

# Curriculum Framework

## Master of Science in Food and Nutrition

As per NEP 2020 and Learning Outcomes-based National Curriculum Framework  
(Aligned with NCrF and NHEQF)

Effective From Academic Year 2025-2026



Founded by Mahatma Gandhi in 1920

**Gujarat Vidyapith**  
**Ahmedabad**

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**GUJARAT VIDYAPITH: AHMEDABAD**

**Curriculum Framework of Master of Science in Food and Nutrition**

**Published by:**

**Dr. Himanshu Patel**

**Registrar**

Gujarat Vidyapith

Near Income Tax Office, Ashram Road, Ahmedabad - 380009.

## From the Desk of Vice Chancellor...



Dear All,

Any curriculum, at any level, must be firmly grounded in the objectives and goals that an educator or an educational institution aspires to achieve for its students. A course that trains students to solve mathematical equations must be very different from one that teaches them how to play a musical instrument, practice yoga, or conduct social research. Each subject requires its own methods, activities, and learning goals, which is why curriculum design is so important.

Therefore, curriculum is of utmost importance, as it determines how teachers and students will spend their time—in laboratories, in clinical practice, in creative endeavors, or in interactive lectures. It also reflects what a class, a department, a school, or an institution values; what it defines as its mission; and what it expects its graduates to accomplish. In this sense, the curriculum is the map that guides the essentials of learning from the classroom level to the institutional level.

The true success of any curriculum must be judged by its ability to achieve its intended objectives. It is a test of how well an institution—or an individual teacher—understands and articulates those objectives, and how effectively a pathway is created for students to attain success as defined by them. Curriculum is, in fact, a continuous chain of activities designed to translate broad educational goals into concrete practices, learning materials, and observable changes in behavior. A lesson plan, for instance, is curriculum at the classroom level, answering the critical questions: *What do I want my students to know? How can I engage them meaningfully? How will I measure what they have learned?*

For a society to achieve its educational aspirations, the curriculum must be both functional and relevant to its needs. Through careful management of curriculum, effective use of resources, and policies that bring systemic improvements, education can move society toward a more promising future. Indeed, curriculum is the very foundation of any academic institution—without it, the institution would lose its purpose and direction.

At Gujarat Vidyapith, established by Mahatma Gandhi in 1920 with its rich cultural and educational heritage, we remain committed to these ideals and we work with well-defined objectives to prepare our students for a brighter academic and social future.

It gives me immense pride and joy to announce the unveiling of the latest curriculum of Gujarat Vidyapith. This curriculum has been carefully designed in alignment with the objectives and guiding principles of the National Education Policy (NEP) 2020. I take this opportunity to place on record my deep appreciation for the efforts of the teaching faculty of Gujarat Vidyapith, the Members of the Board of Studies, and the Members of the Academic Council. Their dedication and vision have given shape to this comprehensive neo-curriculum, which will guide our students and our institution toward continued excellence.

With best wishes,

**Dr. Harshad Patel**  
Vice Chancellor  
Gujarat Vidyapith



# Curriculum Framework

## Master of Science in Food and Nutrition

Effective From Academic Year 2025-2026

Department of Food and Nutrition  
Faculty of Science  
Gujarat Vidyapith

## Board of Studies

### Chairperson:

**Dr. Nikhil S. Bhatt**

Professor & Dean & Head, Faculty of Science & Department of Food and Nutrition,  
Gujarat Vidyapith, Ahmedabad.

### External Experts:

1) **Dr. Vinayak H. Patel**

(Retire) Prof. & Head, Dept. of Food and Nutrition,  
SP University, Vallabh Vidhyanagar, Gujarat.

Email: vpatel716@gmail.com

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2) **Prof. Nilambari Dave**

Former Vice-Chancellor, Saurashtra University, Rajkot, Gujarat.

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### Members from the Department:

1) **Dr. Jaishree S. Mehta**

Associate Professor, Department of Food and Nutrition, Faculty of Science, Gujarat  
Vidyapith, Ahmedabad.

2) **Dr. Parulben V.Sadhu**

Assistant Professor, Department of Food and Nutrition, Faculty of Science, Gujarat  
Vidyapith, Ahmedabad.

**Curriculum Framework - Master of Science in Food and Nutrition - 2025**

<b>PROGRAMME STRUCTURE</b>							
Course Code	Course Name	Hours			Credit	Evaluations	
		Theory	Practical	Total		CCE	TEE
<b>SEMESTER-1</b>							
256010339001	Human Nutrition	45	0	45	3	40	60
256010239002	Human Nutrition Practical	0	60	60	2	40	60
256010339003	Diet Therapy	45	0	45	3	40	60
256010239004	Diet Therapy Practical	0	60	60	2	40	60
256010339005	Food Preservation and Microbiology	45	0	45	3	40	60
256010239006	Food Preservation and Microbiology Practical	0	60	60	2	40	60
256010339007	Physiology	45	0	45	3	40	60
256010239008	Physiology Practical	0	60	60	2	40	60
<b>Total</b>		<b>180</b>	<b>240</b>	<b>420</b>	<b>20</b>	<b>320</b>	<b>480</b>
<b>SEMESTER-2</b>							
256010339009	Public Health Nutrition	45	0	45	3	40	60
256010239010	Public Health Nutrition Practical	0	60	60	2	40	60
256010339011	Dietetics and Diet Counselling	45	0	45	3	40	60
256010239012	Dietetics and Diet Counselling Practical	0	60	60	2	40	60
256010339013	Nutritional Biochemistry	45	0	45	3	40	60
256010239014	Nutritional Biochemistry Practical	0	60	60	2	40	60
256010339015	Entrepreneurship Management	45	0	45	3	40	60
256010239016	Entrepreneurship Management Practical	0	60	60	2	40	60
<b>Total</b>		<b>180</b>	<b>240</b>	<b>420</b>	<b>20</b>	<b>320</b>	<b>480</b>
<b>SEMESTER-3</b>							
256510339017	Food Science	45	0	45	3	40	60
256510239018	Food Science Practical	0	60	60	2	40	60
256510339019	Maternal and Child Nutrition	45	0	45	3	40	60
256510239020	Maternal and Child Nutrition Practical	0	60	60	2	40	60
256510339021	Food Production & Management	45	0	45	3	40	60
256510239022	Food Production & Management Practical	0	60	60	2	40	60
256510339023	Morden Cookery	45	0	45	3	40	60
256510239024	Morden Cookery Practical	0	60	60	2	40	60
<b>Total</b>		<b>180</b>	<b>240</b>	<b>420</b>	<b>20</b>	<b>320</b>	<b>480</b>
<b>SEMESTER-4</b>							
256512039025	Dissertation	00	600	600	20	40	60
<b>Total</b>		<b>0</b>	<b>600</b>	<b>600</b>	<b>20</b>	<b>40</b>	<b>60</b>
<b>GRAND TOTAL</b>		<b>540</b>	<b>1320</b>	<b>1860</b>	<b>80</b>	<b>1000</b>	<b>1500</b>

\*CCE- Continuous Comprehensive Evaluation; \*\*TEE- Term End Evaluation

**Programme Outcomes (POs)**

This program prepares postgraduates to achieve the following POs within two years of education.

<b>PO-1</b>	Advanced Scientific Knowledge	The program develops a sophisticated understanding and integrated application of Food & Nutrition <b>and allied sciences</b> . Students acquire core competencies to address complex problems in research and professional settings through advanced scientific concepts and interdisciplinary approaches.
<b>PO-2</b>	Research & Problem-Solving Skills	Students are equipped to <b>independently conceptualize, analyze, and solve complex</b> problems of societal and global relevance. They gain critical knowledge that enables systematic research, formulation of hypotheses, and application of scientific reasoning.
<b>PO-3</b>	Experimental & Analytical Proficiency	The curriculum emphasizes mastery in <b>designing and conducting scientific experiments using advanced tools and methodologies</b> . Students critically evaluate and interpret data to derive reliable, reproducible scientific conclusions.
<b>PO-4</b>	Interdisciplinary Approach	Graduates are prepared to lead and collaborate in multidisciplinary teams, integrating insights from various scientific fields to develop practical applications in areas such as <b>healthcare, environment, and biotechnology</b> .
<b>PO-5</b>	Environmental Consciousness & Sustainability	The program cultivates the ability to apply Nutritional <b>knowledge to global sustainability challenges</b> . Students are encouraged to propose evidence-based solutions that align with environmental ethics and sustainable development goals.
<b>PO-6</b>	Ethics & Professional Values	Upholding the highest standards of scientific integrity and <b>Gandhian values</b> , students are trained in responsible research practices and ethical decision-making in both academic and industry settings.
<b>PO-7</b>	Effective Scientific Communication	The program ensures graduates can clearly <b>articulate scientific findings to diverse audiences</b> . They <b>are trained to publish research, communicate</b> within multidisciplinary teams, and advocate for <b>science-based societal advancement</b> .
<b>PO-8</b>	Modern Technological Applications	<b>Students independently master and apply advanced technological tools</b> , data analytics, and computational methods to execute complex research projects and remain proficient in modern scientific practices.
<b>PO-9</b>	Teamwork & Leadership in Research	The curriculum <b>fosters leadership, professionalism</b> , and collaboration. Graduates contribute effectively to scientific teams, manage research projects, and uphold social responsibility in their professional roles.
<b>PO-10</b>	Lifelong Learning & Adaptability	Graduates demonstrate <b>independent learning and actively seek new knowledge and technologies</b> . The program nurtures a mindset of continual professional development to stay at the forefront of scientific progress.
<b>PO-11</b>	Project Management & Entrepreneurial Thinking	Students are encouraged to <b>apply scientific knowledge to manage research initiatives efficiently</b> . The program promotes entrepreneurial thinking for developing innovative, technology-driven solutions.
<b>PO-12</b>	Social & Community Engagement	Emphasizing the interplay between science and society, the program instills values of service and community engagement. <b>Graduates advocate for science-driven change</b> and communicate complex ideas to non-specialist audiences to address societal challenges.

**Programme Specific Outcomes (PSOs)**

After successful completion of “Two Year Degree Program” in Food and Nutrition, a student will be able to:

PSO Number	Programme Specific Outcomes (PSOs)	Justification
<b>PSO-1 Mastery in Food and Nutrition Techniques and Innovations</b>	Graduates will acquire proficiency in Equip students with advanced knowledge and skills in food science, nutrition principles, and emerging technologies. Foster innovation in food processing, product development, and dietary interventions to meet contemporary nutritional challenges and promote public health. <b>Research.</b>	<b>Aligned POs: PO1, PO3, PO8</b> <b>Justification:</b> This PSO directly reflects the need for <b>advanced scientific knowledge (PO1), experimental &amp; analytical proficiency (PO3), and technological applications (PO8)</b> in modern Nutrition.
<b>PSO-2 Application of Food and Nutrition to various fields</b>	Graduates will apply Nutritional knowledge to develop practical solutions in medical Food Therapy, food and dairy and different Product, industrial fermentation, environmental Dietetics, and agriculture.	<b>Aligned POs: PO2, PO4, PO5, PO11</b> <b>Justification:</b> This outcome addresses problem-solving (PO2), interdisciplinary approach (PO4), sustainability (PO5), and entrepreneurial thinking (PO11) through applied Food and Nutrition innovations.
<b>PSO-3 Ethical Scientific Inquiry and Communication</b>	Graduates will demonstrate ethical reasoning in research, effective communication of Food and Nutrition findings, and community-oriented scientific outreach with a commitment to social responsibility.	<b>Aligned POs: PO6, PO7, PO9, PO10, PO12</b> <b>Justification:</b> This aligns with ethics (PO6), scientific communication (PO7), teamwork and leadership (PO9), lifelong learning (PO10), and community engagement (PO12), preparing students as responsible and socially aware Nutritionist.

**CO Attainment Levels (OBE & NEP 2020 Aligned)**

COs Attainment Levels	Level	Description	Attainment Criteria			
	Level 3	High	≥ 60% students scored ≥ Benchmark			
	Level 2	Moderate	50–59% students scored ≥ Benchmark			
	Level 1	Low	40–49% students scored ≥ Benchmark			
	Level 0	Not Attained	< 40% students scored ≥ Benchmark			
Target Attainment (Benchmark)	Cos		CO-1	CO-2	CO-3	CO-4
	Target Level (%)		55	55	55	55

<b>Program – M.Sc. (Food and Nutrition)</b>		
<b>Semester- 1</b>		
<b>Course Code</b> 256010339001	<b>Name of Course</b> <b>Human Nutrition</b>	<b>Major</b>
<b>Credit: 03</b>	<b>Teaching Scheme: Theory (45)</b>	<b>Teaching Hours:</b> <b>45</b>
<b>Course Outcomes (COs)</b>		
After studying this course, the student will be able to:		
CO-1:	Relate major Nutritional events with concepts of human nutrition and nutrient functions in the body. State basics of Nutritional taxonomy and classification.	
CO-2:	State the Identify nutritional requirements across different life stages.	
CO-3:	Describe Analyze the impact of nutrient deficiencies and excesses on health.	
CO-4:	Examine nutrition principles to promote health and prevent disease .	
<b>Detailed Syllabus</b>		
<b>Unit-1. Energy Metabolism &amp; Carbohydrates (11h)</b>		
1.1. Definition and Components of Energy Requirement (2h)		
1.2. Factors Affecting Energy Expenditure and Requirement (1h)		
1.3. Methods of Estimation of Energy Expenditure and Requirements (2h)		
1.4. Sequence of Major events during biological evolution, Current recommendations for energy intake of different age, sex groups, Disorders of energy metabolism: Obesity and under nutrition (2h)		
1.5. Short term and long-term weight maintenance (Gut fill cues, Glucostat theory, Lipostat theory) Carbohydrates Digestion, absorption and utilization, Functions and Classification of Carbohydrates Regulation of Blood Glucose Concentration (1h)		
<ul style="list-style-type: none"> <li>• Simple and Complex carbohydrates, non-starch polysaccharides and fibre constituents and their role in Nutrition, Glycaemic Index, Glycaemic load and Satiety index: Clinical implications, Disorders related to carbohydrate metabolism</li> </ul>		
1.6. Modification of Carbohydrate Intake for Specific Disorder (3h)		
<b>Unit-2. Proteins and Lipids (11h)</b>		
2.1. Proteins Classification, Food Sources Digestion, Absorption and Transport, Functions, (3h)		
2.2. Improvement of Quality of Protein in the Diet, Human requirements for proteins (RDA)(2h)		
2.3. Methods of Estimating and Assessing protein Requirements at Different Stages (2h)		
2.4. Life Cycle, Protein Deficiency (2h)		
2.5. Lipids, Basic Facts, Types of Fats and its Metabolism (digestion, absorption, transport) Function of Oils, Assessments of Oils, Nutritional Requirements of Fats and Oils, Visible and invisible fats in diets, Excessive Fat Intake: Changing Trends in Dietary Intake Eating Out Diseases: Association and Preventive Measure (2h)		
<b>Unit-3. Fat Soluble Vitamins – A, D, E, K &amp; Water-Soluble Vitamins (11h)</b>		
Thiamine Riboflavin Niacin, Pantothenic Acid, Pyridoxine, Biotin, Folacin, Cobalamin and Ascorbic acid)		
3.1. Fat Soluble Vitamins – A, D, E, K Basic Facts (2h)		
3.2. Digestion, Absorption, transport and metabolism, Food Sources, Vitamins, Bioavailability (2h)		
3.3. Functions, Assessments of Vitamins status, Interaction with other Nutrients, Toxicity and Deficiency RDA (3h)		
3.4. Water Soluble Vitamins (Thiamine, Riboflavin Niacin, pantothenic Acid, Pyridoxine, Biotin, Folacin, Cobalamin and Ascorbic acid) Basic Facts, Digestion Absorption, Transport and Metabolism (2h)		
3.5. Food Source of Vitamin, Bioavailability, Function, Assessments of Vitamins status, Interaction with other Nutrients, Toxicity and Deficiency RDA (2h)		

**Unit-4. Minerals: Major or Macro elements (Calcium, Chlorine, Phosphorous, Potassium, Sulphur, Sodium and Magnesium) and Minor or Trace elements (Cobalt, Chromium, Copper, Iron, Fluorine, Iodine, Zinc) (12h)**

- 4.1. Sources (3h)
- 4.2. Basic Facts, Digestion Absorption, Transport and Metabolism (3h)
- 4.3. Biochemical Function (3h)
- 4.4. Assessments of Vitamins status, Interaction with other Nutrients, Toxicity and Deficiency RDA (3h)

**Mapping Matrix of POs, PSOs, and COs**

COs	Pos													PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	2	–	–	–	–	–	–	–	2	–	2	<b>2.25</b>	2	2	3	<b>2.33</b>
CO-2	3	3	2	–	2	–	–	–	–	–	–	2	<b>2.4</b>	3	3	2	<b>2.67</b>
CO-3	3	2	–	3	3	–	–	–	–	–	–	3	<b>2.8</b>	2	2	1	<b>1.67</b>
CO-4	3	3	–	2	3	–	2	–	2	3	2	3	<b>2.5</b>	3	3	2	<b>2.67</b>
Avg	3	2.5	0.5	1.25	2	0	0.5	0	0.5	1.25	0.5	2.5		2.5	2.5	2	

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

**Teaching Pedagogy**

CO-1 (Unit: 1)	• Constructivism, Social Constructivism, Behaviorism
CO-2 (Unit: 2)	• Constructivism, Social Constructivism, Behaviorism
CO-3 (Unit: 3)	• Constructivism, Social Constructivism, Behaviorism
CO-4 (Unit: 4)	• Constructivism, Social Constructivism, Behaviorism

**Assessment Method**

Continuous Comprehensive Evaluation 40 Marks	COs	Marks	Exam Component		
			Written Test	Assignment/Seminar	Quiz/Discussion
	CO-1	10	10	--	--
	CO-2	10	10	--	--
	CO-3	10	0	5	5
	CO-4	10	0	5	5
Term-End Evaluation 60 Marks	COs	Marks	Exam Component		
	CO-1	15	Term End Examination		
	CO-2	15			
	CO-3	15			
	CO-4	15			

## References

### Standard Human Nutrition References

1. **Human Nutrition**
  - **Editors:** Catherine Geissler & Hilary Powers
  - **Latest Edition:** 13th Edition (2017)
  - **Publisher:** Oxford University Press
  - **Note:** A comprehensive global reference covering physiology, clinical nutrition, and public health.
2. **Modern Nutrition in Health and Disease**
  - **Editors:** A. Catherine Ross, Benjamin Caballero, Robert J. Cousins, Katherine L. Tucker, Thomas R. Ziegler
  - **Latest Edition:** 12th Edition (2020)
  - **Publisher:** Wolters Kluwer / Lippincott Williams & Wilkins
  - **Note:** Advanced reference text for clinical and academic research in nutrition.
3. **Introduction to Human Nutrition**
  - **Editor:** Susan A. Lanham-New et al.
  - **Latest Edition:** 3rd Edition (2020)
  - **Publisher:** Wiley-Blackwell
  - **Note:** Recommended by the Nutrition Society (UK); ideal for undergraduate/postgraduate studies.
4. **Nutrition Science**
  - **Author:** B. Srilakshmi
  - **Latest Edition:** 8th Edition (2020)
  - **Publisher:** New Age International Publishers
  - **Note:** Widely used in Indian universities for its simple explanation and updated guidelines.
5. **Essentials of Human Nutrition**
  - **Editor:** Jim Mann & Stewart Truswell
  - **Latest Edition:** 5th Edition (2017)
  - **Publisher:** Oxford University Press

### Scientific Guidelines & Official Publications

1. **Dietary Guidelines for Americans (2020–2025)**
  - Published by USDA and HHS
  - <https://www.dietaryguidelines.gov>
  - Offers evidence-based nutrition guidance for the U.S. population.
2. **World Health Organization (WHO) – Nutrition**
  - <https://www.who.int/health-topics/nutrition>
  - Global guidelines on nutrition across the life course.
3. **National Institutes of Health (NIH) Office of Dietary Supplements**
  - <https://ods.od.nih.gov>

Extensive information on vitamins, minerals, and dietary supplements.

### Scientific Journals

- *The American Journal of Clinical Nutrition*
- *Nutrition Reviews*
- *Journal of Nutrition*
- *Public Health Nutrition*

## Web & Other Study Resources

### 1. National & International Nutrition Portals

- **FAO Nutrition** – [www.fao.org/nutrition](http://www.fao.org/nutrition)
- **WHO Nutrition** – [www.who.int/nutrition](http://www.who.int/nutrition)
- **NIH Office of Dietary Supplements (USA)** – [ods.od.nih.gov](http://ods.od.nih.gov)
- **FSSAI Eat Right India** – [www.fssai.gov.in/eatright](http://www.fssai.gov.in/eatright)

### 2. E-Books & Open Textbooks

- **OpenStax – Nutrition: Science and Everyday Application**  
<https://openstax.org/books/nutrition/pages/1-introduction>  
(Free college-level textbook)
- **Human Nutrition (University of Hawai'i at Mānoa)**  
<https://pressbooks.oer.hawaii.edu/humannutrition/>  
(Covers macronutrients, micronutrients, health conditions)
- **NCERT Class 11 & 12 Home Science** (for foundational knowledge)  
<https://ncert.nic.in/ebooks.html>

### 3. YouTube Channels

- **Nourishable** – Animated videos explaining human nutrition
- **Dr. Been Medical Lectures** – Human physiology, nutrition and biochemistry
- **Nutrition Made Simple** – Practical tips and academic insights

### 4. Research Databases & Journals

- **PubMed** – <https://pubmed.ncbi.nlm.nih.gov/>  
Search terms: *human nutrition, micronutrient deficiencies, nutritional epidemiology*
- **Journal of Human Nutrition and Dietetics** (Wiley)
- **Clinical Nutrition ESPEN**

### Indian Journal of Nutrition and Dietetics

<http://www.ijnd.in/>

**Program – M.Sc. (Food and Nutrition)  
Semester- 1**

<b>Course Code</b> 256010239002	<b>Name of Course</b> Human Nutrition Practical	<b>Major</b>
<b>Credit: 02</b>	<b>Teaching Scheme: Practical (60)</b>	<b>Teaching Hours: 60</b>

**Course Outcomes (COs)**

After studying this course, the student will be able to:

CO-1:	Distinguish Nutritional based on their physiological and nutrient deficiencies and excesses on health.
CO-2:	Compare principles to promote health and prevent disease.

**Detailed Syllabus**

1. Plan, prepare Recipe with low and high glycaemic index foods and calculate its nutritive value. (15hr)
2. Plan, prepare high Fiber and low Fiber Recipe and calculate its nutritive value. (15hr)
3. Plan, prepare low Fat Recipe and calculate its nutritive value. (15hr)
4. Plan, prepare high Protein Recipe and calculate its nutritive value. (15hr)

**Mapping Matrix of POs, PSOs, and COs**

COs	POs													PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	3	3	2	2	–	–	3	2	–	–	2	<b>2.5</b>	3	2	2	<b>2.33</b>
CO-2	3	3	3	2	–	2	3	2	2	3	2	3	<b>2.54</b>	2	3	2	<b>2.33</b>
Avg	3	3	3	2	1	1	1	2.5	2	1	1	2.5	2.5	2.5	2.5	2	2.33

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

**Teaching Pedagogy**

CO-1 (Unit: 1)	• Constructivism, Social Constructivism, Behaviorism
CO-2 (Unit: 2)	• Constructivism, Social Constructivism, Behaviorism

**Assessment Method**

Continuous Comprehensive Evaluation 40 Marks	COs	Marks	Exam Component
	CO-1	20	
	CO-2	20	
Term-End Evaluation 60 Marks	COs	Marks	Exam Component
			Term End Examination
	CO-1	30	
	CO-2	30	

<b>Program – M.Sc. (Food and Nutrition)</b>		
<b>Semester- 1</b>		
<b>Course Code</b> 256010339003	<b>Name of Course</b> <b>Diet Therapy</b>	<b>Major</b>
<b>Credit: 03</b>	<b>Teaching Scheme: Theory (45)</b>	<b>Teaching Hours:</b> <b>45</b>
<b>Course Outcomes (COs)</b>		
After studying this course, the student will be able to:		
CO-1:	Describe Principles of therapeutic diets and their modification.	
CO-2:	Describe Plan and manage diets for various diseases and health conditions.	
CO-3:	State the Apply nutrition care process in clinical and hospital settings.	
CO-4:	Relate Various role of diet in prevention and management of lifestyle disorders.	
<b>Detailed Syllabus</b>		
<b>Unit-1. Medical Nutrition Therapy (11h)</b>		
1.1 Definitions and Role of Dietician in Health Care (2hrs)		
<ul style="list-style-type: none"> <li>○ Dietetics the Science and Art of Human Nutrition Care</li> <li>○ Role of Dietician in Health Care</li> </ul>		
1.2 The Nutrition Care Process (NCP) (4hrs)		
<ul style="list-style-type: none"> <li>○ Nutrition Assessment</li> <li>○ Nutritional Diagnosis</li> <li>○ Nutrition Intervention</li> <li>○ Nutrition Monitoring and Evaluation</li> <li>○ Documentation</li> </ul>		
1.3 Importance of Coordinated Nutritional and Rehabilitation Services (2hrs)		
1.4 Patient Care and Counselling (3hrs)		
<ul style="list-style-type: none"> <li>● Patient Care</li> <li>● Counselling</li> </ul>		
<b>Unit-2. Membrane Transport, Physiological Adaptations and Intercellular Signalling (11hrs)</b>		
2.1 Cytoplasmic Membrane and Transport- Membrane Structure, The Functions of cytoplasmic membrane, Nutrient Transport. (5hrs)		
2.2 Physiological Adaptation and Intercellular signaling- Overview of Regulation of gene expression, Bioluminescence, Signal Transduction and its Molecular mechanisms, Mechanism of drug resistance, Quorum Sensing, Cellular Differentiation, Microbial Stress Responses (6hrs)		
<b>Unit-3. Therapeutic Diets (12hrs)</b>		
3.1 Introduction (4hrs)		
<ul style="list-style-type: none"> <li>▪ Types of Dietary Adaptations for Therapeutic Needs</li> <li>▪ Normal Nutrition: A Base of Therapeutic Diet</li> <li>▪ Diet Prescription</li> <li>▪ Constructing Therapeutic Diets</li> <li>▪ Routine Hospital Diet</li> <li>▪ Normal or General Diets</li> <li>▪ Liquid Diets</li> <li>▪ Soft Diets</li> </ul>		

<p>3.2 Mode of Feeding (4hrs)</p> <ul style="list-style-type: none"> <li>▪ Oral Feeding</li> <li>▪ Tube or Enteral Feeding</li> <li>▪ Peripheral Vein Feeding</li> </ul> <p>3.3 Total Parenteral Nutrition (2hrs)</p> <p>3.4 Prevent by Naturopathy (2hrs)</p>
<p><b>Unit-4. Medical Nutritional Therapy in Critical Care (11hrs)</b></p> <p>4.1 Nutritional management of Critically II (2hrs)</p> <ul style="list-style-type: none"> <li>• Special feeding method in nutritional Support</li> </ul> <p>4.2 Enteral Nutrition (EN) benefits advantages of EN Indications for enteric tube feeding for adults and children, Enteral feeds and their specific characteristics (3hrs)</p> <p>4.3 Parenteral Nutrition Daily intravenous nutritional requirements in infants and children, PN products available in Indian market Transitioning to Oral Feeding. (4hrs)</p> <ul style="list-style-type: none"> <li>• Nutrition care in immune deficiency diseases</li> <li>• Care during Cancers</li> <li>• Adverse Food Reactions</li> <li>• Food Allergy (Hypersensitivity)</li> <li>• Food Intolerance</li> <li>• Adverse Food Reactions-The Diagnosis Process</li> <li>• Treatment and Management of Adverse Food Reactions</li> </ul> <p>4.4 Prevention of Adverse Food Reactions (2hrs)</p> <ul style="list-style-type: none"> <li>• Diet and Lifestyle: Follow a balanced, whole-food diet, maintain healthy weight, and include regular exercise to improve metabolism and hormonal balance.</li> <li>• Natural Therapies: Use yoga, meditation, hydrotherapy, and massage to reduce stress, improve circulation, and support reproductive health.</li> <li>• Detoxification and Herbal Support: Employ natural detox methods and herbal remedies to regulate hormones and relieve symptoms like acne and excessive hair growth.</li> </ul>

### Mapping Matrix of POs, PSOs, and COs

COs	POs													PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	3	2	-	2	-	-	-	-	2	-	-	2.4	3	2	2	2.33
CO-2	3	2	3	-	-	-	-	3	-	-	-	2	2.6	3	2	3	2.67
CO-3	3	2	-	2	2	-	-	-	-	-	-	-	2.25	2	3	2	2.33
CO-4	3	3	2	-	3	-	2	3	-	3	2	2	2.55	3	3	2	2.67
Avg	3	2.5	1.75	0.5	1.75	-	0.5	1.5	-	1.25	0.5	1	2.45	2.75	2.5	2.25	2.5

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

### Teaching Pedagogy

CO-1 (Unit: 1)	• Constructivism, Social Constructivism, Behaviorism
CO-2 (Unit: 2)	• Constructivism, Social Constructivism, Behaviorism
CO-3 (Unit: 3)	• Constructivism, Social Constructivism, Behaviorism
CO-4 (Unit: 4)	• Constructivism, Social Constructivism, Behaviorism

<b>Assessment Method</b>					
Continuous Comprehensive Evaluation 40 Marks	COs	Marks	Exam Component		
			Written Test	Assignment/Seminar	Quiz/Discussion
	CO-1	10	10	--	--
	CO-2	10	10	--	--
	CO-3	10	0	5	5
	CO-4	10	0	5	5
Term-End Evaluation 60 Marks	COs	Marks	Exam Component		
	CO-1	15	Term End Examination		
	CO-2	15			
	CO-3	15			
	CO-4	15			

**References**

**Standard Diet Therapy References**

1. **Krause's Food & the Nutrition Care Process**
  - **Authors:** L. Kathleen Mahan, Janice L. Raymond
  - **Latest Edition:** 15th Edition (2020)
  - **Publisher:** Elsevier
  - **Note:** Most widely used textbook for clinical nutrition, MNT (Medical Nutrition Therapy), and diet planning.
  
2. **Nutrition and Diet Therapy**
  - **Authors:** Linda Kelly DeBruyne, Kathryn Pinna
  - **Latest Edition:** 12th Edition (2022)
  - **Publisher:** Cengage Learning
  - **Note:** Great for dietetics students; covers the clinical applications of nutrition science.
  
3. **Dietetics: A Practical Approach**
  - **Author:** B. Srilakshmi
  - **Latest Edition:** 8th Edition (2021)
  - **Publisher:** New Age International Publishers
  - **Note:** Popular in Indian universities; includes therapeutic diets, disease conditions, and Indian food patterns.
  
4. **Clinical Dietetics and Nutrition**
  - **Author:** F. P. Antia & Philip Abraham
  - **Latest Edition:** 4th Edition (2012)
  - **Publisher:** Oxford University Press
  - **Note:** Indian context-based clinical nutrition reference, widely cited in postgraduate studies.
  
5. **Manual of Dietetic Practice**
  - **Editor:** Joan Gandy (British Dietetic Association)
  - **Latest Edition:** 6th Edition (2019)
  - **Publisher:** Wiley-Blackwell
  - **Note:** Internationally recognized; excellent for dietetic internship and clinical application.

### Official and Practice Guidelines

- **Academy of Nutrition and Dietetics (USA)**  
<https://www.eatrightpro.org>  
Practice guidelines and Evidence Analysis Library.

### National Institute for Health and Care Excellence (NICE, UK)

<https://www.nice.org.uk>

Evidence-based guidelines for nutrition and chronic

### Official and Practice Guidelines

- **Academy of Nutrition and Dietetics (USA)**  
<https://www.eatrightpro.org>  
Practice guidelines and Evidence Analysis Library.
- **National Institute for Health and Care Excellence (NICE, UK)**  
<https://www.nice.org.uk>  
Evidence-based guidelines for nutrition and chronic diseases.

### Web & Other Study Resources

#### 1. Standard Nutrition & Medical Platforms

- **Academy of Nutrition and Dietetics (USA)**  
<https://www.eatright.org/>  
(Great for guidelines, case studies, and therapy models)
- **National Institute of Nutrition (India)**  
<https://www.nin.res.in/>  
(Indian RDA, disease-specific dietary guidelines)
- **Mayo Clinic Diet Therapy Pages**  
<https://www.mayoclinic.org/>  
(Reliable medical nutrition therapy information)

#### 2. Diet Therapy Books (Open Access)

- **Diet Therapy by Sue Rodwell Williams**  
Often available on academic platforms or libraries (search PDF on NCBI/Google Scholar)
- **Nutrition Therapy and Pathophysiology**  
Author: Lutz & Przytulski (Check Google Books or library access)
- **Open Textbook: Nutrition and Disease**  
<https://pressbooks.bccampus.ca/nutritionanddisease/>  
(Good for diet therapy basics by disease condition)
- **Human Nutrition (Chapter: Diet Therapy)**  
<https://pressbooks.oer.hawaii.edu/humannutrition/>

#### 3. Key Journals for Case Studies & Research

- **Journal of the Academy of Nutrition and Dietetics**
- **Clinical Nutrition (Elsevier)**
- **International Journal of Food and Nutritional Sciences (IJFANS)**

#### Indian Journal of Dietetics

<http://www.ijnd.in/>

<b>Program – M.Sc. (Food and Nutrition)</b>		
<b>Semester- 1</b>		
<b>Course Code</b> 256010239004	<b>Name of Course</b> Diet Therapy Practical	<b>Major</b>
<b>Credit: 02</b>	<b>Teaching Scheme: Practical (60)</b>	<b>Teaching Hours: 60</b>
<b>Course Outcomes (COs)</b>		
After studying this course, the student will be able to:		
CO-1:	Use practical skills for measuring Nutrition, using standard physiological methods.	
CO-2:	Examine how environmental and nutritional factors influence through hands-on Preparation..	
<b>Detailed Syllabus</b>		
1. <b>Market</b> survey of commercial nutritional supplements and nutritional support substrates(15hr)		
2. <b>Planning</b> and preparation of diets for patients(15hr)		
3. Liquid diet; Soft diet; Tube or Enteral Feeding (15hr)		
4. Nutritional Management in Fever and infection(15hr)		
<ul style="list-style-type: none"> <li>• Whole grains &amp; complex carbs: oats, brown rice, quinoa, millets (ragi, jowar).</li> <li>• Proteins: lentils, chickpeas, sprouts, tofu, nuts, and seeds.</li> <li>• Vegetables &amp; low-GI fruits: leafy greens, broccoli, carrots, cucumber, apples, berries, pears.</li> <li>• Healthy fats: olive oil, coconut oil (moderate), avocado, nuts, and seeds.</li> <li>• Herbs, spices &amp; drinks: cinnamon, turmeric, ginger, fenugreek, herbal teas, and warm water; avoid refined sugar and processed foods.</li> </ul>		

<b>Mapping Matrix of POs, PSOs, and COs</b>																	
COs	POs													PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	3	3	–	2	–	2	–	–	2	–	–	2.5	3	2	2	2.33
CO-2	3	2	3	–	–	2	2	3	2	3	2	3	2.77	3	3	2	2.67
Avg	3	2.5	3	0	1	1	2	1.5	1	2.5	1	1.5		3	2.5	2	3

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

<b>Teaching Pedagogy</b>			
CO-1 (Unit: 1)	• Constructivism, Social Constructivism, Behaviorism		
CO-2 (Unit: 2)	• Constructivism, Social Constructivism, Behaviorism		
<b>Assessment Method</b>			
<b>Continuous Comprehensive Evaluation</b> 40 Marks	<b>COs</b>	<b>Marks</b>	<b>Exam Component</b>
	CO-1	20	<b>Continuous Evaluation</b>
	CO-2	20	
<b>Term-End Evaluation</b> 60 Marks	<b>COs</b>	<b>Marks</b>	<b>Exam Component</b>
	CO-1	30	<b>Term End Examination</b>
	CO-2	30	

<b>Program – M.Sc. (Food and Nutrition)</b>		
<b>Semester- 1</b>		
<b>Course Code</b> 256010339005	<b>Name of Course</b> Food Preservation and Microbiology	<b>Major</b>
<b>Credit: 03</b>	<b>Teaching Scheme: Theory (45)</b>	<b>Teaching Hours: 45</b>
<b>Course Outcomes (COs)</b>		
After studying this course, the student will be able to:		
CO-1:	State the principles, working, and applications of advanced microscopy techniques and preservative tools like Traditional and Chemical.	
CO-2:	Describe various types microorganisms affecting food quality and safety.	
CO-3:	Relate the principles Apply preservation techniques to enhance shelf life and reduce spoilage.	
CO-4:	Examine role of microbes in food fermentation and contamination.	
<b>Detailed Syllabus</b>		
<b>Unit-1. Need for Food Preservation (11hrs)</b>		
1.1 Food Preservation (2hrs)		
1.2 Food Spoilage (3hrs)		
1.3 Food Infection (3hrs)		
1.4 Classification of microorganisms (3hrs)		
<b>Unit-2. Role and Significance of Microorganisms in Foods (11hrs)</b>		
2.1 Bacteria (4hrs)		
2.2 Yeast (4hrs)		
2.3 Mold (3hrs)		
<b>Unit-3. Methods of Isolation, Detection and Destruction of Microorganism (12hrs)</b>		
3.1 Newer and Rapid Methods of Isolation and Detection of Microorganisms in Foods Conventional methods (2hrs)		
3.2 Rapid methods (newer techniques (2hrs)		
3.3 Microbiological criteria for various food products (2hrs)		
3.4 Principals Involved in Destruction of Microorganisms for Prolonged Storage of Foods (2hrs)		
3.5 Physical methods: drying, freezing, cell storage, heat treatment, irradiation, high pressure processing. (2hrs)		
3.6 Chemical preservation and natural antimicrobial compounds. (1hr)		
3.7 Importance of Prebiotics and Probiotics in human health. (1hr)		
<b>Unit-4. Immunity (11hrs)</b>		
4.1 Definition of antigen and antibody. (2hrs)		
4.2 Types of immunity –Active and Passive. (3hrs)		
4.3 Three stages of immunity – primary, secondary and tertiary. (3hrs)		
4.4 Auto immune disease – Rheumatoid arthritis, Type 1 Diabetes, Psoriasis Immune body formation (3hrs)		

**Mapping Matrix of POs, PSOs, and COs**

COs	POs													PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	3	3	-	-	2	2	-	-	-	-	-	2.6	3	2	2	2.33
CO-2	3	3	3	-	-	-	2	3	-	-	-	-	2.8	3	2	2	2.33
CO-3	3	2	3	-	-	-	-	2	-	-	-	-	2.5	3	3	2	2.67
CO-4	3	3	3	-	-	-	2	3	2	3	-	-	2.7	3	2	2	2.33
Avg	3	2.75	3	-	-	0.5	1.5	2	0.5	0.75	-	-	2.65	3	2.25	2	2.42

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

**Teaching Pedagogy**

CO-1 (Unit: 1)	• Constructivism, Social Constructivism, Behaviorism
CO-2 (Unit: 2)	• Constructivism, Social Constructivism, Behaviorism
CO-3 (Unit: 3)	• Constructivism, Social Constructivism, Behaviorism
CO-4 (Unit: 4)	• Constructivism, Social Constructivism, Behaviorism

**Assessment Method**

Continuous Comprehensive Evaluation 40 Marks	COs	Marks	Exam Component		
			Written Test	Assignment/Seminar	Quiz/Discussion
	CO-1	10	10	--	--
	CO-2	10	10	--	--
	CO-3	10	0	5	5
	CO-4	10	0	5	5
Term-End Evaluation 60 Marks	COs	Marks	Exam Component		
	CO-1	15	Term End Examination		
	CO-2	15			
	CO-3	15			
	CO-4	15			

**References**

**Food Preservation and Microbiology References**

**Food Microbiology**

1. **Food Microbiology**
  - **Authors:** W.C. Frazier & D.C. Westhoff
  - **Latest Edition:** 5th Edition (2013)
  - **Publisher:** McGraw-Hill Education
  - **Note:** Classic reference for microbiological principles in food safety and spoilage.
2. **Modern Food Microbiology**
  - **Author:** James M. Jay, Martin J. Loessner, David A. Golden
  - **Latest Edition:** 8th Edition (2005)
  - **Publisher:** Springer
  - **Note:** Comprehensive reference for food pathogens, spoilage organisms, and control methods.
3. **Food Microbiology: Fundamentals and Frontiers**
  - **Editors:** Michael P. Doyle & Robert L. Buchanan
  - **Latest Edition:** 5th Edition (2019)
  - **Publisher:** ASM Press
  - **Note:** Suitable for advanced study; includes molecular and microbial food safety applications.

## Food Preservation

### 4. Principles of Food Preservation

- **Authors:** Norman N. Potter & Joseph H. Hotchkiss
- **Latest Edition:** 5th Edition (1998; Reprinted editions available)
- **Publisher:** Springer / CBS Publishers (India edition)
- **Note:** Classic textbook for both undergraduate and postgraduate courses.

### 5. Handbook of Food Preservation

- **Editor:** M. Shafiur Rahman
- **Latest Edition:** 2nd Edition (2007)
- **Publisher:** CRC Press (Taylor & Francis Group)
- **Note:** Advanced level reference for preservation techniques, additives, and processing technologies.

### 6. Food Science

- **Author:** B. Srilakshmi
- **Latest Edition:** 7th Edition (2020)
- **Publisher:** New Age International Publishers

## Guidelines and Indian References

### 7. ICMR / FSSAI Guidelines

- Food hygiene and preservation standards for India
- <https://www.fssai.gov.in>
- Includes microbiological standards for food products, shelf life, safety, and labeling.

### 8. Manual of Methods of Analysis of Foods (Microbiological Testing)

- **Publisher:** FSSAI
- Downloadable from the FSSAI website

## Journals for Research & Case Studies

- *International Journal of Food Microbiology*
- *Food Control*
- *LWT – Food Science and Technology*
- *Journal of Food Protection*

## Web & Other Study Resources

1. **Lumen Learning.** *Food Preservation.*  
Available at: <https://courses.lumenlearning.com/suny-mcc-microbiology/chapter/food-preservation/>  
(Accessed 2025)
2. **Encyclopedia Britannica.** *Food Microbiology.*  
Available at: <https://www.britannica.com/science/microbiology/Food-microbiology>  
(Accessed 2025)
3. **Wikipedia.** *Food Irradiation.*  
Available at: [https://en.wikipedia.org/wiki/Food\\_irradiation](https://en.wikipedia.org/wiki/Food_irradiation)  
(Accessed 2025)

4. **MDPI.** Paparella, A., et al. (2025). *Microbial and Viral Approaches to Food Preservation*. *Pathogens*, 14(5), 492.  
<https://www.mdpi.com/2076-0817/14/5/492>
5. **NCBI PMC.** *Microencapsulation Technologies for Food Preservation*.  
Available at: <https://pmc.ncbi.nlm.nih.gov/articles/PMC10348988/>  
(Accessed 2025)
6. **Wikipedia.** *Hurdle Technology*.  
Available at: [https://en.wikipedia.org/wiki/Hurdle\\_technology](https://en.wikipedia.org/wiki/Hurdle_technology)  
(Accessed 2025)
1. **2. Lumen Learning — Food Preservation**  
<https://courses.lumenlearning.com/suny-mcc-microbiology/chapter/food-preservation/>
2. **Encyclopedia Britannica — Food Microbiology**  
<https://www.britannica.com/science/microbiology/Food-microbiology>
3. **Wikipedia — Food Irradiation**  
[https://en.wikipedia.org/wiki/Food\\_irradiation](https://en.wikipedia.org/wiki/Food_irradiation)
4. **MDPI — Microbial and Viral Approaches to Food Preservation (Research Article)**  
<https://www.mdpi.com/2076-0817/14/5/492>
5. **NCBI PMC — Microencapsulation Technologies for Food Preservation**  
<https://pmc.ncbi.nlm.nih.gov/articles/PMC10348988/>

**Wikipedia — Hurdle Technology**  
[https://en.wikipedia.org/wiki/Hurdle\\_technology](https://en.wikipedia.org/wiki/Hurdle_technology)

**Program – M.Sc. (Food and Nutrition)  
Semester- 1**

<b>Course Code</b> 256010239006	<b>Name of Course</b> Food Preservation and Microbiology Practical	<b>Major</b>
<b>Credit: 02</b>	<b>Teaching Scheme: Practical (60)</b>	<b>Teaching Hours: 60</b>

**Course Outcomes (COs)**

After studying this course, the student will be able to:

CO-1:	Quantify Relate the principles and Apply preservation techniques to enhance shelf life and reduce spoilage.
CO-2:	Explain hands-on experience with advanced of microbes in food fermentation and contamination.

**Detailed Syllabus**

- NEED FOR FOOD PRESERVATION** - (*Food Preservation, Food Spoilage, Food Infection, Classification of Microorganisms*)1. Determination of Total Viable Count (TVC) by Pour-Plate Method.2. Gram Staining of Microorganisms from Food Sample.3. Making food Preservations by using Physical Methods of Preservation.
- ROLE & SIGNIFICANCE OF MICROORGANISMS IN FOODS.**4. Isolation of Bacteria from Food.5. Yeast Viable Count (Spread-Plate Method)6. Microscopic Examination of Mold Structure.7. Biochemical Tests for Bacterial Identification
- Methods of Isolation, Detection and Destruction of Microorganism.**8. Conventional Isolation of Microorganisms from Food (Pour-Plate Method)9. To Study different kinds of Sterilization Methods.10. MPN of Milk.11. General Principle, Understanding and utilization of Instrument for Microbiology Instrument. A.Safety Cabinet.B. Autoclave.C. Hot-Air Oven.D. Incubator.E. pH Meter.F. Centrifuge.
- IMMUNITY-12.** Blood Group Determination (ABO & Rh Typing.13. Slide Agglutination Test for Detection of Salmonella

**Mapping Matrix of POs, PSOs, and COs**

COs	POs													PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	3	3	-	-	2	2	-	-	-	-	-	2.6	3	2	2	2.33
CO-2	3	2	3	-	-	-	2	3	2	3	-	-	2.57	3	3	2	2.67
<b>Avg</b>	<b>3</b>	<b>2.5</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>1.5</b>	<b>1</b>	<b>1.5</b>	<b>0</b>	<b>0</b>		<b>3</b>	<b>2.5</b>	<b>2</b>	

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

**Teaching Pedagogy**

<b>CO-1 (Unit: 1)</b>	<ul style="list-style-type: none"> <li>Constructivism, Social Constructivism, Behaviorism</li> </ul>
<b>CO-2 (Unit: 2)</b>	<ul style="list-style-type: none"> <li>Constructivism, Social Constructivism, Behaviorism</li> </ul>

**Assessment Method**

	COs	Marks	Exam Component
			Continuous Evaluation
<b>Continuous Comprehensive Evaluation 40 Marks</b>	CO-1	20	
	CO-2	20	
	COs	Marks	
<b>Term-End Evaluation 60 Marks</b>	CO-1	30	Exam Component Term End Examination
	CO-2	30	
	COs	Marks	

<b>Program – M.Sc. (Food and Nutrition)</b>		
<b>Semester- 1</b>		
<b>Course Code</b> 256010339007	<b>Name of Course</b> Physiology	<b>Major</b>
<b>Credit: 03</b>	<b>Teaching Scheme: Theory (45)</b>	<b>Teaching Hours: 45</b>

**Course Outcomes (COs)**

After studying this course, the student will be able to:

CO-1:	Describe the structure and function of human body systems.
CO-2:	State the mechanisms and applications physiological processes related to digestion, circulation, respiration, and excretion, significance.
CO-3:	Describe the Relate physiological changes to different life stages and health conditions therapeutic applications.
CO-4:	Predict physiological knowledge to assess nutritional and health status along with the technologies.

**Detailed Syllabus**

**Unit-1. Digestive and Excretory System (11hrs)**

- 1.1 Homeostasis (2hrs)
- 1.2 Regulation of Body temperature (2hrs)
- 1.3 Digestion & absorption of food (2hrs)
- 1.4 Structure and function of Kidney (2hrs)
- 1.5 Nephron and Urine formation (3hrs)

**Unit-2. Circulatory and Respiratory System (11hrs)**

- 2.1 Blood, blood groups, blood pressure, blood clotting (2hrs)
- 2.2 Structure of Heart and junctional tissues of heart (2hrs)
- 2.3 Cardiac cycle and Types of circulation (2hrs)
- 2.4 Mechanism of respiration. (2hrs)
- 2.5 Transport of oxygen and carbon dioxide. (3hrs)

**Unit-3. Nervous and Endocrine System (11h)**

- 3.1 Types of nervous system. (2hrs)
- 3.2 Types of neurons and Reflex action (3hrs)
- 3.3 Transmission of nerve impulse in nerve fiber and synapse (3hrs)
- 3.4 Types of endocrine glands and its functions Pituitary, thyroid, Para thyroid, and adrenal gland  
Hormones its action and feedback mechanism (3hrs)

**Unit-4. Reproductive System (12hrs)**

- 4.1 Types of Chromosome, Karyotype (1hrs)
- 4.2 Spermatogenesis and oogenesis (2hrs)
- 4.3 Male and Female reproductive system (3hrs)
- 4.4 Fertilization of ovum and different stages of foetus (3hrs)
- 4.5 Parturition, Stages of labor, Development of breast and secretion of milk (3hrs)

**Mapping Matrix of POs, PSOs, and COs**

COs	POs													PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	3	–	–	–	2	2	–	–	–	–	–	2.5	2	3	2	2.33
CO-2	3	3	3	–	–	–	3	3	–	–	–	–	3	2	3	2	2.33
CO-3	3	3	–	3	–	–	3	–	3	–	–	–	3	2	3	3	2.67
CO-4	3	3	3	–	–	3	–	2	2	3	–	3	2.75	3	3	3	3.00
Avg	3	3	1.5	0.75	0	1.25	2	1.25	1.2	0.75	0	0.7	2.81	2.2	3	2.5	2.58

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

<b>Teaching Pedagogy</b>					
<b>CO-1 (Unit: 1)</b>	• Constructivism, Social Constructivism, Behaviorism				
<b>CO-2 (Unit: 2)</b>	• Constructivism, Social Constructivism, Behaviorism				
<b>CO-3 (Unit: 3)</b>	• Constructivism, Social Constructivism, Behaviorism				
<b>CO-4 (Unit: 4)</b>	• Constructivism, Social Constructivism, Behaviorism				
<b>Assessment Method</b>					
<b>Continuous Comprehensive Evaluation 40 Marks</b>	COs	Marks	Exam Component		
			Written Test	Assignment/Seminar	Quiz/Discussion
	CO-1	10	10	--	--
	CO-2	10	10	--	--
	CO-3	10	0	5	5
CO-4	10	0	5	5	
<b>Term-End Evaluation 60 Marks</b>	COs	Marks	Exam Component		
			Term End Examination		
	CO-1	15			
	CO-2	15			
	CO-3	15			
CO-4	15				
<b>References</b>					
<b>Standard References for Human Physiology</b>					
<ol style="list-style-type: none"> <li>1. <b>Textbook of Medical Physiology</b> <ul style="list-style-type: none"> <li>○ <b>Author:</b> Guyton, A.C. &amp; Hall, J.E.</li> <li>○ <b>Latest Edition:</b> 15th Edition (2021)</li> <li>○ <b>Publisher:</b> Elsevier</li> <li>○ <b>Note:</b> Most widely used textbook for understanding systemic and cellular physiology in medical and health sciences.</li> </ul> </li> <li>2. <b>Human Physiology: From Cells to Systems</b> <ul style="list-style-type: none"> <li>○ <b>Author:</b> Lauralee Sherwood</li> <li>○ <b>Latest Edition:</b> 10th Edition (2021)</li> <li>○ <b>Publisher:</b> Cengage Learning</li> <li>○ <b>Note:</b> Good for both undergraduate and postgraduate levels with clinical insights.</li> </ul> </li> <li>3. <b>Principles of Anatomy and Physiology</b> <ul style="list-style-type: none"> <li>○ <b>Authors:</b> Gerard J. Tortora &amp; Bryan H. Derrickson</li> <li>○ <b>Latest Edition:</b> 16th Edition (2020)</li> <li>○ <b>Publisher:</b> Wiley</li> <li>○ <b>Note:</b> Combines anatomy with physiology and is excellent for foundational learning.</li> </ul> </li> <li>4. <b>Essentials of Human Physiology</b> <ul style="list-style-type: none"> <li>○ <b>Author:</b> R. G. Raj</li> <li>○ <b>Latest Edition:</b> 12th Edition (2020)</li> <li>○ <b>Publisher:</b> Orient BlackSwan</li> <li>○ <b>Note:</b> Popular in Indian universities for B.Sc. and M.Sc. courses.</li> </ul> </li> <li>5. <b>Human Physiology</b> <ul style="list-style-type: none"> <li>○ <b>Authors:</b> Dee Unglaub Silverthorn</li> <li>○ <b>Latest Edition:</b> 9th Edition (2022)</li> <li>○ <b>Publisher:</b> Pearson</li> </ul> </li> </ol> <p><b>Note:</b> Emphasizes active learning and critical thinking</p>					

## Laboratory & Practical Physiology

### 6. Practical Physiology Book

- **Author:** C.L. Ghai – *A Textbook of Practical Physiology*
- **Why Use It:** Standard lab manual used for clinical and nutritional physiology experiments (B.P., reflexes, spirometry, etc.)

### Supplementary Learning Tools

- **NPTEL Online Course:** *Human Physiology* by IITs and AIIMS faculty  
<https://nptel.ac.in/courses>
- **WHO Learning Resources on Physiology and Health**  
<https://www.who.int>

### Key Topics You Can Focus in Nutrition Physiology:

- Digestive physiology & absorption of nutrients
- Hormonal regulation of metabolism
- Physiology during pregnancy and lactation
- Thermoregulation & energy balance
- Cardiovascular and renal physiology related to sodium/potassium balance

### Web & Other Study Resources

#### 1. Government & Educational Platforms

- **NPTEL – Human Physiology**  
<https://nptel.ac.in/courses/104105124>  
(Free IIT-level lectures on body systems)
- **NCERT – Class 11 & 12 Biology (Human Physiology Units)**  
<https://ncert.nic.in/ebooks.html>  
(Foundation chapters in simple diagrams and concepts)
- **Khan Academy – Human Anatomy & Physiology**  
<https://www.khanacademy.org/science/health-and-medicine/human-anatomy-and-physiology>  
(Free and visual explanations)

#### 2. Open Textbooks

- **Human Physiology (OpenStax)**  
<https://openstax.org/books/anatomy-and-physiology/pages/1-introduction>
- **Anatomy and Physiology by Betts et al.** (Highly detailed and open-source)  
<https://open.umn.edu/opentextbooks/textbooks/anatomy-and-physiology>
- **BC Campus – Anatomy and Physiology**  
<https://opentextbc.ca/anatomyandphysiology/>

### 3. Online Video Lectures

#### 1. YouTube Channels

- **Osmosis** – Medical-grade, animated physiology content
- **Nucleus Medical Media** – Short 3D videos (excellent for organs/systems)
- **Armando Hasudungan** – Hand-drawn diagrams on systems (neuro, cardiac, etc.)
- **Dr. Najeeb Lectures** (free/paid) – Deep conceptual lectures, medical-level

#### 4. Virtual Lab & Interactive Resources

- **AnatomyZone** – 3D interactive models of organs/systems  
<https://anatomyzone.com/>
- **Visible Body (trial/free tools)** – Human physiology 3D models  
<https://www.visiblebody.com/>
- **Practical Physiology Manual PDFs** (Indian universities) –  
Search: *BSc physiology practical manual PDF* or request specific body system lab charts.

**Program – M.Sc. (Food and Nutrition)  
Semester- 1**

<b>Course Code</b> 256010239008	<b>Name of Course</b> Physiology Practical	<b>Major</b>
<b>Credit: 02</b>	<b>Teaching Scheme: Practical (60)</b>	<b>Teaching Hours: 60</b>

**Course Outcomes (COs)**

After studying this course, the student will be able to:

CO-1:	To develop practical proficiency in physiological changes to different life stages and health conditions and Anatomical studies.
CO-2:	To enable students to perform quantitative and qualitative assays for detecting and analyzing physiological knowledge to assess nutritional and health status.

**Detailed Syllabus**

1. Demonstration of Barr body(15hr)
2. Blood Grouping and Rh factor(15hr)
3. Measurement of Blood Pressure (After exercise and during rest) (15hr)
4. Measurement of body temperature and pulse rate (After exercise and during rest(15hr)

**Mapping Matrix of POs, PSOs, and COs**

COs	Pos													PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	3	3	–	–	2	2	–	–	–	–	–	2.6	3	2	2	2.33
CO-2	3	2	3	–	–	–	2	3	2	3	–	3	2.625	3	3	2	2.67
Avg	3	2.5	3	0	0	1	2	1.5	1	1.5	0	1.5		3	2.5	2	

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

**Teaching Pedagogy**

CO-1 (Unit: 1)	• Constructivism, Social Constructivism, Behaviorism
CO-2 (Unit: 2)	• Constructivism, Social Constructivism, Behaviorism

**Assessment Method**

Continuous Comprehensive Evaluation 40 Marks	COs	Marks	Exam Component	
		CO-1	10	Continuous Evaluation
	CO-2	10		
Term-End Evaluation 60 Marks	COs	Marks	Exam Component	
		CO-1	15	Term End Examination
		CO-2	15	

<b>Program – M.Sc. (Food and Nutrition)</b>		
<b>Semester- 2</b>		
Course Code	Name of Course	Major
256010339009	Public Health Nutrition	
<b>Credit: 03</b>	<b>Teaching Scheme: Theory (45)</b>	<b>Teaching Hours: 45</b>
<b>Course Outcomes (COs)</b>		
After studying this course, the student will be able to:		
CO-1:	Describe classification, specificity, and models and role of nutrition in promoting public health and preventing disease.	
CO-2:	State the Assess nutritional status at community and population levels.	
CO-3:	Describe Plan and evaluate nutrition programs and interventions for diverse groups.	
CO-4:	Describe techniques of policies and strategies to address malnutrition and public health challenges and their applications in Hospital and research settings.	
<b>Detailed Syllabus</b>		
<b>Unit-1. Community Nutrition Understanding Public Nutrition Problems and Programmes (11h)</b>		
1.1 Concept, Scope, Role of Public Nutritionists in Health Care Delivery, Nutritional problems in India Anemia. (3hrs)		
1.2 Vitamin A- deficiency, PEM, Goiter. (2hrs)		
1.3 Government programmes for prevention, National Nutrition Mission, NIPI (2hrs)		
1.4 Vit-A prophylaxes programme. (2hrs)		
1.5 Goiter control programme. (2hrs)		
<b>Unit-2. Assessment of Nutritional Status –1 (12h)</b>		
2.1 Goals and Objectives, Methods of Nutritional Assessment (2hrs)		
2.2 Indirect Assessment of Nutritional Status, Direct Assessment of Nutritional Status, Nutritional Anthropometry. (2hrs)		
2.3 Uses of Anthropometry, Common Measurements Used in Nutritional Anthropometry. (2hrs)		
2.4 Methods of Assessing Nutritional Status in Individuals (2hrs)		
2.5 Determination of Nutritional Status using MUAC (1hr)		
2.6 Determination of Nutritional Status using Weight and Height (1hr)		
2.7 Methods of Assessment of Nutritional Status of Community (1hr)		
2.8 Functional indicators such as grip strength, respiratory fitness, Harvard Step test, squatting test. (1hr)		
<b>Unit-3. Assessment of Nutritional Status –2 (11h)</b>		
3.1 Clinical Assessment, Training and Standardization, Clinical Signs of Nutritional Disorders (2hrs)		
3.2 Biochemical Assessment, Biochemical Tests-An Overview, Biochemical Tests for Nutritional (2hrs)		
3.3 Deficiencies, Dietary Assessment, Family Diet Survey (2hrs)		
3.4 Assessment of Dietary Intakes of Individuals (3hrs)		
3.5 Qualitative Diet Surveys, Institutional Diet Surveys, Food Balance Sheets (FBS) (2hrs)		
<b>Unit-4. Severe Acute Malnutrition (SAM) And MAM and its Management (11h)</b>		
4.1 Severe Acute Malnutrition (SAM) Moderate Acute Malnutrition (MAM)– prevalence and causes in India (2hrs)		
4.2 Indicators of SAM and MAM (2hrs)		
4.3 Selective feeding programme guidelines. (2hrs)		
4.4 Management strategies for addressing SAM -complicated and uncomplicated cases including home based care, Monitoring of SAM and its treatment ((3hrs)		
4.5 A critique of various control strategies for SAM in national programs –Child Malnutrition Treatment Centres CMTC, Nutrition rehabilitation centres (NRC) in Gujarat) (2hrs)		

**Mapping Matrix of POs, PSOs, and COs**

COs	Pos													PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	2	–	–	–	–	–	–	–	2	–	2	2.25	2	2	2	2.00
CO-2	3	3	2	–	–	–	–	3	–	–	–	–	2.75	2	3	2	2.33
CO-3	3	3	3	–	–	–	–	3	–	–	–	–	3	2	2	2	2.00
CO-4	3	3	3	3	-	3	2	2	-	3	2	3	2.7	3	3	2	2.67
Avg	3	2.75	2	0.75	0	0.75	0.5	2	0	1.25	0.5	1.25	2.675	2.25	2.5	2	2.25

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

**Teaching Pedagogy**

CO-1 (Unit: 1)	• Constructivism, Social Constructivism, Behaviorism
CO-2 (Unit: 2)	• Constructivism, Social Constructivism, Behaviorism
CO-3 (Unit: 3)	• Constructivism, Social Constructivism, Behaviorism
CO-4 (Unit: 4)	• Constructivism, Social Constructivism, Behaviorism

**Assessment Method**

Continuous Comprehensive Evaluation 40 Marks	COs	Marks	Exam Component		
			Written Test	Assignment/Seminar	Quiz/Discussion
	CO-1	10	10	--	--
	CO-2	10	10	--	--
	CO-3	10	0	5	5
	CO-4	10	0	5	5
Term-End Evaluation 60 Marks	COs	Marks	Exam Component		
	CO-1	15	Term End Examination		
	CO-2	15			
	CO-3	15			
	CO-4	15			

**References**

Title	Author(s)/Editor(s)	Edition/Year	Publisher	Remarks
<b>Public Health Nutrition: From Principles to Practice</b>	Mark Lawrence & Tony Worsley	2nd Edition (2020)	Allen & Unwin	Combines theory, policy, and interventions
<b>Public Health Nutrition</b>	Judith L. Buttriss, Ailsa Welch, John Kearney, Susan Lanham-New	1st Edition (2017)	Wiley-Blackwell (Nutrition Society Series)	Comprehensive with global case studies
<b>Nutrition and Health in Developing Countries</b>	Richard D. Semba & Martin W. Bloem	3rd Edition (2017)	Humana Press (Springer)	Focus on malnutrition, programs, and solutions
<b>Nutrition for Public Health and Health Care</b>	Linda Kelly DeBruyne	1st Edition (2022)	Cengage Learning	US-based perspective with application to systems

<b>Textbook of Public Health and Community Medicine</b>	AFMC Pune (Rajvir Bhalwar et al.)	2nd Edition (2019)	Wolters Kluwer India	Indian context; includes public health nutrition policies
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### Official Reports & Guidelines (India)

1. **ICMR-NIN Dietary Guidelines for Indians**
  - <https://www.nin.res.in>
  - Key reference for Indian nutrition planning and policy.
2. **National Family Health Survey (NFHS-5)**
  - <https://rchiips.org/nfhs>
  - Real-time data for public health nutrition research in India.
3. **POSHAN Abhiyaan Guidelines**
  - India's flagship scheme to address malnutrition
  - <https://icds-wcd.nic.in>
4. **National Nutrition Mission Reports (Ministry of Women & Child Development)**

### Research Journals

- *Public Health Nutrition* (Cambridge University Press)
- *Maternal and Child Nutrition*
- *Indian Journal of Community Medicine*
- *The Lancet – Public Health* (for global trends)

### Key Focus Areas in Public Health Nutrition

- Malnutrition (PEM, micronutrient deficiencies)
- National Nutrition Programs (ICDS, MDM, Anemia Mukh Bharat)
- Community-based assessment (growth monitoring, surveys)
- Nutrition policy and advocacy
- Maternal and child health
- Food fortification and supplementation

### Web & Other Study Resources

#### 1. National & International Agencies

- **National Institute of Nutrition (NIN), India**  
<https://www.nin.res.in>  
(RDA guidelines, NNMB reports, and nutrition program data)
- **FSSAI – Eat Right India**  
<https://www.fssai.gov.in/eatright/>  
(National campaigns, guidelines, safe & nutritious food at community level)
- **World Health Organization (WHO) – Nutrition**  
<https://www.who.int/health-topics/nutrition>  
(Global data, policies, maternal-child nutrition strategies)
- **UNICEF Nutrition Programs**  
<https://www.unicef.org/nutrition>  
(Malnutrition, stunting, wasting, school feeding, anemia)

## 2. Free Open Access Textbooks

- **Nutrition, Health and Disease: A Lifespan Approach**  
<https://www.springer.com/gp/book/9783319510721>
- **Open Textbook: Human Nutrition (Chapter: Public Health Nutrition)**  
<https://pressbooks.oer.hawaii.edu/humannutrition/>
- **Introduction to Public Health in the 21st Century** (Relevant chapters on nutrition)  
<https://open.umn.edu/opentextbooks/subjects/public-health>

## 3. Online Courses & Videos

### 1. NPTEL / SWAYAM

- **Public Health Nutrition** by ICMR-NIN / IGNOU  
<https://swayam.gov.in>  
Search: *Public Health Nutrition*
- **Coursera**
  - *Global Health and Nutrition* (by Johns Hopkins, Emory, etc.)
  - *Nutrition and Lifestyle in Pregnancy* (Lifespan health)

### 4. YouTube Channels

- **UNICEF India** – Micronutrient and child health videos
- **NIN India** – Government nutrition policy and research updates
- **FoodTech Pathshala** – Indian PHN topics in Hindi/English

### 5. Journals for Public Health Nutrition

- **Journal of Public Health Nutrition (Cambridge)**  
<https://www.cambridge.org/core/journals/public-health-nutrition>
- **Indian Journal of Community Medicine**  
<https://www.ijcm.org.in/>
- **Maternal and Child Nutrition (Wiley)**
- **Lancet Public Health (Nutrition Issues)**
- **BMJ Nutrition, Prevention & Health**

**Program – M.Sc. (Food and Nutrition)  
Semester- 2**

<b>Course Code</b> 256010239010	<b>Name of Course</b> Public Health Nutrition Practical	<b>Major</b>
<b>Credit: 02</b>	<b>Teaching Scheme: Practical (60)</b>	<b>Teaching Hours: 60</b>

**Course Outcomes (COs)**

After studying this course, the student will be able to:

CO-1:	Measure Plan and evaluate nutrition programs and interventions for diverse groups.
CO-2:	Analyze the activity of policies and strategies to address malnutrition and public health challenges.

**Detailed Syllabus**

1. Assess nutritional status of individuals using anthropometric methods(15hr)
  - 1.1 Measure height, weight, BMI
  - 1.2 Calculate Mid Upper Arm Circumference (MUAC)
  - 1.3 Use growth charts (e.g., WHO standards) for children
  - 1.4 Interpret data to identify undernutrition or obesity
2. Field Data Collection & Analysis about programs like ICDS/Mid-Day Meal/ POSHAN Abhiyaan. (15hr)
  - 2.1 Diet Surveys and 24-Hour Recall
  - 2.2 Use food frequency questionnaire (FFQ)
  - 2.3 Water and Sanitation Awareness program
3. Planning Low-Cost Balanced Diets (Create affordable and nutritious meal plans) (15hr)
  - 3.1 Plan diet for different groups: infants, pregnant women, elderly, etc.
  - 3.2 Use local, seasonal foods within budget
  - 3.3 Compare with ICMR Recommended Dietary Allowances (RDA)
  - 3.4 Nutrition Education Material Development
  - 3.5 Prepare MUAC (Mid upper arm circumference) Tap
  - 3.6 Prepare posters, pamphlets, flip charts on topics like:
  - 3.7 Anaemia prevention, Breastfeeding, Balanced diets, Role-play or demonstrate community teaching methods
4. Energy-Dense Supplementary Mix (for children). Iron-Rich Poha (for anaemia prevention) High-Protein Upma (for low-cost nutrition) (15hr)
  - 4.1 Low-Cost calorie and micronutrient rich Nutri Laddu (for pregnant/lactating women) Vitamin A-Rich Carrot-Spinach Salad
  - 4.2 Low-Cost Traditional dishes, Fortified and Supplementary Food Samples

**Mapping Matrix of POs, PSOs, and COs**

COs	POs													PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	3	3	–	–	–	–	3	–	3	–	–	3	3	2	2	2.33
CO-2	3	2	3	–	–	–	–	3	–	–	–	–	2.75	3	3	2	2.67
Avg	3	2.5	3	0	0	0	0	3	0	1.5	0	0		3	2.5	2	

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

**Teaching Pedagogy**

CO-1 (Unit: 1)	<ul style="list-style-type: none"> <li>• Constructivism, Social Constructivism, Behaviorism</li> </ul>
CO-2 (Unit: 2)	<ul style="list-style-type: none"> <li>• Constructivism, Social Constructivism, Behaviorism</li> </ul>

<b>Assessment Method</b>			
<b>Continuous Comprehensive Evaluation 40 Marks</b>	<b>COs</b>	<b>Marks</b>	<b>Exam Component</b>
	<b>CO-1</b>	10	<b>Continuous Evaluation</b>
	<b>CO-2</b>	10	
<b>Term-End Evaluation 60 Marks</b>	<b>COs</b>	<b>Marks</b>	<b>Exam Component</b>
	<b>CO-1</b>	15	Term End Examination
	<b>CO-2</b>	15	

<b>Program – M.Sc. (Food and Nutrition)</b>		
<b>Semester- 2</b>		
<b>Course Code</b>	<b>Name of Course</b>	<b>Major</b>
256010339011	Dietetics & Diet Counselling	
<b>Credit: 03</b>	<b>Teaching Scheme: Theory (45)</b>	<b>Teaching Hours: 45</b>
<b>Course Outcomes (COs)</b>		
After studying this course, the student will be able to:		
CO-1:	Describe the principles of dietetics and the nutrition care process.	
CO-2:	State various types of Plan therapeutic diets for individuals with various health conditions	
CO-3:	Describe the processes of effective counselling skills for dietary behaviour change significance.	
CO-4:	Describe communication techniques to support clients in achieving nutritional goals.	
<b>Detailed Syllabus</b>		
<b>Unit-1. Dietary Management (12h)</b>		
1.1 Weight Imbalance -Prevalence and Classification (1hr)		
1.2 Guidelines for Calculating ideal Body Weight (1hr)		
1.3 Obesity and underweight (1hr)		
1.4 Gastrointestinal Diseases and Disorders (1hr)		
1.5 Diarrhoea (1hr)		
1.6 Constipation (1hr)		
1.7 Oesophagitis (1hr)		
1.8 Gastro Oesophageal Reflux Disease (GERD)		
Dyspepsia (3hrs)		
Gastritis		
Diverticular Disease		
Peptic Ulcer		
1.9 Malabsorption Syndrome'(2hrs)		
<b>Unit-2. Dietary Management in Gout and Diabetes Mellitus (11hrs)</b>		
2.1 Gout,Role of Protein and Purines,Etiology ,Clinical Features and Complications,Management of Gout (2hrs)		
2.2 Diabetes Mellitus,Prevalence of Diabetes Mellitus,Classification and Etiology of Diabetes (2hrs)		
2.3 Factors Affecting Normal Blood Sugar Levels (2hrs)		
2.4 Diagnosis,Complications of Diabetes,Management of Diabetes,Management of Diet Food Exchange System (2hrs)		
2.5 Glycaemic Index (GI) (2hrs)		
Sweeteners: Nutritive and Non-Nutritive Sweeteners,Dietetic Foods,Beneficial Effect of Some Foods		
2.6 Supportive Therapy,Exercise and Drugs (1hr)		
<b>Unit-3. Coronary Heart Diseases and their Management (11hrs)</b>		
3.1 Coronary Heart Diseases (CHD),Prevalence,Etiology: Cardiovascular Risk Factors Pathophysiology of CHD,Common Disorders of Coronary Heart Diseases and their Management		
Dyslipidemia,Atherosclerosis: A Coronary Artery Disseise,Hypertension (HT) (3hrs)		
3.2 Angina Pectoris (2hrs)		
3.3 Myocardial infarction (MI) (2hrs)		
3.4 Congestive Cardiac Failure (2hrs)		
3.5 Rheumatic Heart Disease (RI-ID) (2hrs)		

**Unit-4. Dietary Management in Liver and Renal Diseases (11hrs)**

4.1 Liver disorders, Viral hepatitis types A and B, C, E, Cirrhosis of liver  
Hepatic coma, Kidney Function: Diagnostic Tests, Common Renal Diseases Etiology and Dietary Management (3hrs)

4.2 General Principle of Dietary Management in Renal Diseases (3hrs)

4.3 Acute and Chronic Nephritis (2hrs)

4.4 Nephritic Syndrome, Acute Renal Failure (ARF), Chronic Renal Failure (CRF)-End Stage Renal Disease, (ESRD) and Renal Calculi (3hrs)

**Mapping Matrix of POs, PSOs, and COs**

COs	Pos												PSOs				
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	3	–	–	–	–	3	2	–	2	–	–	2.6	2	3	2	2.33
CO-2	3	3	2	–	–	–	–	2	–	–	–	–	2.5	2	3	2	2.33
CO-3	3	3	3	3	–	–	–	–	–	–	–	–	3	2	3	3	2.67
CO-4	3	3	2	3	–	3	–	2	–	3	3	3	2.77	3	3	2	2.67
Avg	3	3	1.75	1.5	0	0.75	0.7	1.5	0	1.25	0.75	0.7	2.71	2.2	3	2.2	2.5

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

**Teaching Pedagogy**

CO-1 (Unit: 1)	• Constructivism, Social Constructivism, Behaviorism
CO-2 (Unit: 2)	• Constructivism, Social Constructivism, Behaviorism
CO-3 (Unit: 3)	• Constructivism, Social Constructivism, Behaviorism
CO-4 (Unit: 4)	• Constructivism, Social Constructivism, Behaviorism

**Assessment Method**

Continuous Comprehensive Evaluation 40 Marks	COs	Marks	Exam Component		
			Written Test	Assignment/Seminar	Quiz/Discussion
	CO-1	10	10	--	--
	CO-2	10	10	--	--
	CO-3	10	0	5	5
	CO-4	10	0	5	5
Term-End Evaluation 60 Marks	COs	Marks	Exam Component		
	CO-1	15	Term End Examination		
	CO-2	15			
	CO-3	15			
	CO-4	15			

**References**

1 Title	Author(s)/Editor(s)	Edition/Year	Publisher	Remarks
<b>Krause's Food &amp; the Nutrition Care Process</b>	L. Kathleen Mahan & Janice L. Raymond	15th Edition (2020)	Elsevier	Comprehensive clinical dietetics text with NCP and MNT
<b>Essentials of Human Nutrition</b>	Jim Mann & Stewart Truswell	5th Edition (2017)	Oxford University Press	Covers diet planning and counselling basics
<b>Dietetics: A Practical Approach</b>	B. Srilakshmi	8th Edition (2021)	New Age International Publishers	Indian context; practical dietetics and meal planning

<b>Manual of Dietetic Practice</b>	Joan Gandy (British Dietetic Association)	6th Edition (2019)	Wiley-Blackwell	Global reference; suitable for hospital and outpatient settings
<b>Nutrition and Diet Therapy</b>	Linda Kelly DeBruyne & Kathryn Pinna	12th Edition (2022)	Cengage Learning	Ideal for counseling-based diet therapy applications
<b>Clinical Dietetics and Nutrition</b>	F.P. Antia & Philip Abraham	4th Edition (2012)	Oxford University Press	Indian perspective with medical background
<b>Nutrition Counseling and Education Skills for Dietetics Professionals</b>	Betsy B. Holli & Judith A. Beto	7th Edition (2020)	Lippincott Williams & Wilkins	Focused specifically on counseling methods and communication

### **Diet Counselling & Communication Skills**

#### **6. Nutrition Counseling and Education Skills for Dietetics Professionals**

- **Author:** Betsy B. Holli and Judith Beto
- **Focus:** Behavior change models, motivational interviewing, client-centered counselling.

#### **7. Nutrition Counseling Skills for the Nutrition Care Process**

- **Author:** Linda Snetselaar
- **Highlights:** Application of counselling skills in clinical and community dietetics using real-life cases.

### **Official Guidelines & Tools**

1. **Academy of Nutrition and Dietetics – Evidence-Based Guidelines**  
<https://www.eatrightpro.org>
  - Provides tools for NCP, counselling models, and diet planning.
2. **ICMR-NIN RDA Guidelines**  
<https://www.nin.res.in>
  - Used for developing diet plans in Indian context.

### **Key Areas of Focus in Dietetics & Counselling**

- Nutrition Care Process (Assessment, Diagnosis, Intervention, Monitoring)
- Therapeutic diets (Diabetes, CVD, Renal, GI disorders)
- Individualized diet planning and menu design
- Counseling techniques (active listening, motivational interviewing)
- Patient education and behavior change communication (BCC)

## Web & Other Study Resource

### 1. Professional Organizations

- **Academy of Nutrition and Dietetics (USA)**  
<https://www.eatrightpro.org>  
(Practice standards, dietetic protocols, case studies)
- **Indian Dietetic Association (IDA)**  
<https://idaindia.com>  
(Newsletters, Indian dietary guidelines, webinars)
- **FSSAI – Safe and Nutritious Food Initiative**  
<https://www.fssai.gov.in/snf/>  
(Practical tips for community diet counselling and school nutrition)

### 2. Free Open Access Textbooks & PDFs

- **Nutrition Care Process and Model (AND)**  
<https://www.eatrightpro.org/practice/nutrition-care-process>  
(Complete NCP structure for dietetic practice)
- **Open Textbook: Nutrition Counselling and Education Skills**  
<https://open.umn.edu/opentextbooks/textbooks/nutrition-counseling-and-education-skills>  
(Motivational interviewing, communication styles, case studies)
- **OpenStax – Nutrition: Science and Everyday Application**  
<https://openstax.org/books/nutrition/pages/1-introduction>

### 3. Online Courses & Videos

#### 1. NPTEL / SWAYAM

- **Clinical Nutrition and Dietetics** – Includes dietetics modules  
<https://swayam.gov.in>
- **Nutrition Counselling Techniques** – (available on various portals)

#### 2. YouTube Channels

- **Osmosis** – Basics of therapeutic diets and conditions
- **Nutrition Academy India** – Indian-style counselling and diet tips

[Dietitian Shweta / Ishi Khosla](#) – Indian diet counselling

<b>Program – M.Sc. (Food and Nutrition)</b>		
<b>Semester- 2</b>		
<b>Course Code</b> 256010239012	<b>Name of Course</b> <b>Dietetics &amp; Diet Counselling Practical</b>	<b>Major</b>
<b>Credit: 02</b>	<b>Teaching Scheme: Practical (60)</b>	<b>Teaching Hours: 60</b>
<b>Course Outcomes (COs)</b>		
After studying this course, the student will be able to:		
CO-1:	Plan therapeutic diets for individuals with various health conditions	
CO-2:	Analyze communication techniques to support clients in achieving nutritional goals	
<b>Detailed Syllabus</b>		
1. <b>Dietetics &amp; Diet Counselling</b> -Visit to a pathology lab 15hr)		
2. General, Reference Values and Interpretations(15hr) Hemoglobin Blood glucose Serum total cholesterol Serum triglyceride Albumin test Bilirubin test Kidney function taste		
3. <b>Dietetics &amp; Diet Counselling</b> (15hr) Dietary Management in Obesity and underweight Dietary Management in GI Disorders		
4. Dietary Management in Gout (15hr) Dietary Management Diabetes Mellitus Dietary Management in Coronary Heart Diseases Dietary Management in Liver Diseases Dietary Management in Renal Diseases		

<b>Mapping Matrix of POs, PSOs, and COs</b>																	
COs	Pos													PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	3	3	–	–	–	–	3	–	2	–	–	2.8	3	2	2	2.33
CO-2	3	2	3	–	–	–	–	3	–	–	–	–	2.75	3	3	2	2.67
Avg	3	2.5	3	0	0	0	0	3	0	1	0	0		3	2.5	2	

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

<b>Teaching Pedagogy</b>			
<b>CO-1 (Unit: 1)</b>	• Constructivism, Social Constructivism, Behaviorism		
<b>CO-2 (Unit: 2)</b>	• Constructivism, Social Constructivism, Behaviorism		
<b>Assessment Method</b>			
<b>Continuous Comprehensive Evaluation</b> 40 Marks	COs	Marks	Exam Component
	CO-1	10	Continuous Evaluation
	CO-2	10	
<b>Term-End Evaluation</b> 60 Marks	COs	Marks	Exam Component
	CO-1	15	Term End Examination
	CO-2	15	

**Program – M.Sc. (Food and Nutrition)  
Semester- 2**

<b>Course Code</b> 256010339013	<b>Name of Course</b> <b>Nutritional Biochemistry</b>	<b>Major</b>
<b>Credit: 03</b>	<b>Teaching Scheme: Theory (45)</b>	<b>Teaching Hours: 45</b>

**Course Outcomes (COs)**

After studying this course, the student will be able to:

CO-1:	Describe the structure, biochemical roles of nutrients in metabolism and health.
CO-2:	Describe the digestion, absorption, and utilization of macronutrients and micronutrients components of methods.
CO-3:	Describe various Analyze biochemical changes associated with nutritional deficiencies and disorders.
CO-4:	Use biochemical knowledge to assess nutritional status and support diet planning societal concerns.

**Detailed Syllabus**

**Unit-1. Carbohydrates (12hrs)**

1.1 Carbohydrates: Definition and classification, Monosaccharide- structural aspects, Disaccharide, Polysaccharide, Glycolysis and Krebs cycle and its energetics, Errors in metabolism of carbohydrates, Metabolic disorders (12hrs)

**Unit-2. Proteins (11hrs)**

2.1 Proteins: Proteins and amino acids definition and classification Functions of Protein and amino acids, Metabolism of amino acid, ammonia, Urea cycle, Protein Synthesis, Metabolic disorders and errors in protein metabolism. (11hrs)

**Unit-3. Fats: (11hrs)**

3.1 Fats: Fatty Acids definition and classification, Fats definition and classification, Some important steroids,  $\beta$  oxidation of fatty acids, Ketosis and errors in fat metabolism. (11hrs)

**Unit-4. 1 Enzyme: (11hrs)**

4.1 Enzymes definition, nomenclature and classification of enzymes, physical and chemical properties, Factors affecting enzyme activity, Enzyme Inhibition Physiological importance of enzyme in disease condition. (11hrs)

**Mapping Matrix of POs, PSOs, and COs**

COs	Pos													PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	3	3	–	–	–	–	3	–	2	–	–	2.8	3	2	2	2.33
CO-2	3	3	3	–	–	–	–	3	–	–	3	–	3	3	3	2	2.67
CO-3	3	3	3	3	3	3	–	3	2	3	2	2	2.7	2	3	3	2.67
CO-4	3	3	3	3	3	3	2	2	3	3	3	3	8.5	2	3	3	2.67
Avg	3	3	3	1.5	1.5	1.5	0.5	2.75	1.25	2	2	1.25	4.25	2.5	2.75	2.5	2.58

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

**Teaching Pedagogy**

CO-1 (Unit: 1)	• Constructivism, Social Constructivism, Behaviorism
CO-2 (Unit: 2)	• Constructivism, Social Constructivism, Behaviorism
CO-3 (Unit: 3)	• Constructivism, Social Constructivism, Behaviorism
CO-4 (Unit: 4)	• Constructivism, Social Constructivism, Behaviorism

<b>Assessment Method</b>					
Continuous Comprehensive Evaluation 40 Marks	COs	Marks	Exam Component		
			Written Test	Assignment/Seminar	Quiz/Discussion
	CO-1	10	10	--	--
	CO-2	10	10	--	--
	CO-3	10	0	5	5
	CO-4	10	0	5	5
Term-End Evaluation 60 Marks	COs	Marks	Exam Component		
	CO-1	15	Term End Examination		
	CO-2	15			
	CO-3	15			
	CO-4	15			

**References**

<b>1. Nutritional Biochemistry</b>	Tom Brody	3rd Edition (1999) <i>(latest edition may vary)</i>	Academic Press (Elsevier)	In-depth explanation of nutrient metabolism and molecular nutrition
<b>2. Biochemical, Physiological, and Molecular Aspects of Human Nutrition</b>	Martha H. Stipanuk & Marie A. Caudill	4th Edition (2018)	Saunders (Elsevier)	Comprehensive for medical and graduate-level nutrition science
<b>3. Introduction to Human Nutrition</b>	Susan A. Lanham-New et al. (The Nutrition Society)	3rd Edition (2020)	Wiley-Blackwell	Includes key biochemistry concepts integrated with applied nutrition
<b>4. Textbook of Biochemistry for Medical Students</b>	D.M. Vasudevan, Sreekumari S., Kannan Vaidyanathan	8th Edition (2022)	Jaypee Brothers Medical Publishers	Popular in Indian universities for biochemistry with nutrition relevance
<b>5. Essentials of Biochemistry</b>	M.C. Pant	2nd Edition (2015)	I.K. International Publishing House	Indian context; good for foundational and applied understanding
<b>6. Fundamentals of Biochemistry: Life at the Molecular Level</b>	Donald Voet, Judith G. Voet, Charlotte W. Pratt	6th Edition (2023)	Wiley	Gold-standard for core biochemistry; advanced but relevant to nutrition

**7. Important Topics in Nutritional Biochemistry**

- **Macronutrient metabolism** – Carbohydrates, proteins, lipids
- **Micronutrient functions** – Vitamins & minerals in enzyme systems
- **Enzyme kinetics and coenzymes**
- **Energy metabolism** – ATP, TCA cycle, oxidative phosphorylation
- **Biochemical basis of nutrient deficiencies**
- **Gene-nutrient interactions (nutrigenomics)**
- **Hormonal regulation of metabolism**

## 8. Supplementary Learning Tools

1. **NPTEL Course: Biochemistry of Nutrition** (IIT/IISc)
  - Free lectures & notes
  - <https://nptel.ac.in>
2. **ICMR-NIN Guidelines on Nutrient Functions**
  - For Indian RDA-based metabolic functions
  - <https://www.nin.res.in>

## 9. Useful Journals

- *The Journal of Nutritional Biochemistry*
- *Nutrition Research Reviews*
- *The American Journal of Clinical Nutrition*
- *Annual Review of Nutrition*

## Web & Other Study Resources

### 10. Educational Platforms

- **NPTEL – Nutritional Biochemistry (IIT Madras)**  
<https://nptel.ac.in/courses/102106044>  
(Detailed lecture series with Indian examples and MCQs)
- **NCBI Bookshelf – Biochemistry & Nutrition Texts**  
<https://www.ncbi.nlm.nih.gov/books/>  
(Search: “Nutrition”, “Metabolism”, “Biochemistry of vitamins”)
- **Khan Academy – Biochemistry Modules**  
<https://www.khanacademy.org/science/biology/biochemistry>  
(Basic to intermediate level with animations)
- **PubChem & RCSB PDB – Structures of nutrients, enzymes, cofactors**  
<https://pubchem.ncbi.nlm.nih.gov>  
<https://www.rcsb.org>

### 11. Free E-Books & Open Access Textbooks

#### 1. Top Open Source Texts

- **Biochemistry Free for All** – by Oregon State University  
<https://open.oregonstate.edu/biochemistry>
- **Principles of Biochemistry** – OpenStax (for metabolism & molecular nutrition)  
<https://openstax.org/books/biochemistry/pages/1-introduction>
- **Nutrition: Science and Everyday Application**  
<https://openstax.org/books/nutrition/pages/1-introduction>

#### 3. Online Video Lectures

##### 1. YouTube Channels

- **Osmosis** – Great for metabolic cycles and vitamin/mineral pathways
- **Armando Hasudungan** – Illustrated pathways (glycolysis, TCA, urea cycle)
- **Dr. Najeeb Lectures** – Advanced, detailed concepts (paid + free previews)

##### 2. SWAYAM/NPTEL Courses

- **Basics of Biochemistry** (for Nutrition students)

## Biochemistry of Macromolecules and Micronutrients

**Program – M.Sc. (Microbiology)  
Semester- 2**

<b>Course Code</b> 256010239014	<b>Name of Course</b> <b>Nutritional Biochemistry Practical</b>	<b>Major</b>
<b>Credit: 02</b>	<b>Teaching Scheme: Practical (60)</b>	<b>Teaching Hours: 60</b>

**Course Outcomes (COs)**

After studying this course, the student will be able to:

CO-1:	Explain digestion, absorption, and utilization of macronutrients and micronutrients.
CO-2:	Develop proficiency in biochemical changes associated with nutritional deficiencies and disorders analysis

**Detailed Syllabus**

- 1. Carbohydrates and Energy Metabolism**,01 Qualitative tests for carbohydrates by Molisch test 02 Qualitative tests for carbohydrates by Benedict test 03. Qualitative tests for carbohydrates by Barfoed test04. Estimation of Glucose by GOD-POD method 05. Effect of heat and pH on carbohydrate stability.06. Paper chromatography of Carbohydrates (15hr)
- 2. Proteins & Amino Acid Metabolism.**07. **Qualitative tests for proteins by Biuret test.**08. Qualitative tests for proteins by Ninhydrin test.09. Qualitative tests for proteins by Xanthoproteic test.10. Estimation of albumin by BCG method.11. Effect of pH and heat on protein denaturation.12. Paper chromatography of amino acids(15hr)
- 3. Fats & Lipid Metabolism-13.** Qualitative tests for fats and oils by Sudan III test.14. Qualitative tests for fats and oils by Emulsion test.15. Paper chromatography of Lipids.16. Determination of saponification value(15hr)
- 4. Enzymes & Enzyme Regulation-17. Demonstration of enzyme activity (amylase)**18. Effect of temperature on enzyme activity.19. Effect of pH on enzyme activity. (15hr)

**Mapping Matrix of POs, PSOs, and COs**

COs	POs													PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	3	3	–	–	–	–	3	–	2	–	–	<b>2.8</b>	3	2	2	<b>2.33</b>
CO-2	3	2	3	–	–	–	–	3	–	–	–	–	<b>2.75</b>	3	3	2	<b>2.67</b>
Avg	<b>3</b>	<b>2.5</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>		<b>3</b>	<b>2.5</b>	<b>2</b>	

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

**Teaching Pedagogy**

CO-1 (Unit: 1)	• Constructivism, Social Constructivism, Behaviorism
CO-2 (Unit: 2)	• Constructivism, Social Constructivism, Behaviorism

**Assessment Method**

Continuous Comprehensive Evaluation 40 Marks	COs	Marks	Exam Component	
		CO-1	20	Continuous Evaluation
	CO-2	20		
Term-End Evaluation 60 Marks	COs	Marks	Exam Component	
		CO-1	30	Term End Examination
		CO-2	30	

<b>Program – M.Sc. (Food and Nutrition)</b>		
<b>Semester- 2</b>		
<b>Course Code</b> 256010339015	<b>Name of Course</b> Entrepreneurship Management	<b>Major</b>
<b>Credit: 03</b>	<b>Teaching Scheme: Theory (45)</b>	<b>Teaching Hours: 45</b>
<b>Course Outcomes (COs)</b>		
After studying this course, the student will be able to:		
CO-1:	Describe fundamentals of fundamental concepts of entrepreneurship, business planning, and innovation in the food and nutrition sector information.	
CO-2:	Discuss sequence alignment methods and Analyze market trends, identify viable business opportunities, and assess the feasibility of food-based entrepreneurial ventures.	
CO-3:	Apply practical skills in budgeting, resource management, branding, and marketing for nutrition-focused enterprises.	
CO-4:	Use a sustainable business model integrating ethical practices, food regulations, and community health needs while identifying future directions.	
<b>Detailed Syllabus</b>		
<b>Unit-1. ENTREPRENEURSHIP AND FOOD SERVICE MANAGEMENT- I (11hrs)</b>		
1.1 Introduction, A Conceptual Perspective of Entrepreneurship, Defining Entrepreneurship, Who is an entrepreneur?, Characteristics of Successful Entrepreneurs Creativity, Innovation and Entrepreneurship, The Creative Process The Process of Innovation (6hrs)		
1.2 Business Requirements for Food Products What an Entrepreneur Needs to Consider Government Requirements, Marketing, Developing the Business Plan Determine the Resources Needed Managing the Business. (5hrs)		
<b>Unit-2. ENTREPRENEURSHIP AND FOOD SERVICE MANAGEMENT- II (12hrs)</b>		
2.1 Entrepreneurship Development and Training, Approaches to Entrepreneurship Development, The Selective Method, The Shotgun Approach, The Multiplier Method, Intervention as an Approach, Merchandising Skills Specially for Entrepreneurs, Know Your Client, Responding to Requests (8hrs)		
2.2 Marketing Your Business, Pros and Cos of Yellow Pages Advertising, Client Feedback, Competition (4hrs)		
<b>Unit-3. FOOD MANAGEMENT: TYPES OF FOOD SERVICE SYSTEMS (11hrs)</b>		
3.1 Introduction, Introduction to Food Service Systems, Types of Service Systems Conventional, Commissary, Ready Prepared, Assembly / Serve, Distribution and Service in Food Service System Conventional Food Service System Commissary Food Service System. (6hrs)		
3.2 Ready Prepared Food Service System Assembly / Serve Food Service System Conduct and Appearance of Service Unit Personnel. (5hrs)		
<b>Unit-4. FOOD MANAGEMENT: QUALITY FOOD PRODUCTION - PLANNING AND CONTROL (11hrs)</b>		
4.1 Introduction, Principles of Food Production, Food Production Systems Management, Menu, Ingredient Control, Production Forecasting, Production Scheduling, Production Control, Use of Standardized Recipes, Developing. (7hrs)		
4.2 Programme for Recipe Standardization, Safeguard in Food Production, Quality Control in Food Preparation and Cooking, Controlling Microbiological Quality of Food. (4hrs)		

**Mapping Matrix of POs, PSOs, and COs**

COs	POs													PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	–	–	–	–	–	2	3	–	3	–	–	2.75	2	2	2	2.00
CO-2	3	3	3	–	–	–	–	2	–	–	–	–	2.75	3	2	2	2.33
CO-3	3	3	3	3	2	–	–	3	–	–	–	–	2.8	2	2	3	2.33
CO-4	3	3	3	3	3	2	2	3	-	3	3	-	2.8	2	3	3	2.67
Avg	3.0	2.2	2.2	1.5	1.2	0.5	1.0	2.7	-	1.50	0.75	-	2.78	2.25	2.25	2.50	2.33

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

**Teaching Pedagogy**

CO-1 (Unit: 1)	• Constructivism, Social Constructivism, Behaviorism
CO-2 (Unit: 2)	• Constructivism, Social Constructivism, Behaviorism
CO-3 (Unit: 3)	• Constructivism, Social Constructivism, Behaviorism
CO-4 (Unit: 4)	• Constructivism, Social Constructivism, Behaviorism

**Assessment Method**

Continuous Comprehensive Evaluation 40 Marks	COs	Marks	Exam Component		
			Written Test	Assignment/Seminar	Quiz/Discussion
	CO-1	10	10	--	--
	CO-2	10	10	--	--
	CO-3	10	0	5	5
	CO-4	10	0	5	5
Term-End Evaluation 60 Marks	COs	Marks	Exam Component		
	CO-1	15	Term End Examination		
	CO-2	15			
	CO-3	15			
	CO-4	15			

**References**

**Core Textbooks and References:**

- "Entrepreneurship: Theory, Process, and Practice"**
  - **Author:** Donald F. Kuratko
  - **Edition:** 11th Edition
  - **Year:** 2023
  - **Publisher:** Cengage Learning
- "Entrepreneurship Development"**
  - **Author:** S.S. Khanka
  - **Year:** 2012
  - **Publisher:** S. Chand & Company Ltd.
- "Entrepreneurship"**
  - **Author:** Robert D. Hisrich, Michael P. Peters, and Dean A. Shepherd
  - **Edition:** 11th Edition
  - **Year:** 2020
  - **Publisher:** McGraw Hill Education
- "Entrepreneurship and Innovation"**
  - **Author:** Peter F. Drucker
  - **Year:** 2006
  - **Publisher:** HarperBusiness

5. "Essentials of Entrepreneurship and Small Business Management"

- **Author:** Norman M. Scarborough
- **Edition:** 9th Edition
- **Year:** 2019
- **Publisher:** Pearson Education

6. "Innovation and Entrepreneurship"

- **Author:** Peter F. Drucker
- **Year:** 2006 (Reprint)
- **Publisher:** Routledge (originally Harper & Row, 1985)

### Specialized References in Food and Nutrition Entrepreneurship

4. Entrepreneurship in Food Processing Sector

- **Publisher:** Ministry of Food Processing Industries (MoFPI), India
- **Includes:** Support schemes, startup ideas, value addition in food products, government policies.
- <https://mofpi.nic.in>

5. Entrepreneurship in Nutrition and Health Sector (*For PG Food & Nutrition Students*)

- **Custom Content Available:** Often provided in PG diploma or MSc courses with project-based approach.

6. Women Entrepreneurship in India

- **Author:** Lalitha Iyer
- **Focus:** Empowerment, challenges, and case studies in small-scale business especially in food & nutrition sectors.

### Key Topics in Entrepreneurship Management

- Entrepreneurial mindset and types
- Idea generation and feasibility analysis
- Business plan preparation
- Legal and financial aspects (licensing, FSSAI, GST)
- Marketing strategies (4 Ps, digital tools)
- Institutional support (MSME, SIDBI, NABARD, MoFPI)
- Women and rural entrepreneurship

### Government and Institutional Support for Startups

1. StartUp India

<https://www.startupindia.gov.in>

- Free courses, certification, funding opportunities

2. MSME Tool Room – Entrepreneurship Skill Development Programme (ESDP)

<https://msme.gov.in>

3. National Institute for Entrepreneurship and Small Business Development (NIESBUD)

<https://niesbud.nic.in>

4. Food Processing Incubators (CFTRI, NIFTEM, IIFPT)

- Product testing, mentoring, business support for food entrepreneurs

## Web & Other Study Resources

### 1. Government & Educational Platforms

- **Startup India (GoI)**  
<https://www.startupindia.gov.in/>  
(Schemes, funding, incubation support, women entrepreneurs)
- **NSIC – National Small Industries Corporation**  
<https://www.nsic.co.in/>  
(Skill development & MSME support)
- **MSME Champions Portal**  
<https://champions.gov.in>  
(Financial help, tech support, market access)
- **EDII (Entrepreneurship Development Institute of India) – Gujarat-based training**  
<https://www.ediindia.org>
- **NABARD Agribusiness Support**  
<https://www.nabard.org>

### 2. Open Access E-Books & Learning Materials

- **Entrepreneurship: A Working Guide (OpenStax)**  
<https://openstax.org/books/entrepreneurship/pages/1-introduction>
- **Entrepreneurship Development (IGNOU)**  
<https://egyankosh.ac.in> → Search *Entrepreneurship Management*
- **Food Entrepreneurship Toolkit (FAO & UNIDO)**  
<https://www.fao.org>  
(Covers food processing, marketing, hygiene, and value chains)

### 3. Video Lectures & Online Courses

#### 1. NPTEL / SWAYAM

- **Entrepreneurship Essentials**  
<https://swayam.gov.in>  
(Basics of business plans, startup models, funding)
- **Food Business Entrepreneurship**  
(Available from IGNOU/SWAYAM/FAO portals)

#### 2. YouTube Channels

- **SIDBI India** – Financing schemes for MSMEs
- **FICCI FLO Women Entrepreneurship** – Real stories and advice

**EDII Ahmedabad** – Startup development programs and webinars

**Program – M.Sc. (Microbiology)  
Semester- 2**

<b>Course Code</b> 256010239016	<b>Name of Course</b> <b>Entrepreneurship Management Practical</b>	<b>Major</b>
<b>Credit: 02</b>	<b>Teaching Scheme: Practical 60</b>	<b>Teaching Hours: 60</b>

**Course Outcomes (COs)**

After studying this course, the student will be able to:

CO-1:	Apply practical skills in budgeting, resource management, branding, and marketing for nutrition-focused enterprises.
CO-2:	Use a sustainable business model integrating ethical practices, food regulations, and community health needs while identifying future directions

**Detailed Syllabus**

1. Entrepreneurial and private practice (15hr)  
School Nutrition, Sports Nutrition
2. Sustainable resilient healthy food and water system programs (15hr)  
Business and communications
3. Community and public health (15hr)  
Visit to Health care units and institutions
4. Food service systems / department(15hr)

**Mapping Matrix of POs, PSOs, and COs**

COs	POs													PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	–	–	–	–	–	3	3	–	2	–	–	2.75	3	2	2	2.33
CO-2	3	3	3	–	–	–	–	2	–	–	–	–	2.75	3	3	2	2.67
Avg	3	1.5	1.5	0	0	0	1.5	2.5	0	1	0	0		3	2.5	2	

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

**Teaching Pedagogy**

CO-1 (Unit: 1)	• Constructivism, Social Constructivism, Behaviorism
CO-2 (Unit: 2)	• Constructivism, Social Constructivism, Behaviorism

**Assessment Method**

Continuous Comprehensive Evaluation 40 Marks	COs	Marks	Exam Component	
		CO-1	20	Continuous Evaluation
	CO-2	20		
Term-End Evaluation 60 Marks	COs	Marks	Exam Component	
		CO-1	30	Term End Examination
		CO-2	30	

**Program – M.Sc. (Food and Nutrition)  
Semester- 3**

<b>Course Code</b> 256510339017	<b>Name of Course</b> Food Science	<b>Major</b>
<b>Credit: 03</b>	<b>Teaching Scheme: Theory (45)</b>	<b>Teaching Hours: 45</b>

**Course Outcomes (COs)**

After studying this course, the student will be able to:

CO-1:	Understand the structure, composition, and functional properties of various food components such as carbohydrates, proteins, fats, vitamins, and minerals.
CO-2:	Design the physical, chemical, and sensory changes that occur during food processing, cooking, and storage.
CO-3:	Apply principles of food preservation, food safety, and quality control in the preparation and evaluation of food products.
CO-4:	Evaluate the impact of processing techniques on the nutritional quality and shelf-life of different food items. .

**Detailed Syllabus**

**Unit-1. Food carbohydrates - Basic aspects of carbohydrate in brief (11hrs)**

- 1.1 Starch- gelatinization, retrogradation, functional properties of starches, Modified starches – Uses of modified starches in food and confectionery industries. **(4hrs)**
- 1.2 Sugar and related product, Nutritive value, Properties, Role of Sugar in Cookery, Artificial Sweeteners. **(3hrs)**
- 1.3 Polysaccharides - cellulose, pectins, other gums, starch derivatives, fibers  
Non-enzymatic browning reactions- caramelization, Maillard reaction. **(4hrs)**

**Unit-2. Food proteins: Basic aspects of protein (11hrs)**

- 2.1 Classification, Composition and Biological Functions, Food Sources of Proteins  
Functional Properties of Proteins:**(4hrs)**
- 2.2 Hydration, Viscosity, Gelation and Texturization, Dough Formation, Emulsifying and Surface Properties of Proteins, Foaming Properties, Binding of Flavour and other substances **(4hrs)**
- 2.3 Protein Concentrates, Isolates and Hydrolysates and their applications. **(3hrs)**

**Unit-3. Food lipid -Basic aspects of lipid (12hrs)**

- 3.1 Classification of Lipids, Categories of Fats and Oils, Physical properties-melting, crystallization, fractionation of fat, hydrogenation, inter- esterification, reversion and rancidity, Functional Properties of Food Lipids, Deep fat frying **(4hrs)**
- 3.2 Deteriorative Changes in Fats and Oils- Autoxidation, Factors Influencing Lipid Oxidation, Lipolysis, Thermal Decomposition, Antioxidant. **(4hrs)**
- 3.3 Pigments in fruits and vegetables, Chemistry of fruits and vegetables - pigments, changes in pigments during cooking and processing, enzymatic browning reactions.  
Food additives: Different types of food additives in detail. **(4hrs)**

**Unit-4. Evaluation of food Quality (11hrs)**

- 4.1 Food Adulteration- Types of adulteration, Food standards and regulation in India, International Standards. **(6hrs)**
- 4.2 Evaluation of Food Quality- Sensory Evaluations, Types of sensory tests, Objective Evaluation. **(5hrs)**

**Mapping Matrix of POs, PSOs, and COs**

COs	POs													PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	3	–	3	–	–	–	3	–	2	2	–	2.6	3	3	2	2.67
CO-2	3	3	2	–	–	–	–	3	–	–	2	–	2.6	3	3	2	2.67
CO-3	3	3	3	3	–	–	–	3	–	–	2	–	2.8	3	3	2	2.67
CO-4	3	3	3	3	–	2	–	3	–	2	2	–	2.6	2	3	2	2.33
Avg	3	3	2	2.2	-	0.5	-	3	-	1	2	-	2.65	2.75	3.00	2.00	2.59

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

**Teaching Pedagogy**

CO-1 (Unit: 1)	• Constructivism, Social Constructivism, Behaviorism
CO-2 (Unit: 2)	• Constructivism, Social Constructivism, Behaviorism
CO-3 (Unit: 3)	• Constructivism, Social Constructivism, Behaviorism
CO-4 (Unit: 4)	• Constructivism, Social Constructivism, Behaviorism

**Assessment Method**

Continuous Comprehensive Evaluation 40 Marks	COs	Marks	Exam Component		
			Written Test	Assignment/Seminar	Quiz/Discussion
	CO-1	10	10	--	--
	CO-2	10	10	--	--
	CO-3	10	0	5	5
	CO-4	10	0	5	5
Term-End Evaluation 60 Marks	COs	Marks	Exam Component		
	CO-1	15	Term End Examination		
	CO-2	15			
	CO-3	15			
	CO-4	15			

**References**

**1. Textbooks in Food Science**

**Core References in Food Science:**

1. "Food Science"
  - Author: B. Srilakshmi
  - Edition: 8th Edition
  - Year: 2021
  - Publisher: New Age International Publishers
2. "Food Science"
  - Author: Norman N. Potter and Joseph H. Hotchkiss
  - Edition: 5th Edition
  - Year: 1995 (latest edition available)
  - Publisher: Springer Science+Business Media
3. "Principles of Food Science"
  - Author: Janet D. Ward and Larry T. Ward
  - Year: 2016
  - Publisher: Goodheart-Willcox Company

4. **"Outline of Food Technology"**

- **Author:** H.G. Kessler
- **Year:** 2002
- **Publisher:** Food Trade Press

5. **"Fennema's Food Chemistry"**

- **Editor:** Srinivasan Damodaran, Kirk L. Parkin, Owen R. Fennema
- **Edition:** 5th Edition
- **Year:** 2017
- **Publisher:** CRC Press, Taylor & Francis Group

6. **"Fundamentals of Food Process Engineering"**

- **Author:** Romeo T. Toledo
- **Edition:** 3rd Edition
- **Year:** 2018
- **Publisher:** Springer

7. **"Handbook of Food Science, Technology, and Engineering"**

- **Editor:** Y.H. Hui
- **Year:** 2006
- **Publisher:** CRC Press

### **Specialized Books by Domain**

#### **5. Food Chemistry**

- **Author:** H.D. Belitz, Werner Grosch, Peter Schieberle
- **Level:** Advanced
- **Good For:** Biochemical and molecular basis of food constituents.

#### **6. Food Processing and Preservation**

- **Author:** G. Subbulakshmi and Shobha A. Udipi
- **Focus:** Indian perspective; explains preservation methods, traditional and modern technologies.
- **Key Areas in Food Science**
- **Food composition and classification**
- **Cooking principles (moist/dry heat, emulsification, fermentation)**
- **Food additives and preservatives**
- **Food spoilage and quality control**
- **Food adulteration and safety (FSSAI guidelines)**
- **Food packaging and storage**
- **New product development and sensory evaluation**

### **Indian Regulatory and Study Resources**

#### **1. FSSAI Manuals & Guidelines**

- <https://www.fssai.gov.in>
- Standards for food labeling, safety, hygiene, and testing.

#### **2. ICMR-NIN Food Composition Tables**

- Useful for nutrient profiling and product formulation.
- <https://www.nin.res.in>

## Journals for Food Science Research

- *Food Chemistry*
- *Journal of Food Science and Technology*
- *LWT – Food Science and Technology*
- *International Journal of Food Science and Nutrition*

## Web & Other Study Resources

### 1. Government and Educational Platforms

- **FSSAI (India) – Food Science and Safety**  
<https://www.fssai.gov.in>  
(Food standards, additives, safety regulations, fortification guidelines)
- **ICAR – Indian Institute of Food Processing Technology (IIFPT)**  
<https://www.iifpt.edu.in>  
(Food preservation, R&D, entrepreneur support)
- **FAO – Food Science, Safety & Quality**  
<https://www.fao.org/food-safety>
- **IFT (Institute of Food Technologists, USA)**  
<https://www.ift.org>  
(Latest trends, R&D updates, sensory and packaging science)

### 2. Open Access Textbooks & PDFs

#### 1. Free E-Books

- **Introduction to Food Science** (University of Arkansas)  
<https://uark.pressbooks.pub/introfoodscience/>
- **Food Chemistry and Nutrition (by Springer)**  
[Open access via institutional library or researchgate]
- **Food Science and Technology (Open University)**  
<https://www.open.edu/openlearn/science-maths-technology/food-science-and-nutrition>
- **Food Safety Manual (FAO)**  
<https://www.fao.org/3/y1579e/y1579e00.htm>

#### 3. YouTube Channels

- **FoodTech Pathshala** – Indian BSc/MSc content in Hindi/English
- **IFT Student Association** – Global research and innovations
- **SciShow** – Food chemistry, safety myths, and science behind foods

**Program – M.Sc. (Food and Nutrition)**  
**Semester- 3**

<b>Course Code</b> 256510239018	<b>Name of Course</b> Food Science Practical	<b>Major</b>
<b>Credit: 02</b>	<b>Teaching Scheme: Practical (60)</b>	<b>Teaching Hours: 60</b>

**Course Outcomes (COs)**

After studying this course, the student will be able to:

CO-1:	Develop hands-on skills in identifying physical, chemical, and functional properties of various food ingredients through laboratory experiments
CO-2:	Apply standard methods to analyze the effects of cooking and preservation techniques on the sensory and nutritional quality of foods.

**Detailed Syllabus**

- FOOD CARBOHYDRATES-1.** Estimation of Total Carbohydrate by Anthrone Method.  
2. Estimation of Reducing Sugars by DNSA Method. 3. Estimation of carbohydrate by Nelson-Somogyi's method. (15hr)
- FOOD PROTEINS-1. Determination of Protein by Lowry's Method** 2. Estimation of Amino Acids by Ninhydrin Method (15hr)
- FOOD LIPIDS-1. Determination of Peroxide Value** 2. **Determination of Free Fatty Acids (FFA)** (15hr)
- EVALUATION OF FOOD QUALITY**  
**Food Adulteration – Rapid & Instrumental Practical -1.** Starch Adulteration in Milk (Iodine Test) 2. Determination of Urea in Milk — DMAB Test 3. Determination of Detergent in Milk-Foam Test (with semi-quantitative MBAS colorimetric method) (15hr)

**Mapping Matrix of POs, PSOs, and COs**

COs	POs												PSOs				
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	3	3	3	–	–	–	3	–	2	2	–	2.7	3	2	2	2.33
CO-2	3	3	3	3	2	2	–	3	2	3	3	2	2.6	3	3	2	2.67
Avg	3	3	3	3	1	1	0	3	1	2.5	2.5	1		3	2.5	2	

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

**Teaching Pedagogy**

CO-1 (Unit: 1)	• Constructivism, Social Constructivism, Behaviorism
CO-2 (Unit: 2)	• Constructivism, Social Constructivism, Behaviorism

**Assessment Method**

Continuous Comprehensive Evaluation 40 Marks	COs	Marks	Exam Component
	CO-1	20	Continuous Evaluation
CO-2	20		
Term-End Evaluation 60 Marks	COs	Marks	Exam Component
	CO-1	30	Term End Examination
	CO-2	30	

<b>Program – M.Sc. (Food and Nutrition)</b>		
<b>Semester- 3</b>		
<b>Course Code</b> 256510339019	<b>Name of Course</b> Maternal and Child Nutrition	<b>Major</b>
<b>Credit: 03</b>	<b>Teaching Scheme: Theory (45)</b>	<b>Teaching Hours: 45</b>
<b>Course Outcomes (COs)</b>		
After studying this course, the student will be able to:		
CO-1:	Describe & Understand the nutritional requirements and physiological changes during pregnancy, lactation, infancy, and childhood.	
CO-2:	Explain Assess the impact of maternal and child nutrition on health outcomes, growth, and development.	
CO-3:	Describe Plan and evaluate appropriate nutrition interventions and supplementation programs for mothers and children across different stages.	
CO-4:	Demonstrate & Apply knowledge of nutrition policies and programs to improve maternal and child health at the community and national levels.	
<b>Detailed Syllabus</b>		
<b>Unit-1. Physiology and psychological changes during pregnancy(11hrs)</b>		
1.1 Importance of Maternal Nutrition. Physiology and psychological changes Complication during pregnancy Problems and Treatment during Pregnancy. (6hrs)		
1.2 Embryonic and Fetal growth and Development.Stages of pregnancy Types of delivery.(5hrs)		
<b>Unit-2. Nutrition During pregnancy and lactation (11hrs)</b>		
2.1 Foods needs and nutritional consideration during pregnancy and lection,Human Milk Composition. (2hrs)		
2.2 Nutritional Requirement during pregnancy,Meal planning for pregnant women. (2hrs)		
2.3 Nutritional Requirement for lactating women,Meal planning for pregnant lactating women. (3hr)		
2.4 Nutrition During Infancy,Nutrition During Infancy,Brest feeding,weaning foods. (2hrs)		
2.5 Common diseases and diet feeding the premature baby.Supplementary diet. (2hrs)		
<b>Unit-3 Paediatric Problems and Nutritional Management (11hrs)</b>		
3.1 Congenital Heart Disease (CHD), Preterm /Low Birth Weight, Lactose Intolerance, Celiac Disease, Inborn Errors of Metabolism. (11hrs)		
<b>Unit-4 Nutritional program (12hrs)</b>		
4.1 Nutritional program for promoting maternal and child nutrition and health National program for prevention of blindness National Anemia control program Goiter prevention program. <b>Integrated Child(1hr)</b>		
<b>4.2 Development Services (ICDS) Scheme (1hr)</b> Launched: 1975, Focus: Children under 6 years, pregnant and lactating women Services: Supplementary nutrition, health checkups, immunization, referral, preschool education		
<b>4.3 Mid-Day Meal Scheme (MDMS) (2hrs)</b>		
<ul style="list-style-type: none"> <li>○ Launched: 1995</li> <li>○ Focus: School children (Class 1 to 8)</li> <li>○ Services: Cooked mid-day meals to improve nutritional status and school attendance</li> </ul>		
<b>4.4 Poshan Abhiyaan (National Nutrition Mission) (1hr)</b>		
<ul style="list-style-type: none"> <li>○ Launched: 2018</li> <li>○ Focus: Reducing stunting, undernutrition, anemia among children and women</li> <li>○ Features: Convergence, technology use, and behavior change communication</li> </ul>		

<p><b>4.5 Pradhan Mantri Matru Vandana Yojana (PMMVY) (1hr)</b></p> <ul style="list-style-type: none"> <li>○ Launched: 2017</li> <li>○ Focus: Pregnant and lactating mothers</li> <li>○ Services: Conditional cash transfer for improved health and nutrition</li> </ul> <p><b>4.6 National Iron Plus Initiative (NIPI) (1hr)</b></p> <ul style="list-style-type: none"> <li>○ Focus: Addressing anemia in all age groups</li> <li>○ Services: Iron and folic acid supplementation</li> </ul> <p><b>4.7 Weekly Iron and Folic Acid Supplementation (WIFS) (1hr)</b></p> <ul style="list-style-type: none"> <li>○ Focus: Adolescents (10–19 years)</li> <li>○ Services: Weekly IFA tablets and deworming</li> </ul> <p><b>4.8 Nutrition Rehabilitation Centres (NRCs) (1hr)</b></p> <ul style="list-style-type: none"> <li>○ Focus: Treatment of severely malnourished children under 5 years</li> <li>○ Services: Medical and nutritional care</li> </ul> <p><b>4.9 Rajiv Gandhi Scheme for Empowerment of Adolescent Girls – SABLA (1hr)</b></p> <ul style="list-style-type: none"> <li>○ Focus: Adolescent girls (11–18 years)</li> <li>○ Services: Nutrition, health education, life skills</li> </ul> <p><b>4.10 Food Fortification Initiative (1hr)</b></p> <ul style="list-style-type: none"> <li>○ Focus: Fortification of staples like rice, wheat, salt, oil, and milk</li> <li>○ Aim: Address micronutrient deficiencies</li> </ul> <p><b>4.11 National Nutrition Strategy (by NITI Aayog) (1hr)</b></p> <ul style="list-style-type: none"> <li>○ Focus: India’s roadmap to combat undernutrition and malnutrition holistically</li> </ul>
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**Mapping Matrix of POs, PSOs, and COs**

COs	Pos													PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	–	3	–	3	–	–	–	–	2	–	2	2.6	2	3	2	2.33
CO-2	3	3	3	3	3	–	–	–	–	–	–	2	2.8	2	3	2	2.33
CO-3	3	3	3	3	3	3	–	2	–	3	2	2	2.7	3	3	3	3.00
CO-4	3	3	3	3	3	3	3	2	–	3	2	2	2.7	3	3	2	2.67
Avg	3	2.25	3	2.25	3	1.5	0.75	1	-	2	1	2	2.70	2.50	3.00	2.25	2.58

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

**Teaching Pedagogy**

CO-1 (Unit: 1)	• Constructivism, Social Constructivism, Behaviorism
CO-2 (Unit: 2)	• Constructivism, Social Constructivism, Behaviorism
CO-3 (Unit: 3)	• Constructivism, Social Constructivism, Behaviorism
CO-4 (Unit: 4)	• Constructivism, Social Constructivism, Behaviorism

**Assessment Method**

	COs	Marks	Exam Component		
			Written Test	Assignment/Seminar	Quiz/Discussion
<b>Continuous Comprehensive Evaluation</b> 40 Marks	CO-1	10	10	--	--
	CO-2	10	10	--	--
	CO-3	10	0	5	5
	CO-4	10	0	5	5
<b>Term-End Evaluation</b> 60 Marks	COs	Marks	Exam Component		
	CO-1	15	Term End Examination		
	CO-2	15			
	CO-4	15			

## References

**Core References in Food Science:**

1. **"Food Science"**
  - **Author:** B. Srilakshmi
  - **Edition:** 8th Edition
  - **Year:** 2021
  - **Publisher:** New Age International Publishers
2. **"Food Science"**
  - **Author:** Norman N. Potter and Joseph H. Hotchkiss
  - **Edition:** 5th Edition
  - **Year:** 1995 (latest edition available)
  - **Publisher:** Springer Science+Business Media
3. **"Principles of Food Science"**
  - **Author:** Janet D. Ward and Larry T. Ward
  - **Year:** 2016
  - **Publisher:** Goodheart-Willcox Company
4. **"Outline of Food Technology"**
  - **Author:** H.G. Kessler
  - **Year:** 2002
  - **Publisher:** Food Trade Press
5. **"Fennema's Food Chemistry"**
  - **Editor:** Srinivasan Damodaran, Kirk L. Parkin, Owen R. Fennema
  - **Edition:** 5th Edition
  - **Year:** 2017
  - **Publisher:** CRC Press, Taylor & Francis Group
6. **"Fundamentals of Food Process Engineering"**
  - **Author:** Romeo T. Toledo
  - **Edition:** 3rd Edition
  - **Year:** 2018
  - **Publisher:** Springer
7. **"Handbook of Food Science, Technology, and Engineering"**
  - **Editor:** Y.H. Hui
  - **Year:** 2006
  - **Publisher:** CRC Press

**Indian Context Books****4. Textbook of Human Nutrition**

- **Author:** M. Swaminathan
- **Why Use It:** Trusted Indian reference for nutrition across all life stages, including extensive data on Indian diets, maternal deficiencies, and public programs.

**5. A Textbook of Nutrition for Nurses**

- **Author:** B. Srilakshmi
- **Use:** Suitable for UG/PG students needing practical, simple, and culturally contextual knowledge of MCH nutrition.

## Public Health & Programmatic Resources (India)

### 6. ICDS Manual – Integrated Child Development Services

- Government guidelines on maternal and child health schemes.
- <https://wcd.nic.in>

### 7. ICMR-NIN Guidelines for Pregnancy & Childhood Nutrition

- <https://www.nin.res.in>
- Provides Indian RDA, anemia protocols, and guidelines for adolescent girls and pregnant women.

### 8. National Health Mission (NHM) & POSHAN Abhiyaan Reports

- <https://nhm.gov.in>
- <https://icds-wcd.nic.in>

## Key Topics in Maternal & Child Nutrition

- Nutrient requirements during pregnancy & lactation
- Low birth weight, anemia, preeclampsia – nutritional link
- Infant and young child feeding (IYCF) practices
- Breastfeeding, complementary feeding
- Growth monitoring, malnutrition (PEM, stunting)
- Micronutrient deficiencies (iron, iodine, folate, vitamin A)
- Maternal nutrition interventions: supplementation & counselling
- National programs: ICDS, MDM, Anemia Mukta Bharat, Janani Suraksha Yojana

## Web & Other Study Resources

### 1. National & International Platforms

- **Ministry of Health & Family Welfare (MoHFW), India**  
<https://main.mohfw.gov.in>  
(RMNCH+A strategy, national programs, reports)
- **National Health Mission (NHM)**  
<https://nhm.gov.in>  
(JSY, JSSK, immunization, maternal death audits)
- **UNICEF – Maternal and Child Nutrition**  
<https://www.unicef.org/nutrition>
- **WHO – Maternal, Newborn, Child & Adolescent Health (MNCAH)**  
<https://www.who.int/teams/maternal-newborn-child-adolescent-health>

## 2. Free E-Books & Open Access Textbooks

- **Maternal and Child Health Nursing – A Family-Centered Approach**  
[Free nursing resources or institutional access like Open Library, OER]
- **Nutrition in Pregnancy and Lactation – FAO/WHO Guidelines**  
<https://www.fao.org/publications>
- **Open Textbook: Community Health & Nutrition**  
<https://open.umn.edu/opentextbooks/subjects/nutrition>
- **IGNOU MCH Modules**  
<https://egyankosh.ac.in> → Search: *Maternal and Child Health*

## 3. Online Courses & Lectures

### 1. SWAYAM / NPTEL

- **Reproductive and Child Health** – includes maternal nutrition, growth monitoring
- **Child Health and Nutrition** (IGNOU course)

### 2. YouTube Channels

- **UNICEF India** – Maternal health, IYCF, malnutrition
- **NIN Hyderabad** – Nutrition in pregnancy and child health
- **MoHFW** – Janani Suraksha Yojana, Poshan Abhiyaan videos

**Program – M.Sc. (Food and Nutrition)  
Semester- 3**

<b>Course Code</b> 256510239020	<b>Name of Course</b> Maternal and Child Nutrition Practical	<b>Major</b>
<b>Credit: 02</b>	<b>Teaching Scheme: Practical (60)</b>	<b>Teaching Hours: 60</b>

**Course Outcomes (COs)**

After studying this course, the student will be able to:

CO-1:	Assess nutritional status of pregnant women, lactating mothers, infants, and children using dietary, anthropometric, and clinical methods.
CO-2:	Plan and prepare age-appropriate and condition-specific nutritious diets and nutrition education tools for mothers and children..

**Detailed Syllabus**

- Maternal Nutrition (15hr)  
Plan a diet for pregnant women.  
Plan a diet for a low, Middle and high–income pregnant women.  
Plan a diet for lactating women.  
Plan a diet for a low-, Middle- and high-income lactating women.  
Child Nutrition
- Plan and prepare balanced diet and calculate nutrition for the following group.  
Preschool children (15hr)
- School children(15hr)
- Adolescent girl and boy(15hr)

**Mapping Matrix of POs, PSOs, and COs**

COs	Pos													PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	–	3	–	3	–	–	–	–	2	–	2	2.6	3	2	2	2.33
CO-2	3	3	3	3	3	3	–	3	–	2	2	2	2.7	3	3	2	2.67
Avg	3	1.5	3	1.5	3	1.5	0	1.5	0	2	1	2		3	2.5	2	

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

**Teaching Pedagogy**

CO-1 (Unit: 1)	• Constructivism, Social Constructivism, Behaviorism
CO-2 (Unit: 2)	• Constructivism, Social Constructivism, Behaviorism

**Assessment Method**

Continuous Comprehensive Evaluation 40 Marks	COs	Marks	Exam Component	
		CO-1	20	Continuous Evaluation
	CO-2	20		
Term-End Evaluation 60 Marks	COs	Marks	Exam Component	
		CO-1	30	Term End Examination
		CO-2	30	

<b>Program – M.Sc. (Food and Nutrition)</b>		
<b>Semester- 3</b>		
Course Code	Name of Course	Major
256510339021	Food Production & Management	
<b>Credit: 03</b>	<b>Teaching Scheme: Theory (45)</b>	<b>Teaching Hours: 45</b>
<b>Course Outcomes (COs)</b>		
After studying this course, the student will be able to:		
CO-1:	Describe Understand the process of food product development from concept to market.	
CO-2:	Demonstrate Apply principles of quality control and food safety in product formulation.	
CO-3:	Discuss Develop packaging, labeling, and branding strategies for food products.	
CO-4:	Explain Analyze market trends to manage and promote food products effectively	
<b>Detailed Syllabus</b>		
<b>Unit-1. Food Service Establishments (11hrs)</b>		
1.1 History and Development, Factors Affecting Development, Recent Trends, Types of Food Service Establishments, Commercial Establishments, On-commercial Establishments, Understanding Management. Approaches to Food Service Management. <b>(6hrs)</b>		
1.2 Traditional Approach, Classical Approach, Scientific Approach. <b>(2hrs)</b>		
1.3 Management by Objectives, 2.3 Systems Approach, Quantitative Approach, Behavioural and Human Relations Approach, Contingency Approach, Just-in-Time, Total Quality Management Approach. <b>(3hrs)</b>		
<b>Unit-2. The Importance of Menu and Menu Planning in Food Service Organization (12hrs)</b>		
2.1 Definition and Functions of a Menu <b>(2hrs)</b>		
2.2 The Need for Menu Planning Knowledge and Skills Required for Planning Menu <b>(2hrs)</b>		
2.3 The Types of Menu and its Applications Types of Menus Uses of Menus <b>(2hrs)</b>		
2.4 Steps in Menu Planning and its Evaluation <b>(2hrs)</b>		
2.5 Construction of Menu, How to Plan a Menu? <b>(2hrs)</b>		
2.6 Characteristics of a Good Menu, Display a Menu, Evaluation. <b>(2hrs)</b>		
<b>Unit-3. Organization and Leadership (11hrs)</b>		
3.1 Organizational Chart, Organizational Charts of Dietary/food service department, line of staff, authority, responsibility, power, delegation of authority, Centralization and decentralization of food <b>(2hrs)</b>		
3.2 Managing an Organization, Processes Involved, Principles of Management, Functions of Management, Leadership, motivation and communication <b>(3hrs)</b>		
3.3 Dietician as a leader, leadership qualities that a dietitian should possess, styles of leadership and their effect on subordinates. <b>(3hrs)</b>		
3.4 Relation between motivation and performance, Maslow's Theory of Motivation, Fredrik Hedburg Motivation – Hygiene Theory, Application of Above theories to motivate subordinates communication, need for communication, process of communication, upward, downward and lateral communication, barriers to effective communication, listening. <b>(3hrs)</b>		
<b>Unit-4. Personal Hygiene and Sanitary Practices in Hospital (11hrs)</b>		
4.1 Personal Hygiene and Sanitary Practices, Health of Staff, Sanitary Practices, Sanitation Training and <b>(3hrs)</b>		
4.2 Education for Food Service Workers, Sanitation Training and Education, Who should be trained? What a Training Programme should include? <b>(4hrs)</b>		

**4.3 Employment Practice**

Hazard Analysis and Critical Control Point (HACCP) Work Place Safety, Why Accidents should be prevented? How Accidents Take Place?, Types of Accidents, Precautions to Prevent Accidents, Sanitation Regulations and Standards, Control of Food Quality (Adulteration and Misbranding) (4hrs)

**Mapping Matrix of POs, PSOs, and Cos**

COs	Pos													PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	3	3	3	3	3	-	3	-	2	2	2	2.7	2	3	3	2.67
CO-2	3	3	3	3	3	-	-	-	-	2	2	2	2.6	2	3	2	2.33
CO-3	3	3	3	3	3	3	-	3	3	2	2	2	2.7	3	3	2	2.67
CO-4	3	3	3	3	3	3	-	3	3	2	2	2	2.7	3	3	2	2.67
Avg	3	3	3	3	3	2.2	-	2.25	1.5	2	2	2	2.68	2.50	3.00	2.25	2.59

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

**Teaching Pedagogy**

CO-1 (Unit: 1)	• Constructivism, Social Constructivism, Behaviorism
CO-2 (Unit: 2)	• Constructivism, Social Constructivism, Behaviorism
CO-3 (Unit: 3)	• Constructivism, Social Constructivism, Behaviorism
CO-4 (Unit: 4)	• Constructivism, Social Constructivism, Behaviorism

**Assessment Method**

Continuous Comprehensive Evaluation 40 Marks	COs	Marks	Exam Component		
			Written Test	Assignment/Seminar	Quiz/Discussion
	CO-1	10	10	--	--
	CO-2	10	10	--	--
	CO-3	10	0	5	5
	CO-4	10	0	5	5

  

Term-End Evaluation 60 Marks	COs	Marks	Exam Component		
			Term End Examination		
	CO-1	15			
	CO-2	15			
	CO-3	15			
	CO-4	15			

**References**

**1. Core Reference Books for Food Production & Management:**

1. "Theory of Catering"
  - Author: Victor Ceserani and David Kinton
  - Edition: 11th Edition
  - Year: 2007
  - Publisher: Hodder Education
2. "Food Production Operations"
  - Author: Parvinder S. Bali
  - Edition: 2nd Edition
  - Year: 2014
  - Publisher: Oxford University Press (India)

3. **"Quantity Food Production Operations and Indian Cuisine"**
  - **Author:** Parvinder S. Bali
  - **Year:** 2011
  - **Publisher:** Oxford University Press
4. **"Food and Beverage Service"**
  - **Author:** R. Singaravelavan
  - **Year:** 2011
  - **Publisher:** Oxford University Press
5. **"Professional Chef"**
  - **Author:** The Culinary Institute of America
  - **Edition:** 9th Edition
  - **Year:** 2011
  - **Publisher:** Wiley India Pvt. Ltd.
6. **"Introduction to Food and Beverage Service"**
  - **Author:** Lillicrap, Cousins & Smith
  - **Year:** 2014
  - **Publisher:** Hodder Education
7. **"Food Service Management"**
  - **Author:** Mohini Sethi
  - **Year:** 2011
  - **Publisher:** New Age International Publishers
8. **"Catering Management: An Integrated Approach"**
  - **Author:** Mohini Sethi and Surjeet Malhan
  - **Edition:** 3rd Edition
  - **Year:** 2015
  - **Publisher:** New Age International Publishers

### Indian Context Books

#### 5. Catering Management – An Integrated Approach

- **Author:** Mohini Sethi and Surjeet Malhan
- **Best For:** Nutrition, dietetics, and food service students in Indian institutions.

**Includes:** Procurement, menu planning, budgeting, food safety, and service types

#### Key Topics in Food Production & Management

- **Types of food service systems:** Conventional, commissary, ready-prepared and assembly-serve
- **Menu planning:** Types, factors, cycles, and therapeutic menus
- **Food purchasing and procurement:** Specifications, inventory control
- **Kitchen and workflow design:** Layouts, equipment, fuel use
- **Quantity cooking and portion control**
- **Budgeting and cost control:** Fixed/variable costs, pricing
- **Personnel management and hygiene practices**
- **Waste management and sustainability in food services**

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#### Relevant Guidelines and Tools (India)

##### 1. FSSAI Food Safety Standards & Licensing

<https://www.fssai.gov.in>

- Includes hygiene ratings, audit protocols, and kitchen best practices.

2. **NRAI – National Restaurant Association of India Guidelines**
  - For food production sustainability, hygiene audits, and customer service.
3. **ICMR – Nutrient Requirements & Menu Planning for Institutions**
  - <https://www.nin.res.in>

### Useful Journals and Resources

- *Journal of Culinary Science & Technology*
- *International Journal of Hospitality Management*
- *FSSAI e-learning platform – FoSTaC*  
<https://fostac.fssai.gov.in>

### Web & Other Study Resources

#### 1. National and Industry Portals

- **Ministry of Food Processing Industries (MoFPI), Govt. of India**  
<https://mofpi.gov.in>  
(Schemes, cold chain, R&D, subsidy updates)
- **FSSAI – Food Product Labeling & Innovation Guidelines**  
<https://www.fssai.gov.in>
- **ICAR – Indian Institute of Food Processing Technology (IIFPT)**  
<https://www.iifpt.edu.in>
- **Startup India – Agri & Food Sector**  
<https://www.startupindia.gov.in>

#### 2. Food Product Development & Management Resources

- **Food Product Design**  
Website focused on innovation, trends, and management in food product development.  
[foodproductdesign.com](http://foodproductdesign.com)
- **Institute of Food Technologists (IFT)**  
Offers resources on product development, food safety, and management.  
[ift.org](http://ift.org)
- **Food Business News**  
Covers new product launches, market trends, and management strategies.  
[foodbusinessnews.net](http://foodbusinessnews.net)
- **Food Navigator**  
Provides insight on innovation, regulation, and product development.  
[foodnavigator.com](http://foodnavigator.com)

#### 3. Academic and Educational References

- **ScienceDirect – Food Quality and Safety**  
Research articles and case studies on food product development and management.  
[sciencedirect.com/journal/food-quality-and-safety](http://sciencedirect.com/journal/food-quality-and-safety)
- **Journal of Food Science**  
Peer-reviewed articles about food technology and product innovation.  
[onlinelibrary.wiley.com/journal/17503841](http://onlinelibrary.wiley.com/journal/17503841)

#### 4. Government and Regulatory Agencies

- **U.S. Food and Drug Administration (FDA) – Food Product Regulation**  
Guidelines and regulations on food product labeling and safety.  
[fda.gov/food](http://fda.gov/food)
- **European Food Safety Authority (EFSA)**  
Scientific advice on food safety and product standards.  
[efsa.europa.eu](http://efsa.europa.eu)

<b>Program – M.Sc. (Food and Nutrition)</b>		
<b>Semester- 3</b>		
<b>Course Code</b> 256510239022	<b>Name of Course</b> Food Production & Management Practical	<b>Major</b>
<b>Credit: 02</b>	<b>Teaching Scheme: Practical (60)</b>	<b>Teaching Hours: 60</b>
<b>Course Outcomes (COs)</b>		
After studying this course, the student will be able to:		
CO-1:	Demonstrate proficiency in advanced culinary techniques, including Indian and continental food preparation, portion control, and aesthetic presentation suitable for institutional and commercial settings.	
CO-2:	Apply principles of food production management such as time scheduling, standard recipe usage, cost control, and hygiene standards in a practical kitchen environment.	
<b>Detailed Syllabus</b>		
1. <b>New Food Product development-</b> Sensory evaluation(15hr) Sensory test- for new food product Development (for Children		
2. <b>A-day canteen by student-</b> Prepare and sell food products(15hr)		
3. <b>Preparations of recipes for Children-</b> Beverage (hot and cold), Soup and Sauces, Cereals Pulses, Vegetables(15hr)		
4. <b>Preparations of recipes for Children-</b> Salads, Desserts, Snacks, Sandwiches, Pasta, Bakery items(15hr)		

<b>Mapping Matrix of POs, PSOs, and Cos</b>																	
COs	Pos													PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	3	3	3	3	–	–	3	–	2	2	2	<b>2.6</b>	3	3	2	<b>2.67</b>
CO-2	3	3	3	3	3	3	–	3	3	2	2	2	<b>2.7</b>	3	3	2	<b>2.67</b>
Avg	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>1.5</b>	<b>-</b>	<b>3</b>	<b>1.5</b>	<b>2</b>	<b>2</b>	<b>2</b>		<b>3</b>	<b>3</b>	<b>2</b>	

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

<b>Teaching Pedagogy</b>			
CO-1 (Unit: 1)	• Constructivism, Social Constructivism, Behaviorism		
CO-2 (Unit: 2)	• Constructivism, Social Constructivism, Behaviorism		
<b>Assessment Method</b>			
Continuous Comprehensive Evaluation 40 Marks	COs	Marks	Exam Component
	CO-1	20	Continuous Evaluation
	CO-2	20	
Term-End Evaluation 60 Marks	COs	Marks	Exam Component
	CO-1	30	Term End Examination
	CO-2	30	

<b>Program – M.Sc. (Food and Nutrition)</b>		
<b>Semester- 3</b>		
<b>Course Code</b> 256510339023	<b>Name of Course</b> Modern Cookery	<b>Major</b>
<b>Credit: 03</b>	<b>Teaching Scheme: Theory (45)</b>	<b>Teaching Hours: 45</b>

**Course Outcomes (COs)**

After studying this course, the student will be able to:

CO-1:	Demonstrate advanced culinary techniques including baking, confectionery, and cold kitchen preparations, with an emphasis on precision, presentation, and hygiene.
CO-2:	Apply knowledge of international cuisines and contemporary food trends in the preparation of multi-course meals, showcasing innovation and cultural understanding.
CO-3:	List Plan and execute menu items using appropriate modern kitchen equipment and methods, considering cost control and resource efficiency.
CO-4:	Analyze and critique food products based on taste, texture, appearance, and nutritional value, using professional sensory evaluation techniques.

**Detailed Syllabus**

<b>Unit-1. Application of Science in cooking (12hrs)</b> 1.1 Cookery as a Science, Objective of cooking, Preliminary Preparations, Cooking methods (6hrs) 1.2 Moist heat Method and Dry heat method, Microwaves cooking, Solar cooking, Advances in food technology (6hrs)
<b>Unit-2. Role of food ingredients in cookery (11hrs)</b> 2.1 Foundation ingredients, Fats, Resinifying Agents, Salt, Liquid, Flavouring and Seasoning, Sweetening and thickening (11hrs)
<b>Unit-3. Food ingredients and Spices used in Indian and Western Cookery (11hrs)</b> 3.1 Importance of spices, Basic information about spices, Functional foods in cookery, Ingredients used in bakery items, Points consider while making bakery items. (11hrs)
<b>Unit-4. Beverages and Appetizers (11hrs)</b> 4.1 Classification, Nutritive value, Cooking tips , Serving. (11hrs)

**Mapping Matrix of POs, PSOs, and Cos**

COs	POs												PSOs				
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	–	–	–	–	–	3	–	–	2	–	–	<b>2.6</b>	2	2	3	<b>2.33</b>
CO-2	3	3	3	3	3	–	–	–	–	–	–	–	<b>3</b>	3	3	2	<b>2.67</b>
CO-3	3	3	3	3	3	3	–	2	–	2	–	–	<b>2.7</b>	3	2	2	<b>2.33</b>
CO-4	3	3	3	3	3	3	–	2	–	2	2	–	<b>2.6</b>	3	2	2	<b>2.33</b>
<b>Avg</b>	<b>3</b>	<b>2.25</b>	<b>2.25</b>	<b>2.25</b>	<b>2.25</b>	<b>1.5</b>	<b>0.75</b>	<b>1</b>	<b>-</b>	<b>1.5</b>	<b>0.5</b>	<b>-</b>	<b>2.73</b>	<b>2.75</b>	<b>2.25</b>	<b>2.25</b>	<b>2.42</b>

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

**Teaching Pedagogy**

<b>CO-1 (Unit: 1)</b>	• Constructivism, Social Constructivism, Behaviorism
<b>CO-2 (Unit: 2)</b>	• Constructivism, Social Constructivism, Behaviorism
<b>CO-3 (Unit: 3)</b>	• Constructivism, Social Constructivism, Behaviorism
<b>CO-4 (Unit: 4)</b>	• Constructivism, Social Constructivism, Behaviorism

<b>Assessment Method</b>					
<b>Continuous Comprehensive Evaluation</b>	<b>COs</b>	<b>Marks</b>	<b>Exam Component</b>		
			<b>Written Test</b>	<b>Assignment/Seminar</b>	<b>Quiz/Discussion</b>
<b>40 Marks</b>	<b>CO-1</b>	10	10	--	--
	<b>CO-2</b>	10	10	--	--
	<b>CO-3</b>	10	0	5	5
	<b>CO-4</b>	10	0	5	5
<b>Term-End Evaluation</b>	<b>COs</b>	<b>Marks</b>	<b>Exam Component</b>		
	<b>CO-1</b>	15	Term End Examination		
	<b>CO-2</b>	15			
	<b>CO-3</b>	15			
	<b>CO-4</b>	15			

**References**

**Modern Cookery Reference Books:**

1. **"Modern Cookery for Teaching and the Trade – Volume 1 (Theory)"**
  - **Author:** Thangam E. Philip
  - **Edition:** 6th Edition
  - **Year:** 2007
  - **Publisher:** Orient Blackswan
2. **"Modern Cookery for Teaching and the Trade – Volume 2 (Practical)"**
  - **Author:** Thangam E. Philip
  - **Edition:** 6th Edition
  - **Year:** 2007
  - **Publisher:** Orient Blackswan
3. **"Professional Cooking"**
  - **Author:** Wayne Gisslen
  - **Edition:** 9th Edition
  - **Year:** 2018
  - **Publisher:** Wiley India Pvt. Ltd.
4. **"The Professional Chef"**
  - **Author:** The Culinary Institute of America (CIA)
  - **Edition:** 9th Edition
  - **Year:** 2011
  - **Publisher:** Wiley
5. **"Basic Food Preparation: A Complete Manual"**
  - **Authors:** Parvinder S. Bali & Nirupa Metha
  - **Year:** 2011
  - **Publisher:** Oxford University Press
6. **"Indian Cuisine"**
  - **Author:** Pushpesh Pant
  - **Year:** 2010
  - **Publisher:** Dorling Kindersley (DK)
7. **"Quantity Food Production Operations and Indian Cuisine"**
  - **Author:** Parvinder S. Bali
  - **Year:** 2011
  - **Publisher:** Oxford University Press

## Additional Resources

1. **ICMR-NIN and FSSAI Guidelines**
  - For safe food handling and cooking temperatures.
  - <https://www.fssai.gov.in>
2. **Culinary Institute of America (CIA) Books**
  - *The Professional Chef* – Best for high-level culinary learners.
3. **YouTube/NPTEL Culinary Modules**
  - NPTEL & IGNOU sometimes offer modules on *modern culinary science and techniques*.

## Related Journals and Portals

- *Journal of Culinary Science & Technology*
- *International Journal of Gastronomy and Food Science*
- *The Art of Plating* (for trends and visuals)

## Web & Other Study Resources

1. **Acton, Eliza. *Modern Cookery for Private Families*.**
  - One of the earliest and most influential cookery books, published in 1845.
  - Provides a foundation for modern cooking techniques and recipes.
  - Project Gutenberg link (free public domain text)
2. **Escoffier, Auguste. *Le Guide Culinaire (The Culinary Guide)*.**
  - Published in early 20th century, a fundamental book for modern French cuisine techniques.
  - Influenced modern culinary education and professional cooking.
3. **Ferguson, Priscilla. *The Victorian Kitchen: Modern Cookery in the 19th Century*.**

## Discuss Contemporary Online Sources on Modern Cookery

4. **Serious Eats** — A website dedicated to modern cooking techniques and recipes.  
[seriouseats.com](http://seriouseats.com)
5. **Modernist Cuisine** — The official website and blog behind the famous *Modernist Cuisine* book series, focusing on scientific approaches to cooking.  
[modernistcuisine.com](http://modernistcuisine.com)
6. **BBC Good Food – Modern Cookery Section**
  - Offers a broad range of modern recipes and cooking tips.  
bcgoodfood.com
  - the evolution of cookery in the modern era.

## Academic & Educational References

7. **Journal of Culinary Science & Technology**
  - Academic articles on new cooking methods and food science.  
tandfonline.com/toc/wcst20/current
8. **Food and Agriculture Organization (FAO) – Food Technology and Modern Cooking**
  - FAO publishes papers on food innovation and technology applied in cooking.  
[fao.org/food-processing/en](http://fao.org/food-processing/en)

### Top YouTube Channels for Modern Cookery

1. **Babish Culinary Universe**

Hosted by Andrew Rea, this channel recreates iconic dishes from movies and TV shows, offering both entertainment and culinary education.

2. **Bon Appétit**

Features a diverse team of chefs exploring various cuisines and cooking techniques, making gourmet cooking accessible to all.

3. **Jamie Oliver**

Known for his approachable cooking style, Jamie offers recipes that are both delicious and easy to follow, focusing on fresh ingredients and family-friendly meals.

4. **Rainbow Plant Life**

Nisha Vora presents vibrant and flavorful plant-based recipes, catering to both vegans and non-vegans alike.

5. **Village Cooking Channel**

A unique channel showcasing traditional Tamil village cooking methods, offering a glimpse into authentic Indian culinary practices.

6. **Made With Lau**

Features Cantonese dishes taught by Daddy Lau, preserving traditional recipes and family stories.

7. **Sorted Food**

A British channel where a group of friends explores cooking challenges, recipe testing, and culinary adventures.

8. **Barry Lewis (My Virgin Kitchen)**

Offers approachable recipes with a humorous twist, making cooking fun and accessible for beginners.

9. **Tasty**

Known for quick, visually appealing recipe videos, Tasty covers a wide range of cuisines and cooking styles.

#### **ChefSteps**

Provides in-depth tutorials on advanced cooking techniques, ideal for those looking to elevate their culinary skills

**Program – M.Sc. (Food and Nutrition)  
Semester- 3**

<b>Course Code</b> 256510239024	<b>Name of Course</b> Morden Cookery Practical	<b>Major</b>
<b>Credit: 02</b>	<b>Teaching Scheme: Practical (60)</b>	<b>Teaching Hours: 60</b>

**Course Outcomes (COs)**

After studying this course, the student will be able to:

CO-1:	Demonstrate proficiency in preparing and presenting a variety of modern and traditional dishes using appropriate techniques, tools, and ingredients with emphasis on hygiene and safety standards.
CO-2:	Apply creativity and innovation in the preparation of contemporary recipes, including appetizers, main courses, desserts, and fusion dishes, while maintaining nutritional balance and aesthetic appeal.

**Detailed Syllabus**

1. Cooking-Moist heat Method and Dry heat method (15)
2. Microwaves cooking, Solar cooking (15)
3. Functional foods in cookery (15)
4. Ingredients used in bakery items, Prepare Beverages and Appetizers (15)

**Mapping Matrix of POs, PSOs, and Cos**

COs	POs													PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	–	–	–	3	–	3	–	–	2	–	2	<b>2.6</b>	3	2	2	<b>2.33</b>
CO-2	3	3	3	3	3	3	–	3	–	2	2	2	<b>2.7</b>	3	3	2	<b>2.67</b>
Avg	<b>3</b>	<b>1.5</b>	<b>1.5</b>	<b>1.5</b>	<b>3</b>	<b>1.5</b>	<b>1.5</b>	<b>1.5</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>2</b>		<b>3</b>	<b>2.5</b>	<b>2</b>	

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

**Teaching Pedagogy**

CO-1 (Unit: 1)	• Constructivism, Social Constructivism, Behaviorism
CO-2 (Unit: 2)	• Constructivism, Social Constructivism, Behaviorism

**Assessment Method**

Continuous Comprehensive Evaluation 40 Marks	COs	Marks	Exam Component
		CO-1	20
	CO-2	20	
Term-End Evaluation 60 Marks	COs	Marks	Term End Examination
	CO-1	30	
	CO-2	30	

<b>Program – M.Sc. (Food and Nutrition)</b>		
<b>Semester- 4</b>		
<b>Course Code</b> 256512039025	<b>Name of Course</b> Dissertation	<b>Major</b>
<b>Credit: 20</b>	<b>Teaching Scheme: Practical (600)</b>	<b>Teaching Hours: 600</b>
<b>Course Outcomes (COs)</b>		
After studying this course, the student will be able to:		
CO-1:	Develop and demonstrate the ability to independently plan, execute, and document a research project using microbiological and interdisciplinary approaches	
CO-2:	Apply experimental design, data analysis, and interpretation in real-time laboratory/field settings	
CO-3:	To communicate scientific findings effectively through written reports, presentations, and discussions.	
CO-4:	To cultivate scientific integrity, project management skills, and research ethics	

<b>Mapping Matrix of POs, PSOs, and Cos</b>																	
COs	POs													PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	Avg	1	2	3	Avg
CO-1	3	3	3	3	3	3	3	3	3	2	2	2	2.75	3	2	3	2.67
CO-2	3	3	3	3	3	3	3	3	3	2	2	2	2.75	3	2	2	2.33
CO-3	3	3	3	3	3	3	3	3	3	2	2	2	2.75	2	2	3	2.33
CO-4	3	3	3	3	3	3	3	3	3	2	2	2	2.75	2	2	3	2.33
<b>Avg</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2.75</b>	<b>2.50</b>	<b>2.00</b>	<b>2.75</b>	<b>2.42</b>

3 = Strong Contribution, 2 = Moderate Contribution, 1 = Slight Contribution, --- = No Significant Contribution

<b>Teaching Pedagogy</b>			
CO-1 (Unit: 1)	• Constructivism, Social Constructivism, Behaviorism		
CO-2 (Unit: 2)	• Constructivism, Social Constructivism, Behaviorism		
<b>Assessment Method</b>			
Continuous Comprehensive Evaluation 40 Marks	COs	Marks	Exam Component
	CO-1	20	Term End Evaluation
CO-2	20		
Term-End Evaluation 60 Marks	COs	Marks	Exam Component
	CO-1	30	Term End Examination
CO-2	30		



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