Specific Elective - I a-Public Nutrition, Public Health Policy topic was added in Unit -V.
- In Semester -I, Discipline Specific Elective - I b-Sensory evaluation of foods, Unit -V title changed as Quality Testing and Evaluation.
- In Semester - II, Discipline Specific Elective - II b Food Packaging, In Unit – II Metal packaging materials content was added.
- In Semester -III, Discipline Specific Elective III a. Food Safety and Quality Control, In Unit IV abbreviation of FSSA changed as FSSAI & Unit V was Content reframed.

PROGRAMME CODE: PND PROGRAMME STRUCTURE

Semester	SubjectCode	Course	Subject Title	Hour/ Week	Credit	CIA	ESE	Total Marks
I	IMNDC111	Core I	Advanced Food Chemistry	6	5	25	75	100
	IMNDC121	Core II	Advanced Human Nutrition	6	5	25	75	100
	IMNDC132	Core III	• Integrated Course-Advanced Food Microbiology	6	5	25	75	100
	IMNDC141	Core IV	Research Methodology and Statistics	6	5	25	75	100
	IMNDE12A/ IMNDE11B	DSE I	a. Public Health Nutrition b. Sensory Evaluation of food	6	5	25	75	100
	IMNDX1/ IMNDX1O	Extra Credit	Institutional Food Service Management / *Online Course (Food Nutrition for Healthy Living-Swayam)	-	2	-	100	100
			TOTAL	**30**	**25+2**	**125**	**375+ 100**	**500+ 100**
II	IMNDC21	Core V	Medical Nutrition Therapy I	6	5	25	75	100
	IMNDC22P	Core VI	Medical Nutrition Therapy I Practicals	6	5	25	75	100
	IMNDC23	Core VII	Advanced Nutritional Biochemistry	6	5	25	75	100
	IMNDC241	Core VIII	NutritionThrough Life Cycle	6	5	25	75	100
	IMNDE21A/ IMNDE22B	DSE II	a. Diet and Nutrition Counseling /b. Food Packaging	6	5	25	75	100
	IMNDX2PW/ IMNDX2O	Extra Credit	Scientific Writing for Project / *Online Course (Maternal Infant Young Child Nutrition-Swayam)	-	2	-	100	100
			TOTAL	**30**	**25+2**	**125**	**375+ 100**	**500 + 100**
III	IMNDC311	Core IX	Medical Nutrition TherapyII	6	5	25	75	100
	IMNDC32P	Core X	Medical Nutrition Therapy II Practicals	6	5	25	75	100

	IMNDC331	Core XI	• Integrated Course-Functional Foods and Nutraceuticals	6	5	25	75	100
	IMNDC341P	Core XII	FoodAnalysis Practicals	6	5	25	75	100
	IMNDE32A/ IMNDE31B	DSE III	a. Food Safety and Quality Control b.SportsNutrition	6	5	25	75	100
	IMESX3/ IMNDX3O	Extra Credit	Employability Skills / *Online Course (Mental Health and Nutrition-EDX)	-	2	100	-	100
			TOTAL	**30**	**25+2**	**125+ 100**	**375**	**500+ 100**
IV	IMNDC411	Core XIII	Geriatric Nutrition	6	5	25	75	100
	IMNDC42P	Core XIV	# Dietetic Internship in Hospital	6	5	25	75	100
	IMNDC43PW	Core XV	Dissertation	16	5	100	100	200
	IMNDX41/ IMNDX40	Extra Credit	Diabetic Care and Education / *Online Course (Food science and Processing-Swayam)		2	-	100	100
			Library	2				
			TOTAL	**30**	**15 + 2**	**150**	**250+**	**400+**
			GRAND TOTAL	**120**	**90+ 8**	**525+ 100**	**1375+ 300**	**1900 + 400**

DSE –Discipline Specific Elective

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

Core I - Advanced Food Chemistry

(For Students Admitted from 2024-2025)

Semester:I **Hours/week: 6**
Subject Code: IMNDC111 **Credit: 5**

Course Objectives:

1. To get a comprehensive understanding of food chemistry, including the composition of food, the role of each component, and their interactions
2. To have an effective understanding of the functions of food components and their role in food processing

Unit I **(18 hours)**

Chemistry of Food: Food & Colloids – Types and Properties; Sols – Properties; Gels – Properties and factors influencing gel formation; Emulsion – Types, formation, properties and stability of emulsions; Foams – formation, Stability and anti-foaming agents. Gelatinization, factors affecting gelatinization,

Unit II **(18 hours)**

Carbohydrates: Polysaccharides-Structure, Composition of starch, characteristics of food starches, Factors influencing gelatinization and dextrinization changes. Modified food starches- Structure, Composition and characteristics of non-starch polysaccharides such as Cellulose, Hemicellulose, Pectin and gums.

Properties of sugars and sweeteners: Sweeteners & sugar products, Role of sweetener in food products.

Unit III **(18 hours)**

Proteins & Amino Acid- Classification, Structure and Properties of proteins. Effect of heat on physio-chemical properties of proteins, Role of proteins in food products, Texturized vegetable protein and Protein concentrate.

Enzymes: Classification and its nature, Mechanism of action, Factors influencing enzyme activity, Role of enzymes in food products, Immobilized enzymes and its application in food industries.

Unit IV **(18 hours)**

Fat/Oil: Method of oil extraction, composition and properties, refining of oil and winterization, Methods to determine the quality of fat /oil. Effect of processing on Physico-chemical properties of fat/oil, Sources of fat and its shelf life, Quality changes in fat/oil during storage and prevention of fat spoilage, Fat substitutes.

Unit V **(18 hours)**

Food colors and Flavors: Pigments -Classification and properties, Effects of processing on stability of pigments in foods and the factors influencing the stability of colors in foods. Role of colors and flavors in food products. Flavor compounds in fruits, Effect of processing on food flavors in food products.

Course Outcomes:

After successful completion ofthis course, student will be able to

CO 1: Recall knowledge base of core food chemistry with an emphasis on chemical changes during processing and storage and explain the chemistry, structure, and properties of various food constituents

CO 2: Identify the nature of food components and their qualities in order to evaluate the changes in final products

CO 3: Distinguish the functionsof various food-processing components.

CO 4: Discuss the effect of processing on the physiochemical and functional qualities of various food ingredients

CO 5: Prioritize the roles of several constituents in food storage and shelf-life extension

Text Books:

1.Shakuntala Manay.N, Shadaksharaswamy.M, *Food Facts and Principles*, New Age International Publishers, 4th Edition, 2018.
2.Srinivasan Damodaran, Kirk L. Parkin, *Fennema's Food Chemistry*, CRC Press, 5th Edition,2017.
3.L.H. Meyer, *Text Bookof Food Chemistry*, CBS Publishing & Distributors, New Delhi,2006.

Reference Books:

1.Jianquan Kan, Kewei Chen, *Essentials of Food Chemistry*, Springer Publication, 2021.
2.Berk.z, *Food Process Engineering and Technology*, Elsevier Academic Press, Newyork, 3rdEdition, 2018.
1. John M.deMan, John W. Finley, W. Jeffrey Hurst, Chang Yong Lee, *Principles of Food Chemistry*, Springer Publishers, 4th Edition, 2018.
2. Fellows P J, *Food Processing Technology: Principles and Practice*, CRC Wood
3. Head Publishing Ltd., Cambridge, 4th Edition, 2016.

Journals:

1. Journal of Food Science
2. Journal of Food Science and Technology
3. Journal of Agricultural and Food Chemistry

E-Resources:

1. http://www.uprtou.ac.in/other_pdf/MFN_008.pdf
2. http://www.fao.org/3/x5738e/x5738e06.htm#TopOfPage
3. https://www.pdfdrive.com/introduction-to-proteins-structure-function-and-motion-second- edition-e187940292.html
4. https://www.pdfdrive.com/the-chemistry-of-oils-and-fats-sources- composition-properties-and- uses-e156997107.html
5. https://www.pdfdrive.com/colour-additives-for-foods-and-beverages-e40299790.html

Course Outcomes	Programme Outcomes							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
CO1	9	3	9	3	3	3	3	**33**
CO2	9	9	9	9	3	3	3	**45**
CO3	9	3	9	9	3	3	9	**45**
CO4	9	3	3	9	3	3	3	**33**
CO5	9	3	9	9	3	3	9	**45**
Total	**45**	**21**	**39**	**39**	**15**	**15**	**27**	**201**

Low-1 **Medium-3** **High-9**

Core II - Advanced Human Nutrition

(For Students Admitted from 2024-2025)

Semester: I **Hours/week: 6**
Subject Code:IMNDC121 **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 physiologicaland nutritional significance.

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.

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 andnutrient 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 therecent advances in human nutrition

Text Books:

1. Srilakshmi, *NutritionScience*, New Age International Publishers, 8th Edition, 2019.
2. Bamji, M.S., Krishnaswamy K. Brahmam 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							
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
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 2024-2025)

Semester: I **Hours/week: 6**

Subject Code: IMNDC132 **Credit: 5**

Course Objectives:

1. To obtain knowledge about important genera of microorganisms associated with role of micro-organisms 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 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 Gastroenteritics.

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, HACCP Case studies.

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 fermentationproduct and describe their roles

CO3: Differentiate the roles of bacteria, mycotoxin, viruses and parasites to food borne diseases and compare pathogensthat 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 CompanyLimited, 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							
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
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 2024-2025)

Semester: I **Hours /week: 6**
Subject Code: IMNDC141 **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 it 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 it applications Chi-Square Tests and Spearman's Rank correlation. Usage of Statistical Package for Social Science (SPSS) Software - (Interpretation of Findings).

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

Journals:

1.Journal of Advanced Research
2.Journal of Scientific Research
3.Journal of Research in Medical Sciences

E-Resources:

1. https://explorable.com/research- methodology
2. https://www.mbaknol.com/research-methodology/the-basic-types-of-research
3. https://www.pdfdrive.com/fundamental-of-research-methodology-and-statistics-e19853056
4. https://www.pdfdrive.com/spss-statistics-for-dummies-3rd-edition-e34460729.html
5. 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							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
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 2024-2025)

Semester: I **Hours/week: 6**
Subject Code: IMNDE12A **Credit: 5**

Course Objectives:

1. To enable students to identify and contribute to the prevention of public health / social health problems in the country
2. 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, PPrimary 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, Osteomalcia, 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. Nutrition education communication: Programme, Formulation, Implementation and evaluation. Education programs Role in preventing communicable diseases – Role of Audio visual aids in Nutrition Education.Nutritional policies and programs.

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.Suryatapadas, *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:
American Journal of Clinical Nutrition
International Journal of Behavioral Nutrition and Physical Activity 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							
CO	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 2024-2025)

Semester: I **Hours/week: 6**
Subject Code: IMNDE11B **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)**

Introduction to quality attributes of food: Appearance, flavour, textural factors and additional quality factors.

Gestation: Introduction and importance of gestation - Structure and physiology of taste organs- tongue, papillae, taste buds, salivary glands. Mechanism of taste perception Chemical dimensions of basic tastes- sweet, salt, sour, bitter and umami - Factors affecting taste quality, reaction time, taste modification, absolute and recognition threshold. Taste measurement- Electronic Tongue, taste abnormalities

Unit II **(18 hours)**

Olfaction: Introduction and importance of odour and flavor, Anatomy of nose, physiology of odour perception, mechanism of odour perception, theories of odour classification, chemical specificity of odour.

Odour measurement techniques: Historical perspective and emphasis on recent techniques. Olfactory abnormalities.

Unit III **(18 hours)**

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

Colour Measurement: Munsell colour system, CIE colour system, Hunter colour system - Colour abnormalities

Unit IV **(18 hours)**

Texture: Introduction, definition and importance of texture, Phases of oral processing Texture perception, receptors involved in texture perception, rheology of foods.

Texture classification: Texture measurement - basic rheological models, forces involved in texture measurement and recent advances in texture evaluation. Application of texture measurement in cereals, fruits and vegetables, dairy, meat and meat products.

Unit-V **(18 hours)**

Quality Testing and Evaluation - Product Stability; evaluation of shelf life; changes in sensory attributes and effects of environmental conditions; accelerated shelf life determination; developing packaging systems for maximum stability and cost effectiveness; interaction of package with food; Regulatory Aspects; whether standard product and conformation to standards; Approval for Proprietary Product.

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*, CRCPress 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, Hildegarde 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							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
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 2024-2025)

Semester:I

Subject Code: IMNDX1 **Credit: 2**

Course Objectives:

1.To get acquainted with the various types of food service establishments and ability to planmeals and menus

2.To gain working knowledge of the main operating activities in a food institution andunderstand 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 informationand 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 ineach establishment.

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 thesteps involved in menu planning and menu designing

CO4: Distinguish betweencommercial 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							
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
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 2024-2025)

Semester: II **Hours/week: 6**
Subject Code: IMNDC21 **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, preparationand 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 off ever and infection.

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

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 **(18hours)**

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.

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 thevarious diet-related disorders/ diseases

CO5: Develop practical skills for modify the diet asper 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.Saunder's Company, London, 14th Edition, 2016.

Journals:

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

E-Resources:

1. https://ww.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	**57**
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	3	**57**
CO5	9	9	9	3	9	9	9	**57**
Total	**45**	**45**	**45**	**27**	**45**	**45**	**39**	**291**

Low-1 Medium-3 High-9

Core VI -Medical Nutrition Therapy I Practicals

(For Students Admitted from 2024-2025)

Semester: II **Hours/week: 6**
Subject Code: IMNDC22P **Credit: 5**

Course Objectives:

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

List of Experiments:(90 hours)

Standardization of common food preparation

1. Planning and preparing diet for Obesity
2. Planning and preparing diet for Underweight
3. Planning and preparing diet for Dengue fever
4. Planning and preparing diet for Covid-19 and Omicron Infection
5. Planning and preparing diet for Tuberculosis
6. Planning and preparing diet for HIV and AIDS

7. Planning and preparing diets for Peptic ulcer
8. Planning and preparing diet for Diarrhoea
9. Planning and preparing diet for Constipation
10. Planning and preparing diet for Crohn disease
11. Planning and preparing diet for Celiac Sprue
12. Planning and preparing diet for Viral hepatitis
13. Planning and preparing diet for Cholelithiasis
14. 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 derivated nutritive value withRDA using software
CO5: Develop practical skills for modifythe diet as per the disease condition

Text Books:
1. Gopalan C, RN. Ramasastriand 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							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
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 2024-2025)

Semester: II **Hours/week: 6**
Subject code: IMNDC23 **Credit: 5**

Course Objectives:

1. To learn the novel concepts of Enzymes and its application in various field
2. To upgrade the study of nutritional principles, biochemical metabolic pathways of proteins, carbohydrates, lipids, vitamins and minerals as related to human health and disease

Unit -I **(18 hours)**

Enzymes: Classification, Properties, Coenzymes, Factors influencing enzyme action. Enzyme Specificity, Enzyme Inhibition. 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)**

Carbohydrates: Functions, Classifications, Structure, Physical and chemical properties, Biochemical importance. Metabolism and Regulation of Carbohydrates – Introduction to Metabolism, Metabolism of Carbohydrates - Glycolysis, PDH, TCA, Gluconeogenesis, Glycogenesis, Glycogenolysis, HMP Shunt, Uronic acid pathway. Glycogen storage disorders.

Unit III **(18 hours)**

Proteins: Functions, Classifications, Structure (primary, secondary, tertiary and quaternary), Physical and chemical properties, Biological importance of peptides. Metabolism and Regulation of Amino acids - Decarboxylation, Deamination, Transamination, Urea cycle. Metabolism of Phenyl Alanine, Tyrosine, Tryptophan, Histidine, Proline and Arginine. Inborn errors of amino acid metabolism.

Unit IV **(18 hours)**

Lipids: Functions, classifications. Fatty acids - Definition, Classifications, Physical and

chemical properties. Triglycerides, Phospholipids, Glycolipids, Steroids-outline study. Metabolism and Regulation of Lipids – Biosynthesis of fatty acids, Oxidation of fatty acids, Ketogenesis. Metabolism of cholesterol, Triglycerides and Phospholipids. Lipid storage disorders.

Unit-V **(18hours)**

Nucleic acids: Functions and components -Nucleotides and Nucleosides, DNA-structure, types and function. Differentiate between DNA and RNA, 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 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 SivaKumar, Dr.PendyalaKameswari, 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 IllustratedBiochemistry*, 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							
CO	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	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 2024-2025)

Semester: II **Hours/week: 6**
Subject Code: IMNDC241 **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.

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, 8thEdition, 2019.

Reference Books:

1. Kathleen Mahan and Sylvia Escort- Stump, *Food, Nutrition and Diet Therapy*, W.B.Saunder's Company London, 11th Edition, 2016.
2. Susan G. Dudek, *Nutrition Essentials for Nursing Practice*, Lippincot Williams D Wilkias, Philadelphea, 2017.
3. Abraham, *Nutrition Through Lifecycle*, New Age InternationalPrivate 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	Tota l
CO1	9	9	9	9	9	9	3	57
CO2	9	9	3	9	3	9	9	51
CO3	9	9	9	9	9	9	9	63
CO4	9	9	3	3	9	9	9	51
CO5	9	9	9	3	9	9	9	57
Total	45	45	33	33	39	45	39	279

Low-1 Medium-3 High-9

Discipline Specific Elective - II a. Diet and Nutrition Counseling

(For Students Admitted from 2024-2025)

Semester: II **Hours/week: 6**
Subject Code: IMNDE21A **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

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.counselorindelhi.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**	**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 2024-2025)

Semester: **II** **Hours/week:** 6

Subject Code: IMNDE22B **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)**

Metal Packaging Materials: Introduction to Metal Packaging, Manufacturing Processes for Metal Packaging, Design and Innovation in Metal Packaging, Food Safety and Regulatory Compliance, Future Trends and Applications.

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 - Carbondioxide, 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 Material : 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.

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, *FoodPackaging 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 MihaiGrumezescu, 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							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
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 2024-2025)

Semester:II

Subject Code: IMNDX2PW **Credit: 2**

Course Objectives:

1.To explain the structure of scientific writing, how to create a scientific writing, how to make poster for scientific writing, how to make presentation for scientific writing, how to present scientific writing and how to read a scientific writing

2.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.

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*, 3rdEdition, Publisher University of Chicago, 2011.

Journals:

1. Scientific Journal
2. Journal of Writing Research

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							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
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 2024-2025)

Semester: III **Hours/week: 6**
Subject Code: IMNDC311 **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 non-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- Enternal 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 Nephrolithasis - 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.

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 nutritionrelated 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 UniversityPress,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.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

Course Outcomes	Programme Outcomes							
CO	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 2024-2025)

Semester: III **Hours /week: 6**
Subject Code: IMNDC32P **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)

Preparation of routine hospital diets in surgical conditions- Clear fluid, Full fluid and soft diet

1. Planning and preparing diet for Burns
2. Planningand preparing diet for Phenylketouria
3. Planning and preparing diet for Atherosclerosis
4. Planning and preparing diet for Myocardial Infarction
5. Planning and preparing diet for Hypertension
6. Planning and preparing diet for Type I diabetes Mellitus
7. Planning and preparing diet for Type II diabetes Mellitus
8. Planning and preparing diet for Gestational diabetes
9. Planning and preparing diet for Acute and Chronic Renal failure
10. Planning and preparing diet for Nephrolithiasis
11. Planning and preparing diet for Dialysis
12. Planning and preparing diet for Breast cancer
13. Planning and preparing diet for Lung cancer
14. 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. Ramasastriand 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,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							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
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 2024-2025)

Semester: III **Hours /week: 6**
SubjectCode:IMNDC331 **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 dietetics.

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: Prebiotics -role of prebiotic as a functional ingredient. Probiotics-Role of probiotics as functional ingredient. Synbiotics - Role of synbiotics as functional ingredient. Health effects of probiotics including mechanism of action. Probiotics in various foods: fermented milk products, non-milk products.

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, Caffeicacid, 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.

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 andFunctional 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., *Innovationin Healthy and Functional Foods,* CRCPress, 2016.

3. Sareen S. Gropper, Jack L. Smith, *Advanced Nutrition and Human Metabolism*, Cengage Learning, 7th Edition, 2016.

Journals:

1. Nutraceuticals World
2. Journalof 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							
CO	**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 2024-2025)

Semester: III **Hours/week: 6 Credit: 5**
Subject Code: IMNDC341P

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							
CO	**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 2024-2025)

Semester: III **Hours /week: 6**
Subject Code: IMNDE32A **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 ManagementSystems,EmergingTrendsandChallengesinFoodQualityControl.

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 nationaland 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 evaluatethe recent developments inthe 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,2015

Reference Books:

1. Alli, I, *Food quality assurance: principles and practices*. CRCPress, 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							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
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 from2024-2025)

Semester: III **Hours /week: 6**
Subject Code: IMNDE31B **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 topromote 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 acids supplements - Amino Acid Supplements- BCAA, Glutamine, Arginine, Taurine. Fat burners, Ergogenic aids.

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 controlof 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*, Publishedby Churchill Livingstone, Elsevier, 2007.

Journals:

1. BritishJournal of Sports Medicine
2. International Journal ofSport Nutrition and Exercise Metabolism
3. Journal of International Societyof 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
2. https://www.pdfdrive.com/nutrition-and-metabolism-in-sports-exercise-and-health-e178549344.html
3. https://www.pdfdrive.com/essentials-of-sports-nutrition-and-supplements- e175251805.html
4. https://www.pdfdrive.com/sports-nutrition-vitamins-and-trace-elements- second- edition-nutrition- in-exercise-sport-e156737603.html

Course Outcomes	Programme Outcomes							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
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

Core XIII -Geriatric Nutrition

(For Students Admitted from2024-2025)

Semester: IV **Hours /week: 6**

SubjectCode:IMNDC411 **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 Billiary 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.

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 elderlypeople life

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

CO3: Determine different techniques of nutritional assessment ofthe 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. GaryCheuk, *Advanced Age Geriatric Care*, Springer International Publishing, 2018.
2. Srilakshmi.B, *Dietetics*, New Age International (P) Ltd, Chennai,7 th Edition, 2014.
3. Barbara Resnick, *Essentials of Clinical Geriatrics*, McGraw HillProfessional 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
5. https://www.jyotinivas.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**	**Total**
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 2024-2025)

Semester: IV **Hours /week: 6**

Subject Code: IMNDC42P **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 are port 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 offood and nutrition services

CO2: Interpret therelevance 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: Persuadethepatients 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*, OxfordUniversityPress, 4th Edition,2002.
3. A.Joshi Shubhaangini, *Nutrition and Dietetics*, 4th Edition, McGraw HillPublication, 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.Saunder's Company London, 14th Edition, 2016

Journals:

1. Journalof Nutrition and Dietetics
2. American Journal of Clinical Nutrition
3. Journalof 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							
CO	**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-Dissertation

(For Students Admitted from 2024-2025)

Semester: IV **Hours /week: 16**
Subject Code: IMNDC43PW **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							
CO	**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 from2024-2025)

Semester: IV
Subject Code: IMNDX41 **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 metaboliccontrol, internationally recognized standards of care. The evidence for good control, physical assessment and laboratory assessment.

Unit IV
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 V
Organizing a Diabetic clinic: Being part of Multidisciplinary team, documenting and monitoring quality of care, assessing and reporting outcomes
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 DiabetesCare*,John Wilney Publisher,4th Edition,2018.
3. Shashank R Joshi, *Text Bookof Diabetes*, Jaypee Brothers Medical Publishers,2020

Reference Books:
1. Kumthekar Ajit.B, *Practical management of Diabetes*, Jaypee Brothers Medical Publishers, 2011.
2. RudyBilous, 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							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
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 2024-2025)

Programme Specific Outcomes:
On completionof 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 - 24 syllabus and the candidates who will join from 2024 -25 onwards will follow this syllabus.

The following changes have been introduced in the curriculum

- In Semester II, Core IV - Human Physiology Practicals, Experiments 2 splitted into determination of blood group and RH factors and experiments 3 as Determination of Blood clotting.
- In Semester V, Discipline Specific Elective II b. Post-Harvest Technology, In Unit III content was reduced.
- In Semester VI, DSE III a. Food Adulteration- all the unit in this course was elaborated.

PROGRAMME CODE:UND PROGRAMME STRUCTURE

Semester	Subject Code	Part	Course	Subject Title	Hours /Week	Credit	CIA	ESE	Total Marks
I	IBLT112 IBLA111 IBLH111	I	Language-I	Tamil I/ Basic Arabic-I /Hindi-I	5	3	25	75	100
	IBLEIB12/ IBLEIIA12	II	Language-II	English I a orb	5	3	25	75	100
	IBNDC11	III	Core- I	Food Science	6	5	25	75	100
	IBNDC12P		Core-II	FoodScience Practicals	5	4	25	75	100
	IBNDA13l		AECCI	Basic Chemistry	5	4	25	75	100
	IBNDS142P	IV	SEC-I	Yoga for Holistic health	2	2		50	50
				Library/Browsing	1				
				Remedial/Games	1				
				TOTAL	**30**	**21**	**75**	**425**	**550**
II	IBLT212 IBLA211 IBLH211	I	Language-I	Tamil II / Basic Arabic-II/Hindi-II	5	3	25	75	100
	IBLEIB22/ IBLEIIA22	II	Language-II	English II a or b	5	3	25	75	100
	IBNDC21	III	Core–III	Human Nutrition	5	5	25	75	100
	IBNDC221P		Core-IV	Human Physiology Practicals	4	4	25	75	100
	IBNDA231		AECCII	Human Physiology	5	4	25	75	100
	IBES2	IV	GIC-I	Environmental Science	2	2		50	50
	IBNDS24P		SEC-II	Surface Embellishments Practicals	2	2		50	50
	IBNDX2/ IBNDX2O		Extra Credit	FoodHygieneand Sanitation /*Online Course (Maternal Infant Young ChildNutrition-Swayam)		2	-	100	100
				Library/Browsing	1				
				Remedial/Games	1				
				TOTAL	**30**	**23+2**	**125**	**475+ 100**	**600+ 100**
III	IBLT311 IBLA31 IBLH311	I	Language-I	Tamil III/ Basic Arabic III/ Hindi-III	5	3	25	75	100
	IBLEIB32 / IBLEIIA32	II	Language-II	English III a or b	5	3	25	75	100
	IBNDC31	III	Core-V	Nutritional Biochemistry	4	4	25	75	100
	IBNDC32P		Core-VI	Nutritional Biochemistry Practicals	4	4	25	75	100

	IBNDA33		AECC-II	Integrated Course -Food Microbiology	4	4	25	75	100
			OEC		2	2		50	50
	IBNDS34P	IV	SEC-III	Nutrition Garden Practicals	2	2		50	50
	IBHR3		GIC-II	Human Rights	2	2		50	50
	IBXTN3	V	Extension Activities	NSS/CSS	2	2	100		100
	IBNDX3/ IBNDX3O		Extra Credit	Marine Food Processing /*Online Course (Nutrition, Therapeutic and Health-NPTEL)		2	-	100	100
				TOTAL	**30**	**26+2**	**225**	**525 + 100**	**750+ 100**
IV	IBLT41 IBLA41 IBLH411	I	Language-I	Tamil IV/ Basic Arabic IV/Hindi-IV	5	3	25	75	100
	IBLEIB42 / IBLEIIA42	II	Language–II	English IV a or b	5	3	25	75	100
	IBNDC411	III	Core–VII	Family Meal Management	5	4	25	75	100
	IBNDC421P		Core VIII	Family Meal Management Practicals	4	4	25	75	100
	IBNDA43I		AECCII	# Dietetic Internship	5	4	25	75	100
		IV	OEC		2	2		50	50
	IBNDS441P		SEC-IV	Food Product Development Practicals	2	2		50	50
	IBLVE4		GIC-III	Life Skills and Value Education	2	2		50	50
	IBNDX4/ IBNDX4O		Extra Credit	Information, Educationand Communication Material in Education. /*Online Course(Food and Nutrition for Healthy Living–Swayam)		2	-	100	100
				TOTAL	**30**	**24+2**	**125**	**525+ 100**	**650+ 100**
V	IBNDC51	III	Core-IX	Diet TherapyI	6	5	25	75	100
	IBNDC52P		Core-X	Diet Therapy I Practicals	6	5	25	75	100
	IBNDC531		Core-XI	CommunityNutrition	6	5	25	75	100
	IBNDE5A/ IBNDE5B		DSE I	a.Family Resource Management / b.Basics of Textile and Apparel	4	4	25	75	100

	IBNDE5C/ IBNDE51D		DSE II	a.Food Service Management/b.Post-harvest Technology	4	4	25	75	100
	IBNDS54P	IV	SEC-V	Food Preservation Practicals	2	2		50	50
	IBWE5	IV	GIC – IV	Women Entrepreneurship	2	2		50	50
	IBESX5/ IBNDX5O		Extra Credit	Employability Skills /*Online Course (Mental Health andNutrition-EDUX)		2	125		100
				TOTAL	**30**	**27+2**	**200+ 100**	**475**	**600+ 100**
VI	IBNDC611	III	Core-XII	Diet therapyII	6	5	25	75	100
	IBNDC62P		Core-XIII	Diet therapy II Practicals	6	5	25	75	100
	IBNDC63		Core-XIV	• Integrated Course Food Safety and Quality Control	6	5	25	75	100
	IBNDC64PW		Core-XV	Project	5	3	25	75	100
	IBNDE61A/ IBNDE6B		DSE III	a. Food Adulteration b. Nutrition for Sports and Physical Fitness	4	4	25	75	100
	IBNDS65P	IV	SEC-VI	Food Adulteration Practicals	2	2		50	50
	IBNDX6/ IBNDX6O		Extra Credit	Waste Management in food industries / *Online Course.(Food Science and Processing-Swayam)		2		100	100
				Library/Browsing Centre	1				
				TOTAL	**30**	**24+2**	**125**	**425+ 100**	**550+ 100**
				GRANDTOTAL	**180**	**145+10**	**875 +100**	**2850+ 400**	**3700 +500**

AECC-Ability Enhancement Compulsory Course **SEC**-SkillEnhancement Course
DSE-Discipline Specific Elective **OEC**-Open Elective Course

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

Semester	Subject Code	Subject Title	Hours/Week	Credit	CIA	ESE	Total Marks
I	IBCHA14/ IBMBA13	AECC-I Biochemistry I	5	4	40	60	100
II	IBCHA24/ IBMBA23	AECC-II Biochemistry II	5	4	40	60	100

Open Elective Course
(All students other than Nutrition and Dietetics, Fashion Designing)

Semester	Subject code	Subject Title	Hours/Week	Credit	CIA	ESE	Total Marks
III	IBOE3HS	Food Preservation Techniques	2	2		50	50
IV	IBOE4HSP	Basic and Advanced Hand Embroidery Practicals	2	2		50	50

Core-I Food Science

(For Students Admitted from 2024-2025)

Semester:I **Hours/week: 6**
Subject Code: IBNDC11 **Credit: 5**

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 (only sources and not properties and functions), food pyramid (ICMR) and Food plate (USDA**)**. Study of various cooking methods - Dry heat method, moist method, Microwave cooking and solar Cooking.

Unit II **(18 hours)**

Cereals - Classification, and nutritive value of cereals -composition of rice, wheat, effects of cooking on parboiled and raw rice, principles of starch cookery, gelatinization. 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, Cooking Methods.

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

Unit IV **(18 hours)**

Milk: Nutritional Composition, Types of 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: classifications, 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.

Sensory evaluation of foods-methods

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, 3rdEdition, 2018.
3. John M. de Man, *Food process engineering and technology*, Academic Press, Elsevier: Londonand 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.webstaurantstore.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							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
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 2024-2025)

Semester: I **Hours/week: 5**
Subject Code: IBNDC12P **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
2. **Cereal Cookery:** Microscopic Examination of Starches, Gelatinization of starch
3. **Preparation of Fermented Foods by using Cereals and Millets:** Idli, Appam, Dosai,Bajra Porridge.
4. **Preparation of Granules:** Gluten Formation, Methods of Cooking - coarse and fine cereals.
5. **Pulse cookery:** Factors affecting Pulse Cookery – Hard water, Soft water, Soaking, Addition of acid, Alkali, Enzyme, pressure cooking- Any whole gram and any dhal
6. **Egg cookery:** Boiling and Parching, Omelet and Custard, Quality determination of Egg
7. **Meat, fish and poultry:** Methods of Cooking, Common Recipes, Tenderization.
8. **Milk cookery:** Problems in Milk Cookery and their Prevention, Milk preparations: Cheese, Curds, paneer, butter and Milk Kafir.
9. **Frying of Foods in Oil:** Smoking Temperature, Methods of Cooking.
10. **Sugar cookery:** Stages of sugar cookery, Sugar Products.
11. **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.
12. **Beverages:** Types and Preparation of beverage under the following types- refreshing, nourishing, stimulating, soothing and appetizing.
13. **Fireless Cooking:** Puffed Rice, Peanut butter balls, Chocolate truffles, Veg Hung curd Sandwich, Fruit Sushi.
14. Determine the Heat emitted by the Food Sample
15. Determine the pH value and Brix value of the Food Sample
16. 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 FoodScience 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(Ex-9)

Course Outcomes	Programme Outcomes							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
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

Core-III Human Nutrition

(For Students Admitted from 2024-2025)

Semester: II **Hours/week: 5**
Subject Code: IBNDC21 **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. SrilakshmiB., *Nutrition Science*, New Age International(P) Ltd, Publishers, 5th Edition,2019.
2. 2.Mahtab.S.Bamji, Kamala Krishnaswamy and G.N.V Brahmam, *Text Book of HumanNutrition*, Oxford and IBH Publishing Company, 4th Edition.2019.

Reference Books:

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

Journals:

1. American Journal of Clinical Nutrition
2. British Journal of Nutrition
3. The Indian Journalof 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**							
CO	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 Practicals

(For Students Admitted from 2024-2025)

Semester: II **Hours/week:4**
Subject Code: IBNDC221P **Credit:4**

Course Objectives:

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

List of Experiments: **(60 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*, Elsiever Publication, 5th Edition,2017.
2.D.M.Vasudevan, S.Sreekumari, Kannan Vaidiyanathan, *Textbook of Biochemistry for MedicalStudents*, Jaypee Publication, 9th Edition, 2019.

Reference Books:

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

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							
CO	**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	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**

Ability Enhancement Compulsory Course I - Human Physiology

(For Students Admitted from 2024-2025)

Hours/week: 5

SubjectCode:IBNDA231 **Credit: 4**

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 **(15 hours)**

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 **(15 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 **(15 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 **(15 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 **(15 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

CO 2: 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 AlliedHealth 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.

Course Outcomes	Programme Outcomes							
CO	**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

Extra Credit-Food Hygiene and Sanitation

(For Students Admitted from 2024-2025)

Semester: II

Subject Code: IBNDX2 **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., InBruinsma, B. L, InGorham, J. R., In Nip, W., InTong, P. S, & InVentresca, P,*FoodPlant Sanitation*. London: CRC Press, 2017.
2. *Fundamentals of Food Hygiene, Safety and Quality* India, I K International Publishing HousePvt.Limited, 2019.
3. 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.epathshala.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							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
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 2024-2025)

Semester: III **Hours /week: 4**
Subject Code: IBNDC31 **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, TCAcycle.

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 functionsof 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

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*, Elsiever Publication, 5th Edition,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*, Macmillan Publishers,7th Edition, 2017.
2. VictorRodwell,DavidBender,P.AnthonyWeil,PeterKennelly,KathleenBotham, *Harper'sIllustrated Biochemistry*, Lange Publishers, 30thEdition, 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							
CO	**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 2024-2025)

Semester: III **Hours /week: 4**
SubjectCode: IBNDC32P **Credit: 4**

Course Objectives:
1. To develop skills in both qualitative and quantitative estimations
2. To expertise with instrument handling skills and its application

Unit I **(12 hours)**
pH and Buffer
1. Measurement of pH
2. Determination of the Moisture content
3. Determination of Total Ash Content

Unit II **(12 hours)**
Carbohydrates:
Qualitative Test:
1. Reaction of Monosaccharide's–Hexoses- Glucose, Fructose,Galactose.
2. Reaction of Di-saccharides - Lactose, Maltose, Sucrose.
3. Reaction of Polysaccharides - Starch, Dextrin.

Unit III **(12 hours)**
Amino acids:
Qualitative Test:
1. Reactions of amino acids – Phenylalanine, Tyrosine, Tryptophan, Cysteine, Methionine, Arginine.

Unit IV **(12 hours)**
Fats:
Qualitative Test:
1. Reactions of fats and oils – General reactions of lipids (Mustard oil, Coconut oil, Olive oil
Quantitative Test:
1. Determination of Acid value number
2. Determination of Saponification value
3. Determination of Iodine value

Unit V
Demonstration on Tools of Biochemistry: **(12 hours)**
1. Chromatography
2. Photometry Colorimeter and Spectrophotometer
3. Ultra Centrifugation

Course Outcomes:
After successful completion of this lab course, student will be able to
CO 1: Understand and recognize the rule and regulations in the biochemistry lab to practice and perform the experiments in the safest way
CO 2: Apply the knowledge to execute the qualitative determination of macromolecules.
CO 3: Experiment with the parameters such as pH, Moisture, Ash, etc. in various food samples
CO 4: Measure the quantity of nutrients in the various food samples
CO 5: Create insight on advanced analytical instrument

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.RafiMohammed, *Manualof 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							
CO	**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-9 High-3

Ability Enhancement Compulsory Course II-Food Microbiology

(For Students Admitted from 2024-2025)

Semester: III **Hours /week: 4**

Subject Code: IBNDA33 **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.

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,Yearsinia 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, AText Book of Food Microbiology, INSC International Publishers, 2021.

Reference Books:

1. Matthews.K.R, *Foodmicrobiologyan Introduction*, 4th Edition, ASMPress,2017
2. Adams, MR and Moss, MO,*Food Microbiology*, New Age International (P) Ltd., NewDelhi,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							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
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

Extra Credit- Marine Food Processing

(For Students Admitted from 2024 -2025)

Semester: III

Subject Code: IBNDX3 **Credits: 5**

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 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 pickle and hydrocolloids.

Unit IV

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

Unit –V

Packaging and Labelling: Importance of packaging and labelling, functions, packaging materials, Requisites of good packages

Course Outcomes:

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

CO1: Recall the factors that influence the quality and shelflife 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 techiques

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 andfish technology*. Daya Publishing House.
3. Iqbal, A, *Microbiologyof marinefood products,* Burlington, Ontario: Delve Publishing,2021

Journals:

1. Journalof 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/ShoebulIslam/methods-of-quality-assessment-of-fish-78011081
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							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
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- Family Meal Management

(For Students Admitted from 2024-2025)

Semester: IV **Hours /week: 5**

Subject Code: IBNDC411 **Credit: 4**

Course Objectives:

1. To familiarize with the different methods of assessing nutritional status
2. To gain knowledge about the methods of assessment of nutritional problems and their implications

Unit I **(15 hours)**

Basic Principles of Meal Planning: Definition, principles involved in meal planning and factors affecting meal planning. Recommended allowance-RDA for Indians, basis for requirement, energy allowance for various activities. General concepts about growth and development through different stages of life.

Unit II **(15 hours)**

Pregnancy and lactation: Nutrition during Pregnancy - Weight gain, physiological changes, nutritional requirements, complications and nutritional problems in pregnancy. Nutrition during Lactation - physiology of lactation, hormonal control. Milk output and factors affecting it, nutritional components of colostrums and mature milk. Nutritional requirements of lactating women.

Unit III **(15 hours)**

Nutrition during Infancy: Growth and development, factors influencing growth, advantages of breast feeding, breast feeding vs bottle feeding, factors to be considered in bottle feeding. Weaning Foods - Weaning foods and commercial baby foods. Nutritional requirements of infants, feeding programme. Problems in feeding normal and premature infants.

Unit IV **(15 hours)**

Nutritional needs of pre-school children (1-5 year): Nutritional and food requirements of preschool children. Factors to be considered while planning meals for pre-school children. Eating problems of children and their management, preparation of supplementary foods using available low-cost foods. **Nutrition for School children** - Nutritional requirement, meal planning for school children, dental caries and packed lunch.

Unit V **(15 hours)**

Nutrition during adolescence: Food and nutrient requirements, changes in growth pattern, puberty, menarche, changes in food habits, binge eating disorder, predisposition to osteoporosis, anaemia, premenstrual syndrome, malnutrition due to early marriage, nutritional programmes.

Nutrition in adulthood: Food and nutrient requirements, changes in consumption pattern - physical, mental and social changes influencing meal pattern.

Nutrition in old age: Food and nutrient requirements, physical, physiological, biological and psychological changes influencing meal pattern.

Course Outcomes:

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

CO1: Identify the nutrient requirements during each stage of lifecycle

CO2: Execute the diet plan for normal and special children

CO3: Explain the importance of nutrition during physiological stages
CO4: Evaluate the dietary pattern of adolescents, adult and old age
CO5: Summarize the physiological, biological and psychological changes throughout life cycle

Text Books:
1. Mc Mahon, Kimberley, and Bernstein, Melissa, *Nutrition across Life Stages*, United States, Jones&Bartlett Learning, 2022.
2. Srilakshmi,B., *Dietetics*, New Age International Pvt. Ltd, 8th Edition,2019.

Reference Books:
1. Shepherd, Sue, et al. *Food and Nutrition throughout Life: A Comprehensive Overview of Foodand Nutrition inAll Stages of Life*. United Kingdom, Taylor &Francis Group, 2021.
2. Swaminathan M, *Essentials of Food and Nutrition (An Advanced Text Book)*. India,BangalorePrinting &Publishing Company, Limited, 2015.
3. Willams S.R. *Basic Nutrition &Diet Therapy*, Mosby, Inc., St. Louis, 15th Edition, 2016.

Journals:
1. Journal ofWorld Review of Nutrition and Dietetics
2. Journal of Nutrition Today
3. Journal of Nutrition and Dietetics

E-Resources:
1. www.scimagojr.com
2. www.foodandnutritionresearch.net
3. www.nutrition.gov
4. https://www.nutrition.org.uk/nutritionscience/life/880-preschoolchildren.html
5. https://pubmed.ncbi.nlm.nih.gov/5803053/

Course Outcomes	Programme Outcomes							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
CO1	9	9	3	3	3	3	9	**39**
CO2	9	9	9	3	3	1	9	**43**
CO3	9	9	3	1	1	1	9	**33**
CO4	9	9	1	1	1	1	3	**25**
CO5	9	9	3	3	1	1	9	**35**
Total	**45**	**45**	**19**	**11**	**09**	**07**	**39**	**175**

Low-1 Medium-3 High-9

Core VIII –Family Meal Management Practicals

(For Students Admitted from 2024-2025)

Semester:IV **Hours/week: 4**
SubjectCode:IBNDC421P **Credit:4**

Course Objectives:
1. To help students to understand the basis of meal planning and describe the nutritional needs through life cycle
2. To gain knowledge on Therapeutic diet on appropriate nutritional management, develop an attitude and capacity for taking up dietetics as a profession.

List of Experiments: **(60 hours)**

1. Planning, preparing and serving a meal for a Pregnant Woman.
2. Planning, preparing and serving a meal for a Lactating mother.
3. Planning and preparing an indigenous weaning mix, Indian Multipurpose food (CFTRI),win food, malted food.
4. Planning, preparing and serving a meal for an infant of 0 to 6 month
5. Planning, preparing and serving a meal for toddlers of 1 to years.
6. Planning, preparing and serving a meal for a preschool child.
7. Planning, preparing and display a packed lunch for Preschool Children.
8. Planning, preparing and serving a meal for a school going children.
9. Planning, preparing and serving a meal for an adolescent girl and boy.
10. Planning, preparing and serving a meal for an adult in Sedentary Worker
11. Planning, preparing and serving a meal for an adult in moderate Worker
12. Planning, preparing and serving a meal for an adult in heavy worker.
13. Planning, preparing and serving a meal for low-income family
14. Planning, preparing and serving a meal for Middle income family
15. Planning, preparing and serving a meal for high-income family.
16. Planning, preparing and serving a meal for an old age person.

Course Outcomes

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

CO1: Define the terminologies of human life span and explain nutritional requirements at different stages of the lifespan

CO2: Prepare a menu planning for different age group

CO3: Calculate the nutrients in the planned diet chart

CO4: Validate the calculated nutrients to RDA

CO5: Construct the food guidelines for different age group

Text Books:

1. Nutrient requirements and Recommended Dietary Allowances for Indians,ICMR,National Institute of Nutrition, Hyderabad,2014.
2. Dietaryguidelines for Indian**,** ICMR, NationalInstituteof Nutrition, Hyderabad, 2014.

Reference Books:

1. Swaminathan M, *Advanced Textbook on Food and Nutrition* Volume-2, Bapcco Publisher, 2015.
2. AkanshaYadav,Monika Arora, Swayam siddha, *Practical Manual of Nutrition and Dietetics*, Kalpaz Publications,2019.
3. JoanGandy, *Manualof Dietetic Practice*, Wiley- BlackwellPublishers, 6thEdition, 2019.

Journals:

1. Journal of World Review of Nutrition and Dietetics
2. Journal of Nutrition Today
3. Journal of Nutrition and Dieteti

E-Resources:

1. www.scimagojr.com
2. www.foodandnutritionresearch.net
3. www.nutrition.gov
4. https://www.nutrition.org.uk/nutritionscience/life/880-preschoolchildren.html
5. https://pubmed.ncbi.nlm.nih.gov/5803053/

Course Outcomes	Programme Outcomes							
CO	**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

Ability Enhancement Compulsory Course- II Dietetic Internship

(For Students Admitted from 2024-2025)

Semester-IV **Hours/Week:5**

Subject Code: IBNDA431 **Credit: 3**

Course Objectives:

1. To develop practitioner skills for entry-level dietitians who are able to assume leadership roles to improve a maintain the nutritional care of diverse individuals, families and communities within national and global populations
2. To prepare graduates to be competent entry-level dietitians

Aspects to be covered in the Dietary Internship training programs (75 hours)

It is compulsory for all the students to complete the given institutional training programs in reputed institution for a period of 15 days. At the end of the final year, each student has to submit a report of the training and undergo a viva voce examination.

Marking system is as follows: Internal marks will be awarded by the faculty of the department with whose guidance the report is prepared.

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. Supervising the delivery of trays to the patient.
5. Getting feedback from patients regarding diets.
6. Understanding the layout of hospital dietary unit.
7. Acquiring practical knowledge in diet counseling.
8. Undertaking two case studies at hospital situation.

Course Outcomes:

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

CO1: Identify nutrition-related problems and determine and evaluate nutrition intervent

CO2: Explain the work of inter professional teams and the roles of others with whom the registered dietitian nutritionist collaborates in the delivery of food and nutrition services.
CO3: Interpret and apply nutrition concepts to evaluate and improve the nutritional health of individuals with medical conditions
CO4: Apply the knowledge for diet counseling and competent to manage catering outlet
CO5: Determine and translate nutrient needs into menus for individuals and groups across the lifespan, indiverse cultures and religions

Course Outcomes	Programme Outcomes							
CO	**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

Extra Credit- Information Education and Communication Materials in Education
(For Students Admitted from 2024-2025)

Semester: IV
Subject Code: IBNDX4 **Credit:2**

Course Objectives:
1. To familiarize the different types of audio- visual aids
2. To know the emerging trends in educational technology in their teaching field

Unit I
Concept of IEC Material: Meaning, objectives, characteristics of IEC Material - Importance and scope office material for development- Different types of IEC materials for development- Role of IEC material for development in various level.

Unit II
Guidelines for Development of IEC Materials: Selection of IEC material: Strength and Limitations of Various IEC materials - Criteria for selecting IEC material - IEC materials for combining for greater impact
Developing a creative brief - Importance of creative brief. - Elements of creative brief Preparing prototype IEC materials.

Unit III
IEC Materials for Development: Graphics and audiovisual charts, posters, flashcards,flexes, flip books, pamphlets, leaflets, brochures, booklets, modules, manuals Mass Media: IEC materials for radio, television, newspapers and magazines - Radio scripts writing - T.V. programme scripts writing - Newspaper, magazine article writing.

Unit IV
Emerging Trends in Educational Technology: Educational Technology in Formal Education, Non- Formal Education, Informal Education, Distance Education and Open

Learning Systems;

Uses of Communication Technology in Teaching: Videotape, Radio- Vision, Tele conferencing, CCTV, INSAT, Computer simulated Multimedia approach and problems of introducing new technologies in the Indian context.

Unit V

Using internet as pedagogical and communication tool: Using the Internet for teaching & research. - Website and web pages, Internet connectively – Browsing the Internet – Using Internet as an Educational Communication Tool: Online conferencing, Videoconferencing, Conferencing & internet forums, Newsgroups & Blog, Wiki, Discussion Board, Chat Rooms, E- Journal, Digital libraries, Online Examinations.

Course Outcomes:

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

CO1: Recall the process of preparing appropriate IEC materials and understanding the knowledge of communication

CO2: Illustrate the various types of IEC materials

CO3: Categorizing the emerging trends in educational technology **CO4:** Examining the communication technology in teaching **CO5:** Preparing the pedagogicaltool for education

Text Books:

1. AgarwalJ.C, *Essential of Educational technology, Innovation learning,* Vikas Publishing House Pvt. Ltd, New Delhi,3rd Edition,2014.

2. *The Future of Innovation and Technology in Education: Policies and Practices for TeachingandLearningExcellence*. United Kingdom, Emerald Publishing Limited, 2018.

Reference Books:

1. Kumar SanjayPushp Lata, *Communication Skills***,** Oxford UniversityPress,2015
2. Rajaraman V, *Introduction toInformation Technology,* PHI Learning Publisher, 3rd Edition, ,2018.
3. Kumar KevalJ, *Mass communication in India,* Jaico Publishing House, 5th Edition,2021.

Journals:

1. Journal of Education Reform
2. Journal of Information Systems Education
3. Journal of Communications in Information Literacy

E-Resources:

1. www.eric.ed.go
2. www.comminit.com
3. www.ncbi.nlm.nih.gov
4. https://elearningindustry.com/top-educational-technology-trends-2020-2021
5. https://www.theasianschool.net/blog/role-of-internet-in-education/

Course Outcomes	Programme Outcomes							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
CO1	9	9	3	1	1	9	3	**34**
CO2	9	9	9	1	1	9	1	**39**
CO3	9	9	9	3	1	9	1	**41**
CO4	9	9	9	3	1	9	1	**41**
CO5	9	9	3	3	1	9	1	**35**
Total	**45**	**45**	**33**	**11**	**05**	**45**	**6**	**190**

Low-1 **Medium-3** **High-9**

Core -IX Diet Therapy-I

(For Students Admitted from 2024-2025)

Semester-V **Hours/Week: 6**

SubjectCode: IBNDC51 **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 DietTherapy*, 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 Abstractsand 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/healthlyliving/healthy-nutrition
4. http://www.lllnutrition.com/mod_lll/TOPIC12/m121.pdf
5. https://slideplayer.com/slide/6183777/

Course Outcomes	Programme Outcomes							
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Total
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 -X Diet Therapy - I Practicals

(For Students Admitted from 2024-2025)

Semester-V **Hours/Week: 6**
Subject Code: IBNDC52P **Credit: 5**

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 **(18 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 **(18 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 **(18 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 **(18 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 **(18 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

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 InstituteofNutrition, Hyderabad, 2021.

Reference Books:

1. Brenda Davis,Kick *Diabetes Essentials: The Diet and Lifestyle Guide*, Healthy Living Publications, 2019

2. JoanGandy, Manualof Dietetic practice published byWiley,2019

3. KathleenD. Bauer,Doreen Liou, *Nutrition Counselling and Education Skill Development*, Published by Cengage Learning,2020.

Journals:

1. The American Journal of Clinical Nutrition
2. Nutrition Abstractsand 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_lll/TOPIC12/m121.pdf
5. https://slideplayer.com/slide/6183777/

Course Outcomes	Programme Outcomes							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
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

Core-XI - Community Nutrition

(For Students Admitted from 2024-2025)

Semester:V **Hours /week:6**

Subject Code: IBNDC531 **Credit:5**

Course Objectives:

1. To enable students to impart nutrition education among rural and needy people modification

2. To acquaint knowledge regarding food security and government and international program running in the field of community nutrition

UnitI **(18hours)**

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 hour)**

Strategies to overcome malnutrition: Measures to overcome malnutrition-Increased agricultural production and nutritious foods and nutrition gardens, food technology, food fortification and enrichmet, 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 hour)**

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 hour)**

National and International agencies in uplifting the nutritional status – FAO, WHO, UNICEF, CARE, ICMR, ICAR, CSIR, CFTRI. NIN, NNMB CFTRI, DFRL and NIPCCD, ICDS, SLP and MOM

Unit V **(18 hour)**

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 andUNISA,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							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
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

Core-XII Diet Therapy-II

(For Students Admitted from 2024-2025)

Semester:VI **Hours/week: 6**
SubjectCode:IBNDC611 **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 drug interaction 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 -dietarycarbohydrate 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 oftherapeutic 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,6thEdition, 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 Abstractsand 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	**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 - XIII Diet Therapy - II Practicals

(For Students Admitted from 2024-2025)

Semester: VI **Hours/week: 6**
SubjectCode:IBNDC62P **Credit: 5**

Course Objectives:

1. To understand the therapeutic diets for various diseases – Diabetes, CVD, Hypertension, Renal disease and GI problems
2. 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)**

1.Planning, preparation and calculation of diet for Hyperlipidemia

2.Planning, preparation and calculation of diet for Hypertension

3.Preparation and calculation of diet in Atherosclerosis

4.Planning, preparation and calculation of diet for High fiber

5.Planning, preparation and calculation of diet for Type I Diabetes mellitus

6.Planning, preparation and calculation of diet for Type II Diabetes mellitus

7.Planning, preparation and calculation of diet for Low sodium diet

8.Planning, preparation calculation of diets for Glomerulonephritis

9.Planning, preparation and calculation of diet for Acute and chronic Renal Failure

10.Planning, preparation and calculation of diet for Renal calculi

11.Planning, preparation and calculation of diet for Gout

12.Planning, preparation and calculation of diet for Allergy

13.Planning, preparation and calculation of diet for Cancer

14.Planning, preparation and calculation of diet for Burns

15.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 inplanning therapeutic dietsusing 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

Reference Books:

1. ShubhanginiA. 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 Abstractsand 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							
CO	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 XIV Food Standard and Quality Control

(For Students Admitted from 2024-2025)

Semester-VI **Hours/Week:** 6
Subject Code: IBNDC63 **Credit:** 5
Course Objectives:

1. To gain knowledge on food safety and food laws
2. To study about quality control and common food standards

Unit I **(18 hours)**

Food Safety: Meaning, Concept, Importance of Safe Food, Factors affecting Food Safety, Current Challenges to Food Safety. Quality Control-Definition, concept, Importance and Functions. WHO assisted Activities in Food Safety, Role of Central Food Laboratory and State Food Laboratories, Duties of Public Analyst and Food Inspector.

Unit II **(18 hours)**

Food Quality Assurance: Meaning, Principles, Total Quality Management (TQM) – Meaning, Concepts, Need, Components, MP, GHP. HACCP – History, Principle, Guidelines for application of HACCP.

Unit III **(18 hours)**

Food Laws and Regulations: History of Regulations in India, FAO, WHO, CODEX Alimentarius, BIS, AGMARK, Consumer Protection Act, FSSAI, PFA, Essential Commodities Act, Export Act, FPO, ISO22000, ISO 9000 Series, HALAL.
Guidelines for Food Labelling: Name of the food, weight, ingredients, date and storage conditions,preparation instructions, name and address of manufacturer.

Unit IV **(18 hours)**

Food Quality Indices: Meat and Meat Products, Fish and Fish Products, Milk and Dairy Products, Vegetables, Fruits and their Products, Grains, Pulses and Oil Seeds Coffee Tea and Spices Food Adulteration**:** Definition, Nature of Adulterants, Methods of Evaluation of Food Adulterants and Toxic Constituents.
Additives: Meaning, Classification, Types of Additives.

Unit V **(18 hours)**

Sensory Assessments – Sensory Assessments on food quality (appearance, taste, texture, flavor). Different methods of sensory analysis- Difference test, Paired Comparison and Duo-

trio Test, Ranking test –Ranking and hedonic rating- Sensitivity Test-Threshold and Dilution

Test- Descriptive test and preparation of scorecard.

Course Outcomes:
After successful completion of this course, student will be able to
CO1: Recall the application of food quality and food safety system and explain the international systems of standards
CO2: Illustrate the importance of food quality standards
CO3: Examine the chemical and microbiological quality of food samples
CO4: Evaluate the adulteration in food samples
CO5: Review of legislative approaches for the management of food safety

Text Books:
1. Thomas Ohlsson, Nils Bengtsson, Minimal *Processing Technologies in the Food Industry –Business &Economics,* Publisher CBS,2002.
2. Gustavo V. Barbosa-Canovas, Maria S. Tapia, M. Pilar Cano, *Technology & Engineering*, CBSPublishers and Distributors,2004.

Reference Books:
1. Philip,A.C. *Reconceptualizing Quality.* New Age International Publishers, Bangalore, 2001.
2. Bhatia,R. and Ichhpujan,R.L. *Quality Assurance in Microbiology.* CBS Publishers and Distributors, New Delhi, 2004.
3. Kher, C.P. *Quality Control for theFood Industry*. ITC Publishers, Geneva, 2000.

E-Resources:
2. www.fao.org
3. www.teaboard.gov.in
4. www.fssai.gov.in
5. https://www.eolss.net/Sample-Chapters/C10/E5-08-04.pdf
6. https://www.slideshare.net/shuchij10/sensory-assessment

Course Outcomes	**Programme Outcomes**							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
CO1	9	3	9	9	9	3	9	**51**
CO2	9	3	3	3	3	1	9	**31**
CO3	9	9	9	3	1	1	9	**41**
CO4	9	9	3	3	3	1	9	**37**
CO5	9	3	1	1	3	1	9	**27**
Total	**45**	**27**	**25**	**19**	**19**	**7**	**45**	**187**

Low -1 Medium-3 High-9

Core XV-Project

(For Students Admitted from 2024-2025)

Semester: IV **Hours /week: 6**

Subject Code: IBNDC64PW **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 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							
CO	**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 -Waste Management in Food Industries
(For Students Admitted from 2024-2025)

Semester: VI
SubjectCode: IBNDX6 **Credit: 2**

Course Objectives:
1. To have a thorough understanding of the processing and management of waste products
2. To instill a fundamental understanding of waste disposal and sanitation

Unit I
Introduction: Classification of waste. Characterization of food industrial wastes from Fruit and vegetable processing industry, Beverage industry; Fish, Meat & Poultry industry, Sugar industry and Dairy industry.

Unit II
Treatment methods for liquid wastes from food process industries; Design of Activated Sludge Process,Rotating Biological Contactors, Trickling Filters, UASB, Biogas Plant.
Unit III
Treatment methods of solid wastes: Biological composting, drying and incineration; Design of Solid Waste Management System: Landfill Digester, Vermicomposting Pit.

Unit IV
Bio filters and Bio clarifiers, Ion exchange treatment of waste water, Drinking-Water treatment, Recovery of useful materials from effluents by different methods.

Unit V
Waste disposal methods – Physical, Chemical & Biological; Economical aspects of waste treatment anddisposal.

Course Outcomes:
After successful completion of this course, student will be able to
CO1: Define and summarizing the agricultural waste and byproducts that are beneficial
CO2: Categorize a variety of waste-treatment equipment
CO3:Establish various wastewatertreatment and disposal technologies
CO4: Choose from a number of waste water treatment options, all of which are available froma various sources
CO5: Evaluate how byproductsand waste materials are utilized

Text Books:
1. Thakur, M., Modi, V. K., Khedkar, R & Singh, K., *Sustainable Food Waste Management: Conceptsand Innovations*. Springer. 2020.
2. Banu, R., Kumar, G., Gunasekaran, M., &Kavitha, S, *Food waste to valuable resources: Applicationsand management*, Academic Press.2020.
Reference Books:
1. Yaser, A. Z. , *Advances in Waste Processing Technology*, Springer,2020.
2. Bhat, R,*Valorization of Agri-food Wastes and By-products: Recent Trends, Innovations andSustainability Challenges*, Netherlands: Elsevier Science.2021.

3. Galanakis C.M,*Food Waste Recovery: Processing Technologies, Industrial Techniques, andApplications,*Academic Press,2020.

Journals:

1. International Journal of Environment and Waste Management
2. Journal of Waste Management and Disposal
3. Journal of Waste Management

E-Resources:

1. www.omicsonline.org
2. www.imedpub.com
3. www.imedpub.com
4. https://www.slideshare.net/Ankit7733/biofiltration
5. https://byjus.com/biology/waste-disposal/

Course Outcomes	Programme Outcomes							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
CO1	9	3	3	3	3	1	3	**25**
CO2	9	3	9	3	3	3	3	**33**
CO3	9	9	9	9	3	1	9	**49**
CO4	9	3	9	3	1	1	3	**29**
CO5	9	9	9	9	1	1	3	**41**
Total	**45**	**27**	**39**	**27**	**11**	**7**	**21**	**177**

Low-1 Medium-3 High-9

Discipline Specific Elective –I a. Family Resource Management

(For Students Admitted from 2024-2025)

Semester:V **Hours /week:4**

Subject Code: IBNDE5A **Credit: 4**

Course Objectives:

1. To educate student about management in the family as wellas in other sphere of life
2. To make student aware about maximum utilization oftheir 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, goalsand standards)
Management Concepts- Goals and Values – their relationship to decision making.

UnitII **(12 hours)**

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 utilizedto 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 consider 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 **(12 hours)**

Savings: Meaning, objectives, Needs for savings in the family, types of savings institutions and schemes. **Consumer:** Meaning and definition of consumer, consumer rights. Problems faced by the consumer.

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*, *AnIntroduction to Family Resource Management***,** Publisher CBS,2019.
3. TamiJames Moore, Sylvia M. Asay, *Family Resource Management***,** Publisher CBS,2017.

Journals:

1. Research Journalof Family, Community and Consumer Sciences.
2. Journal of Familyand 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							
CO	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

Discipline Specific Elective – I b. Basics of Textile and Apparel

(For Students Admitted from 2024-2025)

Semester:V **Hours/Week:4**
Subject Code:IBNDE5B **Credit:4**
Course Objectives:

1. To familiarize the fashion design concepts and factors influencing fashion changes
2. To impart the knowledge of fibers, their sources, identification and properties

Unit I **(12 hours)**

Introduction to textile fiber to fabric

Textile fiber and its classification - properties, manufacturing process and their end uses of natural and man-made fibers. Fabric formation - woven, knitted and non-woven fabrics. Textile finishes and its classification.

Unit II **(12 hours)**

Textile Wet Processing

Textile preparatory processes -Dyeing and printing and its classification - Dyeing and printing Methods-Tie and dye, batik ,natural-Block, screen, stencil, digital and Roller printing .

Unit III **(12 hours)**

Concepts of Apparel Designing:

Introduction to Apparel Designing- elements and principals of designing –Illustration and parts of garments - colour theories - fashion terminologies – fashion cycle and fashion theories, Haute couture and Pret - a - porter.

Unit IV **(12 hours)**

Introduction to Apparel

Introduction to sewing machine, parts and functions - body measurements. Principles of pattern making – and its Methods. Seams and Seam finishes - Process of apparel manufacturing. Quality, care and maintains of apparel.

Unit V **(12 hours)**

Traditional textiles and Embroidery

Introduction of Indian traditional textiles and embroidery -Tamil Nadu-Kerala, Karnataka - Andhra Pradesh-Madhya Pradesh-Uttar Pradesh-Gujarat-Rajasthan, Punjab-Jammu and Kashmir.

Course Outcomes:

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

CO1: Recall the basic concept of textile and apparel and understanding the knowledge of textile material

CO2: Identifying the methods of fabric formation and processing

CO3: Analyzing the concept of apparel design elements and fashion cycle

CO4: Assessing the design development and apparel production

CO5: Develop knowledge about Indian traditional textiles and embroidery

Text Books:

1. HollyM. Kent ,—*Teaching Fashion Studies*, BloomsburyPublishing,2018
2. Sekhri, Seema, *Fabric science*‖ , *fundamentals to finishing*, PHI Learning 3rd Edition Pvt LtdPublisher, 2020.
3. Janarthanan U —*World History of Textiles and Costumes*, Amazon Digital Services Publisher, US, 2020.

Reference Books:

1. J N Shah, Guide to Wet Textile Processing Machines‖ , Elsevier Science and Technology,2015.
2. Angela, Damayanthie Eluwawalage, Laura Petican, Mariam Esseghaier,*New Developments in FashionStudies*, BrillPublishing,2019.
3. Carolyn mair, *The Psychologyof Fashion*, Taylor and Francis Publisher, 2018.

Journals:

1. Journal of Clothing and Textile
2. Journal of Designing Apparel For Consumers
3. International Journal of Textile Science Research

E Resources:

1. www.TextileLearner.com
2. www.Dyeing World.Com
3. https://www.brainkart.com/article/Seam-Finishes-and-Types-of-Seam-Finishing_35626/
4. http://textilelearner.blogspot.com/2014/11/the-basic-fundamentals-of-apparel.html
5. https://www.researchgate.net/publication/215616545_Decorative_Design_History_In_Indian_Textiles_Costumes

Course Outcomes	Programme Outcomes							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
CO1	3	3	3	3	3	9	9	**33**
CO2	3	3	3	9	3	3	9	**33**
CO3	9	9	3	9	3	9	9	**51**
CO4	3	3	3	9	3	3	9	**33**
CO5	9	9	9	9	3	3	9	**51**
Total	**27**	**27**	**21**	**39**	**15**	**27**	**45**	**201**

Low-1 **Medium-3** **High-9**

Discipline Specific Elective II a. Food Service Management

(For Students Admitted from 2024-2025)

Semester:V **Hours /week:4**
SubjectCode:IBNDE5C **Credit:4**

Course Objectives:

1. To create awareness on the organizational aspect and functioning of different types of food service institutions
2. To develop managerial skills among the students

Unit I **(12 hours)**

Food Service Institutions: Types of food service Institution, Commercial and Non-Commercial Institutions. Commercial -Hotel, Motel, Restaurant, Bar, Pub, Fast Food Restaurant, Popular Catering. Non-Commercial-Transport Catering, welfare catering, Industrial Catering, Leisure linked Catering.

Unit II **(12 hours)**

Food plant -Types of Kitchen. Layout of different food service units, Types of lighting and ventilation adopted in different units such as Kitchen, storage and dining area, Work simplification process.

Unit III **(12 hours)**

Equipment used in Food service industries: Classification of equipment, Application of electrical and non-electrical equipment for food storage, Preparation, Serving, Dish-washing. Kitchen equipment's selection and care.

Unit IV **(12 hours)**

Quantity food preparation: Menu planning – Types of menu, Standardization and standardized recipes portion control. Quantity Food Service: Types of service, Styles of service - Waiter, waitress service, Counter service - snack bar, buffet service, Banquet.

Unit V **(12 hours)**

Buying and accounting procedures in food service institution: Budget preparation, Portion control, Methods of cost control, Cost accounting, Cost concepts- Types of cost, Food cost control factors, Break even analysis. System of book keeping - Cash book, Purchase book, Sales book and purchase returns book, Sales returns book and journals. HACCP - Definition, Principles of HACCP.

Course Outcomes:

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

CO1: Explain the interdependent components of the international hospitality and tourism industryand understand the rolesof national and state visitors' authorities, marketing and sales
CO2: Applymanagement skills needed ina food service production
CO3: Emphasize problem solving tools with in food service careers
CO4: Evaluate the professional lodging specific technical skills, supervisory techniques and management skills in food service management
CO5: Monitor the quality controlin food product and service

Text Books:

1. Sethi, M. Malhan,S, *Catering Management: An integrated approach*, New AgeInternational Publisher,2010.

2. Sudhir Andrews, *Food and Beverage Service Training Manual*, Tata McGraw Hill Publishing Company Ltd New Delhi,2nd Edition,2011.

Reference Books:

1. Mohini Sethi and Surjeet Malhan, *Catering management- An integrated approach*, New Age International Publishers,3rdEdition, 2015.
2. Mohini Sethi, *Institutional food management*, New Age International Publishers. 2ndEdition, 2016

Journals:

1. Journal of Food Service
2. Journal of Food Service Management & Education
3. Journal of Food Service Business Research

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							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
CO1	9	3	1	3	3	1	9	**29**
CO2	9	3	1	3	3	3	9	**31**
CO3	9	9	3	3	3	1	9	**37**
CO4	9	3	1	1	3	1	9	**27**
CO5	9	9	3	9	9	3	9	**51**
Total	**45**	**27**	**9**	**19**	**21**	**9**	**45**	**175**

Low -1 Medium –3 High-9

Discipline Specific Elective II b. Post-Harvest Technology

(For Students Admitted from 2024-2025)

Semester:V **Hours/week:4**

Subject Code: IBNDE51D **Credit: 4**

Course Objectives:

1. To gain knowledge on food safety and to reduce losses between harvest and consumption
2. To enhance the students to understand the environment, parameters, causes of post-harvest loss, management and value addition

Unit I **(12 hours)**

Introduction to Post harvest technology: Introduction to post harvest technology, Need, Scope and Importance. Post-Harvest technology for cereals, legumes, oilseeds, vegetables, and spices (cleaning, grading, milling), hydrothermal treatment, and conditioning of grains, Drying Principles, Crop Drying methods, selection criteria for dryers.

Unit II **(12 hours)**

Unit Operations: Introduction to various post-harvest operations such as Primary, Secondary

and Tertiary Operation, Cleaning, grading, Harvesting, Transportation, Handling and storage. Post- Harvest treatments- Pre-Cooling, Curing, Inhibition of Sprouting and Fungicide Application and Ripening

Unit III **(12 hours)**

Post harvesting technology: Importance of post-harvest processing for cereals, legumes, and oilseeds. Techniques for harvesting and handling crops to minimize losses and maintain quality. Methods and importance of drying to prevent spoilage and preserve quality. Overview of milling and processing techniques for cereals, legumes, and oilseeds , Value Addition and Product Diversification Sustainable practices and technological innovations in post-harvest processing.

Unit III **(12 hours)**

Post-Harvest Processing of fruits and vegetables: Methods of Harvesting and Post- harvest losses in fruits and vegetables. Introduction to the storage of fruits and vegetables. Principle of storage of fruits and vegetables. Recommended storage operation conditions for some important fruits and vegetables and their storage life. Introduction to Packaging of fruits and vegetables and types of packaging. Concept of modified atmosphere packaging.

Unit V **(12 hours)**

Post-Harvest Processing of Spices, condiments and Processing: Methods of Harvesting; Cleaning, grading Threshing, Blanching, Drying of Black pepper, Curing and Garbling of Cardamom, Peeling, drying and polishing of Ginger, Post harvesting operations of Chilies, Nutmeg and Mace, Cinnamon, Seed spices- Stage of harvesting. Grading of tea; wet and dry method of coffee Processing- Packaging and storage. Post-harvest losses.

Course Outcomes:

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

CO1: Recall the principle underlying Post-Harvest Technology and understand the knowledge of post-harvest management of foods

CO2: Classify the importance and methods of post-harvest conservation of foods

CO3: Outline the post-harvest processing in Major crops

CO4: Estimate the shelf stability of product in storage and post-harvest processing of temperate crops

CO5: Determine the quality parameters of plantation crops during Post-harvest operations

Text Books:

1. Chakraborty, *Post-Harvest Technology of Cereals, Pulses and Oilseeds*, Oxford & IBH Publishing Co. Pvt Ltd, 3rd Edition,2019

2. Sergio Tonettode Freites and Sunil Pareek, *Postharvest Physiological Disorders in Fruits and Vegetables*, Innovations in Post harvest Technology Series, 2019.

Reference Books:

1. BrizzolaraS, *Postharvest Technology of Fruits and Vegetables* Hard cover, 2020.

2. Charis M. Ganalakis, *Food losses, Sustainable Post Harvest and Food Technologies,* AcademicPress,2021.

Journals:

1. Journal of Post Harvest Technology
2. Journal of Processing and Post Harvest Technology
3. Journal of Horticulture and Post Harvest Technology

E-Resources:

1. http://ecoursesonline.iasri.res.in/course/view.php?id=164
2. http://www.fao.org/3/x5672e/x5672e08.htm
3. https://www.agrifarming.in/post-harvest-technology-of-cereals-pulses-and-oilseeds
4. https://onlinecourses.swayam2.ac.in/cec20_ag02/preview#:~:text=Post%2Dharvest%20technologies%20constitute%20an,food%20and%20nutritional%20requirements%20o

5.https://agritech.tnau.ac.in/postharvest/pht_spices.html

Course Outcomes	Programme Outcomes							
CO	**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

Discipline Specific Elective - III a. Food Adulteration

(For Students Admitted from 2024-2025

Semester: VI **Hours/week: 4**
SubjectCode:IBNDE61A **Credit: 4**

Course Objectives:

1. To impart knowledge in the legislatory aspects of adulteration.
2. To educate about standards and composition of foods and role of consumer

Unit I **(15 hours)**

Introduction to Food Adulteration - Definition and types of food adulteration, Historical context and prevalence of food adulteration, Impact on public health, consumer confidence, and industry reputation.

Unit II **(15 hours)**

Types of Food Adulterants: Chemical adulterants: additives, preservatives, pesticides, and contaminants-Biological adulterants: pathogens, molds, and spoilage organism physical adulterants: foreign materials, adulterated packaging, and tampering.

Unit III **(15 hours)**

Methods of Detection and Analysis - Analytical techniques for detecting food adulteration (e.g., chromatography, spectroscopy, DNA testing), Rapid screening methods and portable devices for on-site detection, Challenges and limitations in detecting adulterants in complex food matrices

Unit IV **(15 hours)**

Consumer Awareness and Education - Importance of consumer education in recognizing and reporting food adulteration, Role of media, NGOs, and public health campaigns in raising awareness, Tools and resources for consumers to make informed food choices

Unit V **(15 hours)**

Future Trends and Challenges - Emerging technologies for detecting and combating food adulteration, Globalization and cross-border challenges in ensuring food authenticity, Opportunities and challenges in addressing emerging risks and vulnerabilities

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.ShaliniSehgal, *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							
CO	**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**

Discipline Specific Elective –III b. Nutrition for Sports and Physical Fitness
(For Students Admitted from 2024-2025)

Semester: VI **Hours /week: 4**
Subject Code: IBNDE6B **Credit: 4**

Course Objectives:
1. To acquire knowledge in physical activity is essential for physical and mental health of children and adolescents taking part in sports have high demands of nutrients
2. To understand the nutritional needs of members at different sport activities

Unit I **(15 hours)**
Importance of Health and Physical Fitness: Definition of Health, Health Education, Sports Nutrition, physical health, mental health & public health, Four Dimensions of Health. Hygiene – importance of hygiene, food hygiene & personnel hygiene. Needs and importance of Health Education. Types of exercises - Aerobic and anaerobic exercises. Yoga – types and health benefits. Health benefits of doing exercise regularly.

Unit II **(15 hours)**
Determination of Energy Expenditure in Sports and Exercise: Intensity of training impacting carbohydrate utilization; Type, timing and quantity of carbohydrate intake in Resistance training and Endurance training. Contribution of Resting metabolic Rate, Thermic effect of food and Exercise and Non- exercise activity thermogenesis (NEAT) towards energy expenditure; Energy and nutritional requirements for athletes. Recommendations of carbohydrate for varying intensities, level of training and for fitness & recreational sports.

Unit III **(15 hours)**
Protein and Body Building and Fat: Protein diet planning, Fats/Lipids- diet planning, Water and Electrolyte Balance, Temperature Regulation, Fluid Replacement Products. Assessment of Hydration.
Hydration strategies: Beverage composition and formulation (isotonic, hypotonic and hypertonic); Only fluid versus fuelling with other macronutrients and electrolytes for exercise benefits; Beverage volume for maintaining dehydration with performance benefits.
Dehydration: Causes; Symptoms and its effects on cardiovascular system and muscle metabolism; Tolerable levels of dehydration; Synergistic effect of dehydration and hyperthermia; Effects of dehydration on endurance performance; Methods for determining degree of dehydration among athletes; Strategies for lowering hyperthermia.

Unit IV **(15 hours)**
Important Micronutrients for Exercise: B complex vitamin and specific minerals. Exercise induced oxidative stress and role of antioxidants. Sports injury and rehabilitation: Stress and strain, Basic injuries in upper and lower limb, neck, trunk and hip joint and nerve injuries, acute and chronic back ache, foot problem in sports, role of physiotherapy and yoga, preventive exercise program - How to avoid Sports Injuries, Role of Warm-up and Cool Down.
Antioxidant: Definition; Enzymatic and Non-Enzymatic antioxidants; Mode of action; Antioxidant effects to reduce oxidative stress; Effect on muscle contraction and exercise performance; Antioxidant deficiencies and exercise performance; Antioxidant requirements for exercise.

Unit V **(15 hours)**

Weight Management: Definition, Importance in weight management and exercise. Diet in weight management- Paleo diet, vegan diet, and low carbohydrate diet, low fat diet, Keto diet. Body Composition analysis, Weight reduction through nutrition and exercise, disordered - Eating Behaviours in Athletes / The Female Athlete Triad. Doping in athletes and its types.

Course Outcomes:

After successful completion of this course, student willable to

CO1: Recall the concept of nutrition on sports and fitness and understanding of the relationship between nutrition and exercise performance

CO2: Apply the concept of fluid balance in sportsperson

CO3: Analyze the weight management in fitness and sports people

CO4: Assess on different types of micronutrients need for their fitness

CO5: Role-playon Antioxidant in sports and Fitness.

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. 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.sportsnutritionsociety.org
4. www.scandpg.org
5. www.ais.gov.au

Course Outcomes	Programme Outcomes							
CO	**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**

Skill Enhancement Course I-Yoga for Holistic Health
(For Students Admitted from 2024-2025)

Semester: I **Hours/week: 2**
Subject Code: IBNDS141P **Credit:2**

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

List of Yoga Practices: **(5 Hours)**
1.Loosening Exercises: Simplified yogic exercise
2. Asanas: **(10 Hours)**
3. **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, 48thEdition, 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 StrawberryProductions,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							
CO	**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

Skill Enhancement Course II-Surface Embellishments Practicals

(For Students Admitted from 2024-2025)

Semester:2 **Hours/week: 2**

SubjectCode:IBNDS24P **Credit:2**

Course Objectives:

1. To impart practical knowledge in various surface ornamentation techniques
2. To equip the students to analyze suitable surface embellishment used on different products

List of Experiments: **(10 hours)**

1. **Introduction to embroidery stitches**

2.Basic embroidery stitches:

a. Line stitches – running and its variation – whipped running – looped running – stepped thread–back stitch – stem stitch – couching.
b. Loop stitches – chain stitch and its variations – detached – lazydaisy stitch – square chain
c. Filling stitch– satin– long and short – seeding – french knot – bullionknot – flystitch
d. Cross stitch– cross stitch– herring bone – double herring bone – close herringbone.
e. Edging stitch– button hole and its variations – blanket – closed buttonhole.
f. Feather stitch – fishbone

3.Surface ornamentation techniques (10 hours)

Appliqué work – cut work – patchwork– bead – sequins – ribbon works – aari– zardozi.

4. Traditional embroidery (10 hours)

g. Kantha of Bengal
h. Kashida of Kashmir
i. Embroideryof Gujarat
j. Phulkhari of Punjab
k. Chikankari of Uttarpradesh
l. Kasuti of Karnataka

3. Application of the surface Embellishment in the following:

a. Home furnishing
b. Garment

Course Outcomes:

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

CO1: Outline the basic embroidery stitches
CO2: Analyze the different methods of surface ornamentation techniques
CO3: Identify and represent traditional embroideries of India using basic stitches
CO4: Recommend the appropriate surface embellishment techniques to enhance the value of home furnishing and apparel fabrics
CO5: Design and develop appropriate designs for embroidery in textile products

Text Books:

1. Yumiko Higuchi,Shambhala, *A Year of Embroidery*,2018.
2. Jessisa Pile , *Fashion Embroidery*,Bats ford Publisher,2018

Reference Books:

1. Dorling Kindersley, *Embroidery* , DKPublisher,2015.
2. BettyBarnden ,*Embroidery Stitch Bible* ,Search Press LTD Publisher,2017.
3. Jessika Pile , *Fashion Embroidery* , Bats ford Publishing,2018

Journals:

1. Journal of Textile Science
2. Journal of Surface Design
3. Journal of Application Techniques

E Resources:

1. https://thedesigncart.com/blogs/news/the-beautiful-details-of-surface-ornamentation
2. https://thedesigncart.com/blogs/news/surface-ornamentation-history-and-types
3. https://sosopoetry.blogspot.com/2018/08/fabric-surface-embellishment-techniques.html
4. https://www.achievementlearn.com/cloth-surface-embellishment-techniques/
5. https://archive.hs.iastate.edu/past-exhibits/on-the-surface-textile-embellishment- techniques

Course Outcomes	Programme Outcomes							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
CO1	3	3	1	1	3	1	1	**13**
CO2	9	3	9	9	3	1	3	**37**
CO3	9	9	9	9	3	3	3	**45**
CO4	3	1	9	9	3	1	3	**29**
CO5	3	3	3	9	9	1	9	**37**
Total	**27**	**19**	**31**	**37**	**21**	**7**	**19**	**161**

Low-1 Medium-3 High-9

Skill Enhancement Course III-Nutrition Garden Practicals
(For Students Admitted from2024-2025)

Semester: III **Hours /week: 2**
SubjectCode: IBNDS34P **Credit:2**

Course Objectives:
1. To enjoy gardening and have positive attitude towards agriculture
2. To create a successful, sustainable garden using organic methods

List of Experiments: **(30 hours)**
1. Planning and lay-out of kitchen garden. Types of garden –In ground, Vertical, Container, Raised - bed,etc.
2. Types of Soil, tools, manures, fertilizers, seed, water etc.
3. Methods of irrigation in kitchen garden.
4. Preparation of different beds for vegetables, Vegetables in kitchen garden - Cowpea, Cluster bean, Coriander, Brinjal, Onion, and Tomato.
5. Preparation of nursery bed and transplanting.
6. Identification and control of vegetable pest and control of vegetable diseases.
7. Use of different pots for vegetable cultivation interrace garden.
8. Preparations of vermin composting, zero energy cool chambers.
9. Post-Harvest handling of plant procedure.
10. Visit to different Nutri garden

Course Outcomes:
After successful completion of this course, the student will be able to
CO1: Understand the importance of cultivation and discuss the various types layout.
CO2: Illustrate the various types of soil and fertilizers.
CO3: Explain the different beds for cultivation.
CO4: Experiment the different methods of cultivation of plants
CO5: Develop the practical skills on preparing their own nutria-garden

Text Books:
1. Richard Bird, *The Kitchen Garden Book Kitchen*, South water Publishing, 2015.
2. Ankur Tiwari, *Kitchen Gardening Mini Handbook*, Thought lytics Internet Pvt. Ltd; 1st Edition,2019.

Reference Books:
1. Naqsh Mansoor, *The Beginners Gardening Guidefor Creating Your Own Kitchen Garden*,Wiley-Blackwell P, 2016.
2. Gomez, L. Thivant , *Training Manual for Organic Agriculture* ,Published by United book prints ,2017.
3. Jill Mc Sheehy, *Vegetable Gardening for Beginners:* A Simple Guide to Growing Vegetables at Home, Published by rock ridge Press,2021.

Journals:
1. Everyday Old House.com.
2. My Gardening Journal
3. Royal Horticultural Society

E -Resources:

1. www.finegardening.com
2. www.agritech.tnau.ac.in
3. www.kitchengarden.co.uk
4. www.kitchengardenseeds.com
5. www.savvygardening.com

Course Outcomes	Programme Outcomes							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
CO1	9	9	9	9	3	9	9	57
CO2	9	9	9	9	3	3	9	51
CO3	9	9	3	9	3	3	9	45
CO4	9	9	9	9	3	3	9	51
CO5	9	9	9	9	3	3	9	51
Total	**45**	**45**	**39**	**45**	**15**	**21**	**45**	**255**

Low-1 Medium-3 High-9

Skill Enhancement Course –IV Food Product Development Practicals

(For Students Admitted from 2024-2025)

Semester: IV **Hours /week: 2**
Subject Code: IBNDS44P **Credit: 2**

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: **(45 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 offood 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. C.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 NewFood 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							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
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**

Skill Enhancement Course –V Food Preservation Practicals

(For Students Admitted from 2024-2025)

Semester: V **Hours /week: 2**
SubjectCode: IBNDS54P **Credit: 2**

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 **(9hours)**

Preservation by sugar

Preparationof Jam: Mixed fruit jam, Apple jam, Guava jam, Pineapple jam

Preparationofjelly: Apple jelly, Guava jelly, Tutti-frutti.

Unit II **(9hours)**

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 **(9 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 **(9 hours)**

Preparation of Spice products: Tomato sauce, Tomato ketchup

Unit V **(9 hours)**

Preservation by fermentation Saurekaurat, Curd, Lassie, 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 byFB&C Limited,2018.
2. Mohammad U. H. Joardder,Mahadi Hasan Masud, *Food Preservation in Developing Countries: Challenges and Solutions*, Springer InternationalPublisher,2019.

Reference Books:

1. GaryS. Tucker, *Food Preservation and Bio deterioration*, WileyPublishers,2016.
2. Fereidoon Shahidi, *Handbookof 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							
CO	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

Skill Enhancement Course - VI Food Adulteration Practicals

(For Students Admitted from 2024-2025)

Semester: VI **Hour/week:2**

Subject Code: IBNDS65P **Credit: 2**

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 **(9 hours)**

1. Detection of Vanaspati in ghee or butter.
2. Detection of Kasseri flour in basin (gram flour).
3. Detection of Metanil yellow in turmeric.
4. Colour measurement and analysis in Fresh and Processed Foods

Unit II **(9 hours)**

1. Detection of aregmone oil in edible oil.
2. Detection of chicory in coffee.
3. Detection of adulteration in m

Unit II **(9 hours)**

1. Detection of adulteration in spices.
2. Detection of adulteration in honey.
3. Detection of adulteration ingrains/grain-based flours.

Unit IV **(9 hours)**

1. Testing adulteration of cereal and cereal products
2. Testing adulteration of pulses
3. Testing adulteration of sugars &Preserves

Unit V **(9 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. PearsonD, *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. ww.jissn.biomedcentral.com
2. www.topendsports.com
3. www.sportsnutritionsociety.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							
CO	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**

General Interest Course IV– Women Entrepreneurship

(For Students Admitted from 2024-2025)

Semester: III **Hours /week:2**
SubjectCode:IBWE5 **Credit:2**

Course Objectives:

1. To promote women entrepreneurship and reduce the rate of unemployment
2. To elucidate the role of various developmental schemes supporting women entrepreneurship

Unit I **(6 hours)**

Women Entrepreneurship: Meaning, Definition, Characteristics, Factors affecting Entrepreneurship Growth: Economic, Social, Cultural, Personality, Psychological, Sociological and Motivational Factors, Role of Entrepreneurship in Economic Development.

Unit II **(6 hours)**

Entrepreneurship Competencies: Competence – Meaning, Components: Knowledge, Skill, Traits and Motives - Case Competency – Qualities of Entrepreneurs – Types of Entrepreneurs– Functions of Entrepreneurs.

Unit III **(6 hours)**

Entrepreneurship Journey: Self –Assessment of Qualities, skills, Resources and Dreams, Generation of ideas, Business Ideas Vs Business Opportunities, Opportunity Assessment – Factors, Micro and Macro Environment, Feasibility Study, Business Plan Preparation-Case Study of Successful Entrepreneurs.

Unit IV **(6 hours)**

Start-up: Meaning-Types-Requirements for new Enterprise Creation-Family Business Management- Social Entrepreneurship-Startup India Ecosystem-Schemes-Registration Process.

Unit V **(6 hours)**

Entrepreneurship Development Programmes: Objectives-Special Women EDPs-Micro Enterprises and Self Employment Opportunities-Supporting Schemes for Women Entrepreneurs- DIC-NABARD- Commercial Banks. Self-Employment Loan Scheme: PMEGP- NEEDs-UYEGP.

Course Outcomes:

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

CO 1: Understand the role of women entrepreneurship in different facets of society
CO 2: Know the various livelihood supports for women Employment opportunities
CO 3: Elucidate the role of various developmental schemes supporting women entrepreneurship
CO 4: Examine the various governmental and non-governmental support offered to the entrepreneurs
CO 5: Critically analyze various entrepreneurship schemes in India

Text Books:

1. Vasanth Desai, *Entrepreneurship Development*, Himalaya Publishing House, Mumbai, 1st Edition, 2019.
2. Kathleen R Allen, *Launching New Ventures, An Entrepreneurial Approach*, Cengage Learning,2016.

Reference Books:

1. Steven Fisher, Ja-nae Duane, *The Startup Equation -A Visual Guidebook for Building Your Startup*, Indian Edition, Mc Graw Hill Education India Pvt. Ltd,2016
2. BruceR. Barringer, R.Duane, *Entrepreneurship successfully, Launching New Ventures*. Pearson,2019
3. Gordon E, Natarajan K, *Entrepreneurship Development*, Himalaya Publishing House, Mumbai, 6th Edition, 2017.

Journals:

1. Journal of Women's Entrepreneurship and Education
2. International Journal of Gender and Entrepreneurship
3. Journal of Innovation and Entrepreneurship

E-Resources:

1. www.dic.org
2. www.msme.tn.govt.in
3. www.nismsme.org
4. www.entrepreneur.com
5. http://www.entrepreneurship.org

Course Outcomes	Programme Outcomes							
CO	**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

Open Elective Course I-Food Preservation Techniques

(For Students Admitted from 2024-2025)

Semester:III **Hour/week: 2**
Subject Code: IBOE3HS **Credit: 2**

Course Objectives:

1. To impart basic knowledge of cold preservation and freezers, dehydration, irradiation, food packaging and thermal processing
2. To impart basic knowledge of heat and cold preservation and freezers, fermentation, current techniques in food preservation

Unit I **(6 hours)**

Food preservation - Definition, importance, Principles and Methods of Food Preservation. Classification of foods for processing. Need for preservation, types of spoilage, role of micro-organism in food spoilage, prevention of food spoilage, shelf life of food products, Factors affecting shelf life.

Unit II **(6 hours)**

Preservation by addition of sugar - General Principles and methods of preparation of jams, jellies and Marmalades, theory of gel formation. Failure to jelly and jam to set. Preparation of squashes & syrups.

Preservation by addition of salt - Pickling and curing of meat & scope of food processing industry in India in developing Entrepreneur**.**

Unit III **(6 hours)**

Preservation by Use of High Temperature: Principle of dehydration-heat and mass transfer. Pasteurization, Sterilization and their types. Canning-steps, types of cans, advantages, disadvantages. Bottling - steps, advantages, disadvantages. Food dehydration - concept of dehydration and sun drying. Types of driers - advantages, disadvantages.

Unit IV **(6 hours)**

Preservation by use of Low Temperature - Types - Common types of cold storage, refrigeration- requirement of refrigerated storage, characteristic of refrigerant, refrigeration during transport, defects in cold storage. Freezing – types, Principles and methods of freezing, Freeze drying. Advantages and Disadvantages of freezing.

Unit V **(6 hours)**

Mechanism of microbial inhibition, mechanism and action of preservatives in processed food: Inorganic & Organic preservatives – Antibiotics. Antioxidants and its role.

Radiation of Foods: Sources of radiation, units of radiation- Mode of action of irradiation, radiation effect on proteins enzyme System. Microwave heating, properties of microwaves, applications in food processing and Preservation.

Preservation of Semi moist foods: Principles and Intermediate moist foods.

Course Outcomes:

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

CO1: Recognize the principles of food preservation and explain the different types of preservation techniques

CO2: Practice the skills in methods of food preservation

CO3: Prioritize the perishable and non-perishable foods from microbial contamination and microbial spoilage

CO4: Critique the doses of preservatives and irradiation rays in foods to control the food spoilage

CO5: Formulate the preservation of foods using salt, sugar, and chemicals

Text Books:

1.Srilakshmi. B, *Food Science,* New Age International (P) Limited Publishers, 6th Edition, 2015.

2.Sivasankar.B; *Food Processing and Preservation,* PHI Learning Private Limited,2011.

Reference Books:

1. Lillian Hoagland Meyer, Food Chemistry**,** CBS Publishers and Distributors, 2004.

2. Subbulakshmi. G and Shobha. A.U; Food Processing and Preservation, New Age International (P) Limited Publishers, 2021.

3. Srivastava R.P. Sanjeev Kumar and Kumar S., Fruit and Vegetable Preservation: Principles and Practices. 3rd Edition, International Book Distributing Company, 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.comJournals
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							
CO	**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	3	9	9	9	9	**60**
CO5	9	9	3	9	9	9	9	**60**
Total	**45**	**45**	**39**	**45**	**45**	**45**	**45**	**309**

Low-1 Medium-3 High-9

Open Elective Course II-Basics and Advance Hand Embroidery Practicals

(For Students Admitted from 2024-2025)

Semester: **Hours/week:2**
Subject Code: IBOE4H **Credit:2**

Course Objectives:

1. To impart practical knowledge in various surface ornamentation techniques
2. To equip the students to analyze suitable surface embellishment used on different products

List of Experiments **(30 hours)**

1. **Introduction to Embroidery Stitches (6 hours)**
2. **Basic Embroidery Stitches: (14 hours)**

a. Line stitches – running and its variation – whipped running – looped running–stepped thread – back stitch – stem stitch – couching.
b. Loop stitches – chain stitch and its variations – detached – lazy daisy stitch – square chain
c. Filling stitch – satin– long and short – seeding – French knot – bullion knot – flystitch
d. Cross stitch– crossstitch– herringbone – double herringbone – close herringbone.
e. Edging stitch– buttonhole and its variations – blanket – closed buttonhole.
f.Feather stitch– fishbone

3. **Advance Embroidery Techniques (10 hours)**

Applique work – cut work – patch work– bead work – Sequins work – Ribbon works – Aariand Zardozi embroidery.

Course Outcomes:

After successful completion of this course, student will be able to CO1: Outline the basic embroidery stitches

CO2: Analyze the different methods of surface ornamentation techniques

CO3: Identify the advance embroidery works

CO4: Recommend the appropriate surface embellishment techniques to enhance the value of home furnishing and apparel fabrics

CO5: Design and develop appropriate designs for embroidery in textile products

Text Books:

1. KimberlyIrwin, *"Surface Designfor Fabric"*, BloomsburryAcademic,2015
2. Yumiko Higuchi—*A Year of Embroidery*‖ ,Shambhala Publisher,2018.
3. Jessisa Pile —*Fashion Embroidery*‖ , Bats ford Publisher, 2018.

Reference Books:

1. Dorling Kindersley*"Embroidery*‖ , DKPublisher,2015
2. Betty Barnden *"Embroidery Stitch Bible*‖ , Search Press LTD Publisher,2017
3. Jessika pile *"Fashion Embroidery*, Bats ford Publisher, 2018.

Journals:

1. Journal of Textile Science
2. Journal of Surface Design
3. Journal of Application Techniques

E Resources:

1. https://thedesigncart.com/blogs/news/the-beautiful-details-of-surface-ornamentation
2. https://thedesigncart.com/blogs/news/surface-ornamentation-history-and-types
3. https://sosopoetry.blogspot.com/2018/08/fabric-surface-embellishment-techniques.html
4. https://www.achievementlearn.com/cloth-surface-embellishment-techniques/
5. https://archive.hs.iastate.edu/past-exhibits/on-the-surface-textile-embellishment-techniques

Course Outcomes	Programme Outcomes							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
CO1	3	3	1	1	3	1	1	**13**
CO2	9	3	9	9	3	1	3	**37**
CO3	9	9	9	9	3	3	3	**45**
CO4	3	1	9	9	3	1	3	**29**
CO5	3	3	3	9	9	1	9	**37**
Total	**27**	**19**	**31**	**37**	**21**	**7**	**19**	**161**

Low-1 Medium-3 High-9

FIRST SEMESTER

(Only For Microbiology and Chemistry Department Students)

Ability Enhancement Compulsory Course Biochemistry –I

(For Students Admitted from 2024-2025)

Semester: I **Hours/week:5**

Subject code: IBCHA14/IBMBA13 **Credit:5**

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 **(15 hours)**

Carbohydrates – Definition, Functions, classifications, structure, physical and chemical properties, Biochemical importance.

Unit II **(15 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 **(15 hours)**

Lipids– Definition, Functions, classifications. Fatty acids-Definition classification, physical and chemical properties .Triglycerides, Phospholipids, glycolipids, steroid-outline study

Unit IV **(15 hours)**

Nucleic acids - Definition, Functions, and Components of Nucleotides and nucleosides. DNA & RNA –structure, function and types. Differentiate DNA and RNA.

Unit V **(15 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*, Elsiever 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, *Harper'sIllustratedBiochemistry*, LangePublishers, 30th Edition, 2017.
3. Donald Voet, JudithG.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 Biologicaland 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							
CO	**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

SECOND SEMESTER

(Only For Microbiology and Chemistry Department Students)

Ability Enhancement Compulsory Course - Biochemistry –II

(For Students Admitted from 2024-2025)

Semester:II **Hours/week: 5**

SubjectCode:IBCHA24/IBMBA23 **Credit: 5**

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 **(15 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 **(15 hours)**

Metabolism of Carbohydrates: Introduction to Metabolism, Metabolism of Carbohydrates-glycolysis, PDH, TCA, Gluconeogenesis, Glycogenesis, Glycogenolysis, HMP Shunt, Uronic acid pathway.

Unit III **(15 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 **(15 hours)**

Metabolism of Lipids: Biosynthesis of fatty acids, Oxidation of fatty acids, Ketogenesis. Metabolism of cholesterol, triglycerides and phospholipids.

Unit V **(15 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*, Elsiever 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, *Harper'sIllustrated Biochemistry*, Lange Publishers, 30th Edition, 2017.
3. Donald Voet, Judith G.Voet, *Biochemistry***,** John Wileyand 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
2. https://www.pdfdrive.com/textbook-of-biochemistry-e14983388.html
3. https://www.pdfdrive.com/lehninger-principles-of-biochemistry-e189596394.html

Course Outcomes	**Programme Outcomes**							
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**Total**
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

VALUE ADDED PROGRAMME IN FOOD PROCESSING AND PRESERVATION

(For Students Admitted from 2024-2025)

PREAMBLE

- Food Processing and preservation theory of 30 hours with 2 credits is removed and Food Processing and preservation practical of 50 hours with 3 credits is replaced with 5 credits.
- Clinical Dietetics theory of 30 hours with 2 credits is removed and Clinical Dietetics practical of 50 hours with 3 credits is replaced with 5 credits.
- Yoga For Holistic Health theory of 30 hours with 2 credits is removed and Yoga For Holistic Health practical of 50 hours with 3 credits is replaced with 5 credits.

Paper	Subject Code	Subject title	Contact Hours	Credit	ESE Marks
I	HCFP21P	Food Processing and Preservation Practicals	50	5	100
		Total	**50**	**5**	**100**

Paper II- Food Processing and Preservation Practicals

(For Students Admitted from 2024-2025)

Subject Code: HCFP21P **Hours:50**
Credit: 5

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 fruitprocessing",Wiley-lackwell,2012.
2. Anju singh, Handbook food preservation, Agrotechpress,2017.
3. Srilakshmi.B, Food science, New Age International Publishers, NewDelhi, 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.
5. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=516

VALUE ADDED PROGRAMME IN CLINICAL DIETETICS

(For Students Admitted from 2024-2025)

Paper No	Subject Code	Subject Title	Contact Hours	Credit	External Marks
I	HCCD21P	Clinical Dietetics Practicals	50	5	100
		Total	**50**	**5**	**100**

Paper- II Clinical Dietetics Practicals

(For Students Admitted from 2024-2025)

Subject Code: HCCD21P **Hours: 50**
Credit: 5

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)**

Planning, preparation and calculation of diets to fulfill nutritional needs in pregnancy, Lactation, preschool children, Adolescent boys and girls, adult and old age groups.

Unit II **(10 hours)**

Planning, preparation and calculation of diet for Routine Hospital Diets - Clear fluid, Full fluid, Soft diet, Pre-operative and post-operative diets.

Unit III **(10 hours)**

Planning, preparation and calculation of diet for PEM and Vitamin A deficiency, Anemia and Fever conditions.

Unit IV **(10 hours)**

Planning, preparation and calculation of diet for Obesity, Underweight, Jaundice, and liver diseases.

Unit V **(10 hours)**

Planning, preparation and calculation of 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

VALUE ADDED PROGRAMME IN YOGA FOR HOLISTIC HEALTH

(For Students Admitted from2024-2025)

Paper No	Subject Code	Subject Title	Contact Hours	Credit	Extern al marks
I	HCYH21P	Yoga For Holistic Health Practicals	50	5	100
		Total	**50**	**5**	**100**

Yoga for Holistic Health Practicals

(For Students Admitted from 2024-2025)

SubjectCode:HCYH21P **Hours:50**
Credit: 5

Course Objectives

1. To enhance physical and mental fitness of the students through asanas, mudras,etc
2. To attain higher level of consciousness

List of Yoga Practices:

1. **Loosening Exercises :** Simplified yogic exercise, Sun Salutation**.** **(10 Hours)**

2. **Asanas:** **(20 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 **(10 Hours)**

Simple Meditation, Transcendental meditation

Course Outcomes:

After successful completion of this course, student will be able to**CO1**: Promote Positive Health in the Student through Yoga**CO2**: Impart skills in them to practice yoga

CO3: Regulate the inter-personal, behavioural concepts of human life overcome various physical and mental stress of life activities

CO4: Impart skills in them to introduce Yoga for health to general public and Yoga for total personality development of students

CO5: Promote positive health, prevention of stress related health problems and rehabilitation through Yoga

Text Books:

1. Yoga Practise –I Vethathiri Maharishi Institute for spiritual and Institutional Education, WCSC, Veththathiri Publication, Erode.4th Edition 2012.
2. Yoga Practise –II Vethathiri Maharishi Institute for spiritual and Institutional Education, WCSC, Veththathiri Publication, Erode.15th Edition 2017.

Reference Books:

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

Journals:

1. International Journal of Yoga Therapy2.International Journal of Yoga 3.Journal of Yoga and Physiotherapy

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.insider.com/types-of-meditation
5. https://www.easyayurveda.com/2012/11/11/types-of-pranayama-effect-on-health-through-an-ayurveda- microscope/amp/

DIPLOMA IN BAKERY AND CONFECTIONERY SYLLABUS
One year Programme (2024-2025)

One year 60 credit
Per semester 30 credit
Semester I
18Credit -Skill Education
12Credit –General Education
Semester II
18Credit -Skill Education
12 Credit –Project

PROGRAMMESTRUCTURE

Sem	Subject Code	Subject	Credit	Hours/ week	CIA	ESE	Total Marks
I	IDBC11	Bakery Theory I	5	5	40	60	100
	IDBC12	Confectionery Theory I	5	5	40	60	100
	IDBC13P	Bakery Practicals I	4	8	40	60	100
	IDBC14P	Confectionery Practicals I	4	8	40	60	100
	IDBC15	Entrepreneurial Skills and Productivity	4	4	-	50	50
	IDBC16PW	Mini Project	8	8	-	100	100
	Total		**30**	**38**	**160**	**390**	**550**
Sem	**Subject Code**	**Subject**	**Credit**	**Hours/ week**	**CIA**	**ESE**	**Total Marks**
II	IDBC21	Bakery Theory II	6	6	40	60	100
	IDBC22	Confectionery Theory II	6	6	40	60	100
	IDBC23P	Bakery Practicals II	3	6	40	60	100
	IDBC24P	Confectionery Practicals II	3	6	40	60	100
	IDBC25PW	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 2024-2025)

Semester: I **Hours/week: 5**
Subject Code: IDBC11 **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, glutin, 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, *Handbookof 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
3. NIIR Board of Consultants &Engineers, 2020.
4. Gupta, A. K, *Textbook of Bakery and Confectionery,* Daya Publishing House, a division of Astral International Pvt. Limited,2021.

E- Resources:

1. https://pediaa.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 2024-2025)

Semester: I **Hours/week: 5**
SubjectCode:IDBC12 **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 2024-2025)

Semester: I **Hours/week: 8**

Subject Code: IDBC13P **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 2024-2025)

Semester: I **Hours/week: 8**
Subject Code: IDBC14P **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& Jam tart.
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 from2024-2025)

Semester: I **Hours/week: 4**
Subject Code: IDBC15 **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, safe cash 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*. McGrawHillEducation, 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 2024-2025)

Semester: I **Hours/week: 8**
Subject Code: IDBC16PW **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 ofresearch and theory.

Recommended Readings:APAmanual for dissertation
Evaluation: Viva jointly by one internal and one external examiner.

Bakery Theory II

(For Students Admitted from 2024-2025)

Semester: II **Hours/week: 6**
Subject Code: IDBC21 **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 **(15 hours)**
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 II **(15 hours)**
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 **(15 hours)**
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 **(15 hours)**
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 **(15 hours)**

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., *Theoryof 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

Confectionery Theory II

(For Students Admitted from 2024-2025)

Semester: II **Hours/week: 6**
SubjectCode:IDBC22 **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
4. https://study.com/academy/lesson/food-safety-definition- guidelines.html
5. https://www.academia.edu/15638010/DIPLOMA_IN_BAKERY_and_CONFECTIONERY

Baking Practicals II

(For Students Admitted from 2024-2025)

Semester: II **Hours/week: 6**
Subject Code: IDBC23P **Credit: 3**

Course Objectives:
To equip the professional standards of baking principles
1. 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,2 019.
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*. , Laplambert

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 2024-2025)

Semester: II **Hours/week: 3**
SubjectCode:IDBC24P **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 Macaroons 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/exconfection ery.pdf

Major Project

(For Students Admitted from 2024-2025)

Semester: II **Hours/week: 12**
Subject Code: IDBC25PW **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