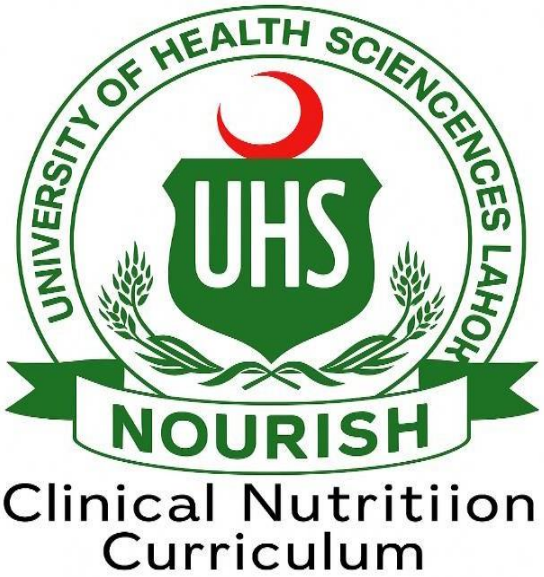


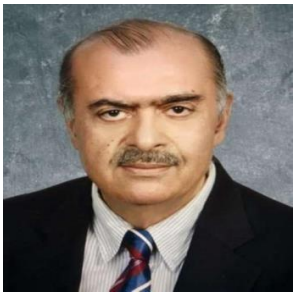
BACHELOR OF SCIENCE (BS)

HUMAN NUTRITION

AND

DIETETICS CURRICULUM

2025



Vice Chancellor

I am deeply grateful to Almighty Allah for enabling the University of Health Sciences (UHS), Lahore, to take a timely and visionary step in developing an evidence-based, clinically aligned, and outcome-oriented curriculum framework for the BS Human Nutrition & Dietetics program.

The introduction of the NOURISH (Nutrition, Outcome-based, Undergraduate Training, Realistic & Reflective, Immersive & Integrated, Skill-building, Healthcare-centered) module reflects our firm commitment to aligning academic training with real-world clinical needs. This initiative is not merely curricular reform—it is a strategic response to the evolving demands of modern healthcare systems, where integration of knowledge, skills, professionalism, and patient-centered care is essential.

In today's healthcare landscape, nutrition is no longer confined to dietary advice; it is a cornerstone of preventive, therapeutic, and rehabilitative care. Recognizing this, UHS has ensured that this curriculum is grounded in evidence-based practices, enriched with early clinical exposure, and structured to foster critical thinking, ethical conduct, and culturally sensitive care.

The NOURISH module serves as a foundational platform for students, offering structured clinical observership, reflective learning, and competency-based skill development. It is designed to bridge the traditional gap between theory and practice, ensuring that graduates are not only knowledgeable but also clinically competent, professionally responsible, and socially responsive.

This initiative represents a significant milestone in strengthening healthcare education in Pakistan. By embedding clinical alignment from the outset, we are nurturing a new generation of nutrition professionals who are prepared to contribute meaningfully to multidisciplinary healthcare teams and address the growing burden of nutrition-related diseases.

I commend the dedicated efforts of our faculty and curriculum development teams whose vision and hard work have made this advancement possible. I am confident that this program will set a benchmark for excellence and will play a pivotal role in improving patient care and public health outcomes.

With best wishes for its successful implementation.

Prof. Ahsan Waheed Rathore
Vice Chancellor
University of Health Sciences Lahore

Pro-Vice Chancellor

NOURISH (Nutrition, Outcome-based, Undergraduate Training, Realistic & Reflective, Immersive & Integrated, Skill-building, Healthcare-centered) is an introductory clinical competency module designed to orient BS Human Nutrition & Dietetics students to professional conduct, ethical practice, clinical observership, and culturally sensitive nutrition care. It reflects a thoughtful approach to introducing students to the essential values and competencies that form the basis of professional practice in the field of nutrition and dietetics.

In the present era of healthcare transformation, the role of nutrition professionals extends far beyond dietary planning alone. It now encompasses ethical responsibility, effective communication, cultural understanding, professional conduct, and collaborative engagement within multidisciplinary healthcare settings. It is therefore important that students begin their professional journey with a strong foundation rooted in these principles.

This clinical competency workbook/logbook has been designed to provide students with guided observership and structured reflective learning, enabling them to develop insight into real-world professional environments.

Such academic efforts are essential in promoting quality education that is relevant, practical, and responsive to contemporary healthcare needs. I am pleased to see the inclusion of foundational professional competencies at this stage of training, as these are vital for the holistic development of students and for the advancement of healthcare education in our institutions.

I acknowledge the efforts of the faculty and curriculum team for developing this important educational resource and hope that it will serve as a valuable guide for both students and teachers throughout the learning process.

Prof. Nadia Naseem

Pro-Vice Chancellor

University of Health Sciences Lahore

Director Medical Education

It is a privilege to contribute to the development of the NOURISH curriculum as Director of Medical Education, building on our continued commitment to transforming health professions education into competency-based, outcome-driven, and patient-centered learning experiences.

This initiative draws upon our prior curricular reforms, including the COMPASS and COMPASS-M frameworks, which have laid the foundation for structured, skills-oriented, and integrated education across disciplines. The NOURISH module extends this vision into the field of Human Nutrition & Dietetics by providing undergraduate students with early and meaningful exposure to clinical practice.

The curriculum has been carefully designed to integrate professional conduct, ethical responsibility, reflective learning, and culturally sensitive care. It aims to bridge the gap between theoretical knowledge and real-world healthcare environments, preparing students to function effectively within multidisciplinary teams.

In today's evolving healthcare landscape, nutrition professionals play a critical role beyond dietary planning. NOURISH therefore emphasizes communication skills, professionalism, teamwork, and contextual understanding of patient-centered care. Structured observership and reflective exercises have been incorporated to foster critical thinking and professional identity from the outset of training.

I acknowledge and appreciate the collaborative efforts of our dedicated faculty and curriculum team who have contributed to the development of this innovative module. Our shared goal is to produce competent, compassionate, and skilled professionals capable of addressing contemporary healthcare challenges.

We believe that NOURISH will serve as a strong foundation for lifelong learning and professional excellence, and will further strengthen our institutional mission of advancing quality education aligned with national priorities and global standards.

Dr. Lamia Yusuf
Director, Medical Education
University of Health Sciences Lahore

Director, Institute of Allied Health Sciences

NOURISH (Nutrition, Outcome-based, Undergraduate Training, Realistic & Reflective, Immersive & Integrated, Skill-building, Healthcare-centered) module marks a pivotal advancement in competency-based education for BS Human Nutrition & Dietetics students. This introductory clinical competency module equips learners with essential skills in professional conduct, ethical practice, clinical observership, and culturally responsive nutrition care, yielding outcomes such as improved clinical readiness and interdisciplinary effectiveness.

In today's dynamic healthcare environment, nutrition professionals must excel in ethical accountability, communication, cultural competence, collaboration, and standards adherence. Early integration of these competencies ensures students achieve high proficiency in real-world settings, reducing transition gaps and elevating patient care quality.

The accompanying clinical competency workbook/logbook adopts a structured, outcome-oriented framework. Through guided observership and reflective practice, it delivers tangible results: sharpened critical thinking, heightened self-awareness, and accelerated skill acquisition, directly bridging theory to practice.

This module advances the University of Health Sciences' commitment to innovative, relevant education. By embedding foundational competencies at the undergraduate level, it fosters holistic professional development, producing graduates who drive superior healthcare outcomes.

I commend the faculty and curriculum team's expertise in creating this resource, which will optimize teaching, learning, and student performance

Dr. Saba Khaliq
Director, Institute of Allied Health Sciences
University of Health Sciences, Lahore

University of Health Sciences
Lahore

Vision Statement

UHS is a leading University aiming to keep its graduates apt with the ever emerging global health challenges evolving educational methodologies and emerging technological advancements to maintain its distinguishable position as a Medical University.

Mission Statement

UHS shall continue to strive for producing a human resource par at excellence to cater for the health needs of the people of Punjab and Pakistan.

TABLE OF CONTENTS

SUBJECT ADVISORY COMMITTEE	
Sr. No	**Name**
1.	**Prof. Huma Arshad Cheema (Convener)** Pediatric Gastroenterologist Children Hospital
2.	**Prof Dr. Sana Ullah** Head of Department University of Veterinary & Animal Sciences (UVAS), Lahore
3.	**Prof. Dr. Ayesha Humayun** Head, Department of Public Health & Community Medicine Shaikh Zayed Postgraduate Medical Institute (SZGMI)
4.	**Dr. Mateen Ahmed** HOD/ Assistant Professor Gulab Devi Educational Complex, Lahore
5.	**Col (R) Dr. Muhammad Ashraf Chaudhry** HOD Community Medicine Central Park Medical College
6.	**Dr. Safeena Amjad** Assistant Professor/ Nutritionist Kanwal Wellness Center, University of Home Economics, Lahore
7.	**Dr. Yasir Zulfiqar** Registrar, Department of Social & Preventive Pediatrics Mayo Hospital Lahore
8.	**Prof. Shazia Zahra** Director of the School of Nutrition at NUR-FMS Fatima Memorial Hospital (FMH)
9.	**Dr. Yahya Gulzar** Technical Officer Reproductive Maternal, Newborn Child and Adolescent health, WHO
10.	**Ms. Ammara Khan** Regional Lead Nutrition (Punjab) World Food Program
11.	**Ms. Rashda Javaid** Stabilization Centre Children Hospital
12.	**Ms. Javeriya Afzal** Clinical Dietitian Shalamar Hospital Lahore

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2.	**Dr. Uruj Zehra** Associate Professor, Head, Anatomy Department University of Health Sciences, Lahore
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PREAMBLE

Human Nutrition and Dietetics stands at the forefront of global public health, offering essential solutions to some of the most pressing health challenges of our time. As dietary patterns evolve and the burden of nutrition-related diseases continues to increase, the role of professionally trained nutritionists and dietitians has become indispensable in both clinical and community settings. The discipline integrates biological sciences, food systems, clinical dietetics, public health nutrition, and behavioral sciences to improve human well-being and enhance the quality of life across populations. Despite the significance of this field, Pakistan has long faced a shortage of qualified nutrition professionals, contributing to persistent nutritional deficiencies, rising metabolic disorders, and limited capacity for effective health promotion and disease prevention programs.

In response to these challenges and in alignment with national health priorities, the University of Health Sciences, Lahore, has developed the Bachelor of Science program in Human Nutrition and Dietetics. This comprehensive four-year curriculum is designed to cultivate scientific competence, clinical expertise, ethical responsibility, and professional excellence. It integrates foundational courses in anatomy, physiology, biochemistry, and pathology with advanced content in clinical diet therapy, community nutrition, nutritional epidemiology, food safety, functional foods, and emerging disciplines such as artificial intelligence in food and nutrition. By combining theoretical instruction with problem-based learning, supervised practicums, laboratory training, internships, and professional certifications, the program ensures that graduates acquire the knowledge, skills, and confidence required to address a wide spectrum of nutritional needs.

The curriculum reflects a strong commitment to evidence-based practice and is built upon international standards while remaining sensitive to Pakistan’s unique cultural, demographic, and public health context. Students are trained to assess nutritional status, design individualized and population-level interventions, interpret scientific data, conduct research, and communicate effectively with healthcare teams, policymakers, communities, and individuals seeking guidance. Emphasis is placed on critical thinking, ethical decision-making, leadership development, and interdisciplinary collaboration, enabling graduates to function as integral members of the healthcare system.

Furthermore, the program prepares students to respond to new and emerging challenges, such as food insecurity, lifestyle-related disorders, environmental impacts on nutrition, and the complexities of modern food systems.

This curriculum has been structured to meet the academic and professional requirements set by national regulatory bodies, ensuring compatibility with the Higher Education Commission's Undergraduate Education Policy and the competencies expected of nutrition professionals globally. Through its balanced integration of scientific rigor and practical exposure, the BS Human Nutrition and Dietetics program seeks to produce graduates capable of contributing meaningfully to hospitals, community organizations, government departments, research institutions, academic settings, and the broader food and health industries. It opens pathways to careers in medical nutrition therapy, public health nutrition, diet counseling, food service management, nutritional policymaking, product development, and research, while also supporting opportunities for advanced study and specialization.

The University of Health Sciences affirms its commitment to strengthening the nation's health systems by developing a skilled workforce equipped to address current and future nutritional challenges. This program represents a forward-looking initiative that not only responds to immediate national needs but also anticipates the evolving demands of the global nutrition landscape. Through high-quality education, practical training, and continuous innovation, the BS Human Nutrition and Dietetics program aims to nurture professionals who will champion health, shape policy, empower communities, and contribute to a healthier and more resilient Pakistan

PROGRAM AIMS, OBJECTIVES, LEARNING OUTCOMES

In alignment with the vision and rationale outlined in the preamble, the following section articulates the program's aims, objectives, learning outcomes, and graduate attributes. These collectively define the academic framework and the professional competencies that graduates are expected to achieve upon completion of the BS Human Nutrition & Dietetics program.

Program Aims

The Bachelor of Science in Human Nutrition & Dietetics program aims to produce highly competent, ethically grounded, and research-oriented nutrition professionals capable of addressing contemporary health and nutrition challenges at individual, community, and population levels. The program integrates foundational scientific knowledge with applied clinical and public health nutrition practices, fostering critical thinking, innovation, and interdisciplinary collaboration. It is designed to contribute to improved health outcomes by preparing graduates who can respond effectively to the evolving demands of healthcare systems, food industries, and policy environments.

Program Objectives

The program is structured to:

- Provide **a comprehensive understanding** of human nutrition, dietetics, food science, and health sciences.
- Develop proficiency in nutritional **assessment**, diet **planning**, and therapeutic nutrition **interventions.**
- Equip students with **research competencies** and the ability to apply **evidence-based** approaches in professional practice.
- Enhance clinical and practical skills through **supervised training**, practicum, and internship experiences.
- Promote ethical, culturally competent, and professional conduct in **diverse healthcare** and **community settings**.

- Address **public health nutrition priorities**, including malnutrition, food insecurity, and non-communicable diseases.
- Foster **innovation and adaptability** in emerging areas such as functional foods, nutraceuticals, and digital nutrition technologies.
- Strengthen communication, leadership, and teamwork skills essential for **multidisciplinary collaboration**.

Learning Outcomes

Upon successful completion of the program, graduates will demonstrate the following attributes:

Knowledge and Understanding

- Apply comprehensive knowledge of nutrition, dietetics, and food science to promote health and manage disease.
- Explain the interrelationship between diet, metabolism, and health across the life cycle.
- Understand principles of food safety, quality assurance, and food systems management.

Cognitive and Analytical Competence

- Utilize critical thinking and scientific reasoning to analyze nutrition-related problems.
- Interpret clinical, biochemical, and epidemiological data for evidence-based decision-making.
- Design appropriate nutrition interventions and public health strategies.

Clinical and Practical Competence

- Conduct comprehensive nutritional assessments using standardized tools and methods.
- Develop and implement therapeutic diets and individualized nutrition care plans.
- Apply food safety standards and quality management systems in professional practice.

Communication and Professionalism

- Communicate effectively with patients, communities, and multidisciplinary teams.

- Deliver nutrition education and counseling with cultural sensitivity and ethical consideration.
- Demonstrate professional integrity, responsibility, leadership, and teamwork.

Research, Innovation, and Digital Competence

- Conduct basic and applied research in nutrition and dietetics.
- Utilize modern technologies, digital tools, and emerging innovations in food and nutrition practice.

Societal Contribution and Lifelong Learning

- Contribute to public health improvement and address community nutrition challenges.
- Engage in lifelong learning and continuous professional development in response to evolving scientific advancements.

BASIC LAYOUT FOR BS HUMAN NUTRITION AND DIETETICS CURRICULUM

- The Evolution of the BS Human Nutrition & Dietetics Curriculum is a A strategic shift from implicit exposure to standardized, assessable professional training. The aim is to "bridge the gap between medical professionals and patients" by equipping students with professional knowledge, ethics and hands-on skills. These modules emphasize early, continuous clinical exposure, practical skills, and patient-centered care
- In line with UHS's shift to outcome-based, competency-focused curricula, we propose a new standalone clinical nutrition module NOURISH
- NOURISH is more than a name—it's a strategic educational compass for building clinical nutritionists who are competent, outcome-driven, culturally aware, and clinically safe.
- It signifies UHS's commitment to training students through immersive, skill-based, and healthcare-integrated learning across the undergraduate journey."

Letter	Stands For	Significance in the Clinical Nutrition Curriculum
N	Nutrition	Core subject focus—developing deep knowledge of clinical nutrition science and therapeutic applications.
O	Outcome-based	Aligned with UHS's vision for OBE: every module has clear, measurable clinical outcomes that guide teaching & exams.
U	Undergraduate Training	Designed for undergrad (BS Nutrition) students from semester 1 to 8—progressive exposure from novice to competent.
R	Realistic & Reflective	Emphasizes real-life, patient-facing clinical practice and reflective learning through logbooks and debriefs.
I	Immersive & Integrated	Blends theory and hands-on learning: simulations, hospital placements, case-based learning, interprofessional rounds.
S	Skill-building	Focus on practical clinical nutrition competencies like assessment, counseling, tube feeding, and diet planning.
H	Healthcare-centered	Nutritionists are integrated as part of the healthcare team—fostering collaboration, communication, and ethics.

KEY HIGHLIGHTS

CREDIT HOURS 153 Credit Hours

- Explicit, structured clinical training. Almost 150 clinical skills with check list and log book
- Designed practicum and internship hours.
- Track-based electives (Clinical vs. Public Health).
- Clear competency progression.

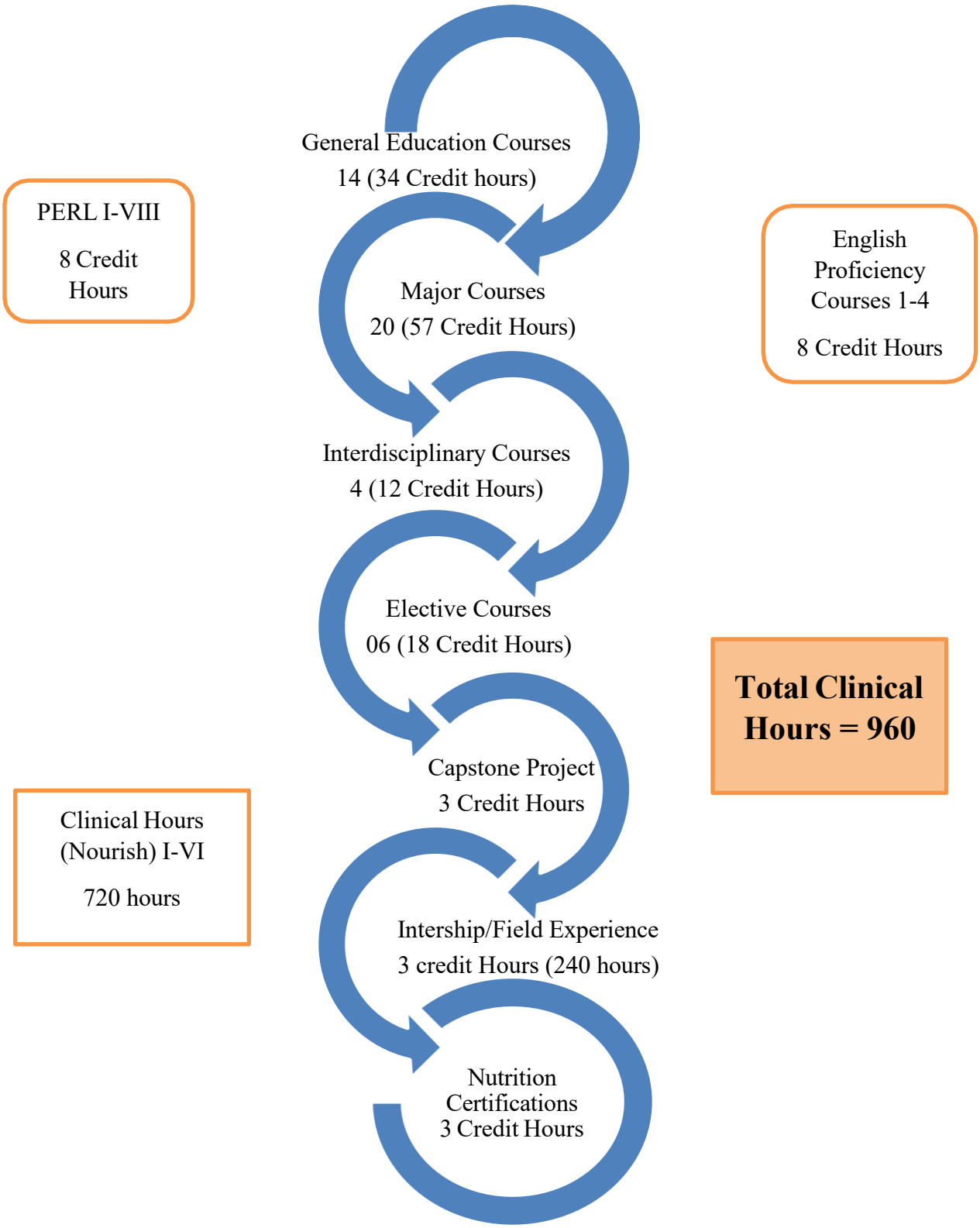
Mandatory skill-based workshops in emergency and life-saving care

- BLS / Cardiac First Response
- Emergency Neonatal Care / NRP
- ETAT (emergency triage assessment and treatment).
- EMONC (emergency obstetric and neonatal care)
- Immediate Care Cardiac.
- Immediate Care Trauma.

CLINICAL ROTATIONS

Semester	Ward	Ward	Ward	Ward	Ward
1	General OPD Hospital Kitchen	Pediatric OPD/ Growth monitoring room	Antenatal clinic	General medicine ward	Community Nutrition center/LHW clinic
2	General OPD	Pediatric OPD	BHU	Gynecology ward/Antenatal clinic	Medicine OPD
3	Medicine OPD	Neonatal and pediatric ward/NICU	Lactation clinic	Gynecology ward/Antenatal clinic	Medicine ward
4	Diabetes clinic/Endocrinology OPD	Cardiology ward	Pediatric ward	General medicine ward	Obesity and fitness clinic
5	Stabilization centers	Immunization and growth monitoring clinics	BHU/LHW clinics	Neurology and psychiatry ward	Hepatology and gastroenterology ward
6	Nephrology	Surgery	Oncology ward	ICU	Burn unit/surgical ICU

PROGRAM STRUCTURE


General Education Courses
14 (34 Credit hours)
Major Courses
20 (57 Credit Hours)
Interdisciplinary Courses
4 (12 Credit Hours)
Elective Courses
06 (18 Credit Hours)
Capstone Project
3 Credit Hours
Intership/Field Experience
3 credit Hours (240 hours)
Nutrition
Certifications
3 Credit Hours
PERL I-VIII
8 Credit
Hours
English
Proficiency
Courses 1-4
8 Credit Hours
Total Clinical
Hours = 960
Clinical Hours
(Nourish) I-VI
720 hours

Duration: 4 years (8 semesters)

Nomenclature: Bachelor of Science (BS) Human Nutrition & Dietetics

Training Sites: Accredited hospitals and community setups affiliated with UHS

Teaching Methodologies:

1. Large & small group discussions
2. Case-based & problem-based learning
3. Clinical rotations & community visits
4. Peer learning & mentorship
5. Workshops, seminars, and invited talks

ASSESSMENT STRATEGIES

Students enrolled in the Nutrition program will be assessed through a combination of theoretical and practical evaluation methods designed to develop and measure critical knowledge, applied skills, and professional competence. Assessment formats include:

- **Multiple Choice Questions (MCQs):**
  Designed to test knowledge across diverse topics such as biochemistry, food science, community nutrition, and clinical dietetics in an objective and time-efficient manner
- **Objective Structured Practical Examination (OSPE):**
  Used to evaluate practical skills such as anthropometric measurements, dietary assessment techniques, food label interpretation, and nutrient analysis.
- **Objective Structured Clinical Examination (OSCE):**
  Focused on assessing clinical competencies including nutrition counseling, patient communication, therapeutic diet planning, and case-based decision-making in clinical settings.
- **Clinical Case Studies:**
  Realistic nutrition-related scenarios that require students to assess, diagnose, and plan interventions for individuals or populations, enhancing problem-solving and applied clinical reasoning.

EVALUATION CRITERIA

Internal Assessment:

1. The assessment shall be done by the institution/respective department
2. The institution/department shall ensure that cognitive domains are assessed through internal assessment.
3. Minimum of 50% marks in Internal assessment (class performance + examination) is a mandatory prerequisite to appear in the Final Term Examinations.
4. The internal assessment for each semester in each subject shall be assessed as under

Class Performance Assessment	Number per semester	Maximum Marks	Total Marks
Quizzes/class tests	02	05 marks per quizzes/class test	10
Assignments	02	05 marks per assignment	10
Presentations	01	05 marks per presentation	05

Mid-Term Examination:

1. The mid-term examination shall be held in the 9th week of the semester.

2. The schedule/date sheet of the mid-term examination shall be notified by the of Student Affairs of the respective institution, two weeks before the commencement of the examination, in accordance with the academic calendar.

3. The candidate shall be required to attempt all tie Questions given in mid-term examination. There shall no choice.

Format of Mid-Semester & Final Examination

a. Mid-Semester Examination shall comprise of only Theory Examination.

b. Final Examination of Semester shall consist of Theory and Practical Examinations in subjects where Cognitive and Psychomotor domains are to be assessed whereas only

Theory Examination will be given in subjects where Cognitive domain is to be assessed in isolation.

c. The student shall be required to submit a Research Project in the Final Semester of the Program. The Research Project shall be allocated by the Head of Department. The Research Project can be allocated to a group of students. The group shall comprise a maximum of 5 students.

d. The research project shall be evaluated by an External Examiner and each student shall appear before the External Examiner for taking the Viva Voce examination based on Research Project.

Scoring Scheme

Assessment Component	Structure	Weightage	Time Allowed
Internal Assessment	**As per guidelines**	**5%**	**-**
Mid-term	MCQs based following similar structure as for final examination	15%	MCQ=1.5min/MCQ
Final Term Exam (Theory)	MCQs=100% (1 mark each)	80%	MCQ=1.5min/MCQ
Final Term Examination (Practical/Clinical)	50% OPSE/OSCE 50% Viva	100%	3 hours

Per Credit hour Allocation of Questions

Credit hours	No. Of MCQs	No. of OSPE/OSCE
1(1-0)	30	--
1(0-1)	-	03
2 (1-1)	30	03

SUBJECTS

GENERAL SUBJECTS	
14 Courses 34 Credit Hours	
Subject	**Credit Hours**
1. Arts and Humanities	2(2-0)
2. Natural Sciences	3(2-1)
3. Social Sciences	2(2-0)
4. Functional English	3(3-0)
5. Expository Writing	3(3-0)
6. Quantitative Reasoning I	3(3-0)
7. Quantitative Reasoning II	3(3-0)
8. Islamic Studies/Ethics	2(2-0)
9. Ideology and Constitution of Pakistan	2(2-0)
10. Applications of Information and Communication Technologies (ICT)	3(2-1)
11. Entrepreneurship	2(2-0)
12. Civics and Community Engagement	2(2-0)
13. Pakistan Studies	2(2-0)
14. Fehm e Quran	2(2-0)

PERL Modules (I-VIII) 8 Credit Hours (1-0)

English Proficiency Courses (1-4) 8 Credit Hours (2-0)

Note: The course contents of General subjects, PERL modules and English Proficiency courses are available on website with Allied health Sciences curricula.

MAJOR COURSES	
Subject	**Cr. Hrs.**
1. Fundamentals of Human Nutrition and Dietetics	3(3-0)
2. Introduction to Food Science and Technology	3(2-1)
3. Food Microbiology and Biotechnology	3(2-1)
4. Analytical Techniques in Food and Nutrition	3(1-2)
5. Food Product Development	3(1-2)
6. Functional Foods & Nutraceuticals	2 (2-0)
7. Research Methods in Food & Nutrition	2 (1-1)
8. Community & Public Health Nutrition	3(3-0)
9. Food Safety & Quality Management	3 (3-0)
10. Fundamentals of Food Systems	3(3-0)
11. AI in Food and Nutrition	2(1-1)
12. Food and Nutrition Policies	3(3-0)
13. Food and Nutrition Certifications	3(3-0)
14. Macro and Micronutrients	3(3-0)
15. Nutrition through Lifecycle	3(3-0)
16. Meal Planning and Management	3(2-1)
17. Nutritional Assessment	3(2-1)
18. Dietetics I	3(2-1)
19. Dietetics II	3(2-1)
20. Nutrition Education & Counseling	3(2-1)
21. Nutritional Epidemiology	3(3-0)
22. Food Service Management	2(1-1)

Food and Nutrition Certifications 3(3-0)

CLINICAL PRACTICUM	
Courses (06) Credit Hours (15) Clinical Hours (720)	
Title	**Cr. Hours**
1. Nourish I (Practicum)	1(0-1)
2. Nourish II (Practicum)	2 (0-2)
3. Nourish III (Practicum)	2 (0-2)
4. Nourish IV (Practicum)	2 (0-2)
5. Supervised Practicum I (Nourish V)	3(0-3)
6. Supervised Practicum II (Nourish VI)	3(0-3)

INTERNSHIP 03 Credit Hours 240 Hours

CAPSTONE PROJECT 03 Credit Hours

INTERDISCIPLANRY SUBJECTS	
04 Courses 12 Credit Hours	
Subject	**Credit Hours**
1. Basic Sciences Foundation Module-I	3 (3-0)
2. Basic Sciences Foundation Module-II	3 (3-0)
3. Basic Sciences Foundation Module-III	3 (3-0)
4. Clinical Biochemistry	3 (2-1)

Elective Courses

06 Courses=18 Credit Hours

The university/offering department may offer any cluster course as elective in Human Nutrition & Dietetics program based on available academic and physical resources, depending on its geographical location and program objectives.

Specialization-1: Clinical Nutrition

Code	Specialization Courses (Major)	Credit Hours			
		Total	Theory	Practical	Clinical
ELEC-I	Medical Nutrition Therapy I	3 (2-1)	2		1
ELEC-II	Medical Nutrition Therapy II	3 (2-1)	2		1
ELEC-III	Nutrition Practices in Critical Care	3 (2-1)	2	1	
ELEC-IV	Nutrition Metabolism & Endocrinology	3 (3-0)	3		
ELEC-V	Diet Therapy for Individuals with Special Needs	3 (2-1)	2	1	
ELEC-VI	Nutrition in Inborn Errors of Metabolism	3 (2-1)	2	1	

Specialization-2: Community & Public Health Nutrition

Code	Specialization Courses (Major)	Credit Hours		
		Total	Theory	Practical
ELEC-I	Diet Diversity & Food Security	3 (3-0)	3	
ELEC-II	Nutrition Program Planning and Evaluation	3 (3-0)	3	

ELEC-III	Nutrition in Emergencies	3 (3-0)	3	
ELEC-IV	Nutrition Behaviour Change Communication	3 (3-0)	3	
ELEC-V	Sports Nutrition & Exercise	3 (2-1)	2	1
ELEC-VI	Early Childhood Development	3 (3-0)	3	

SCHEME OF STUDIES

BS Human Nutrition & Dietetics

Course Code	Course Title	Credit hours	Theory	Practical	
				Lab	Clinical
Semester 1					
GEFE	Functional English	3 (3-0)	3		
GEQR-I	Quantitative Reasoning-I	3 (3-0)	3		
GENS	Natural Sciences	3 (2-1)	2	1	
GEAH	Arts and Humanities	2 (2-0)	2		
GEICP	Ideology and Constitution of Pakistan	2 (2-0)	2		
HND101	Fundamentals of Human Nutrition and Dietetics	3 (3-0)	3		
HND102	Introduction to Food Science & Technology	3 (2-1)	2	1	
IDBS	Basic Sciences Foundation Module-I	3 (3-0)	3		
PERL-I	PERL-I	1 (1-0)	1		
		23 (21-2)	**21**	**2**	
Semester 2					
GEEW	Expository Writing	3 (3-0)	3		
GEQR-II	Quantitative Reasoning-II	3 (3-0)	3		
GESS	Social Sciences	2 (2-0)	2		
GEIS	Islamic Studies (Religious Education/Ethics for Non-Muslim Students)	2 (2-0)	2		
IDBS	Basic Sciences Foundation Module-II	3 (3-0)	3		
HND201	Macro & Micronutrients	3 (3-0)	3		
HND202	Nutritional Assessment	3 (2-1)	2	1	
HND203	Nourish I (Practicum)	1 (0-1)			1
PERL-II	PERL-II	1 (1-0)	1		

		21 (19-2)	**19**	**1**	**1**
Semester 3					
GEE	Entrepreneurship	2 (2-0)	2		
GECCM	Civics and Community Engagement	2 (2-0)	2		
GEICT	Applications of Information and Communication Technologies (ICT)	3 (2-1)	2	1	
GEFQ	Fehm-e-Quran (Muslim Students)	2 (2-0)	2		
IDBS	Basic Sciences Foundation Module-III	3 (3-0)	3		
HND301	Food Safety & Quality Management	3 (3-0)	3		
HND302	Food Service Management	2(1-1)	1	1	
HND302	Nourish – II (Practicum)	2 (0-2)			2
EPC-1	English Proficiency-1	2 (2-0)	2		
PERL-III	PERL-III	1 (1-0)	1		
		22 (18-4)	**18**	**2**	**2**
Semester 4					
GEPST	Pakistan Studies	2 (2-0)	2		
IDCB	Clinical Biochemistry	3 (2-1)	2	1	
HND401	Nutrition Through Lifecycle	3 (3-0)	3		
HND402	Meal Planning & Management	3 (2-1)	2	1	
HND403	Functional Foods & Nutraceuticals	2 (2-0)	2		
HND404	Food Microbiology and Biotechnology	3 (2-1)	2	1	
HND405	Nourish – III (Practicum)	2 (0-2)			2
EPC-2	English Proficiency-2	2 (2-0)	2		
PERL-IV	PERL-IV	1 (1-0)	1		

		21 (16-5)	**16**	**3**	**2**
Semester 5					
HND501	Analytical Techniques in Food and Nutrition	3 (1-2)	1	2	
HND502	Fundamentals of Food Systems	3 (3-0)	3		
HND503	Dietetics – I	3 (2-1)	2	1	
ELEC-I	Medical Nutrition Therapy I	3 (2-1)	2		1
EPC-3	English Proficiency-3	2 (2-0)	2		
HND504	Nourish IV (Practicum)	2 (0-2)			2
PERL-V	PERL-V	1 (1-0)	1		
		17 (11-6)	**11**	**3**	**3**
Semester 6					
HND601	Community Nutrition & Public Health Nutrition	3 (3-0)	3		
HND602	Research Methods in Food and Nutrition	2 (1-1)	1	1	
HND603	Dietetics – II	3 (2-1)	2	1	
ELEC-II	Medical Nutrition Therapy II	3 (2-1)	2		1
EPC-4	English Proficiency-4	2 (2-0)	2		
HND604	Supervised Practicum I (Nourish – V)	3 (0-3)			3
PERL-VI	PERL-VI	1 (1-0)	1		
		17 (11-6)	**11**	**2**	**4**
Internship (6-8 weeks) in Summer Break *				**3 (0-3)**	
Semester 7					
HND701	Food Product Development	3 (1-2)	1	2	

HND702	Nutrition Education & Counselling	3 (2-1)	2	1	
ELEC-III	Nutrition Practices in Critical Care	3 (2-1)	2	1	
ELEC-IV	Nutrition Metabolism & Endocrinology	3 (3-0)	3		
HND703	Supervised Practicum II (Nourish - VI)	3 (0-3)			3
PERL-VII	PERL-VII	1 (1-0)	1		
		16 (9-7)	**9**	**4**	**3**
Semester 8					
Food and Nutrition Certifications **				**3 (3-0)**	
HND801	Food and Nutrition Policies	3 (3-0)	3		
HND802	Nutritional Epidemiology	3 (3-0)	3		
HND803	AI in Food and Nutrition	2 (1-1)	1	1	
ELEC-V	Diet Therapy for Individuals with Special Needs	3 (2-1)	2	1	
ELEC-VI	Nutrition in Inborn Errors of Metabolism	3 (2-1)	2	1	
CAP	Capstone Project	3 (0-3)	0	3	
PERL-VIII	PERL-VIII	1 (1-0)	1		
		18 (12-6)	**12**	**6**	
Total Credit Hours: 153			**113**	**25**	**15**

* Internships of three (03) credit hours (8 weeks) must be completed in accordance with HEC Undergraduate Education Policy V 1.1. This requirement cannot be substituted with additional coursework, capstone, research, or project work**.**

** BS Human Nutrition & Dietetics students are required to complete three certifications

(equivalent to 3 credit hours in total) over the period of four-year program as a mandatory condition for degree completion. Each certification will be considered equivalent to 1 credit hour if it comprises at least 16 hours. The respective department will guide student.

SEMESTER 1

Fundamentals of Human Nutrition & Dietetics 3 (3-0)

By the end of this course the student will be able to:

- Define fundamental concepts, terminologies, and principles related to human nutrition and dietetics.
- Describe the functions, sources, and basic roles of essential nutrients, including macronutrients and micronutrients, in maintaining human health.
- Explain the processes of digestion, absorption, and basic metabolism of nutrients in the human body.
- Discuss the scope, roles, and professional responsibilities of nutritionists and dietitians within clinical, community, and public health contexts.

Contents (Theory)

Key Topics Covered	MCQs
Unit 1: Introduction to Human Nutrition and Dietetics	
Definition and key terms (nutrition, food, nutrients, diet, health); history and development of nutrition science; importance of human nutrition; branches and scope of nutrition and dietetics; relationship between food, health, and disease.	18
Unit 2: Macronutrients and Energy	
Energy concept and balance; functions, sources, and types of carbohydrates, proteins, and fats; essential amino acids and fatty acids; overview of protein quality; simple introduction to energy-yielding nutrients.	20
Unit 3: Micronutrients and Water	

Classification of vitamins and minerals; overview of major vitamins and minerals, their functions, and dietary sources; importance of water and electrolyte balance.	20	
Unit 4: Digestion, Absorption, and Basic Metabolism		
Structure and functions of the digestive system; steps in digestion and absorption of carbohydrates, proteins, and fats; introduction to metabolism (catabolism and anabolism); energy production (ATP concept).	20	
Unit 5: Scope and Professional Roles in Nutrition and Dietetics		
Overview of fields: clinical, community, food service, and public health nutrition, ethical and professional responsibilities of dietitians; emerging trends and career prospects.	12	
Total	**90**	**9**

Recommended Books

1. Whitney E. N. and Rolfes S. R. 2008. Understanding Nutrition, Thomson Higher Education.
2. Wardlaw G. M. and Kessel M. W. 2002. Perspectives in Nutrition, McGraw-Hill.
3. Mahan, L. K., Escott-Stump, S., & Raymond, J. (2022). Krause's Food & the Nutrition Care Process (16th ed.). Elsevier.

Introduction to Food Science and Technology 3 (2-1)

By the end of this course the student will be able to:

- Describe the fundamental concepts, scope, and interdisciplinary nature of food science and technology.
- Identify the physical, chemical, and microbiological properties of foods and learn their implications
- Classify foods based on perishability, pH, and level of processing
- Understand common food processing, preservation, and packaging methods
- Recognize the role of food additives and regulatory bodies in ensuring food safety, national food security, and maintaining quality standards

Course Contents

Theory

Key Topics Covered	MCQs
Unit I: Introduction to Food Science & Technology	
• Fundamental concepts, scope, and significance of food science in public health and industry. • Evolution of food technology: from traditional preservation (drying, salting, fermentation) to modern industrial applications. • Modern advancements: food engineering, biotechnology, nanotechnology in food. • Interdisciplinary nature of food science: linking chemistry, biology, engineering, nutrition	**4**
Unit II - Physical, Chemical, and Microbiological Properties of Food	
• **Physical Properties of Food:** Color, Texture and Rheology, Instrumental vs. sensory evaluation, Density and Specific Gravity, Water Activity (a_w) • **Chemical Properties of Food:** pH, moisture content, redox potential, enzymes, nutrient composition	**6**

• **Bioavailability and nutrient stability of constituents of Food** • **Microbiological Properties of Food:** Spoilage potential of microorganisms present in food, Factors Affecting Microbial Growth: Temperature (psychrophiles, mesophiles, thermophiles), pH, Water activity, Oxygen availability	
Unit III - Classification of Food Based on Perishability, pH, and Degree of Processing	
• **Based on perishabilit**y: definition; categories: Perishable, Semi-perishable, Non-perishable; Examples and storage implications • **Based on pH**: Role of pH in food quality and safety; pH ranges and food categories; Microbial growth and acid sensitivity; Real-life examples • **Based on the extent and purpose of industrial processing**: NOVA Classification, characteristics and examples of each group; Impact of processing on health and diet	**6**
Unit IV - Food Spoilage: Causes and Mechanisms	
Types, mechanisms, examples and implications • **Shelf Life and food deterioration factors** • **Physical Spoilage:** Insects and pests: direct damage to nutrients and indirect contamination; Spoilage during post-harvest handling and storage • **Enzymatic degradation and autolysis**: Proteolysis in meat and fish; Lipolysis in fats and oils • **Chemical spoilage (Non-enzymatic)**: Maillard reactions and caramelization – dual role in flavor enhancement and amino acid loss; rancidity in lipids; oxidation; light induced reactions	**7**

• **Microbial spoilage** (bacteria, molds, yeasts) and its effects on nutrient losses.	
Unit V - Principles & Preliminary Operations in Food Processing & Preservation	
• **Principles** and objectives of food preservation and nutrient retention strategies. • **Classification** of food processing & preservation techniques: Processes/procedures; role in nutrient retention or degradation in foods. • **Preliminary operations**: cleaning (dry & wet cleaning), peeling, sorting, grading, evaporation, drying (sun, tray, freeze drying) Mechanical and enzymatic nutrient losses.	**6**
Unit VI – Food Processing and Preservation Techniques	
• **Thermal Methods of Food Preservation**: Pasteurization, sterilization, blanching, canning Impact on vitamins (especially C, B1, folate), protein denaturation, lipid oxidation. • **Low-Temperature Methods in Food Preservation:** Refrigeration and freezing (air freezing, indirect contact freezing, immersion and cryogenic freezing) Freeze burn and textural changes affecting nutrient bioavailability. • **Moisture Control Methods:** Sun drying, Dehydration, Evaporation, Concentration, Freeze drying, Dehydro freezing Concentration of minerals and degradation of heat-sensitive vitamins. • **Irradiation/Cold Pasteurization:** Types, applications, and nutrient implications: minimal effect on macronutrients, variable effect on vitamins A, E, and C. • **Others:** High Pressure Processing, Ohmic heating induction Heating	**9**

• **Biological Methods of Preservation:** Fermentation; Bio-preservation using natural antimicrobials (bacteriocins, organic acids)	
Unit VII - Role of Additives in Food Processing & Preservation	
• Differentiate and define food adulterant, food contaminant, chemical additive • Categories of food additives**:** use in food processing; use in food preservation (brining, syruping)	**6**
Unit VIII - Food Packaging Technology	
• Function, characteristics and determining factors for packaging. • Types of packaging materials (glass, metal, polymers, biodegradable options) and nutrient preservation capacity. • ROP Packaging Procedures: CAP, MAP, aseptic, vacuum (VP), active, biodegradable, edible and smart/intelligent packaging	**6**
Unit VIX - Food Processing and National Food Security	
• Role of processing in reducing food waste and extending food availability and accessibility. • Implications for food and nutrient security in Pakistan	**4**
Unit X - Regulatory bodies for the evaluation of food quality and safety parameters	
• Brief explanation of the roles, responsibilities, and scope of authority of each regulatory body. • Analyze how regulatory frameworks impact food quality assurance and safety enforcement both within Pakistan and internationally	**6**
Total	**60**

Practical

Content	OSPEs
Unit I - Introduction to Food Science Laboratory	
Basic definitions related to Food Science and Technology, introduction to the essential Good Laboratory Practices and Laboratory Safety Practices	**0.5**
Unit II - Laboratory Equipment in Food Science	
Identification and purpose of common laboratory glassware and equipment. • **Identification and basic functions of common equipmen**t: weighing balance, Micropipette, pH meter, Fume hood, HPLC, incubator, water bath, hot air oven, including basic calibration and maintenance practices • **Identification and basic functions of food analysis equipment**: Refractometer, food thermometers, Soxhlet apparatus, Kjeldahl equipment, Muffle furnace, Flame Photometer, Autoclave, Hydrometer, Commercial ovens, Distillation plants, Texture Analyzer, Color meter	**0.5**
Unit III - Basic Food Processing Operations	
Study of methods of peeling, including manual, mechanical, and chemical techniques. Demonstration of manual peeling and calculating peeling loss Introduction to mixing methods and related equipment. Explanation and practical demonstration of blanching techniques and their role in food processing.	**0**.5
Unit IV - Food Processing Practicals	
Hands-on preparation of yogurt from milk, bread baking, and development of fruit-based products such as squash and jam. Preparation of vinegar through standard laboratory procedures. Appreciate and understand the role pf processing techniques, additives used and their implications	**0**.5

Unit V - Market-Based Learning Activities	
Market search and evaluation of canned foods focusing on labeling and processing details. Market review of food additives commonly used in industry, including identification and applications	**0**.5
Unit VI - Sensory Evaluation	
Introduction to sensory analysis techniques: conducting triangle tests, ranking tests, and hedonic rating methods	**0**.5
Total	**0**3

Recommended Books

1. Vaclavik, V. A., Christian, E. W., & Campbell, T. (2021). Essentials of food science (5th ed.). Springer Nature Switzerland AG. https://doi.org/10.1007/978-3-030-46814-9
2. Potter, N. N., & Hotchkiss, J. H. (2012). Food science (5th ed.). Springer. https://doi.org/10.1007/978-1-4615-4985-7
3. Awan, J.A. (2011) Food processing and preservation (3rd ed). Unitech Communications, Faisalabad-Pakistan.
4. Brennan, J. G., & Grandison, A. S. (Eds.). (2011). *Food processing handbook*. Wiley-VCH. https://doi.org/10.1002/9783527634361
5. Tortora, G. J., Funke, B. R., Case, C. L., Weber, D., & Bair, W. (2013). Microbiology: an introduction (Vol. 8). Boston: Pearson
6. Innovative Food Products and Processing (2023) – Special Issue reprint (MDPI)

SEMESTER 2

Macro & Micronutrients 3 (3-0)

By the end of this course the student will be able to:

- Classify macro and micronutrients and their dietary sources.
- Describe the biochemical functions and physiological roles of each nutrient.
- Assess the nutritional status of individuals using dietary intake and biomarkers.
- Interpret the signs and symptoms of deficiency and toxicity of nutrients.
- Formulate diet plans that ensure adequate intake of essential nutrients.

Theory

Key Topics Covered	MCQs
Unit 1: Introduction • Classification of nutrients: macronutrients & micronutrients • Overview of digestion, absorption, transport, and storage	10
Unit 2: Macronutrients - Proteins • Classification, structure, and functions of proteins • Essential and non-essential amino acids • Digestion, absorption, and metabolism of proteins • Evaluation of protein quality and dietary sources • Protein-energy malnutrition (Kwashiorkor and Marasmus): causes & symptoms	12
Unit 3: Macronutrients – Carbohydrates • Classification and types of carbohydrates (monosaccharides, disaccharides, polysaccharides) • Dietary fiber: types, sources, and physiological roles • Glycemic index and glycemic load and their nutritional significance • Digestion, absorption, and metabolism of carbohydrates • Role of carbohydrates in health and disease (diabetes mellitus, obesity, and metabolic disorders)	15
Unit 4: Macronutrients – Lipids • Classification and structure of lipids (simple, compound, and derived) • Essential fatty acids: types, functions, and dietary sources • Lipoproteins and their role in lipid transport and metabolism • Digestion, absorption, and metabolism of dietary fats • Lipid-related disorders: cardiovascular diseases, obesity, and metabolic syndrome	13

Unit 5: Micronutrients – Vitamins • Fat-soluble (A, D, E, K): Functions, sources, recommended intakes (RDA, DRI, UL), deficiency/toxicity disorders • Water-soluble (B-complex, C): Functions, sources, deficiency/toxicity • Factors affecting vitamin stability and bioavailability	15
Unit 6: Micronutrients – Minerals • Major minerals (Ca, P, Mg, Na, K): Roles, sources, recommended intakes (RDA, DRI, UL), deficiency/toxicity disorders • Trace elements (Fe, Zn, I, Se, F, Cu): Functions, recommended intakes (RDA, DRI, UL), deficiency/toxicity disorders • Nutrient–nutrient interactions affecting absorption/utilization	13
Unit 7: Applied Nutrition • Nutritional assessment methods: dietary intake (24-hour recall, food frequency), biochemical markers, clinical signs	12
Total	**90**

Recommended Books

1. Gropper, S.S. and Smith, J.K. 2012. Advanced Nutrition and Human Metabolism, 6th ed. Wadsworth Cengage Learning, Belmont, CA, USA.
2. Allen, L. 2006. Guidelines on Food Fortification with Micronutrients. World Health Organization, Geneva, Switzerland.
3. Bender, D.A. 2009. Nutritional Biochemistry of Vitamins, 2th ed. Cambridge University Press, Cambridge, UK.
4. DiSilvestro, R.A. 2004. Handbook of Minerals as Nutritional Supplements. CRC Press, Taylor & Francis Group, Boca Raton, FL, USA.
5. Biochemical and Physiological Aspects of Human Nutrition- Martha H. Stipanuk.
6. Advanced Nutrition: Micronutrients by Carolyn D. Berdanier.
7. Mahan, L. K., Escott-Stump, S., & Raymond, J. (2022). Krause's Food & the Nutrition Care Process (16th ed.). Elsevier.

Nutritional Assessment 3 (2-1)

By the end of this course the student will be able to:

- Explain the components and importance of comprehensive nutritional assessment.
- Demonstrate the use of nutrition screening, dietary, anthropometric, biochemical, and clinical methods in assessing nutritional status.
- Apply appropriate tools and techniques for assessing individuals in different age groups and physiological conditions.
- Interpret assessment data and formulate nutrition care strategies accordingly.
- Critically evaluate the reliability and validity of different nutritional assessment tools.

Theory

Key Topics Covered	MCQs
Unit I – Introduction to Nutritional Assessment • Overview of the course and its objectives • Historical development and significance of nutritional assessment • Ethical considerations in conducting assessments	4
Unit II – Dietary Intake Assessment Methods • 24-hour recall, food records, food frequency questionnaires • Advantages and limitations of each method	9
Unit III – Anthropometric Measurements • Principles and techniques: height, weight, BMI, body composition • Use of growth charts and anthropometric indicators • Assessment of growth in children and adolescents	7
Unit IV – Clinical Assessment • Physical examination for nutritional status • Clinical signs of malnutrition and specific nutrient deficiencies • Importance of medical history in nutritional diagnosis	7

Unit V – Biochemical Assessment • Blood tests and key nutritional biomarkers (e.g., iron, folate, vitamin D, calcium, albumin) • Interpretation of biochemical values • Specialized tests: bone density, fatty acid profiles	9
Unit VI – Functional and Specialized Dietary Assessment • Functional indicators: grip strength, cognitive performance, physical performance tests • Dietary pattern analysis and nutritional adequacy • Specialized assessments in chronic conditions: diabetes, hypertension, celiac disease, thyroid dysfunction	6
Unit VII – Nutritional Screening and Assessment Tools • Nutrition screening systems: surveys, surveillance, screening • Tools such as MUST (Malnutrition Universal Screening Tool), SGA (Subjective Global Assessment), and NRS-2002 • Practical use and interpretation of screening and assessment outcomes	8
Unit VIII – Nutritional Assessment in Special Populations • Assessment considerations for infants, children, pregnant/lactating women, elderly • Nutritional needs of athletes and individuals with eating disorders	4
Unit IX – Assessing Dietary Patterns and Cultural Considerations • Impact of cultural and traditional practices on dietary habits • Importance of cultural competence in assessment	1
Unit X – Technology and Nutritional Assessment • Use of apps, wearable devices, and online platforms • Data entry and analysis through software tools	1

Unit XI – Data Interpretation and Report Preparation • Data analysis techniques and interpretation of findings • Preparation and presentation of comprehensive nutritional assessment reports	1
Unit XII – Ethics and Confidentiality in Nutritional Practice • Informed consent and confidentiality in assessment procedures • Ethical challenges and case discussions	1
Unit XIII – Quality Assurance and Validation in Nutritional Assessment • Ensuring accuracy, reliability, and reproducibility of results • Validation and standardization of assessment tools and methods	1
Unit XIV – Special Topics (Integrated Throughout the Course) • Measuring food consumption at the national level: food balance sheets, total diet studies • Household food consumption: food accounts, household records, 24-hour food record • Individual dietary measurement: weighed food records, repeated recalls, diet histories • Selecting appropriate methods based on objectives: mean intake, population at risk, ranking individuals	1
Total	**60**

Practical

Practical Content	OSPEs
Practicing methods of nutritional assessment (ABCD of Nutritional assessment); Comparison of the data with references values for drawing conclusions. • Introduction to Nutritional Assessment	1

• Standards for nutrient intake • Dietary reference intakes • Direct & indirect measures.	
Nutritional assessment of ambulatory and bedridden patients • Basic nutrition calculations, calculations of Physical activity of ambulatory and non-ambulatory individuals. • Calculation of energy & protein requirements of hospitalized and outdoor patients.	1
MNA, MUST, SGA, growth charts. • 24-hour recall of indoor and outdoor patient • FFQ development • Food labels • Exchange list for meal planning.	1
Total	**3**

Recommended Books

1. Driskell, J.A. and Wolinsky, I. 2011. Nutritional Assessment of Athletes, 2nd ed. CRC Press, Taylor & Francis Group, New York, USA.

2. Gibson, R.S 2005. Principles of Nutrition Assessment. Oxford University Press Inc., New York, USA.

3. Lee, R.D. and Nieman, D.C. 2012. Nutritional Assessment, 6th ed. The McGraw-Hill Companies Inc., New York, USA.

4. McGuire, M. and Beerman, K.A. 2011. Nutritional Sciences: From Fundamentals to Food. Cengage Learning, Belmont, CA, USA.

SEMESTER 3

Food Safety and Quality Management 3 (3-0)

By the end of this course the student will be able to:

- Explain the principles and importance of food safety, hygiene, and quality
- Identify and assess physical, chemical, and biological food hazards.
- Apply food safety systems including HACCP, GMP, GHP, and SSOPs in food operations.
- Interpret national and international food safety regulations and standards.
- Evaluate food safety systems through auditing, documentation, and risk management approaches

Course (Theory)

	Key Topics Covered	MCQs
	Unit 1: Introduction to Food Safety and Quality • Definitions: food safety, food quality, and food security • Importance of food safety in public health and nutrition • Key terminologies in food safety and quality management	**10**
	Unit 2: Food Hazards and Risk Analysis • Physical hazards (foreign bodies, contaminants) • Chemical hazards (pesticides, additives, allergens, heavy metals) • Biological hazards (bacteria, viruses, parasites, fungi) • Emerging foodborne pathogens • Cross-contamination and allergen management • Risk identification, risk assessment, and risk management	**15**
	Unit 3: Food Hygiene and Good Practices • Good Manufacturing Practices (GMP) • Good Hygiene Practices (GHP) • Good Storage Practices (GSP) • Sanitation Standard Operating Procedures (SSOPs) • Personnel hygiene, pest control, and cleaning protocols • Food labeling, expiry dates, batch coding, and traceability	**15**
	Unit 4: Food Safety and Quality Management Systems • HACCP principles and applications • ISO 22000 (Food Safety Management System) • ISO 9001 (Quality Management System) • FSSC 22000 and BRC overview • Documentation and record-keeping • Traceability and recall systems	**15**
	Unit 5: Risk Management and Foodborne Diseases • Risk identification, assessment, and management • Development of sample HACCP plans • Foodborne diseases: Salmonella, E. coli, Listeria, Hepatitis A • Root	**10**

	cause analysis and corrective actions	
	Unit 6: Food Laws and Regulatory Systems in Pakistan • West Pakistan Pure Food Ordinance • Cantonments Pure Food Ordinance • West Pakistan Pure Food Rules • Punjab Pure Food Rules • Pakistan Standards and Quality Control Authority standards and labeling • Pakistan Penal Code (food adulteration & misbranding) • Pakistan Hotels and Restaurants Act	**10**
	Unit 7: Regulatory Bodies and Implementation Tools • Punjab Food Authority • Codex Alimentarius Commission • World Health Organization • Food and Agriculture Organization • World Trade Organization (SPS Agreement) • Internal audits and food safety audits • Checklists, SOPs, validation, verification • Digital tools in food quality management	**15**
	Total	**90**

Recommended Books

1. Mortimore, S., & Wallace, C. (2013). *HACCP: A Practical Approach* (3rd ed.). Springer.
2. Forsythe, S. J. (2020). *The Microbiology of Safe Food* (3rd ed.). Wiley-Blackwell.
3. Mottram, D. (2006). *Food Safety: A Practical and Case Study Approach*. Springer.
4. Adams, M. R., & Moss, M. O. (2010). *Food Microbiology* (3rd ed.). Royal Society of Chemistry.
5. World Health Organization. (2006). *Five Keys to Safer Food Manual*. WHO Press.
6. Codex Alimentarius Commission. *Food Hygiene Basic Texts*. FAO/WHO.
7. Mahan, L. K., Escott-Stump, S., & Raymond, J. (2022). *Krause's Food & the Nutrition Care Process* (16th ed.). Elsevier.

Food Service Management 2 (1–1)

By the end of this course the student will be able to:

• Explain the fundamental principles and types of food service systems.
• Apply menu planning, procurement, and budgeting principles in institutional settings.
• Demonstrate practical skills in food production, quality control, and hygiene management.
• Analyze workflow, staffing, and equipment requirements in food service operations.
• Design an efficient food service operation plan based on institutional needs.
• Evaluate financial and human resource aspects of food service units.

Theory

Key Topics Covered	MCQs
Unit 1: Introduction to Food Service Systems • Definition, importance, and scope of food service operations • Foodservice Systems Model: input, transformation, output • Institutional vs. commercial food service systems • Types: conventional, commissary, ready-prepared, assembly-serve	6
Unit 2: Menu Planning and Control • Menu as a management and control tool • Types of menus: static, cycle, single-use • Principles of menu planning (nutrition, cost, acceptability) • Menu planning and operational efficiency	6
Unit 3: Procurement and Budgeting • Purchasing systems and supplier selection • Food specifications and purchase orders • Receiving, storage, and inventory management • Cost control and budgeting basics	6
Unit 4: Food Production and Quality Assurance • Standardized recipes and portion control • Yield testing and production scheduling • Workflow efficiency in kitchen operations • Basic HACCP concepts in food production • Sanitation, hygiene, and workplace safety	6
Unit 5: Organizational Management and	6

Evaluation • Managerial roles in food service operations • Human resource and financial management overview • Facility layout and equipment considerations • Evaluation and sustainability of food service units	
Total	**30**

Practical

Practical Content	OSPEs
Menu Planning Exercise (static, cycle, single-use menus for institutions)	1
Recipe Standardization and Costing (yield & portion cost calculation)	1
Equipment Identification & Kitchen Layout Design (basic commercial setup) Table/Tray Setting Demonstration	1
Industrial/Commercial Kitchen Visit and Report Writing	-
Total	3

Recommended Books

1. Payne-Palacio, J., & Theis, M. (2016). *Foodservice Management: Principles and Practices* (13th ed.). Pearson.
2. Gregoire, M. B. (2016). *Foodservice Organizations: A Managerial and Systems Approach* (9th ed.). Pearson.
3. Spears, M. C., & Gregoire, M. B. (2018). *Foodservice Organizations: A Managerial and Systems Approach*. Pearson.
4. Brown, A. (2011). *Understanding Food: Principles and Preparation*. Cengage Learning.
5. Sethi, M., & Malhan, S. (2014). *Catering Management: An Integrated Approach*. Wiley.
6. Mahan, L. K., Escott-Stump, S., & Raymond, J. (2022). *Krause's Food & the Nutrition Care Process* (16th ed.). Elsevier.

SEMESTER 4

Functional Foods & Nutraceuticals 2 (2-0)

By the end of this course the student will be able to:

- Define and classify functional foods and nutraceuticals.
- Discuss bioactive components and their health benefits.
- Analyze regulatory and labeling aspects of nutraceuticals.
- Evaluate clinical evidence supporting functional food claims.
- Formulate functional food products targeting specific health issues

Contents (Theory)

Key Topics Covered	MCQs
Unit I - Introduction to Functional Foods and Nutraceuticals • Definitions and concepts • Historical background and global trends • Classification and comparison with pharmaceutical drugs and supplements	6
Unit II - Health Benefits and Mechanisms of Action • Concept of food as medicine • Mechanisms: antioxidant, anti-inflammatory, lipid-lowering, immunomodulatory, etc. • Nutrigenomics and nutrigenetics (basic introduction)	8
Unit III - Functional Foods in Disease Prevention • Role in cardiovascular disease, diabetes, obesity, and cancer • Gut health, bone health, cognitive function, and immune enhancement • Scientific evidence and clinical trial data	10
Unit IV - Bioactive Components in Functional Foods • Dietary fiber, prebiotics, and probiotics • Phytochemicals: flavonoids, polyphenols, carotenoids, glucosinolates • Omega-3 fatty acids, plant sterols, peptides, and functional proteins	10

Unit V - Development and Formulation of Nutraceuticals • Selection of functional ingredients • Formulation techniques and delivery systems (capsules, bars, beverages, etc.) • Stability, bioavailability, and shelf-life considerations	8
Unit VI - Nutraceuticals in Practice • Herbal nutraceuticals, traditional remedies, and modern applications • Nutraceuticals in chronic disease management • Drug-nutrient interactions and safety concerns	8
Unit VII - Food Regulations and Safety Aspects • Regulatory frameworks: FDA (USA), EFSA (EU), FSSAI (India), DRAP (Pakistan) • Labeling requirements, health claims, and marketing • Quality assurance and safety assessment of nutraceutical products	6
Unit VIII - Research and Innovations in Functional Foods • Advances in food biotechnology • Emerging trends: personalized nutrition, microbiome-targeted products • Current research gaps and opportunities for product development	4
Total	**60**

Recommended Books

1. Shi, J., C.T. Ho and F. Shahidi. 2005. Asian Functional Foods. Marcel Dekker/CRC Press, New York, U.S.A.

2. Shi, J., G. Mazza and M.L. Maguer. 2002. Functional Foods: Biochemical and Processing Aspects, Vol. 2. CRC Press, Traylor & Francis Group, Boca Raton, New York, USA.

3. Wildman, R.E.C. 2006. Handbook of Nutraceuticals and Functional Foods,2nd ed. CRC Press, Traylor & Francis Group, Boca Raton, New York, USA.

4. FAO (Food and Agriculture Organization of the United Nations). 2007. Report on Functional Foods. Food and Agriculture Organization of the United Nations, Rome, Italy.

Food Microbiology and Biotechnology 3 (2-1)

By the end of this course the student will be able to:

- Demonstrate knowledge of probiotics, prebiotics, and gut microbiota, including their roles in human health and functional food development
- Apply principles of microbial genetics and molecular biology to understand the genetic manipulation of microbes used in food biotechnology
- Evaluate industrial fermentation processes and enzyme technologies for large-scale food production, bioconversion, and quality enhancement
- Analyze the mechanisms, detection, and control of foodborne pathogens and toxins, ensuring food safety and public health
- Design bioprocesses and assess the ethical, regulatory, and technological aspects of GMOs and environmental microbiology in food systems

Theory

Key Topics Covered	MCQs
Unit I - Introduction to Food Microbiology & Biotechnology • Scope and significance in food systems, nutrition, and health • Beneficial vs spoilage microorganisms in food	6
Unit II - Probiotics, Prebiotics, and Gut Microbiota • Concepts and definitions • Health benefits and mechanisms of action • Application in functional foods and nutraceuticals	10
Unit III - Microbial Genetics and Biotechnology • Microbial DNA, plasmids, and gene transfer • Genetic manipulation of microbes (recombinant DNA, CRISPR basics) • Applications in food biotechnology (strain improvement, enhanced nutrition)	12

Unit IV - Industrial Fermentation and Enzyme Technology • Principles of fermentation (batch, fed-batch, continuous) • Starter cultures and their applications (yogurt, cheese, bread, beverages) • Enzyme production and applications in food (amylases, proteases, lipases) • Bioconversion and nutrient enhancement	14
Unit V - Foodborne Pathogens and Food Safety • Pathogenic bacteria: Salmonella, E. coli, Listeria, Clostridium • Foodborne toxins (mycotoxins, bacterial toxins) • Detection and control strategies: culture-based, immunological, molecular methods • HACCP, GMP, and novel preservation techniques	12
Unit VI - Biotechnology Applications and Ethical Issues • Genetically Modified Organisms (GMOs) in food systems • Bio-preservation techniques (LAB, bacteriocins, natural antimicrobials) • Environmental microbiology and sustainability • Ethical, regulatory, and consumer concerns in GM foods	6
Total	**60**

Practical

Practical Content	OSPEs
Microscopy and staining of food microorganisms	0.5
Enumeration techniques: Total Plate Count, MPN	0.5
Isolation and identification of foodborne pathogens (E. coli, S. aureus)	0.5
Galacto-oligosaccharides quantification using thin layer chromatography and discussion	0.5
Bioconversion of lactose using beta-galactosidase to produce prebiotic galacto-oligosaccharides and discussion for factors affecting	0.5
Production of dairy products (milk, yogurt) with reduced lactose and improved GOS	0.5

Field/industrial visit: food processing or fermentation unit	
Total	**3**

Recommended Books

1. Cornelissen, Cynthia Nau, B. D. Fisher, and R. A. Harvey. "Lippincott's Illustrated Reviews: Microbiology. 3th." (2013): 111-5.
2. Jay J. M., M.J. Loessner and D.A.Golden. Modern Food Microbiology. 2006. Springer Science, Inc., USA.
3. Shetty K., Paliyath G., Pommeto, Levin, R. E. 2006. Food Biotechnology. 2nd edition. Taylor and Francis Group, LLC.
4. Stahl U., Donalies U. E. B., and Nevoigt E. 2008. Food Biotechnology. Advances in Biochemical Engineering /Biotechnology. Springer-Verlag Berlin Heiderberg.
5. Corry J. E., L.D. Roberts and F.A. Skinner. Isolation and Identification of Food Poisoning Organisms. 1992. Academic Press Inc., London.
6. Frazer W. C. Food Microbiology. 1998. McGraw Hill Book Co., New York.

Meal Planning & Management 3 (2-1)

By the end of this course the student will be able to:

- Identify the principles of a balanced diet, food exchange lists, and dietary guidelines used in meal planning.
- Prepare meal plans considering individual needs, cultural preferences, economic status, and health conditions.
- Demonstrate practical skills in calculating nutrient content and food portions.
- Modify meal plans for special populations such as diabetics, hypertensives, renal, and weight management patients.
- Evaluate the adequacy, acceptability, and feasibility of planned diets through case studies.

Course Contents (Theory)

Key Topics Covered	MCQs
Unit I – Foundations of Meal Planning • Principles of balanced diet and healthy eating • Overview of DRIs, RDAs, and food-based dietary guidelines • Food exchange system: concepts, calculations, and applications • Socio-cultural, lifestyle, and economic determinants of meal planning	12
Unit II – Tools and Techniques in Meal Planning • Steps in planning meals for individuals and families • Portion size estimation and serving standards • Use of food composition tables and software for nutrient analysis • Factors influencing food acceptance: sensory, cultural, and psychosocial	12
Unit III – Meal Planning Across the Life Cycle • Infants, children, adolescents, adults, elderly • Nutritional adjustments for growth, development, and aging • Family meal planning and budgeting	12
Unit IV – Specialized Meal Planning for Health Conditions • Obesity and Weight Management: energy-restricted diets, balanced macronutrient distribution • Polycystic Ovary Syndrome (PCOS): insulin sensitivity, low-GI meal planning, lifestyle diet management • Metabolic Syndrome: calorie moderation, anti-inflammatory dietary patterns	16

• Anemia and Micronutrient Deficiencies: iron-rich diets, enhancers/inhibitors of absorption, fortified food use • Renal Diseases: protein, phosphorus, sodium, potassium restrictions • Other lifestyle-related concerns: disordered eating, food intolerances, gluten-free diets	
Unit V – Evaluation of Diet Plans • Nutritional adequacy (macro- and micronutrients) • Cost-effectiveness and feasibility • Acceptability and cultural adaptability • Case study analysis and critical review	8
Total	**60**

Practical

Practical Content	OSPEs
Orientation to food exchange lists: hands-on calculation of exchanges and nutrient contributions	0.5
Meal plan development exercises for: • Healthy adult (balanced diet) • Children/adolescents (growth needs) • Elderly (reduced energy, higher micronutrient focus)	0.5
Specialized diets: • Obesity & weight reduction diets • PCOS meal plans (low-GI, insulin sensitivity–focused) • Metabolic syndrome plans (anti-inflammatory, Mediterranean approach) • Anemia-focused diets (iron-rich, vitamin C inclusion, phytate reduction strategies) • Renal patient plans (restricted protein, sodium, and potassium)	0.5
Case studies: development, presentation, and justification of individualized diet plans	0.5
Diet evaluation exercises: comparing planned meals against DRIs and RDAs	1
Total	**3**

Recommended Books

1. Whitney, E., & Rolfes, S. R. (2024). *Understanding Nutrition* (17th ed.). Cengage Learning.
2. Gibson, R. S. (2020). *Principles of Nutritional Assessment* (3rd ed.). Oxford University Press.
3. Mahan, L. K., Escott-Stump, S., & Raymond, J. (2022). Krause's Food & the Nutrition Care Process (16th ed.). Elsevier.
4. Academy of Nutrition and Dietetics. (2023). *Nutrition Care Manual (NCM).* Online Resource.
5. FAO/WHO. (2020). *Food-Based Dietary Guidelines: A Framework for Healthy Diets.* Open Access.
6. American Dietetic Association (ADA). (2022). *Evidence-Based Nutrition Practice Guidelines.*
7. Monteiro, C. A., et al. (2019). "Ultra-processed foods: what they are and how to identify them." *Public Health Nutrition*, 22(5), 936–941.
8. World Health Organization (2021). *Healthy Diet Factsheet (No. 394).*
9. Harvard T.H. Chan School of Public Health (2023). *The Nutrition Source – Healthy Eating Plate & Dietary Guidelines*

Nutrition Through Lifecycle 3 (3-0)

By the end of this course the student will be able to:

- Describe the changing nutritional needs throughout different stages of life, from conception to old age.
- Explain the physiological and metabolic changes affecting nutrient requirements during pregnancy, lactation, infancy, childhood, adolescence, adulthood, and aging.
- Analyze the impact of malnutrition during critical periods of growth and development.
- Recommend appropriate dietary interventions tailored to each life stage.
- Evaluate national and international programs that support nutrition across the life cycle.

Course Contents (Theory)

Key Topics Covered	MCQs
Unit I – Introduction to Life Cycle Nutrition • Concept and significance of life cycle nutrition. • Ethical, social, and cultural considerations in nutrition care. • Long-term health impacts of nutrition at critical life stages.	10
Unit II – Preconception and Maternal Nutrition • Nutritional factors affecting fertility and reproductive health. • Influence of obesity, PCOS, diabetes, and contraceptives on nutrition. • Antenatal nutrition guidelines and their role in pregnancy outcomes.	10
Unit III – Nutrition During Pregnancy and Lactation • Nutrient requirements and physiological changes in pregnancy. • Maternal nutrition and fetal development: growth, birth weight, and outcomes. • Common pregnancy-related conditions and dietary management. • Human milk composition, benefits, and factors influencing lactation. • Breastfeeding challenges, contraindications, and maternal diet.	15
Unit IV – Infant and Early Childhood Nutrition • Concept of First 1000 days of Life. • Nutrient needs in infancy (0–12 months). • Breastfeeding, formula feeding, complementary feeding, and skill development.	10

• Gut microbiome establishment and its health implications. • Toddler & preschooler nutrition (1–5 years): growth patterns, feeding behaviors, food intolerances, and allergies.	
Unit V – Nutrition in School-Aged Children and Adolescents • Nutritional needs during school age (6–12 years): growth, cognition, physical activity. • Prevention of obesity, eating disorders, and behavioral challenges. • Adolescent nutrition: puberty, rapid growth, dietary risks, body image, and disordered eating. • Strategies to promote healthy habits and self-esteem.	15
Unit VI – Nutrition in Adulthood • Nutritional needs for adults: maintaining physical and mental health. • Nutrition and lifestyle balance in work and family life. • Preventing chronic diseases (CVD, diabetes, osteoporosis). • Diet and metabolic health: weight management strategies.	10
Unit VII – Nutrition in Aging and Later Life • Physiological changes in digestion, metabolism, and absorption. • Nutritional concerns: sarcopenia, bone health, cognitive decline, frailty. • Dietary strategies for healthy aging, independence, and quality of life.	10
Unit VIII – Programs and Policies Across the Life Cycle • National and international programs supporting nutrition across life stages. • Global frameworks: WHO, UNICEF, SDGs related to maternal and child health. • Pakistan's national programs and strategies for maternal, child, and elderly nutrition. • Evaluating program effectiveness: successes, gaps, and challenges.	10
Total	**90**

Recommended Books

1. Brown, J.E. 2014. Nutrition through the Life Cycle, 5th ed. Cengage Learning, Belmont, CA, USA.

2. Rolfes, S.R., K. Pinna and E. Whitney. 2015. Understanding Normal and Clinical Nutrition, 10th ed. Thomson and Wadsworth Publishers, USA.

3. Shetty, P. 2002. Nutrition Through the Life Cycle. Leatherhead International Ltd. And Royal Society of Chemistry, Cambridge, U.K.

4. Worthington-Roberts, B.S. and S.R. Williams. 2000. Nutrition Throughout the Life Cycle. The McGraw-Hill Education, Maidenhead, Berkshire, U.K.

5. Nutrition through the Life Cycle by Judith E. Brown 6th edition

6. Krause's Food and Nutrition and Diet Therapy

7. Understanding Nutrition by Ellie Whitney and Sharon Rady Rolfes

8. Recent research according to the topic.

Clinical Biochemistry 3(2-1)

By the end of this course, students will be able to:

1. Explain the biochemical basis of digestion, absorption, and metabolism of nutrients.
2. Interpret key biochemical markers for nutritional assessment.
3. Analyze blood, urine, and other body fluids for nutritional and metabolic imbalances.
4. Demonstrate basic biochemical laboratory techniques.
5. Evaluate biochemical changes in common metabolic disorders.

Theory

Key Topics Covered	MCQs
Unit 1: Introduction to Clinical Biochemistry • Definition, scope, and significance in nutrition and health • Role of the clinical biochemistry laboratory • Specimen collection, preservation, and quality control • Reference values and interpretation of biochemical data	6
Unit 2: Biochemical Basis of Digestion and Absorption • Digestion and absorption of carbohydrates, proteins, and fats • Role of enzymes and hormones in metabolism • Malabsorption syndromes and related biochemical tests	8
Unit 3: Energy Metabolism and Nutrient Utilization • Overview of carbohydrate, lipid, and protein metabolism • Energy balance and biochemical indicators of nutritional status • Disorders of energy metabolism (obesity, undernutrition, metabolic syndrome)	6
Unit 4: Biochemical Assessment in Nutrition • Blood glucose and glycosylated hemoglobin (HbA1c) • Serum proteins (albumin, prealbumin, transferrin) • Lipid profile (cholesterol, HDL, LDL, triglycerides) • Electrolytes (Na^+, K^+, Cl^-, bicarbonate) and acid-base balance • Micronutrient assessment (vitamins, iron, calcium, zinc)	12
Unit 5: Biochemical Markers of Organ Function • Liver function tests (LFTs): ALT, AST, ALP, bilirubin, albumin • Kidney function tests (RFTs): urea, creatinine, uric acid • Cardiac markers: CK-MB, troponins, LDH • Interpretation in nutritional and metabolic context	8
Unit 6: Metabolic Disorders and Biochemical Alterations • Diabetes mellitus: biochemical basis and laboratory findings • Renal disease and electrolyte imbalance • Liver dysfunction and jaundice types • Lipid metabolism disorders • Inborn errors of metabolism (phenylketonuria, galactosemia, etc.)	12

Unit 7: Clinical Nutrition and Biochemical Monitoring • Monitoring nutritional therapy through biochemical parameters • Biochemical indicators during parenteral and enteral nutrition • Nutritional biomarkers in special conditions (pregnancy, critical illness)	8
Total	**60**

Practical

Content	OSPEs
Unit I – Introduction to Clinical Biochemistry Laboratory Basic laboratory safety rules and precautions Specimen collection and handling (serum, plasma, urine) Identification of anticoagulants and collection tubes Units, normal ranges, and interpretation of basic biochemical reports	1
Unit II – Basic Biochemical Estimation Methods Estimation of blood glucose (glucose oxidase method): principle and interpretation Estimation of serum total protein (Biuret method) Estimation of serum albumin (Bromocresol green method) Identification of reagents, standards, and calculation of results	1
Unit III – Organ Function Tests and Urine Analysis Estimation of urea and creatinine (colorimetric method) Estimation of serum cholesterol and triglycerides Estimation of liver enzymes (ALT, AST, ALP)	1
Urine analysis: physical, chemical, and microscopic examination Estimation of serum electrolytes (Na^+, K^+, Cl^-) and interpretation	
Total	**03**

Recommended Books

1. Rodwell, V. W., Bender, D. A., Botham, K. M., Kennelly, P. J., & Weil, P. A. (2018). *Harper's illustrated biochemistry* (31st ed.). McGraw-Hill Education.
2. Ferrier, D. R. (2017). *Lippincott illustrated reviews: Biochemistry* (7th ed.). Wolters Kluwer.
3. Chatterjea, M. N., & Shinde, R. (2012). *Textbook of medical biochemistry* (8th ed.). Jaypee Brothers Medical Publishers.
4. Satyanarayana, U., & Chakrapani, U. (2017). *Biochemistry* (5th ed.). Elsevier.
5. Gaw, A., Murphy, M. J., Srivastava, R., Cowan, R. A., O'Reilly, D. S. J., & Stewart, M. J. (2013). *Clinical biochemistry: An illustrated colour text* (5th ed.). Elsevier.

SEMESTER 5

Analytical Techniques in Food and Nutrition 3 (1-2)

By the end of this course the student will be able to:

- Describe the basic principles of instrument, theories and operations of key components of the instrument used for food component analysis.
- Explain modern extraction and food analyzing techniques
- Acquire knowledge about sampling and sampling procedure, with special reference to intended instruments
- Demonstrate the basic principles behind analytical techniques
- Learn different working principles, parts and applications of different instruments used in food analysis

Course Contents (Theory)

Contents	MCQs
1. Introduction to Food Analysis • Importance and scope of food analysis in nutrition, industry, and public health. • Classification of food constituents (major vs. minor). • Accuracy, precision, and sources of analytical errors.	**6**
2. Sampling and Sample Preparation • Principles of representative sampling for different food types. • Techniques for sample preparation and preservation (grinding, drying, homogenization). • Precautions to maintain sample integrity.	**6**

3. Proximate Composition Analysis • Overview of proximate components: moisture, ash, protein, fat, fiber, and carbohydrate. • Common methods: oven drying, Kjeldahl, Soxhlet, and muffle furnace techniques. • pH and titratable acidity—basic concepts and measurement	**6**
4. Instrumental Techniques in Food Analysis • Basic principles of spectroscopy (Beer–Lambert Law). • UV–Visible and Atomic Absorption Spectroscopy (AAS): working principles and applications. • Introduction to chromatography (paper, TLC, and HPLC): purpose and applications in food testing.	**6**
5. Sensory Evaluation and Statistical Overview • Sensory attributes: appearance, taste, aroma, and texture. • Types of sensory tests (difference and preference). • Basic introduction to statistical tools in food analysis (mean, SD, variance).	**6**
Total	**30**

Practical

List	OSPE
• Laboratory safety procedures and preparation of standard solutions.	**1**
• Sampling and sample preparation for food analysis.	
• Determination of physical properties: specific gravity and refractive index	**1**
• Measurement of pH and acidity.	
• Paper and thin layer chromatography for compound separation and toxin identification	**1**
• Determination of calorific value by bomb calorimeter	**1**
• Proximate analysis: moisture, ash, crude protein, crude fat, crude fiber, and NFE.	**1**
• Mineral determination using flame photometers and AAS.	**1**
Total	**06**

Recommended Books

1. AOAC. 2016. Official Methods of Analysis of AOAC International, 20th ed. Association of Official Analytical Chemists, Arlington, USA.

2. Awan, J.A. and S.U. Rehman. 2015. Food Analysis Manual. Unitech Communications, Faisalabad, Pakistan.

3. Cruz, R.M.S., I. Khmelinskii and M. Vieira. 2014. Methods in Food Analysis. CRC Press. Taylor & Francis Group, Boca Raton, F.L, USA.

4. Pomeranz, Y. and C.E. Meloan. 2000. Food Analysis: Theory and Practice, 3rd ed. Chapman & Hall, New York, USA.

5. Winton, A. and K.B. Winton. 2006. Techniques of Food Analysis. Agrobios Publishing Co., Jodhpur, India.

Fundamentals of Food Systems 3 (3-0)

By the end of this course the student will be able to:

- Define and explain the dimensions and determinants of food security.
- Gain insights into historical overview, components and significance of sustainable food systems.
- Evaluate impact of climate change, gender and youth mainstreaming on food, nutrition, and health
- Understand Pakistan Food System Dashboard (PFSD) and its utilization for data acquisition
- Analyze the interconnections between food production, distribution, consumption, and sustainability within local and global food systems.

Course Contents (Theory)

Contents	MCQs
1. Introduction to Food Systems and Food Security • Basic definitions: food system, food security, food sovereignty • Importance and scope in nutrition and public health • Global evolution of food systems: traditional to industrial • The role of food systems in achieving Sustainable Development Goals (SDGs) • Interdisciplinary nature: linking agriculture, economics, health, and environment	**6**
2. Dimensions and Determinants of Food and Nutrition Security • Four dimensions: Availability, Access, Utilization, Stability	**10**

• Determinants: economic, social, environmental, and policy factors • Indicators and measurement tools (GHI, FIES, HDDS, HFIAS) • Food security and human rights perspectives • Youth and gender mainstreaming in food and nutrition security • Case study: Pakistan's National Food Security Policy	
3. Components and Stakeholders of Food Systems • Components: production, processing, distribution, retail, consumption, waste management • Stakeholders: farmers, industries, governments, consumers, NGOs • Linkages among agriculture, nutrition, and health • Food system typologies: local, regional, and global • Drivers of change: social, economic, policy, and technological forces • Food value chains and governance	**6**
4. Sustainable Food Systems • Definition, principles, and significance • Environmental, economic, and social dimensions • Conventional vs. sustainable production systems • Sustainable food supply chains and diets • Circular economy approaches and waste minimization • Role of innovation and policy in sustainable transformation • Agroecology, organic farming, and climate-smart agriculture	**12**
5. Climate Change and Food Systems	**10**

• Basics of climate change and greenhouse gas emissions • Impacts on agriculture, food availability, and nutrition • Adaptation and mitigation strategies • Climate-smart agriculture and sustainable practices • Case studies: South Asia and Pakistan's vulnerabilities • Policy frameworks for resilience and adaptation	
6. Global Food Issues and Malnutrition Challenges • Overview of global food situations and insecurity trends • Forms of malnutrition: undernutrition, micronutrient deficiencies, obesity • Protein-energy malnutrition and hidden hunger • Post-harvest losses, global trade, and food price fluctuations • Global and regional inequality in food access • Case study: The triple burden of malnutrition in developing countries	**14**
7. Economic and Behavioral Influences on Food Access • Economic determinants of food access: income, purchasing power, prices • Global food markets and consumption trends • Consumer behavior and irrational food choices • Urbanization and changing food environments • Food advertising, ultra-processed foods, and sustainability concerns • Policy approaches to promote equitable food access	**10**
8. Functional, Organic, Kosher, and Halal Foods in Global Food Systems	**10**

• Definitions and standards: functional, organic, kosher, and halal foods • Global markets and consumer preferences • Ethical and sustainability perspectives • Cultural and religious significance of halal and kosher systems • Organic certification and eco-labeling systems • Implications for health, environment, and trade	
9. Food System Dashboards and Emerging Challenges • Introduction to Food System Dashboards (Global and PFSD) • Data components, indicators, and visualization tools • Sources of data: FAO, WHO, WFP, World Bank, PFSD • Practical: navigating PFSD, applying filters, and interpreting indicators Using dashboards for evidence-based decision-making Emerging global challenges: food insecurity, digital transformation, conflict, and sustainability transitions	**12**
Total	**90**

Suggested Readings

1. Marsden, T. and Morley, A. (eds) (2014) Sustainable Food Systems: Building a New Paradigm. London and New York: Routledge
2. Galanakis, C.M. (Ed.). (2018). Sustainable Food Systems from Agriculture to Industry. Academic Press.
3. Galanakis, C. M. (Ed.). (2020). Food Security and Nutrition. Academic Press,
4. Marsden, T., & Morley, A. (2014). Sustainable Food systems. Building a new paradigm. Routledge.

5. HLPE (2020). Food Security and Nutrition: Building a Global Narrative Towards 2030.
6. FAO (2018). The Future of Food and Agriculture – Alternative Pathways to 2050.
7. FAO, IFAD, UNICEF, WFP, WHO (2023). The State of Food Security and Nutrition in the World (SOFI) Report.
8. Pakistan Bureau of Statistics – Household Integrated Economic Survey (HIES).
9. FAO (2018). Sustainable Food Systems: Concept and Framework.
10. FAO (2020). The Impact of Climate Change on Food Security and Nutrition.
11. CGIAR (2021). Gender, Climate Change, and Food Systems Transformation.
12. Pakistan Food Systems Dashboard (https://pakistan.foodsystemsdashboard.org)
13. HLPE (2017). Nutrition and Food Systems.
14. Fanzo et al. (2021). The Food Systems Dashboard: Integrating Data for Better Decision-Making.

Dietetics – I 3 (2-1)

By the end of this course the student will be able to:

- Explain the history, scope, and ethical responsibilities of dietitians in clinical practice and preventive nutrition.
- Describe the causes and pathophysiology of nutrition-related diseases affecting the gastrointestinal, endocrine, cardiovascular, hepatopancreatic, renal, and musculoskeletal systems.
- Interpret laboratory, biochemical, and clinical diagnostic findings relevant to these diseases, including lipid profiles, liver/pancreatic enzymes, glucose tests, and hematology markers.
- Apply the Nutrition Care Process (NCP) to systematically assess and document nutrition-related problems using anthropometric, clinical, and laboratory data.

Theory (Contents)

Contents	MCQs
1. Foundations of Dietetics • History, scope, and significance of dietetics • Role and ethical responsibilities of dietitians in clinical practice • Balanced diets, food composition tables, and dietary guidelines (DRIs, RDAs, food plate/pyramid models) • Exchange system and principles of therapeutic menu planning	**2**
2. Introduction to Pathophysiology & Diagnosis • Overview of the Nutrition Care Process (NCP) • Concepts of etiology, pathophysiology, and clinical diagnosis • Integration of nutrition with disease mechanisms	**4**

3. Adverse Reactions to Food • Causes & etiology: immune-mediated (allergy) vs non-immune (intolerance) • Pathophysiology: antigen-antibody reactions, histamine response, gut barrier dysfunction • Diagnostic tools: skin prick test, specific IgE/IgG, elimination and challenge tests	**4**
4. Cardiovascular Disease • Causes & risk factors: atherosclerosis, hypertension, heart failure, hyperlipidemia, genetic predisposition • Pathophysiology: endothelial dysfunction, plaque formation, myocardial ischemia, ventricular remodeling • Diagnosis: blood pressure measurement, lipid profile, ECG, echocardiography, stress testing	**8**
5. Hepatobiliary & Pancreatic Disorders • Etiology: viral hepatitis, NAFLD, alcoholic liver disease, gallstones, pancreatitis • Pathophysiology: hepatocellular injury, cholestasis, bile flow obstruction, exocrine pancreatic insufficiency	**6**

• Diagnostic evaluation: liver function tests (AST, ALT, ALP, bilirubin), pancreatic enzymes (lipase, amylase), imaging (ultrasound, CT, MRI)	
6. Diabetes Mellitus & Nondiabetic Hypoglycemia • Etiology: Type 1, Type 2, MODY, reactive hypoglycemia • Pathophysiology: insulin deficiency/resistance, β-cell dysfunction, counter-regulatory hormone imbalance • Diagnosis: fasting glucose, OGTT, HbA1c, blood glucose monitoring during hypoglycemia challenges	**10**
7. Upper Gastrointestinal Tract Disorders • Etiology: GERD, gastritis, peptic ulcer disease, post-surgical conditions • Pathophysiology: acid-peptic damage, mucosal inflammation, impaired motility • Diagnostic tests: endoscopy, H. pylori testing, barium studies, pH monitoring	**10**
8. Nutrition in Weight Management • Causes of overweight and obesity: genetic, behavioral, metabolic factors • Pathophysiology: energy imbalance, adipose tissue function, hormonal regulation • Assessment: BMI, waist–hip ratio, body composition	**8**
9. Nutrition and Bone Health • Etiology of bone disorders: osteoporosis, osteopenia, rickets, osteomalacia	**8**

• Pathophysiology: bone remodeling, calcium/vitamin D metabolism, hormonal regulation • Diagnostic methods: bone mineral density, serum calcium, vitamin D, alkaline phosphatase	
	60

Practical

List	OSCEs/OSPEs
• Orientation to nutrient analysis software and exchange system use	**0.5**
• Application of menu planning tools and exchange lists for disease-specific diets	
• Nutrient adequacy analysis of clinical and preventive diets	
• Use of Nutrition Care Process Forms	**0.5**
• Adverse Reactions to Food: Plan elimination diets, interpret IgE/IgG reports; food challenge simulations will be practiced.	**0.5**
• Cardiovascular Disease: interpret lipid profiles and blood pressure	**0.5**
• Hepatobiliary & Pancreatic Disorders: review liver and pancreatic tests, assess signs and symptoms	**0.5**
• Diabetes Mellitus & Nondiabetic Hypoglycemia: interpret glucose, HbA1c, and OGTT results; learn carb counting, and types of insulin	
• Upper Gastrointestinal Tract Disorders: learn food texture-based diets	**0.5**

• Perform BMI, waist, and body composition measurements; analyze metabolic markers for overweight/obesity risk	
	03

Recommended Books

1. Mahan, L. K., Escott-Stump, S., & Raymond, J. (2022). Krause's Food & the Nutrition Care Process (16th ed.). Elsevier.
2. Nix S. 2009. Williams' Basic Nutrition & Diet Therapy, 13th edition, Mosby, . ISBN: 9780323051996
3. Nelms M., Sucher K. 2010. Nutrition Therapy and Pathophysiology, Cengage Learning.
4. Whitney E. N. and Rolfes S. R. 2008. Understanding Nutrition, Thomson Higher Education.
5. Wardlaw G. M. and Kessel M. W. 2002. Perspectives in nutrition, McGraw-Hill.
6. King K. and Helm K. K. 2007. Nutrition Therapy: Advanced Counseling Skills, Lippincott Williams & Wilkins.

Medical Nutrition Therapy I 3(2-1)

By the end of this course the student will be able to:

- Apply dietary guidelines and evidence-based protocols in planning therapeutic diets.
- Evaluate case studies using nutrition care process (NCP) and medical nutrition therapy (MNT) models.
- Interpret clinical and biochemical data to support MNT decisions.
- Demonstrate the ability to modify regular diets into therapeutic diets for common conditions.
- Apply dietary guidelines and evidence-based protocols in planning therapeutic diets.

Theory Contents

Contents	MCQs
1. Foundations of Medical Nutrition Therapy • Introduction to MNT and the Nutrition Care Process (NCP) • Stages of NCP: Nutrition assessment, diagnosis, intervention, monitoring & evaluation • Scope and philosophy of MNT vs. general dietetics • Nutrition Care Process (NCP): framework and clinical application • Integration of pathophysiology with nutrition interventions	**4**
• Evidence-based clinical guidelines in MNT (e.g., ESPEN, ASPEN, ADA)	

2. Clinical Data in Nutrition Therapy • Medical history and chart review in clinical settings • Interpretation of biochemical and metabolic markers (liver function tests, renal profile, electrolytes, lipid profile) • Linking clinical data to nutrition diagnoses and interventions	**4**
3. Introduction to MNT & Lab Interpretation • Role of nutrition in therapy • Review of key laboratory tests and reference ranges • Monitoring and evaluating therapy outcomes	**4**
4. Adverse Reactions to Food • Lab/clinical findings: elevated IgE, eosinophilia, elimination/challenge test results • MNT strategies: elimination diets, substitution to maintain nutrient adequacy, allergen avoidance • Monitoring dietary compliance and symptom improvement	**4**
5. Cardiovascular Disease • Lab findings: lipid panel (LDL, HDL, triglycerides), CRP, NT-proBNP in heart failure • MNT: Therapeutic Lifestyle Changes (TLC), saturated fat <7%, trans fat avoidance, plant sterols, dietary fiber 25–30g/day, sodium restriction • Patient education and long-term lifestyle modification	**8**

6. Hepatobiliary & Pancreatic Disorders
 	
• Lab findings: AST, ALT, ALP, bilirubin, albumin, lipase, amylase
• MNT:
  ○ Liver disease: protein 1.0–1.5 g/kg, sodium restriction for ascites, energy balance, alcohol avoidance
  ○ Gallbladder/pancreas: low-fat diet, small frequent meals, enzyme replacement if needed
• Monitoring for malnutrition, steatorrhea, or nutrient deficiencies
	8

7. Diabetes Mellitus & Nondiabetic Hypoglycemia • Lab findings: fasting glucose, HbA1c, OGTT, blood glucose <60 mg/dL for hypoglycemia • MNT: carbohydrate-controlled meal planning, carbohydrate counting, small frequent meals for hypoglycemia, fiber and protein to stabilize blood glucose • Education on glucose monitoring and meal timing	**8**

8. Upper Gastrointestinal Tract Disorders
 	
• Lab/clinical findings: endoscopic lesions, H. pylori, anemia, nutrient deficiencies
• MNT:
  ○ GERD: avoid late meals, reduce fat, elevate head of bed
  ○ Peptic ulcer: small, frequent meals, avoid irritants (alcohol, caffeine, spicy foods)
  ○ Post-surgical: nutrient-dense liquids then solids, supplementation of B12, iron, calcium as needed
	8

9. Nutrition in Weight Management • Lab/clinical findings: body composition, BMI, waist circumference, metabolic markers • MNT: calorie-controlled diets, portion management, macronutrient balance, behavioral modifications • Monitoring weight, biochemical markers, and comorbidities	**6**
10. Nutrition and Bone Health • Lab/clinical findings: bone mineral density, serum calcium, vitamin D, alkaline phosphatase • MNT: adequate calcium, vitamin D, protein, magnesium, phosphorus intake • Lifestyle interventions: physical activity, fall prevention, supplementation as needed • Monitoring bone health and biochemical markers	**6**
	60

Practical Contents

Contents	OSPEs
• Plan elimination diets and track hypothetical symptoms. They interpret IgE, eosinophilia, and challenge test results.	**0.5**
• Students interpret lipid panels and CRP results. Lifestyle modification counseling is practiced with mock patients.	
• Diet plans for liver, gallbladder, and pancreatic disorders are created. Protein, sodium, and fat calculations are practiced.	**0.5**

• Carbohydrate counting and meal timing exercises are performed. Plans for hypoglycemia prevention are practiced.	**0.5**
• Students review endoscopy and H. pylori results. Diet planning for GERD, ulcers, and post-surgery cases is performed.	**0.5**
• Texture, frequency, and supplementation adjustments	
• Create calorie-controlled meal plans for overweight/obese cases.	**0.5**
• Develop diets rich in calcium, vitamin D, and protein for bone health	**0.5**
	03

Recommended Readings

1. Mahan, L. K., Raymond, J. L. (2022). *Krause's Food & the Nutrition Care Process* (16th Ed.).
2. Escott-Stump, S. (2021). *Nutrition and Diagnosis-Related Care* (9th Ed.).
3. Nelms, M., Sucher, K. P., & Lacey, K. (2022). *Nutrition Therapy and Pathophysiology* (4th Ed.).
4. Gropper, S. S., & Smith, J. L. (2021). *Advanced Nutrition and Human Metabolism* (8th Ed.).
5. ESPEN Guidelines (European Society for Clinical Nutrition and Metabolism)
6. ASPEN (American Society for Parenteral and Enteral Nutrition) Clinical Guidelines

Semester 6

Community Nutrition & Public Health Nutrition 3 (3-0)

By the end of this course the student will be able to:

- Describe the scope and objectives of public health nutrition in Pakistan.
- Interpret national and international nutritional surveillance data.
- Develop community-based nutrition interventions targeting vulnerable populations.
- Assess the effectiveness of nutrition programs in addressing malnutrition.
- Formulate policies to overcome nutrition-related challenges in different communities.

Course Contents (Theory)

Contents	MCQs
1. Foundations of Public Health & Community Nutrition • Scope, definitions, and determinants of public health and community nutrition. • Disease burden and nutrition-related health outcomes in Pakistan. • Role of nutrition in health promotion and disease prevention. • Global and national perspectives on community nutrition.	**8**
2. Nutrition Surveillance and Data Systems • National nutrition surveys (NNS, DHS, MICS, SMART). • WHO Anthro/Anthro Plus and global nutrition monitoring tools.	**12**

• Nutritional indicators: anthropometry, dietary intake, biochemical markers. • Pakistan Food System Dashboard (PFSD): structure and use. • Interpretation of nutrition survey results and datasets.	
3. Community Nutrition Problems and Epidemiology • Identification and prioritization of community-level nutritional problems. • Epidemiological approaches: descriptive, analytical, experimental studies. • Determinants of malnutrition: socio-economic, cultural, gender, climate change. • Nutrition in emergencies: food security, displacement, vulnerable groups	**12**
4. Designing Community-Based Nutrition Interventions • Planning cycle: assessment, prioritization, goal setting, implementation. • Life-cycle approach: maternal, infant, child, adolescent, elderly nutrition. • Nutrition-specific vs. nutrition-sensitive interventions. • Multi-sectoral collaboration: food, agriculture, health, education. • Case studies of interventions (e.g., CMAM, supplementation, fortification).	**16**
5. Monitoring and Evaluation of Nutrition Programs	**14**

• Frameworks and tools for monitoring & evaluation. • Lot Quality Assurance Sampling (LQAS). • SMART methodology for surveys and interventions. • Use of DHIS-2 and NLiS for data tracking. • Measuring effectiveness and sustainability of interventions	
6. Nutrition Policies and Governance • Overview of Pakistan's national food and nutrition policies. • Global frameworks and standards (WHO, FAO, SDGs, SUN movement). • Role of regulatory bodies: PFA, PSQCA, DRAP, PHDA. • Policy development cycle: needs assessment, advocacy, formulation, implementation. • Integration of climate change, gender, and food systems into policy.	**16**
7. Ethics and Professional Practice in Public Health Nutrition • Roles and competencies of public health nutritionists. • Ethical responsibilities in community and program work. • Communication strategies: engaging policymakers, communities, and media. • Preparation of PC-1s and budget proposals for nutrition programs.	**10**
	90

Recommended Books

1. Edelstein, S. 2011. Nutrition in Public Health: A Handbook for Developing Programs and Services, 3rd ed. Jones & Bartlett Learning, Sudbury, M.A, USA.

2. IFPRI. 2016. Taking Actions: Progress and Challenges in Implementing Nutrition Policies and Programs. International Food Policy Research Institute, Washington, DC, USA.

3. Nnakwe, N.E. 2009. Community Nutrition: Planning Health Promotion and Disease Prevention. Jones and Bartlett Learning International, London, UK.

4. Semba, R.D. and M.W. Bloem. 2008. Nutrition and Health in Developing Countries, 2nd ed. Humana Press, New York, USA.

5. Spark, A. 2007. Nutrition in Public Health: Principles, Policies and Practice. CRC Press, Taylor & Francis Group, Boca Raton, FL, USA.

6. Sari E. 2006. Nutrition in Public Health, A Handbook for Developing Programs and Services. 3rd edition. Jones and Bartlett Learning

7. Walter W. 1998. Nutritional Epidemiology. Oxford University Press, USA; 2nd edition.

8. Richard D. S., Martin W. B. 2001. Nutrition and Health in Developing Countries (Nutrition and Health) Humana Press.

9. Edelstein, S. 2011. Nutrition in Public Health: A Handbook for Developing Programs and Services, 3rd ed. Jones & Bartlett Learning, Sudbury, M.A, USA.

10. Gibney, M.J., B.M. Margette and J.M. Kearney. 2004. Public Health Nutrition. Blackwell Science Ltd. Oxford, UK.

11. Lawrence, M. and T. Worsley. 2007. Public Health Nutrition: From Principles to Practice. Allen & Unwin Book Publishers, Australia.

12. McKenzie, J.F. and R.R. Pinger. 2015. An Introduction to Community & Public Health. 8th ed. Jones & Bartlett Learning, LLC Burlington, MA, USA.

Research Methods in Food and Nutrition 2 (1-1)

By the end of this course the student will be able to:

- Differentiate among various types of research (qualitative, quantitative, and mixed methods) relevant to food and nutritional sciences, and formulate clear, testable research questions and hypotheses.
- Critically evaluate scientific literature to identify research gaps, methodological strengths and weaknesses, and justify the selection of appropriate study designs and data collection methods
- Design and implement a research study using suitable tools such as surveys, interviews, focus groups, or laboratory experiments within the context of food and nutrition.
- Analyze quantitative and qualitative data using statistical software (e.g., SPSS,R, or Excel), and interpret findings in relation to research objectives.
- Communicate research findings effectively through structured written reports and oral presentations tailored to academic and professional audiences.

Course Contents (Theory)

Contents	MCQs
1. Introduction to Research in Food & Nutrition • Scope and importance of research in nutrition and food sciences • Types of research: qualitative, quantitative, and mixed methods • Framing research problems, objectives, questions, and hypotheses	**6**
2. Research Design and Methods	**6**

• Common designs in nutrition research: cross-sectional, case-control, cohort, experimental • Sampling basics: population, sample size, random vs. non-random methods • Data collection tools: questionnaires, dietary surveys, interviews, focus groups	
3. Data Handling and Analysis • Basics of data entry and coding (Excel/SPSS) • Descriptive statistics (mean, median, SD, frequency) • Introductory inferential statistics (t-test, ANOVA) • Presentation of results in tables, charts, and graphs	**6**
4. Literature Review & Research Ethics • How to search and review scientific literature (Google Scholar, PubMed) • Avoiding plagiarism; citation and referencing (APA/Harvard) • Research ethics in food and nutrition: informed consent, data privacy, authorship ethics	**6**
5. Scientific Writing & Communication • Structure of a research proposal/synopsis • Writing abstracts, reports, and short research papers • Effective oral/poster presentation skills	**6**
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Practical

Contents	OSPEs
1. Literature Review Practice o Conduct a small literature search on a nutrition-related topic. o Use reference managers (Zotero / Mendeley).	**0.5**
2. Formulating a Research Question o Group activity: develop research questions and hypotheses on food/nutrition issues.	**0.5**
3. Survey/Tool Development o Design a short questionnaire for dietary assessment or food behavior study. o Conduct peer testing of the tool in class.	**0.5**
4. Sampling and Data Collection o Simulated exercise in selecting a sample and collecting small datasets.	
5. Data Entry and Analysis o Enter class-generated data in Excel/SPSS. o Perform descriptive statistics and generate graphs/tables.	**0.5**
6. Mini Research Proposal o Develop and present a brief research synopsis (title, objectives, methods).	**0.5**
7. Scientific Communication o Present results from class activity in oral or poster format.	

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Recommended Books

1. Awan, J.A. 2015. Scientific Presentations. Unitech Communications, Faisalabad, Pakistan.

2. Lovegrove, J.A., L. Hodson, S. Sharma and S.A. Lanham-New. 2015. Nutrition Research Methodologies. Wiley-Blackwell, John Wiley & Sons Ltd., Chichester, West Sussex, UK.

3. Lowe, M. 2007. Beginning Research: A Guide for Foundation Degree Students, 1st ed. Routedge Publications, New York, USA.

4. Starks, T.P. 2006. Trends in Nutrition Research. Nova Science Publishers, Inc., New York, USA.

5. Walliman, N. 2005. Your Research Project, A Step by Step Guide for The First-time Researcher, 2nd ed. Sage Publications, Thousand Oaks, CA, USA.

Dietetics – II 3 (2-1)

By the end of this course the student will be able to:

- Explain the etiology and pathophysiology of diseases affecting the gastrointestinal, endocrine, renal, hematologic, pulmonary, infectious, and immune systems.
- Interpret diagnostic findings including stool analysis, hormone panels, renal function tests, CBC, spirometry, ABG, cultures, and viral load in relation to disease mechanisms.
- Apply case-based analysis to monitor hydration, weight, metabolic parameters, and lab trends in simulated or academic scenarios.
- Evaluate immune, hematologic, and organ-specific markers to assess progression and severity of selected diseases.
- Compile, document, and present laboratory and clinical data to demonstrate understanding of disease assessment and monitoring.

Contents

Contents	MCQs
1. Lower Gastrointestinal Tract Disorders • Etiology: IBD (Crohn's, Ulcerative Colitis), IBS, diarrhea, constipation • Pathophysiology: inflammation, malabsorption, altered motility • Diagnosis: colonoscopy, stool tests, imaging, symptom assessment	**14**
2. Thyroid, Adrenal, and Other Endocrine Disorders • Etiology: hypothyroidism, hyperthyroidism, Addison's, Cushing's, adrenal insufficiency	**10**

• Pathophysiology: hormone dysregulation, metabolic consequences • Diagnosis: thyroid/adrenal hormone panels, imaging, clinical signs	
3. Renal Disorders • Etiology: CKD, AKI, nephrotic syndrome, renal stones • Pathophysiology: reduced GFR, electrolyte imbalance, fluid retention • Diagnosis: serum creatinine, BUN, eGFR, urinalysis, imaging	**12**
4. Anemia • Etiology: iron deficiency, B12/folate deficiency, hemolytic anemia • Pathophysiology: impaired hemoglobin synthesis, reduced RBC lifespan • Diagnosis: CBC, serum ferritin, transferrin, B12/folate levels	**6**
5. Pulmonary Diseases • Etiology: COPD, asthma, cystic fibrosis • Pathophysiology: airway inflammation, reduced oxygen exchange • Diagnosis: spirometry, ABG, oxygen saturation, imaging	**6**
6. Infectious Diseases • Etiology: bacterial, viral, parasitic infections • Pathophysiology: immune response, nutrient depletion, metabolic stress	**6**

• Diagnosis: microbiology tests, cultures, clinical evaluation	
7. HIV and AIDS • Etiology: HIV infection, immunodeficiency progression • Pathophysiology: CD4 depletion, opportunistic infections, malnutrition • Diagnosis: HIV testing, CD4 counts, viral load	**6**
	60

Practical

List	OSPE
• Collect and analyze stool reports, imaging results, and inflammatory markers. Monitor hydration, weight, and symptom progression. (Lower GI)	**0.5**
• Interpret hormone panels (TSH, T3/T4, cortisol, ACTH) and imaging data. Track metabolic parameters, weight changes, and lab trends.	**0.5**
• Review BUN, creatinine, eGFR, electrolytes, urinalysis, and imaging. Monitor fluid balance, edema, and laboratory changes over time.	**0.5**
• Analyze CBC, ferritin, transferrin, B12, and folate results. Track hemoglobin, hematocrit, and RBC indices in case-based exercises.	**0.5**
• Assess spirometry, ABG, oxygen saturation, and inflammatory markers. Monitor weight, muscle mass, and respiratory function in simulated patients.	**0.5**

• Interpret WBC, CRP, cultures, and nutrient-related markers. Track immune response, recovery progress, and clinical status.	**0.5**
• Review CD4 counts, viral load, and micronutrient status. Monitor immune function, weight, and symptom progression in case studies.	
	03

Recommended Books

1. Mahan, L. K., Escott-Stump, S., & Raymond, J. (2022). Krause's Food & the Nutrition Care Process (16th ed.). Elsevier.
2. Nix S. 2009. Williams' Basic Nutrition & Diet Therapy, 13th edition, Mosby, . ISBN: 9780323051996
3. Nelms M., Sucher K. 2010. Nutrition Therapy and Pathophysiology, Cengage Learning.
4. Whitney E. N. and Rolfes S. R. 2008. Understanding Nutrition, Thomson Higher Education.
5. Wardlaw G. M. and Kessel M. W. 2002. Perspectives in nutrition, McGraw-Hill.
6. King K. and Helm K. K. 2007. Nutrition Therapy: Advanced Counseling Skills, Lippincott Williams & Wilkins.

Medical Nutrition Therapy II 3(2-1)

By the end of this course, the student will be able to:
• Describe the nutritional implications of advanced clinical conditions including anemia, pulmonary, infectious diseases, and HIV/AIDS.
• Interpret clinical and biochemical data for nutritional assessment and monitoring.
• Develop individualized Medical Nutrition Therapy (MNT) plans for disease-specific conditions.
• Plan enteral and parenteral nutrition support according to patient needs.
• Apply critical thinking in managing complex clinical cases.
• Use healthcare technologies for patient assessment and documentation.
• Collaborate with healthcare teams for comprehensive nutrition care.
• Evaluate nutrition interventions through patient outcomes and follow-up.

Theory Contents

Content	MCQs
1. Lower Gastrointestinal Tract Disorders • Lab findings: anemia, electrolyte disturbances, stool analysis, CRP • MNT: low-residue diets, high-fiber diets, probiotics, hydration, nutrient supplementation • Monitoring: symptom relief, weight, hydration status	**12**
2. Thyroid, Adrenal, and Other Endocrine Disorders • Lab findings: TSH, T3/T4, cortisol, ACTH, electrolytes • MNT: iodine/selenium balance, caloric adjustments, protein management, sodium/potassium regulation • Monitoring: thyroid/adrenal function, weight changes, metabolic parameters	**12**

3. Renal Disorders • Lab findings: BUN, creatinine, electrolytes, urinalysis, proteinuria • MNT: protein modification, sodium/potassium/phosphorus restriction, fluid management, energy optimization • Monitoring: labs, weight, edema, electrolyte balance	**12**
4. Anemia • Lab findings: CBC, ferritin, transferrin, B12/folate levels • MNT: iron, B12, folate supplementation; diet rich in heme/non-heme iron; vitamin C for absorption • Monitoring: hemoglobin, hematocrit, RBC indices	**6**
5. Pulmonary Diseases • Lab findings: ABG, oxygen saturation, inflammatory markers • MNT: energy-dense diets, adequate protein, antioxidant-rich foods, small frequent meals • Monitoring: weight, muscle mass, respiratory function	**6**
6. Infectious Diseases • Lab findings: WBC, CRP, cultures, nutrient markers • MNT: high-energy, high-protein diets, micronutrient supplementation, hydration • Monitoring: recovery, weight, immune markers	**6**

7. HIV and AIDS • Lab findings: CD4 counts, viral load, micronutrient deficiencies • MNT: energy and protein adjustments, micronutrient supplementation, management of GI symptoms and opportunistic infections • Monitoring: weight, CD4 count, viral load, symptom progression	**6**
	60

Practical Contents

List	OSPEs
• Assess stool, hydration, weight, and abdominal symptoms. Plan low-residue or high-fiber diets and monitor symptom improvement.	**0.5**
• Review hormone panels (TSH, T3/T4, cortisol) and design diets for iodine, selenium, protein, and electrolytes	**0.5**
• Interpret BUN, creatinine, electrolytes, and urinalysis. Plan protein-, sodium-, potassium-, phosphorus-controlled diets and monitor fluid balance.	**0.5**
• Check CBC, ferritin, B12, and folate levels. Prepare iron-, folate-, or B12-rich diets and monitor hemoglobin and RBC indices.	**0.5**
• Review ABG, oxygen saturation, and inflammatory markers. Plan high-protein, energy-dense, antioxidant-rich diets and monitor weight and respiratory function.	**0.5**
• Analyze WBC, CRP, and nutrient markers. Plan high-energy, high-protein diets with micronutrients and monitor recovery and immune markers	**0.5**
• Check CD4 counts, viral load, and micronutrient deficiencies. Plan energy- and protein-optimized diets, manage GI symptoms, and monitor weight and CD4 trends	**0.5**
	03

Recommended Readings

1. Nelms, M., Sucher, K. P., & Lacey, K. (2022). *Nutrition Therapy and Pathophysiology* (4th Ed.).

2. Mahan, L. K., Raymond, J. L. (2024). *Krause's Food & the Nutrition Care Process* (16th Ed.).
3. Arends, J., & Baracos, V. (2021). *Clinical Nutrition in Oncology: ESPEN Practical Guidelines.*
4. Gropper, S. S., & Smith, J. L. (2021). *Advanced Nutrition and Human Metabolism* (8th Ed.).
5. ESPEN Clinical Practice Guidelines (2020–2025 Series)

Semester 7

Food Product Development 3(1-2)

By the end of this course the student will be able to:

- Explain the stages of food product development from concept to commercialization.
- Apply sensory, nutritional, and functional criteria to design novel food products.
- Utilize ingredient technologies and formulation techniques for product optimization.
- Evaluate prototypes through sensory analysis, shelf-life testing, and consumer feedback.
- Develop a business plan and marketing strategy for launching a new food product.

Contents (Theory)

Contents	MCQs
1. Introduction to Food Product Development • Scope, importance, and challenges in food product development • Consumer-driven vs. technology-driven innovation • Trends in food and nutrition industries (functional foods, plant-based, convenience, clean-label, fortified products)	**4**
2. Stages of Product Development • Idea generation and screening • Feasibility analysis (technical, sensory, financial) • Prototype development and scaling up	**6**

• Packaging, labeling, and regulatory requirements	
3. Ingredient & Formulation Technology • Functional role of macronutrients (proteins, carbs, fats) and additives • Role of stabilizers, emulsifiers, preservatives, colors, and flavors • Fortification and enrichment strategies (micronutrients, probiotics, prebiotics) • Reformulation for health (low sugar, low sodium, gluten-free, high protein, fiber-enriched)	**8**
4. Product Testing & Optimization • Sensory evaluation methods (hedonic, triangle, ranking tests) • Shelf-life testing (microbiological, chemical, sensory changes) • Nutritional analysis and compliance with dietary guidelines • Consumer acceptance studies and market testing	**6**
5. Commercialization & Marketing • Scaling up from lab to industry • Costing, pricing, and economic feasibility • Intellectual property, patents, and food safety regulations • Branding, positioning, and marketing strategies for new products • Business plan development for food startups	**6**

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Practical

Hands-on Laboratory / Project Work

List	OSPE
1. **Idea Generation & Screening** ○ Brainstorming innovative food products (functional, convenience, therapeutic foods) ○ Screening based on consumer needs, nutritional gaps, and feasibility	1
2. **Formulation & Prototype Development** ○ Designing recipes/formulas for selected product ideas ○ Substitution and reformulation (low-fat snacks, fortified drinks, plant-based alternatives, high-protein bars, etc.) ○ Use of ingredient technologies (stabilizers, natural colors, preservatives, emulsifiers)	
3. **Sensory Evaluation** ○ Training in sensory panel setup ○ Conducting hedonic, ranking, and discrimination tests ○ Data collection, statistical analysis, and interpretation	1
4. **Shelf-life & Quality Testing** ○ Microbial testing, moisture content, and rancidity tests ○ Monitoring physical, chemical, and sensory changes over time	1

○ Packaging evaluation (material selection, labeling compliance)	
5. **Nutritional & Functional Analysis** ○ Energy, macronutrient, and micronutrient calculation ○ Comparison with dietary guidelines and RDA requirements ○ Functional properties (texture, stability, viscosity, emulsification)	2
6. **Market Feasibility & Consumer Testing** ○ Designing consumer surveys and focus groups ○ Conducting small-scale consumer testing for product feedback ○ SWOT analysis of prototype	1
7. **Business & Commercialization Plan** ○ Cost analysis and pricing strategy ○ Designing a marketing strategy (branding, labeling, health claims) ○ Preparation of a mini business plan + product pitch presentation	
	06

Recommended Books

1. Fuller, G. W. (2016). *New Food Product Development: From Concept to Marketplace* (3rd ed.). CRC Press
2. Earle, M., Earle, R., & Anderson, A. (2001). *Food Product Development*. Woodhead Publishing / CRC Press.
3. Moskowitz, H. R., Saguy, I. S., & Straus, T. (2009). *An Integrated Approach to New Food Product Development*. CRC Press.

4. Stone, H., & Sidel, J. L. (2020). *Sensory Evaluation Practices* (5th ed.). Academic Press
5. Food and Agriculture Organization (FAO). (2019). *Food Labelling and Claims: Guidelines for Industry*.
6. Roberfroid, M. B. (2016). *Functional Foods: Concept to Product* (2nd ed.). Woodhead Publishing.

Nutrition Education & Counselling 3 (2-1)

By the end of this course the student will be able to:

- Explain key theories and models of behavior change relevant to nutrition education.
- Design effective nutrition education materials and messages for diverse populations.
- Demonstrate counseling skills including active listening, motivational interviewing, and goal setting.
- Conduct individual and group nutrition education and counseling sessions.
- Assess the impact of counseling and education strategies on client behavior and health outcomes.

Contents Theory

Contents	MCQs
1. Foundations of Nutrition Education • Definition, history, and need for nutrition education • Scope, goals, and challenges in educating diverse populations • Competencies and skills required for effective nutrition educators	**2**
2. Influences on Food and Health Behavior • Biological, social, cultural, psychological, and family-related influences • Determinants of food choices and eating behaviors	**6**
3. Theories of Motivation and Behavior Change	**12**

• Expectancy-value theories of motivation • Social Cognitive Theory, Health Belief Model, and Child Feeding Practices • Understanding behavior change as a process and its stages • Multiple and overlapping levels of influence on eating behavior • Gender sensitive strategies	
4. Planning and Implementing Nutrition Education • Use of logical models and DESIGN theory for education planning • Steps for generating effective education plans and interventions • Tailoring content for different age groups and populations	**10**
5. Communication in Nutrition Education • Communication models in nutrition education • Designing, organizing, and delivering effective oral presentations • Conducting workshops, developing nutrition education materials • Use and effectiveness of visual aids • Media support and campaigns (print, electronic, social media)	**12**
6. Overview of Information, Education and Communication (IEC) Strategy • Nutrition Awareness Creation: create messages	**6**

• Educational Material Development: designing leaflets, posters, flip charts, and brochures • Interpersonal Communication: counseling sessions for dietary guidance • Mass Media Utilization: to disseminate nutrition information at scale	
7. Understand Communication for Development (C4D) Process • Participatory Communication • Application of Behavior and Social Change Strategies • Advocacy and Policy Influence • Use of ICT and Digital Platforms for promoting nutrition-related behavior change	**8**
8. Ethics and Community Involvement • Ethical principles in nutrition education • Conflict resolution and participatory processes • Community coalitions, NGOs, and public health nutrition initiatives • Overview of national and international nutrition education programs	**4**
	60

Practical

List	OSPE
1. Conducting nutrition education campaigns	**0.5**
2. Developing posters, scripts, and visual tools for outreach	
3. Designing and evaluating behavioral interventions	**0.5**
4. Simulating school lunch programs, community sessions, and public health messaging	**0.5**
5. Performing oral communication, peer analysis, and program planning	
6. Engaging in policy design for diseases like anemia, rickets, and NTDs	**1**
7. Exploring international strategies in nutrition education	**0.5**
	03

Recommended Books:

1. Contento, I. R. (2016) – *Nutrition Education: Linking Research, Theory, and Practice* (3rd ed.).
2. Park, K. (2021) – *Park's Textbook of Preventive and Social Medicine* (26th ed.).
3. Story, M., & McLeroy, K. R. (2009) – *Creating Healthy Food and Eating Environments: Policy and Environmental Approaches*.
4. Lang, T., & Heasman, M. (2015) – *Food Wars: The Global Battle for Mouths, Minds and Markets* (2nd ed.).
5. Glanz, K., Rimer, B. K., & Viswanath, K. (2015) – *Health Behavior: Theory, Research, and Practice* (5th ed.).
6. WHO (2012) – *Nutrition Education in Primary Schools: A Planning Guide for Curriculum Development*.

Nutrition Practices in Critical Care 3(2-1)

By the end of this course the student will be able to:

- Identify the nutritional challenges and needs of critically ill patients.
- Explain the principles and protocols of enteral and parenteral nutrition in ICU settings.
- Apply clinical judgment to assess and monitor nutrition status in critical care.
- Collaborate in the formulation of nutrition support plans for trauma, sepsis, burns, and post-operative patients.
- Evaluate outcomes of nutritional support using patient data and care indicators.

Contents Theory

Contents	MCQs
1. Introduction to Critical Care Nutrition • Scope and role of nutrition in ICU and critical illness • Pathophysiology of stress response, catabolism, and metabolic alterations • Energy and protein requirements in acute vs. chronic critical illness	**4**
2. **Metabolic Response to Stress** • **Etiology:** Critical illness, trauma, burns, major surgery, sepsis. • **Pathophysiology:** Hypermetabolism, catabolism, increased energy and protein requirements, insulin resistance. • **Clinical/Lab Findings:** Elevated cortisol, catecholamines, CRP, hyperglycemia, nitrogen loss.	**6**

• **MNT:** Calculate energy/protein for hypermetabolic states, prevent lean body mass loss, monitor fluid and electrolytes.	
3. **Hormonal and Cell-Mediated Response** • **Etiology:** Stress-induced inflammation, infection, trauma. • **Pathophysiology:** Cytokine release, acute phase response, immune activation, muscle protein breakdown. • **Lab Findings:** CRP, IL-6, WBC counts, albumin/prealbumin changes. • **MNT:** Adjust macronutrient intake to support immune function, maintain nitrogen balance, consider antioxidant and micronutrient support.	**6**
4. **Starvation vs. Stress** • **Etiology:** Prolonged fasting vs. critical illness. • **Pathophysiology:** Starvation → energy conservation, fat utilization; Stress → catabolism, protein breakdown, hypermetabolism. • **Lab Findings:** Ketone bodies (starvation), elevated cortisol and glucose (stress). • **MNT:** Early nutrition support, tailor energy/protein to metabolic state, prevent refeeding syndrome.	**6**
5. **Systemic Inflammatory Response Syndrome (SIRS), Sepsis, Organ Dysfunction/Failure** • **Etiology:** Severe infection, trauma, pancreatitis, burns. • **Pathophysiology:** Cytokine storm, multi-organ dysfunction, hypercatabolism. • **Lab Findings:** CRP, procalcitonin, lactate, renal and liver function tests.	**6**

• **MNT:** Early EN preferred; PN if contraindicated, monitor energy/protein, electrolytes, and organ function.	
6. **Malnutrition – Etiology-Based Definition** • **Etiology:** Disease-related, starvation-related, chronic inflammation. • **Pathophysiology:** Muscle wasting, impaired immunity, delayed wound healing. • **Lab Findings:** Albumin, prealbumin, nitrogen balance, anthropometry. • **MNT:** Nutrition screening, calculation of requirements, EN/PN support if oral intake insufficient, micronutrient supplementation.	**8**
7. **Trauma and the Open Abdomen** • **Etiology:** Abdominal injury, surgery, GI complications. • **Pathophysiology:** Hypermetabolic response, fluid/electrolyte loss, high nitrogen/protein needs. • **Lab Findings:** Electrolyte imbalance, CRP, nitrogen loss, hematology. • **MNT:** EN preferred, PN if bowel not usable, high-protein diet, monitor fluid, electrolytes, and wound healing.	**6**
8. **Major Burns** • **Etiology:** Thermal injury, extensive tissue damage. • **Pathophysiology:** Hypermetabolism, catabolism, high energy/protein demand, immune dysfunction. • **Lab Findings:** Nitrogen loss, glucose, CRP, electrolytes, trace elements.	**6**

• **MNT:** High-energy, high-protein, micronutrient support, early EN; monitor wound healing and metabolic tolerance.	
9. **Surgery** • **Etiology:** Elective or emergency surgical interventions. • **Pathophysiology:** Stress response, inflammation, altered nutrient utilization. • **Lab Findings:** Albumin, prealbumin, electrolytes, CRP. • **MNT:** Pre-op nutrition optimization, post-op EN or PN as needed, protein and micronutrient support, gradual transition to oral intake.	**6**
10. **Enteral and Parenteral Nutrition** • **Indications:** Dysphagia, GI dysfunction, hypercatabolic states. • **Routes & Formulas:** NG, NJ, PEG, PEJ; central or peripheral PN; polymeric, semi-elemental, disease-specific formulas. • **Monitoring:** Labs (glucose, electrolytes, liver enzymes), tolerance, complications (aspiration, refeeding syndrome, catheter infection). • **Integration:** Combine with oral intake when feasible, adjust based on disease severity and metabolic response.	**6**
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Practical

List	OSPEs
1. Observe ICU patient charts; record energy and protein needs. Practice calculating fluid and electrolyte requirements for simulated patients.	**0.5**
2. Review inflammatory markers (IL-6, WBC, albumin/prealbumin). Adjust macronutrient distribution and antioxidant/micronutrient support in sample scenario	
3. Analyze lab reports (CRP, cortisol, nitrogen balance) of trauma or burn cases. Calculate individualized energy/protein for hypermetabolic states.	**0.5**
4. Calculate hypermetabolic energy/protein needs. Plan micronutrient supplementation and monitor metabolic tolerance in burn cases.	
5. Compare lab profiles of fasting vs. stress-induced patients. Simulate refeeding strategies and monitor glucose/electrolyte changes.	**0.5**
• Practice EN initiation and monitoring in sepsis cases. Calculate PN when EN is contraindicated; monitor labs and tolerance.	
6. Conduct anthropometric, biochemical, and clinical assessments on case studies. Plan EN/PN support according to severity of malnutrition.	**0.5**
7. Simulate EN/PN initiation in post-op abdominal patients. Monitor nitrogen balance, electrolytes, and wound healing indicators.	**0.5**
8. Simulate pre- and post-op nutrition planning. Practice transition from PN/EN to oral intake, monitoring labs and tolerance.	**0.5**
9. Hands-on PN calculations and formula selection. Simulate EN tube feeding, monitor labs, complications, and gradual integration with oral diet	

	03

Recommended Books:

1. Mahan, L. K. and S. Escott-Stump. 2022. Krause's Food & Nutrition Therapy, Elsevier Saunders
2. Nelms, M., Sucher K. 2010. Nutrition Therapy and Pathophysiology, Cengage Learning.
3. Vishwanath M. S. 2011. Introduction to Clinical Nutrition. 3rd edition. Marcel Dekker, Inc. NY, USA

Nutrition Metabolism & Endocrinology 3(3-0)

By the end of this course the student will be able to:

- Describe the hormonal regulation of metabolism and nutrient utilization.
- Explain the metabolic pathways of macronutrients and their integration during fed and fasting states.
- Analyze the role of endocrine glands in regulating appetite, energy balance, and weight.
- Interpret biochemical indicators of metabolic and endocrine disorders.
- Apply knowledge of metabolic pathways in developing dietary strategies for metabolic syndromes.

Theory Contents

Contents	MCQs
1. Introduction to Metabolism & Endocrinology • Overview of metabolism and its regulation • Integration of nutrition and endocrinology in human physiology • Hormone classification, mechanisms of action, and signaling pathways	**8**
2. Carbohydrate Metabolism & Hormonal Regulation • Glycolysis, gluconeogenesis, glycogen metabolism • Hormonal regulation (insulin, glucagon, cortisol, epinephrine) • Fed vs. fasting states in carbohydrate utilization • Disorders: diabetes mellitus, hypoglycemia, metabolic syndrome	**10**
3. Lipid Metabolism & Hormonal Regulation	**10**

• Fatty acid oxidation, lipogenesis, ketogenesis • Lipoprotein metabolism (LDL, HDL, VLDL, chylomicrons) • Hormonal influences (insulin, glucagon, thyroid hormones) • Dyslipidemia and obesity-related endocrine dysfunctions	
4. Protein & Amino Acid Metabolism • Protein catabolism and nitrogen balance • Urea cycle, transamination, deamination • Hormonal regulation of protein metabolism (insulin, cortisol, growth hormone) • Clinical relevance: PEM, cachexia, and sarcopenia	**10**
5. Integration of Macronutrient Metabolism • Cross-talk between carbohydrate, lipid, and protein metabolism • Metabolic shifts during fed, fasting, starvation, and exercise states • Role of hormones in energy balance and adaptation	**12**
6. Endocrine System in Nutrition & Metabolism • Hypothalamic-pituitary axis and appetite regulation • Thyroid gland and metabolic rate • Pancreatic hormones and glucose regulation • Adrenal and gonadal hormones in energy balance and weight regulation	**12**
7. Biochemical Indicators of Metabolic & Endocrine Disorders	**12**

• Laboratory assessment: blood glucose, HbA1c, lipid profile, thyroid hormones, cortisol • Interpretation of indicators for obesity, metabolic syndrome, diabetes, thyroid disorders, adrenal disorders • Clinical nutrition implications of abnormal lab results	
8. Nutrition & Metabolic Syndromes • Pathophysiology of metabolic syndrome, insulin resistance, and obesity • Dietary strategies for prevention and management • Role of functional foods, dietary patterns (Mediterranean, DASH, low-GI diets) • Nutrigenomics and personalized nutrition in endocrine health	**16**
	90

Recommended Readings

1. Murray, R.K., Bender, D.A., Botham, K.M., Kennelly, P.J., Rodwell, V.W., & Weil, P.A. (2023). Harper's Illustrated Biochemistry (33rd ed.). McGraw-Hill Education.
2. Nelson, D.L., & Cox, M.M. (2021). Lehninger Principles of Biochemistry (8th ed.). W.H. Freeman.
3. Gropper, S.S., & Smith, J.L. (2021). Advanced Nutrition and Human Metabolism (8th ed.). Cengage Learning.
4. Hall, J.E. (2020). Guyton and Hall Textbook of Medical Physiology (14th ed.). Elsevier.
5. Mahan, L. K., Escott-Stump, S., & Raymond, J. (2022). Krause's Food & the Nutrition Care Process (16th ed.). Elsevier.

Semester 8

Food and Nutrition Policies 3 (3-0)

By the end of this course the student will be able to:

- Recall key historical milestones in food and nutrition policy development.
- Interpret existing food and nutrition policies in Pakistan and globally.
- Analyze the impact of policies on food security, safety, and public health.
- Compare and contrast policy frameworks used in different countries.
- Recommend evidence-based policy improvements for the national nutrition agenda.

Contents (Theory)

Contents	MCQs
1. Introduction to Food and Nutrition Policies • Definition, scope, and significance of food and nutrition policies. • Policy cycle: formulation, implementation, monitoring, and evaluation. • Role of government, international agencies, NGOs, and private sector.	**8**
2. Historical Evolution of Food & Nutrition Policies • Global milestones: ○ Alma-Ata Declaration (1978), Millennium Development Goals (MDGs), Sustainable Development Goals (SDGs).	**12**

○ Global nutrition movements: Scaling Up Nutrition (SUN), WHO Global Nutrition Targets 2025. • Pakistan context: evolution of nutrition programs since independence. • Shift from food availability to food security and nutrition-sensitive policies.	
3. Food Security and Nutrition Policies in Pakistan • National Food Security Policy (2018). • Pakistan Multi-Sectoral Nutrition Strategy (2018–2025). • National Fortification Strategy (wheat, oil, salt). • School feeding programs, breastfeeding policies, and micronutrient supplementation. • Gaps and challenges in implementation.	**10**
4. Global Policy Frameworks in Nutrition • WHO, FAO, UNICEF policies and frameworks. • Codex Alimentarius and international food safety regulations. • Global nutrition initiatives: SUN movement, REACH, Global Alliance for Improved Nutrition (GAIN). • Case studies from South Asia, Africa, and developed countries.	**10**
5. Food Safety Regulations and Consumer Protection • Pakistan Pure Food Laws, PSQCA standards, Punjab Food Authority model. • Codex guidelines on contaminants, labeling, additives.	**10**

• International standards: FDA (USA), EFSA (EU). • Nutrition labeling regulations and consumer rights.	
6. Public Health Nutrition Policies • Maternal and child nutrition policies. • Addressing malnutrition: stunting, wasting, anemia. • Policies for obesity and NCD prevention (taxes on sugary drinks, trans-fat bans). • Emergency nutrition policies in disaster and conflict settings.	**10**
7. Comparative Analysis of Policies Across Countries • South Asia (India's POSHAN Abhiyaan, Bangladesh National Nutrition Policy). • Developed nations (US Dietary Guidelines, UK Obesity Strategy). • Regional frameworks: SAARC, ASEAN nutrition initiatives.	**10**
8. **Policy Advocacy, Governance, and Ethics** • Role of advocacy in shaping nutrition policy. • Governance structures for multi-sectoral nutrition. • Ethical considerations: equity, right to food, vulnerable groups. • Role of academia and civil society in policy reform.	**10**
9. Future Directions & Evidence-Based Policy Recommendations • Digital innovations in food systems governance. • Climate change, sustainability, and food system resilience.	**10**

• Aligning national policies with SDGs and global nutrition targets. • Developing student-led evidence-based recommendations for Pakistan.	
	90

Recommended Readings

1. Mann, J., Truswell, S., Drewnowski, A., & Buttriss, J. (2024). Essentials of Human Nutrition (6th ed.). Oxford University Press
2. Swinburn, B., Kraak, V., Rutter, H., et al. (2019). Strengthening Governance for Nutrition: A Common Agenda for Action. The Lancet Commission on Obesity.
3. Nestle, M. (2020). Food Politics: How the Food Industry Influences Nutrition and Health (Updated ed.). University of California Press.
4. Government of Pakistan. (2018). National Food Security Policy. Islamabad: Ministry of National Food Security & Research.
5. Planning Commission of Pakistan. (2018). Pakistan Multi-Sectoral Nutrition Strategy (2018–2025).
6. FAO. (2021). The State of Food Security and Nutrition in the World (SOFI) 2021 Report.
7. World Health Organization. (2020). Global Nutrition Policy Review 2016–2021.
8. UNICEF, WHO, & World Bank. (2021). Levels and Trends in Child Malnutrition: Key Findings of the Joint Malnutrition Estimates

Nutritional Epidemiology 3 (3-0)

By the end of this course the student will be able to:

- Describe basic epidemiological concepts and their relevance to nutritional science.
- Analyze the relationship between diet, nutrition, and disease distribution in populations.
- Interpret data from epidemiological studies including cohort, case-control, and cross-sectional designs.
- Evaluate the strengths and limitations of dietary assessment methods used in large-scale studies.
- Use evidence from nutritional epidemiology to inform public health recommendations and policies.

Contents (Theory)

Contents	MCQs
1. Foundations & Core Concepts • Definitions: population, population at risk, incidence, prevalence, cumulative incidence, person-time. • Measures of association: risk ratio, rate ratio, odds ratio, risk difference, attributable fraction. • Basic causal concepts: temporality, necessity/sufficiency, causation vs. association. • Introduction to causal diagrams (DAGs) and directed acyclic graphs for nutrition research.	**10**
2. Study Designs & Choosing the Right Design • Descriptive vs analytic epidemiology; strengths/limits for nutrition questions.	**16**

• Cross-sectional studies: uses, pitfalls (temporality), prevalence ratio. • Case-control studies: selection of cases/controls, matching, OR interpretation. • Cohort studies: prospective vs retrospective, time-to-event, censoring, hazards. • Randomized trials in nutrition: feasibility, bias, intention-to-treat, pragmatic vs explanatory trials. • When to choose which design for a given nutrition question (decision rules, tradeoffs).	

3. Population-Level Dietary and Nutritional Assessment
• Common tools in large-scale studies:
  ○ Food Frequency Questionnaires (FFQs).
  ○ 24-hour dietary recalls and food records.
  ○ National health/nutrition surveys (NHANES, DHS, PNNS, MICS).
• Strengths and limitations when scaled to populations (cost, recall bias, cultural variation, food composition database issues).
• Biomarkers of dietary intake and nutritional status in population research (urinary sodium, serum vitamin D, hemoglobin, etc.).
	14

4. Bias, Confounding and Effect Modification • Types of bias: selection bias, information bias (recall bias, interviewer bias), misclassification.	**12**

• Confounding: identification, control (restriction, stratification, standardization, multivariable modeling). • Effect measure modification (interaction): biological vs statistical interaction, interpretation. • Sensitivity analysis for unmeasured confounding and measurement error.	
5. Statistical Modelling Specific to Nutritional Exposures Modeling continuous dietary exposures, categorical exposures, dose–response. • Handling collinearity among nutrients, dietary patterns (principal components, factor analysis), and indices (Mediterranean score, DASH score). • Time-varying exposures and repeated measures analysis (mixed models, GEE). • Mediation analysis basics (diet → mediator → outcome) and causal inference concepts. • Assessing internal vs external validity, applicability to Pakistan. • Meta-analysis basics and heterogeneity interpretation (I^2, random vs fixed effects).	**14**
6. From Evidence to Recommendations & Policy • Hierarchies of evidence and GRADE principles adapted to nutrition (quality, certainty, strength of recommendations). • Translating associations into public health guidance (risk vs benefit, population attributable fraction).	**12**

• Communicating uncertain evidence: risk communication, precautionary principle, equity considerations. • Case examples of successful evidence-to-policy transitions (e.g., salt reduction, trans-fat bans) — focus on method of translation rather than program design.	
7. Emerging Issues & Ethical Considerations (CLO1, CLO5) • Use of big data (NHANES, cohort consortia, GBD), data linkage and privacy. • Nutrigenetics/nutrigenomics: promise and current limitations for population studies. • Ethical concerns: consent in cohort studies, data sharing, conflicts of interest in dietary research.	**12**
	90

Recommended Readings

1. Willett, W.C. & Stampfer, M.J. (2021). Nutritional Epidemiology (4th ed.). Oxford University Press.
2. Rothman, K.J., Lash, T.L., & Greenland, S. (2021). Modern Epidemiology (4th ed.). Wolters Kluwer.
3. Gibney, M.J., Margetts, B., Kearney, J.M., & Arab, L. (2020). Public Health Nutrition (2nd ed.). Wiley-Blackwell.
4. FAO/WHO. (2020). Guidelines on Human Nutrient Intake and Dietary Assessment. Geneva: WHO.
5. National Institutes of Health (NIH) – Office of Dietary Supplements. (2021). Biomarkers of Nutritional Exposure and Status: Compendium.
6. Centers for Disease Control and Prevention (CDC). National Health and Nutrition Examination Survey (NHANES) Dietary Data Tutorial.

7. World Health Organization. (2021). Global Health Estimates and Burden of Disease Database.

AI in Food and Nutrition 2 (1-1)

By the end of this course the student will be able to:

- Develop a comprehensive understanding of artificial intelligence methodologies and their integration into food science and nutritional research
- Apply machine learning, deep learning, and data analytics to model, predict, and optimize food quality, safety, and nutritional outcomes
- Design and implement AI-driven systems for personalized nutrition, dietary recommendations, and metabolic health monitoring
- Evaluate ethical, regulatory, and data privacy considerations in the use of AI for food and nutrition application
- Develop problem solving skills through AI-based solutions for real world challenges in food systems and nutritional health

Contents (Theory)

Contents	MCQs
1. Introduction to AI in Food & Nutrition • Fundamentals of AI, ML, and DL • Role of AI in modern food and nutrition research • Current and emerging applications in the food industry and healthcare	**2**
2. AI in Food Systems • Food safety: contamination detection, adulteration control, predictive microbiology • Food quality: image recognition for grading, freshness detection, shelf-life prediction	**6**

• Precision agriculture & food supply chain optimization	
3. AI in Nutrition Science • Personalized nutrition: AI-driven diet recommendations, nutrient tracking • Nutritional epidemiology: big data analysis of diet-disease relationships • AI-based biomarkers: prediction of metabolic outcomes and deficiencies	**8**
4. Data Science & Predictive Analytics • Role of datasets: food composition, dietary intake, health outcomes • Predictive modeling in obesity, diabetes, and chronic diseases • Optimization of diet plans using ML algorithms	**6**
5. Ethical, Regulatory & Privacy Issues • Data protection and patient confidentiality in AI-driven health tools • Bias, fairness, and equity in AI applications • International regulations and standards for AI in food and nutrition	**8**
	30

Practical

List	OSPEs
1. Introduction to AI Tools ○ Basic training in Python or R for ML applications ○ Introduction to TensorFlow / Scikit-learn for beginners ○ Dataset handling (CSV, Excel, open-source datasets)	**0.5**
2. Food Quality & Safety Applications ○ Image classification exercise: identifying fresh vs. spoiled fruits/vegetables ○ Predictive modeling for shelf-life estimation using sample data	**0.5**
3. Personalized Nutrition Systems ○ Designing a rule-based diet recommendation system using nutrient databases ○ AI-based prediction model for BMI or calorie requirements	**01**
4. Predictive Analytics in Nutrition Health ○ Using ML models (e.g., logistic regression, decision trees) to predict risk of diabetes or obesity from dietary/lifestyle datasets ○ Data visualization of nutrition trends (heatmaps, scatter plots, correlation networks)	**0.5**
5. Capstone Mini-Project ○ Students select a real-world problem (e.g., obesity management, food adulteration detection, personalized diet for athletes)	**0.5**

○ Develop a simple AI-driven solution (data preprocessing, model building, interpretation) ○ Present results with discussion of ethical and practical challenges	
	03

Recommended Books

1. Raschka, S., & Mirjalili, V. (2022). Python Machine Learning: Machine Learning and Deep Learning with Python, scikit-learn, and TensorFlow 2 (4th ed.). Packt Publishing.
2. Singh, R. P., & Heldman, D. R. (2021). Introduction to Food Engineering (6th ed.). Academic Press.
3. Rachuri, S., & Mahalik, N. P. (2024). Artificial Intelligence in Food and Agriculture. Springer.
4. Das, S., & Mohanty, S. N. (2023). AI Applications in Nutrition and Food Science: Personalized Diets and Predictive Models. Elsevier.
5. WHO. (2023). Ethics and Governance of Artificial Intelligence for Health. Geneva: World Health Organization.
6. FAO. (2022). Artificial Intelligence and Big Data in Agriculture and Food Systems: Policy Guidance. FAO Publication

Diet Therapy for Individuals with Special Needs 3(2-1)

By the end of this course the student will be able to:

- Identify the unique nutritional requirements of individuals with disabilities, chronic illnesses, and special conditions.
- Explain the dietary challenges associated with physical, developmental, and sensory impairments.
- Plan modified diets suitable for tube feeding, texture-modified diets, and feeding assistance.
- Demonstrate skills in preparing adaptive meal plans and nutrition support protocols.
- Evaluate the impact of tailored diet therapy on nutritional status and quality of life in special needs populations.

Course Contents (Theory):

Contents	MCQs
1. **Introduction to Diet Therapy for Special Needs** • Scope of dietetics in disability and chronic illness • Principles of individualized nutrition care planning • Ethical issues and patient rights in special needs nutrition	**6**
2. **Nutritional Requirements in Chronic Illness & Disability** • Energy and protein needs in chronic diseases (neurological, renal, respiratory, cancer, HIV/AIDS) • Micronutrient considerations in long-term illness • Role of nutrition in rehabilitation and recovery	**10**
3. **Dietary Challenges in Special Populations**	**12**

• Feeding difficulties in physical disabilities (motor impairments, cerebral palsy, spinal cord injury) • Nutrition in developmental and intellectual disabilities (Down syndrome, autism spectrum disorder) • Dietary concerns in sensory impairments (visual/hearing impairment) • Swallowing disorders (dysphagia) and related risks	
4. **Modified Diets and Nutrition Support** • Texture-modified diets: minced, pureed, thickened liquids • Tube feeding: indications, formulas, monitoring, complications • Parenteral nutrition overview in special cases • Adaptive feeding assistance and caregiver training	**12**
5. **Adaptive Meal Planning and Support Protocols** • Meal modifications for chewing/swallowing difficulties • Culturally sensitive and acceptable dietary adaptations • Assistive technology for feeding and nutrition support • Role of multidisciplinary care teams in nutrition management	**10**
6. **Monitoring and Evaluation of Diet Therapy** • Anthropometric and biochemical indicators in special populations • Tools for quality of life and functional outcome assessment • Evaluating the impact of diet therapy on health and psychosocial well-being	**10**

• Case studies of successful interventions	
	60

Practical

List	OSPEs
• Practice in preparing texture-modified meals (pureed, soft, thickened liquids)	**0.5**
• Demonstration of enteral feeding techniques (using models/simulations)	**0.5**
• Designing adaptive meal plans for specific conditions (e.g., cerebral palsy, autism, cancer)	**0.5**
• Role-playing sessions for caregiver/patient counseling	**1**
• Critical appraisal of case scenarios on nutrition interventions in special needs populations	**0.5**
	03

Recommended Readings

1. Mahan, L.K., Raymond, J.L., & Escott-Stump, S. (2022). *Krause's Food & the Nutrition Care Process* (16th ed.). Elsevier.
2. Nelms, M., Sucher, K.P., Lacey, K., & Roth, S.L. (2021). *Nutrition Therapy and Pathophysiology* (5th ed.). Cengage Learning.
3. Bankhead, R., Boullata, J., Guenter, P. (2018). *Enteral and Parenteral Nutrition: A Comprehensive Guide* (5th ed.). ASPEN
4. Molenda-Figueira, H.A., et al. (2019). *Manual of Clinical Dietetics* (7th ed.). Academy of Nutrition and Dietetics.

5. National Institute for Health and Care Excellence (NICE). (2022). *Nutrition Support for Adults: Oral Nutrition Support, Enteral Tube Feeding, and Parenteral Nutrition.*
6. Chernoff, R. (Ed.). (2014). *Geriatric Nutrition: The Health Professional's Handbook* (4th ed.). Jones & Bartlett Learning.
7. FAO. (2020). *Inclusive Nutrition Programming for Persons with Disabilities.*

Nutrition in Inborn Errors of Metabolism 3(2-1)

By the end of this course the student will be able to:

- Describe the pathophysiology and classification of major inborn errors of metabolism (IEMs).
- Explain dietary restrictions and nutrient modifications required in common IEMs (e.g., PKU, MSUD, galactosemia).
- Develop specialized meal plans and formulas suitable for managing IEMs.
- Interpret genetic, biochemical, and clinical markers relevant to nutrition management.
- Evaluate case scenarios and implement evidence-based dietary interventions for IEMs.

Theory Contents

Contents	MCQs
1. **Introduction to Inborn Errors of Metabolism (IEMs)** • Definition, history, and significance of IEMs • Pathophysiology: enzyme deficiencies, metabolic blocks, and accumulation of toxic metabolites • Classification of IEMs: amino acid disorders, carbohydrate metabolism disorders, lipid metabolism disorders, urea cycle defects, and mitochondrial disorders • Global and local burden of IEMs	**6**
2. **Diagnostic Approaches in IEMs** • Role of newborn screening programs	**8**

• Biochemical markers: plasma amino acids, organic acids, enzyme assays • Genetic testing and molecular diagnosis • Clinical manifestations and red-flag signs for dietitians	
3. **Principles of Nutritional Management in IEMs** • Goals of dietary management (preventing toxicity, ensuring growth, preventing deficiencies) • Specialized medical foods and metabolic formulas • Nutrient restriction and supplementation principles • Monitoring dietary adherence and nutritional status	**8**
4. **Amino Acid Metabolism Disorders** • Phenylketonuria (PKU): pathophysiology, clinical features, dietary management • Maple Syrup Urine Disease (MSUD): clinical presentation, formula use, leucine/isoleucine/valine control • Homocystinuria and Tyrosinemia: nutrition interventions	**8**
5. **Carbohydrate Metabolism Disorders** • Galactosemia: lactose/galactose-free diet, long-term complications • Glycogen Storage Disorders: diet modifications, uncooked cornstarch therapy • Fructose intolerance and related metabolic conditions	**8**
6. **Urea Cycle Disorders & Organic Acidemias** • Pathophysiology and presentation	**8**

• Protein restriction and use of nitrogen-scavenging agents • Role of arginine, citrulline, and essential amino acid supplementation	
7. **Lipid and Mitochondrial Disorders** • Fatty Acid Oxidation Disorders (MCAD, LCHAD): dietary strategies and avoidance of fasting • Mitochondrial disorders: nutrition considerations and supportive therapy	**8**
8. **Psychosocial, Ethical, and Policy Aspects** • Family-centered care in IEM management • Quality of life and long-term complications • Ethical issues in dietary management and newborn screening policies • Global and national guidelines for IEM care (e.g., ESPKU, ACMG, WHO references)	**6**
	60

Practical

List	OSPEs
1. Diet Planning for IEMs o Preparation of sample meal plans for PKU, MSUD, galactosemia, and other common IEMs.	**1**
2. Use of Specialized Formulas	**0.5**

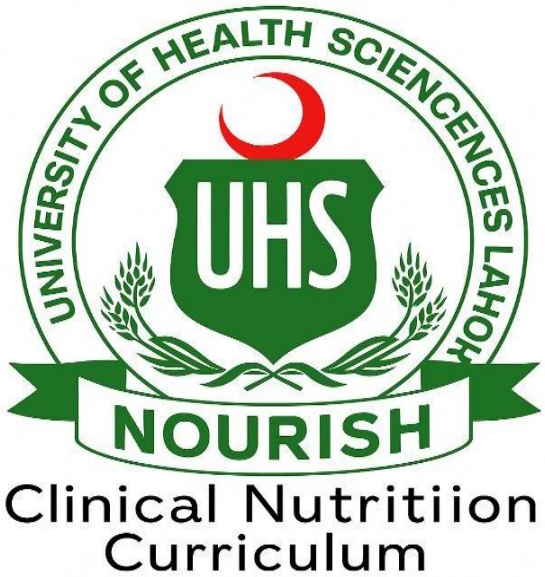
○ Practice in calculating protein and amino acid allowances with medical foods.	
3. Interpretation of Clinical Data ○ Basic analysis of biochemical reports and growth charts to guide dietary adjustments.	**0.5**
4. Nutrition Support Protocols ○ Planning tube feeding or special formula feeding regimens for infants and children.	
5. Counseling & Education ○ Role-play sessions for caregiver guidance on restricted diets and adherence.	**0.5**
6. Emergency Management ○ Development of simple “sick-day” dietary plans for acute episodes	**9.5**
	03

Recommended Readings

a. Acosta, P. B. (Ed.). (2010). *Nutrition Management of Patients with Inherited Metabolic Disorders.* Jones & Bartlett Learning.

b. Mahan, L. K., Escott-Stump, S., & Raymond, J. L. (Eds.). (2022). *Krause’s Food & the Nutrition Care Process* (16th ed.). Elsevier.

c. Nelms, M., Sucher, K. P., Lacey, K., & Roth, S. L. (2021). *Nutrition Therapy and Pathophysiology* (4th ed.). Cengage Learning.



NOURISH

LOGBOOK

INTRODUCTION

NOURISH is a structured clinical skills and competency-based document developed for the BS Human Nutrition & Dietetics program. It goes beyond traditional learning tools by combining skill lists, checklists, and guided practice to help students translate theoretical knowledge into safe, patient-centered clinical practice.

Designed for progressive learning, NOURISH guides students from foundational knowledge to supervised clinical tasks and finally to competency in essential nutrition interventions. It emphasizes hands-on experience, reflective practice, and professional integration within the healthcare team.

The framework ensures measurable skill acquisition, immersive learning, and outcome-focused training. Students gain confidence in assessment, counseling, therapeutic diet planning, and other practical competencies while maintaining ethics and patient-centered care.

In essence, NOURISH is a comprehensive roadmap for developing clinically competent, confident, and healthcare-ready nutrition professionals, bridging the gap between classroom learning and real-world clinical practice.

Letter	Stands For	Significance in the Clinical Nutrition Curriculum
N	Nutrition	Core subject focus—developing deep knowledge of clinical nutrition science and therapeutic applications.
O	Outcome-based	Aligned with UHS's vision for OBE: every module has clear, measurable clinical outcomes that guide teaching & exams.
U	Undergraduate Training	Designed for undergrad (BS Nutrition) students from semester 1 to 8—progressive exposure from novice to competent.
R	Realistic & Reflective	Emphasizes real-life, patient-facing clinical practice and reflective learning through logbooks and debriefs.
I	Immersive & Integrated	Blends theory and hands-on learning: simulations, hospital placements, case-based learning, interprofessional rounds.
S	Skill-building	Focus on practical clinical nutrition competencies like assessment, counseling, tube feeding, and diet planning.
H	Healthcare-centered	Nutritionists are integrated as part of the healthcare team—fostering collaboration, communication, and ethics.

CLINICAL ROTATIONS

Semester	Ward	Ward	Ward	Ward	Ward
2	General OPD Hospital Kitchen	Pediatric OPD/ Growth monitoring room	Antenatal clinic	General medicine ward	Community Nutrition center/LHW clinic
3	General OPD	Pediatric OPD	BHU	Gynecology ward/Antenatal clinic	Medicine OPD
4	Medicine OPD	Neonatal and pediatric ward/NICU	Lactation clinic	Gynecology ward/Antenatal clinic	Medicine ward
5	Diabetes clinic/Endocrinology OPD	Cardiology ward	Pediatric ward	General medicine ward	Obesity and fitness clinic
6	Stabilization centers	Immunization and growth monitoring clinics	BHU/LHW clinics	Neurology and psychiatry ward	Hepatology and gastroenterology ward
7	Nephrology	Surgery	Oncology ward	ICU	Burn unit/surgical ICU

SEMESTER–II

NOURISH–I

Professional Ethics, Observer ship & Cultural Competence

Clinical Competency Workbook / Logbook
Program: BS Human Nutrition & Dietetics
Credit Hours: 01 (Clinical)

COURSE DESCRIPTION

NOURISH–I is an introductory clinical competency module designed to orient BS Human Nutrition & Dietetics students to professional conduct, ethical practice, clinical observership, and culturally sensitive nutrition care. The module emphasizes professional identity formation, ethical boundaries, respectful communication, and structured observation of dietetic practice in healthcare settings. Students engage in guided observership, reflective practice, and foundational documentation activities without independent patient management.

CLINICAL ROTATION / EXPOSURE PLAN

- Duration: Semester-long (as per academic calendar)
- Nature of Exposure:
    - Hospital observership (wards, OPD, hospital kitchen)
    - Simulated activities and guided reflections
- Student Role:
    - Observer and learner
    - No independent patient counseling or decision-making
- Supervision:
    - Faculty clinical instructor
    - Clinical dietitian (where applicable)

CLINICAL OBJECTIVES

By the end of NOURISH–I, the student will be able to:

1. Demonstrate punctuality, hygiene, and professional conduct in clinical settings.
2. Observe and document the professional role of dietitians within the healthcare team.
3. Recognize ethical principles related to patient privacy, consent, and professional boundaries.
4. Appreciate the influence of culture, religion, and ethnicity on nutrition care.

5. Practice respectful and non-judgmental communication in observed and simulated settings.
6. Maintain reflective records supporting professional identity development.
7. Develop familiarity with basic clinical nutrition documentation formats.

EVALUATION CRITERIA (CLINICAL PORTFOLIO)

Sr. No	Clinical Portfolio Content	Weightage	Frequency
1	Clinical Objectives Achievement	10%	Weekly
2	Professional Behavior & Ethics Checklist	15%	Ongoing
3	Observership Records & Logs	20%	Minimum 5 entries
4	Cultural Competence Observation & Reflection	15%	Minimum 3 entries
5	Foundational Documentation Practice	10%	Minimum 5 forms
6	Reflective Journal / Clinical Diary	20%	Weekly
7	Short Report on Professional Identity	10%	One submission

LIST OF CLINICAL COMPETENCIES

Levels of Competency: 1–5 (Novice to Expert)

Sr. No	Skill / Competency	Level (1–5)	Minimum Frequency
1	Demonstrate punctuality, dress code compliance, and hygiene		Ongoing
2	Respectful and empathetic communication		Ongoing
3	Maintain patient privacy and confidentiality		10
4	Recognize ethical boundaries in dietetic practice		5
5	Understand dietetic code of conduct		3
6	Observe dietitian–patient interaction		5

7	Record dietitian responsibilities in wards, OPD, kitchen		5
8	Observe interprofessional collaboration		5
9	Document patient journeys (nutrition focus)		2
10	Shadow nutrition counseling session		3
11	Identify cultural food patterns & restrictions		5
12	Understand cultural/religious impact on diet		5
13	Observe culturally adapted nutrition advice		3
14	Practice non-judgmental questioning (simulation)		5
15	Participate in cultural food discussion/demo		2
16	Maintain clinical diary		Weekly
17	Reflect on personal attitudes and biases		3
18	Write report on professionalism in dietetics		1
19	Practice professional self-introduction & consent		5
20	Practice filling basic nutrition documentation		5
21	Observe and mock patient file handling		3

CLINICAL COMPETENCY LOGBOOK

Sr. No	Competency	Faculty Signature	Date	Clinical Supervisor Signature	Date
1	Demonstrate punctuality, dress code compliance, and personal hygiene in clinical and hospital environments				
2	Show respectful and empathetic communication with patients, families, and healthcare staff				
3	Maintain patient privacy and confidentiality (verbal, written, digital) in line with ethical principles				
4	Recognize ethical boundaries in dietetic practice, including referral, conflict of interest, and consent				
5	Understand the code of conduct for dietitians as defined by national or international dietetic associations				
6	Observe dietitian-patient interactions during initial assessment, follow-up, and counseling				
7	Record and reflect on dietitian responsibilities in wards, OPD, and hospital kitchens (referrals, menu checking)				
8	Document at least two patient journeys from admission to discharge focusing on nutritional care steps				
9	Shadow a nutrition counseling session and identify communication strategies used to educate the patient				
10	Identify common cultural food patterns and restrictions relevant to the local population (Halal, vegetarian, fasting)				

11	Understand how religion, ethnicity, language, and belief systems affect patient food choices and compliance				
12	Observe and record how dietitians adapt nutrition advice for diverse cultural backgrounds				
13	Practice non-judgmental questioning during dietary history simulations respecting food taboos, fasting, and traditional remedies				
14	Participate in a cultural food demo or discussion session with patients from different backgrounds				
15	Maintain a clinical diary or observation journal summarizing daily experiences and lessons learned				
16	Reflect on personal attitudes and biases that may influence client interactions				
17	Write a short report on “What professionalism means in nutrition and dietetics” based on clinical exposure				
18	Practice introductory professional communication (introducing self, purpose of visit, obtaining verbal consent)				
19	Learn how to fill out basic dietitian referral forms, nutrition screening sheets, and patient case summary logs				
20	Observe how patient files are handled in clinical settings and practice mock documentation using sample templates				

PROFESSIONAL BEHAVIOR & ETHICS CHECKLIST

Sr. No	Criteria	Satisfactory	Needs Improvement
1	Reports on time and follows dress code		
2	Maintains personal hygiene		
3	Communicates respectfully		
4	Maintains confidentiality		
5	Demonstrates ethical awareness		
6	Seeks guidance appropriately		
7	Respects professional boundaries		

Faculty Comments

OBSERVERSHIP REFLECTION RECORD

Student Name: _____
Registration No: _____
Clinical Area Observed: _____
Date: _____

1. Dietitian role observed:
2. Nature of patient interaction:
3. Ethical considerations noted:
4. Cultural factors influencing care:
5. Key learning points:

REFLECTIVE JOURNAL (WEEKLY)

Week #: _____Dates: _____

- Summary of observations:
- Professional behavior observed:
- Ethical or cultural insight gained:
- Personal reflection and learning:

FOUNDATIONAL DOCUMENTATION PRACTICE LOG

Sr. No	Document Type (Referral / Screening / Case Summary)	Faculty Signature	Date
1			
2			
3			
4			
5			

STUDENT DECLARATION

I hereby declare that the clinical competencies, observations, and reflections documented in this workbook are my own and have been completed according to the program requirements.

Student Signature: _____Date: _____

FACULTY VERIFICATION

This is to certify that the above-mentioned student has satisfactorily completed the required clinical competencies and observership activities for **NOURISH–I (Semester–II)**.

Faculty Name: _____
Signature: _____
Date: _____‘

SEMESTER–III NOURISH II

Macronutrients & Micronutrients in Human Nutrition and Nutritional Assessment

Clinical Competency Workbook / Logbook
Program: BS Human Nutrition & Dietetics
Credit Hours: 02 (Clinical)
Clinical Attachment: Observership with Clinical Nutritionist

COURSE DESCRIPTION

NOURISH–II is a clinically oriented competency module designed to build foundational understanding of macronutrients and micronutrients in relation to human nutrition and nutritional assessment. The module emphasizes structured observership with an MNT specialist, accurate nutritional assessment techniques, recognition of clinical signs of nutrient deficiencies, and interpretation of routine biochemical markers relevant to nutrition care.

Students develop competency in anthropometric measurements, dietary assessment tools, nutrition screening instruments, and interpretation of nutrition-related laboratory data. This module prepares students for advanced clinical decision-making in later semesters by strengthening assessment accuracy and clinical reasoning skills.

CLINICAL ROTATION / EXPOSURE PLAN

- Duration: Semester-long (as per academic calendar)
- Nature of Exposure:
    - Hospital-based observership with MNT specialist
    - Nutrition OPD, wards, and assessment areas
    - Skill lab practice and supervised demonstrations
- Student Role:
    - Observer and supervised performer
    - No independent prescription of diet therapy
- Supervision:
    - Faculty clinical instructor
    - Clinical dietitian / MNT specialist

CLINICAL OBJECTIVES

By the end of NOURISH–II, the student will be able to:

6. Observe and understand the clinical application of macronutrient and micronutrient requirements.
7. Apply standardized anthropometric and growth assessment protocols accurately.

8. Conduct dietary assessments using validated tools and culturally appropriate methods.
9. Identify clinical signs and symptoms of common micronutrient deficiencies.
10. Apply validated nutrition screening tools across life stages.
11. Interpret routine biochemical markers relevant to nutritional status.

12. Correlate clinical findings with nutritional assessment data under supervision.

EVALUATION CRITERIA (CLINICAL PORTFOLIO)

Sr. No	Clinical Portfolio Content	Weightage	Frequency
1	Achievement of Clinical Objectives	10%	Weekly
2	Anthropometric & Growth Assessment Checklists	20%	Minimum 10
3	Dietary Assessment Records	20%	Minimum 10
4	Nutrition Screening Tools Application	15%	Minimum 8
5	Micronutrient Deficiency Observation Logs	10%	Minimum 5
6	Biochemical Marker Interpretation Sheets	15%	Minimum 5
7	Case Study (Multiple Nutrient Deficiencies)	10%	One submission

LIST OF CLINICAL COMPETENCIES

Levels of Competency: 1–5 (Novice to Expert)

A. Observership & Nutrient Application

Sr. No	Skill / Competency	Level (1–5)	Minimum Frequency
1	Use dietary software to compute macronutrient energy contribution		5
2	Understand selection of AMDRs using patient case data		5
3	Observe therapeutic AMDR variations in clinical diet plans		6
4	Observe clinical signs of vitamin and mineral deficiencies		10
5	Conduct case study of multiple micronutrient deficiencies		1
6	Review supplement labels for micronutrient management		5

7	Review supplement labels for macronutrient management		5

B. Anthropometric Measurement Skills

Sr. No	Skill	Level (1–5)	Minimum Frequency
8	Height/length and weight measurement (all devices)		10
9	BMI calculation and classification		10
10	Use of WHO/CDC growth charts		8
11	Indirect height measurement methods		6
12	Waist & hip circumference measurement		6
13	Skinfold thickness measurement		6
14	MUAC measurement and interpretation		6

C. Dietary Assessment Skills

Sr. No	Skill	Level (1–5)	Minimum Frequency
15	Food Frequency Questionnaire administration		6
16	24-hour dietary recall		6
17	Three-day dietary recall		3
18	Dietary Diversity Score calculation		5
19	Food diary evaluation		5
20	IBW and adjusted body weight calculation		6
21	Physical activity level assessment		6
22	Cultural dietary assessment		5

D. Nutrition Screening & Clinical Examination

Sr. No	Skill	Level (1–5)	Minimum Frequency
23	Pediatric screening using STAMP		4
24	Adult screening using MUST		4
25	Adult screening using NRS-2002		4

26	Geriatric screening using MNA / GNRI		4
27	Subjective Global Assessment (SGA)		4
28	Edema assessment		5
29	Hydration status assessment		5
30	Musculoskeletal assessment for sarcopenia		5
31	Neurological signs assessment		5

E. Biochemical Marker Interpretation

Sr. No	Skill	Level (1–5)	Minimum Frequency
32	Interpretation of nutritional biomarkers		6
33	Interpretation of routine medical panels		6
34	Interpretation of micronutrient laboratory tests		5
35	Interpretation of additional laboratory tests		5

CLINICAL COMPETENCY LOGBOOK

Sr. No	Competency	Faculty Signature	Date	Clinical Supervisor Signature	Date
1	Use dietary software to compute energy contributions from macronutrients				
2	Understand and apply AMDRs using patient case data				
3	Observe therapeutic diet plans for different clinical conditions (high-protein, low-fat, diabetes, renal, cardiovascular)				
4	Identify signs and symptoms of vitamin and mineral deficiencies in hospitalized patients				

5	Conduct clinical case studies of multiple micronutrient deficiencies (anemia, rickets, osteoporosis, goiter)				
6	Analyze and research supplement labels for micronutrient deficiency management				
7	Analyze and research supplement labels for macronutrient requirements				
8	Accurately measure height/length and weight using neonatal scale, infantometer, stadiometer, and bathroom scale				
9	Perform indirect height measurements (arm span, recumbent length, knee height, demi-span)				
10	Measure waist and hip circumference and calculate Waist-to-Hip Ratio (WHR)				
11	Perform skinfold thickness measurements to assess body fat percentage				
12	Assess mid-upper arm circumference (MUAC) and identify undernutrition				
13	Apply BMI calculations and interpret adult BMI categories				
14	Use WHO/CDC growth charts to assess weight-for-age, height-for-age, and identify stunting/wasting in children				
15	Administer dietary assessment tools: Food Frequency Questionnaire, 24-hour recall, three-day dietary recall, dietary diversity score				
16	Assess ideal body weight (IBW) and adjusted body weight for nutrition planning				
17	Evaluate physical activity and classify PAL for energy requirement calculations				

18	Perform pediatric, adult, and geriatric nutrition screening using STAMP, MUST, NRS-2002, MNA, GNRI				
19	Conduct clinical signs examination for edema, hydration status, muscle wasting, bone tenderness, and vitamin/mineral deficiencies				
20	Identify neurological signs related to nutritional deficiencies (tingling, numbness, burning, neuropathy red flags)				
21	Interpret routine biochemical markers, medical panels, and micronutrient tests for diet therapy				

Nutritionist Skills Checklists

Section 1: Anthropometry

Skill 1: Height/Length & Weight Measurement

Purpose: To accurately measure patient height/length and weight according to clinical protocols.

Materials Required:

- Neonatal scale
- Infantometer
- Stadiometer
- Bathroom scale
- Pen / recording sheet
- Hand sanitizer

Pre-Procedure Preparation:

- Perform hand hygiene
- Explain procedure to patient/caregiver
- Ensure patient comfort and privacy

Checklist

Sr. No	Task	Yes	No	Comments
1	Verify patient identity			
2	Prepare equipment & check calibration			
3	Neonatal scale: Zero-balance, position supine, ensure limbs not hanging			
4	Infantometer: Align head, extend body, gentle knee pressure, read to 0.1 cm			
5	Stadiometer: Frankfort plane alignment, feet/buttocks/shoulders touching wall, measure to 0.1 cm			
6	Bathroom scale: Patient standing still, minimal clothing, read to 0.1 kg			
7	Record measurements accurately in patient sheet			

Post-Procedure Care:

- Thank the patient
- Clean and store equipment
- Document findings

Supervisor Signature & Date: _____

Skill 2: Indirect Height Measurement

Purpose: To estimate height in bedridden, elderly, or non-ambulatory patients.

Materials Required:

- Measuring tape
- Knee-height calipers
- Pen / recording sheet

Pre-Procedure Preparation:

- Explain procedure to patient
- Ensure comfort & privacy

Checklist

Sr. No	Task	Yes	No	Comments
1	Measure arm span; convert to estimated height			
2	Measure adult recumbent length; record accurately			
3	Measure knee height using calipers; convert to estimated height			
4	Measure demi-span; calculate height using formula			
5	Select method appropriate for patient condition			
6	Record results in patient chart			

Post-Procedure Care:

- Thank patient
- Clean equipment
- Document results

Supervisor Signature & Date: _____

Skill 3: Waist & Hip Circumference / Waist–Hip Ratio

Purpose: To assess central obesity and metabolic risk.

Materials Required:

- Non-stretchable measuring tape
- Pen / recording sheet

Pre-Procedure Preparation:

- Explain procedure to patient
- Ensure patient is standing comfortably with light clothing

Checklist

Sr. No	Task	Yes	No	Comments

1	Identify waist midpoint (between lowest rib & iliac crest)			
2	Measure waist circumference			
3	Identify hip widest point			
4	Measure hip circumference			
5	Calculate waist-to-hip ratio (WHR)			
6	Interpret metabolic risk according to cut-offs			

Post-Procedure Care:

- Thank patient
- Document findings

Supervisor Signature & Date: _____

Skill 4: Mid-Upper Arm Circumference (MUAC)

Purpose: To assess nutritional status and risk of undernutrition.

Materials Required:

- Non-stretchable MUAC tape
- Pen / patient record sheet
- Hand sanitizer

Pre-Procedure Preparation:

- Perform hand hygiene
- Explain procedure and obtain verbal consent
- Ensure patient comfort & privacy

Checklist

Sr. No	Task	Yes	No	Comments
1	Identify mid-point between acromion & olecranon			
2	Position arm relaxed at side			
3	Wrap MUAC tape snugly without compression			
4	Read measurement at eye level			
5	Record value accurately (cm)			

Post-Procedure Care:

- Thank patient
- Clean & store equipment
- Document findings

Supervisor Signature & Date: _____

Skill 5: Skinfold Thickness Measurement

Purpose: To estimate subcutaneous fat stores and body fat percentage.

Materials Required:

- Skinfold caliper
- Alcohol swabs
- Recording sheet

Pre-Procedure Preparation:

- Explain procedure
- Ensure privacy and patient comfort

Checklist

Sr. No	Task	Yes	No	Comments
1	Identify correct anatomical site (triceps, biceps, subscapular, suprailiac)			
2	Pinch skin correctly			
3	Position caliper accurately			

4	Take reading after 2 seconds			
5	Repeat measurement for accuracy			
6	Record average value			

Post-Procedure Care:

- Thank patient
- Clean & store calipers
- Document findings

Supervisor Signature & Date: _____\

Section 2: Clinical Signs Assessment

Skill 6: Edema Assessment

Purpose: To detect fluid imbalance and malnutrition.

Materials Required:

- Examination gloves
- Pen / recording sheet

Pre-Procedure Preparation:

- Explain procedure to patient
- Ensure comfort and privacy

Checklist

Sr. No	Task	Yes	No	Comments
1	Inspect lower limbs & face for swelling			
2	Apply pressure over bony prominences for pitting edema			
3	Grade edema severity (0–4+)			
4	Check bilateral involvement			
5	Document findings accurately			

Post-Procedure Care:

- Thank patient
- Dispose gloves properly
- Document results

Supervisor Signature & Date: _____

Skill 7: Hydration Status Assessment

Purpose: To identify dehydration or fluid overload.

Materials Required:

- Observation checklist
- Pen / recording sheet

Pre-Procedure Preparation:

- Explain procedure to patient
- Ensure patient comfort

Checklist

Sr. No	Task	Yes	No	Comments
1	Assess skin turgor			
2	Examine mucous membranes			
3	Check for sunken eyes			
4	Correlate findings with intake/output records			
5	Record hydration status			

Post-Procedure Care:

- Thank patient
- Document findings

Supervisor Signature & Date: _____

Skill 8: Musculoskeletal Assessment for Sarcopenia / Bone Health

Purpose: To identify muscle wasting and signs of vitamin D/calcium deficiency.

Materials Required:

- Pen / recording sheet
- Observation checklist

Pre-Procedure Preparation:

- Explain procedure to patient
- Ensure comfort and privacy

Checklist

Sr. No	Task	Yes	No	Comments
1	Inspect temples, clavicles, thighs for muscle wasting			
2	Palpate bones for tenderness			
3	Observe gait and posture			
4	Identify clinical signs of vitamin D/calcium deficiency (e.g., bowed legs, delayed walking)			
5	Document findings accurately			

Post-Procedure Care:

- Thank patient
- Document observations

Supervisor Signature & Date: _____

Skill 9: Neurological Signs Assessment

Purpose: To identify neuropathy signs such as tingling, numbness, or burning sensation, particularly related to vitamin B12 deficiency or diabetes.

Materials Required:

- Pen / recording sheet
- Reflex hammer (if required)

Pre-Procedure Preparation:

- Explain procedure to patient
- Ensure comfort and privacy

Checklist

Sr. No	Task	Yes	No	Comments
1	Ask patient about tingling sensations			
2	Ask about numbness or burning sensations			
3	Perform brief physical exam if indicated			
4	Identify red flags (e.g., severe neuropathy, unsteady gait)			
5	Document findings and alert supervising dietitian			

Post-Procedure Care:

- Thank patient
- Document assessment

Supervisor Signature & Date: _____

Section 3: Dietary Assessment

Skill 10: 24-Hour Dietary Recall

Purpose: To assess recent dietary intake of the patient.

Materials Required:

- Recall form
- Portion size models / household measures
- Pen / clipboard

Pre-Procedure Preparation:

- Explain purpose to patient
- Ensure privacy and comfort

Checklist

Sr. No	Task	Yes	No	Comments
1	Explained purpose of dietary recall to patient			
2	Collected meal-by-meal intake information			
3	Probed for forgotten foods or snacks			
4	Estimated portion sizes using models or household measures			
5	Reviewed recall for completeness			
6	Converted intake into calories and macronutrients			

Post-Procedure Care:

- Thank patient
- Document findings accurately

Supervisor Signature & Date: _____

Skill 11: Food Frequency Questionnaire (FFQ) – Pakistani-Based

Purpose: To identify dietary patterns and frequency trends of food intake.

Materials Required:

- Standardized FFQ form
- Pen / clipboard

Pre-Procedure Preparation:

- Explain purpose of FFQ to patient
- Ensure patient comfort

Checklist

Sr. No	Task	Yes	No	Comments
1	Collected demographic and patient details			
2	Asked about frequency of food group consumption			
3	Checked portion sizes and typical servings			
4	Identified patterns of macro/micronutrient intake			
5	Recorded and interpreted FFQ data			

Post-Procedure Care:

- Thank patient
- Document findings

Supervisor Signature & Date: _____

Skill 12: Dietary Diversity Score (DDS)

Purpose: To assess the adequacy of usual dietary intake across food groups.

Materials Required:

- Food diary / recall
- DDS calculation sheet
- Pen / clipboard

Pre-Procedure Preparation:

- Explain procedure to patient
- Gather dietary intake information

Checklist

Sr. No	Task	Yes	No	Comments
1	Collected complete dietary intake information			
2	Categorized foods into standard food groups			
3	Calculated DDS using standard scoring			
4	Interpreted score for nutrient adequacy			
5	Documented findings			

Post-Procedure Care:

- Thank patient
- Store forms properly

Supervisor Signature & Date: _____

Skill 13: Cultural Dietary Assessment

Purpose: To assess dietary habits affected by culture, religion, or ethnicity.

Materials Required:

- Observation checklist
- Food diary / dietary recall
- Pen / clipboard

Pre-Procedure Preparation:

- Explain purpose to patient
- Respect privacy and cultural sensitivities

Checklist

Sr. No	Task	Yes	No	Comments
1	Collected information on cultural food patterns			
2	Identified religious or ethnic dietary restrictions			
3	Assessed implications on nutrient intake			
4	Documented findings clearly			

Post-Procedure Care:

- Thank patient
- Maintain cultural sensitivity
- Store documentation

Supervisor Signature & Date: _____

Skill 14: Food Diary Assessment

Purpose: To evaluate patient's dietary intake for accuracy and completeness.

Materials Required:

- Food diary form
- Pen / clipboard
- Portion size guides

Pre-Procedure Preparation:

- Explain purpose to patient
- Collect completed diary

Checklist

Sr. No	Task	Yes	No	Comments
1	Checked completeness of food diary			
2	Identified potential underreporting/overreporting			
3	Estimated portion sizes accurately			
4	Converted diary entries into calories and macronutrients			
5	Recorded assessment in patient file			

Post-Procedure Care:

- Thank patient
- Store diary securely

Supervisor Signature & Date: _____

Skill 15: Physical Activity Assessment

Purpose: To classify patient's activity level and estimate energy expenditure.

Materials Required:

- Physical activity assessment sheet
- Pen / clipboard

Pre-Procedure Preparation:

- Explain procedure to patient
- Collect recent activity history

Checklist

Sr. No	Task	Yes	No	Comments
1	Asked patient about daily activities and exercise			
2	Categorized Physical Activity Level (PAL)			
3	Calculated energy expenditure using standard formulas			
4	Documented findings			

Post-Procedure Care:

- Thank patient
- Store assessment sheet

Supervisor Signature & Date: _____

Section 4: Screening Tools

Skill 16: Malnutrition Universal Screening Tool (MUST)

Purpose: To screen adult patients for malnutrition risk in clinical settings.

Materials Required:

- MUST screening form
- Patient weight & height data
- Calculator
- Pen / clipboard

Pre-Procedure Preparation:

- Review patient file
- Explain purpose of screening to patient

Checklist

Sr. No	Task	Yes	No	Comments
1	Verified patient identity			
2	Measured or obtained current weight & height			
3	Calculated BMI and assigned BMI score			
4	Assessed unplanned weight loss			
5	Evaluated acute disease effect (if any)			
6	Calculated total MUST score			
7	Classified malnutrition risk (Low/Medium/High)			
8	Documented findings in patient file			

Post-Procedure Care:

- Report findings to supervising dietitian
- File screening form appropriately

Supervisor Signature & Date: _____

Skill 17: STAMP – Screening Tool for Assessment of Malnutrition in Pediatrics

Purpose: To identify pediatric patients at risk of malnutrition.

Materials Required:

- STAMP screening form
- Weight & height measuring equipment
- Growth charts
- Pen / clipboard

Pre-Procedure Preparation:

- Verify patient identity & age
- Explain procedure to parent/guardian

Checklist

Sr. No	Task	Yes	No	Comments
1	Verified patient identity & age			
2	Measured weight accurately			
3	Measured height/length accurately			
4	Assessed clinical diagnosis impact on nutrition			
5	Evaluated recent dietary intake / appetite			
6	Assigned STAMP score correctly			
7	Classified risk (Low / Medium / High)			
8	Documented findings			

Post-Procedure Care:

- Thank patient/guardian
- File STAMP assessment properly

Supervisor Signature & Date: _____

Skill 18: Mini Nutritional Assessment (MNA)

Purpose: To assess nutritional risk in elderly patients.

Materials Required:

- MNA form
- MUAC tape
- Weight & height measurement tools
- Pen / clipboard

Pre-Procedure Preparation:

- Review patient history
- Explain procedure to patient

Checklist

Sr. No	Task	Yes	No	Comments
1	Collected demographic data			
2	Asked dietary intake questions			
3	Assessed weight loss history			
4	Measured MUAC			
5	Calculated total MNA score			
6	Classified nutrition status (Normal / At Risk / Malnourished)			
7	Documented and reported results			

Post-Procedure Care:

- Thank patient
- Maintain documentation

Supervisor Signature & Date: _____

Skill 19: Geriatric Nutritional Risk Index (GNRI)

Purpose: To evaluate nutrition-related risk using anthropometric and biochemical data in elderly patients.

Materials Required:

- Patient weight & height
- Serum albumin value
- Calculator
- Pen / clipboard

Pre-Procedure Preparation:

- Review latest lab and anthropometric data
- Explain procedure to patient

Checklist

Sr. No	Task	Yes	No	Comments
1	Recorded current & ideal body weight			
2	Obtained serum albumin value			
3	Applied GNRI formula correctly			
4	Classified risk category (Low / Moderate / High)			
5	Documented findings			

Post-Procedure Care:

- Share results with supervising dietitian
- Maintain record

Supervisor Signature & Date: _____

Skill 20: Subjective Global Assessment (SGA)

Purpose: To assess nutritional status using history and physical examination parameters.

Materials Required:

- SGA assessment form
- Patient medical history
- Pen / clipboard

Pre-Procedure Preparation:

- Review diagnosis & clinical history
- Explain procedure to patient

Checklist

Sr. No	Task	Yes	No	Comments
1	Assessed weight change history			
2	Reviewed dietary intake changes			
3	Assessed gastrointestinal symptoms			
4	Evaluated functional capacity			
5	Observed muscle and fat stores			
6	Assigned SGA category (A / B / C)			
7	Documented findings clearly			

Post-Procedure Care:

- Discuss findings with supervisor
- File assessment appropriately

Supervisor Signature & Date: _____

CASE STUDY TEMPLATE – MULTIPLE MICRONUTRIENT DEFICIENCIES

- Patient Age & Gender:
- Diagnosis:
- Observed Signs & Symptoms:
- Identified Nutrient Deficiencies:
- Supporting Clinical / Laboratory Findings:
- Nutrition-Relevant Learning Points:

BIOCHEMICAL MARKER INTERPRETATION SHEET

Test	Patient Value	Normal Range	Nutrition Interpretation

STUDENT DECLARATION

I hereby declare that the clinical competencies and assessment activities recorded in this workbook are my own and were completed according to program requirements.

Student Signature: _____Date: _____

FACULTY VERIFICATION

This is to certify that the above-mentioned student has satisfactorily completed the required clinical competencies for **NOURISH–II (Semester–III)**.

Faculty Name: _____
Signature: _____
Date: _____

SEMESTER–IV NOURISH III

Clinical Nutrition Applications, Food Safety, Functional Foods & Life Cycle Nutrition

Clinical Competency Workbook / Logbook
Program: BS Human Nutrition & Dietetics
Credit Hours: 02 (Clinical)
Clinical Attachment: Observer ship with Clinical Nutritionist / Hospital Food Services

COURSE DESCRIPTION

NOURISH–III is an advanced clinically oriented competency module designed to strengthen students' applied skills in food microbiology and food safety, functional foods and nutraceuticals, clinical meal planning and management, and nutrition across the life cycle.
The course emphasizes hospital-based observer ship, patient-centered nutrition planning, food safety risk assessment, and evidence-based nutrition counselling under supervision.
Students develop competencies in clinical meal planning, functional food application, hospital food safety systems, and life-stage–specific nutrition assessment, preparing them for independent clinical rotations in later semesters.

CLINICAL ROTATION / EXPOSURE PLAN

• **Duration:** Semester-long (as per academic calendar)
• **Nature of Exposure:**
o Hospital wards & nutrition OPD
o Hospital kitchen & food service units
o Observership with clinical dietitian
o Supervised demonstrations

• **Student Role:**
o Observer and supervised performer
o No independent diet prescription

• **Supervision:**
o Faculty clinical instructor
o Clinical nutritionist / dietitian

CLINICAL OBJECTIVES

By the end of **NOURISH–III**, the student will be able to:

1. Identify foodborne illness risks and apply food safety principles in clinical settings.
2. Assess hospital food safety systems including HACCP and cold chain management.
3. Apply functional foods and nutraceutical concepts in disease-specific nutrition care.

4. Develop culturally appropriate, cost-effective clinical meal plans under supervision.
5. Apply nutrition assessment and meal planning across all life stages.
6. Observe interdisciplinary collaboration in infection control and nutrition services.
7. Document and correlate clinical findings with nutrition interventions.

EVALUATION CRITERIA (CLINICAL PORTFOLIO)

Sr. No	Clinical Portfolio Content	Weightage	Minimum Frequency
1	Achievement of Clinical Objectives	10%	Weekly
2	Food Safety & Microbiology Skills Logs	20%	Minimum 8
3	Clinical Meal Planning & Nutrient Analysis Records	20%	Minimum 8
4	Functional Foods & Nutraceutical Application Logs	15%	Minimum 6
5	Life Cycle Nutrition Assessment Logs	15%	Minimum 6
6	Hospital Food Service & HACCP Observation Logs	10%	Minimum 4
7	Integrated Clinical Case Study	10%	One submission

LIST OF CLINICAL COMPETENCIES

Levels of Competency: 1–5 (Novice to Expert)

A. Food Microbiology & Food Safety (Clinical Application)

Sr. No	Skill / Competency	Level (1–5)	Minimum Frequency
1	Identify symptoms of foodborne illness in patients		5
2	Interpret food poisoning cases from patient files		4
3	Relate culture & sensitivity reports to food safety risk		4
4	Identify high-risk foods for vulnerable patients		5
5	Observe hospital food safety protocols		6
6	Monitor cold chain temperature logs		4
7	Identify HACCP critical control points		4
8	Participate in supervised food safety audits		3
9	Apply hand hygiene and infection control principles		6

B. Functional Foods & Nutraceuticals (Clinical Skills)

Sr. No	Skill / Competency	Level (1–5)	Minimum Frequency
1.	Identify patients benefiting from functional foods		5
2.	Review nutraceutical supplement labels		5
3.	Assess safety and contraindications of supplements		4
4.	Identify signs of over-supplementation		4
5.	Observe counselling on functional foods		6
6.	Assist in development of functional food meal plans		4
7.	Monitor tolerance and response to nutraceuticals		4

C. Meal Planning & Management in Clinical Practice

Sr. No	Skill / Competency	Level (1–5)	Minimum Frequency
1.	Apply DRIs, RDAs & national guidelines		6
2.	Use food exchange lists for portion planning		6
3.	Analyze diets using food composition tables/software		6
4.	Modify diets based on cost and feasibility		5
5.	Develop culturally appropriate meal plans		5
6.	Prepare disease-specific diet plans		6
7.	Review and update hospital diet sheets		4
8.	Present diet plans with clinical justification		4

D. Nutrition Throughout the Life Cycle (Clinical Skills)

Sr. No	Skill / Competency	Level (1–5)	Minimum Frequency
1.	Assess infant & young child feeding practices		4
2.	Calculate pediatric nutrient requirements		4
3.	Assess maternal nutrition during pregnancy		4
4.	Assess lactation nutrition and feeding practices		4
5.	Conduct adolescent nutrition assessment		4
6.	Assess adult nutrition-related risk factors		4
7.	Screen geriatric patients for malnutrition		4
8.	Observe life-cycle–specific meal planning		4

Sr. No	Competency	Faculty Signature	Date	Clinical Supervisor Signature	Date
1	Identify and interpret symptoms of foodborne illness in clinical cases				
2	Review patient files for suspected food poisoning and relate to dietary exposure				
3	Interpret culture and sensitivity reports related to foodborne infections				
4	Identify high-risk foods for immunocompromised, oncology, neonatal, and elderly patients				
5	Assess hospital diets for potential microbial contamination risks				
6	Monitor cold storage temperatures in hospital kitchens				
7	Compare cold chain temperature logs with hospital food safety standards				
8	Identify breaks in cold chain and potential patient safety risks				
9	Identify HACCP Critical Control Points (CCPs) in hospital meal preparation				
10	Identify spoilage indicators (odor, color, texture changes) in food items				
11	Observe hygiene and infection control practices in food preparation areas				
12	Apply hand hygiene principles while entering food service areas				
13	Observe collaboration between nutrition and infection control teams				
14	Participate in supervised food safety audits				
15	Identify patients who may benefit from functional foods				
16	Review disease conditions suitable for functional food intervention (CVD, diabetes, PCOS, gut disorders)				

17	Interpret nutraceutical and supplement labels used in wards or OPD				
18	Assess supplement safety, dosage, and contraindications				
19	Identify signs of vitamin toxicity or over-supplementation				
20	Identify potential herb–drug or nutrient–drug interactions				
21	Observe patient counselling on functional foods for disease management				
22	Assist in developing functional food–based meal plans				
23	Monitor patient tolerance to probiotics, prebiotics, or nutraceuticals				
24	Apply DRIs, RDAs, and national dietary guidelines in diet planning				
25	Use food exchange lists for portion calculation				
26	Analyze clinical diets using food composition tables or software				
27	Modify meal plans based on cost, feasibility, and cultural acceptability				
28	Prepare disease-specific meal plans under supervision				
29	Review hospital diet sheets and identify gaps				
30	Propose modifications to hospital diet plans with justification				
31	Assess Infant and Young Child Feeding (IYCF) practices				
32	Calculate pediatric energy, protein, and fluid requirements				
33	Monitor appetite and intake patterns in hospitalized children				
34	Assess maternal nutrition during pregnancy using gestational indicators				

35	Measure MUAC and assess gestational weight gain				
36	Screen nutrition-related pregnancy complications (GDM, nausea, pica)				
37	Observe breastfeeding and infant feeding counselling				
38	Assess chewing and swallowing ability in elderly patients				
39	Screen for sarcopenia using muscle wasting and functional indicators				
40	Identify common medication–nutrient interactions in geriatric patients				
41	Assess hydration status in elderly patients				
42	Perform meal tray assessment and record percentage intake				
43	Provide caregiver guidance on nutrient-dense and texture-modified diets				
44	Document integrated clinical nutrition case involving food safety, diet planning, and life-cycle nutrition				

SECTION 1: FOOD MICROBIOLOGY & BIOTECHNOLOGY (CLINICAL APPLICATION)

SKILL 1: IDENTIFICATION & INTERPRETATION OF FOODBORN ILLNESS IN CLINICAL SETTINGS

Purpose:
To enable students to identify foodborne illnesses through clinical symptoms and laboratory findings and relate them to food safety risks.

Materials Required:
• Patient medical file
• Laboratory reports (culture & sensitivity)
• Clinical observation sheet
• Pen and clipboard

Checklist

Sr. No	Tasks	Yes	No	Comments
1	Review patient file for suspected food poisoning			
2	Identify key symptoms (vomiting, diarrhea, fever, dehydration)			
3	Correlate symptoms with possible microbial cause			
4	Interpret culture and sensitivity report			
5	Relate findings to food safety risk			

Faculty Signature: _____Date: _____

Clinical Supervisor Signature: _____Date: _____

SKILL 2: ASSESSING FOOD SAFETY RISKS FOR VULNERABLE PATIENTS

Purpose:
To assess hospital diets for contamination risks in vulnerable populations.

Materials Required:
• Hospital diet sheets
• Patient list
• Food safety guidelines

Checklist

Sr. No	Tasks	Yes	No	Comments
1	Identify vulnerable patient category			
2	Review diet for high-risk foods			
3	Identify unsafe food items			
4	Document contamination risk			
5	Suggest safer alternatives			

Faculty Signature: _____Date: _____
Clinical Supervisor Signature: _____Date: _____

SKILL 3: PROBIOTIC, PREBIOTIC & FERMENTED FOODS IN CLINICAL NUTRITION

Purpose:
To understand the clinical use of probiotic, prebiotic, and fermented foods.

Materials Required:
• Diet plans
• Supplement labels
• Patient monitoring sheet

Checklist

Sr. No	Tasks	Yes	No	Comments
1	Identify patient eligible for probiotics/prebiotics			
2	Review probiotic/prebiotic food sources			
3	Observe hospital use of fermented foods			
4	Monitor GI tolerance			
5	Document patient response			

Faculty Signature: _____Date: _____
Clinical Supervisor Signature: _____Date: _____

SKILL 4: COLD CHAIN & STORAGE SAFETY IN HOSPITAL KITCHEN

Purpose:
To monitor cold chain practices for patient food safety.

Materials Required:
• Temperature logs
• Refrigerator thermometer
• Food storage guidelines

Checklist

Sr. No	Tasks	Yes	No	Comments
1	Check cold storage temperature			
2	Compare with safety standards			
3	Review temperature logs			
4	Identify cold chain breaches			
5	Report unsafe practices			

Faculty Signature: _____Date: _____
Clinical Supervisor Signature: _____Date: _____

SKILL 5: HOSPITAL HACCP & FOOD SAFETY CRITICAL POINTS

Purpose:
To identify critical control points in hospital meal preparation.

Materials Required:
• HACCP chart
• Kitchen observation checklist

Checklist

Sr. No	Tasks	Yes	No	Comments
1	Identify CCPs in meal flow			
2	Observe hygiene practices			
3	Identify spoilage indicators			
4	Document deviations			
5	Suggest corrective actions			

Faculty Signature: _____Date: _____
Clinical Supervisor Signature: _____Date: _____

SKILL 6: INFECTION CONTROL & FOOD SAFETY COLLABORATION

Purpose:
To ensure safe food handling through collaboration with infection control teams.

Materials Required:
• PPE
• Hand hygiene supplies
• Audit checklist

Checklist

Sr. No	Tasks	Yes	No	Comments
1	Apply hand hygiene before kitchen entry			
2	Observe infection control practices			
3	Participate in food safety audit			
4	Advise food handlers appropriately			
5	Document observations			

Faculty Signature: _____Date: _____
Clinical Supervisor Signature: _____Date: _____

SECTION 2

MEAL PLANNING & MANAGEMENT IN CLINICAL PRACTICE

Skill 2.1: Application of Standards & Guidelines in Clinical Diet Planning

Purpose:
To apply evidence-based dietary standards for safe and adequate patient meal planning.

Equipment / Materials Required:
• DRIs / RDAs charts
• Pakistan Dietary Guidelines
• Food exchange lists
• Patient diet order
• Calculator
• Pen

Checklist

Sr. No	Tasks	Yes	No	Comments
1	Reviewed patient diagnosis and diet order			
2	Selected appropriate RDA/DRI for age & condition			
3	Applied food exchange lists correctly			
4	Estimated portion sizes using hospital standards			
5	Ensured nutrient adequacy and safety			
6	Documented diet plan clearly			

Supervisor Remarks & Signature:

Skill 2.2: Nutrient Analysis of Clinical Diet Plans

Purpose:
To evaluate macro- and micronutrient adequacy of patient meal plans.

Equipment / Materials Required:
• Food composition tables / software
• Patient diet plan
• Calculator
• Pen

Checklist

Sr. No	Tasks	Yes	No	Comments
1	Reviewed full daily meal plan			
2	Calculated total energy intake			
3	Calculated macronutrient distribution			
4	Assessed key micronutrients (iron, calcium, etc.)			
5	Compared intake with recommended values			
6	Identified deficiencies or excesses			
7	Recorded analysis findings			

Supervisor Remarks & Signature:

Skill 2.3: Cost, Feasibility & Cultural Adaptation of Diet Plans

Purpose:
To ensure diet plans are affordable, practical, and culturally acceptable.

Equipment / Materials Required:
• Patient socioeconomic history
• Local food price knowledge
• Cultural food preferences list
• Pen

Checklist

Sr. No	Tasks	Yes	No	Comments
1	Assessed patient's economic constraints			
2	Identified culturally preferred foods			
3	Modified meal plan using local alternatives			
4	Ensured religious/ethnic acceptability			
5	Maintained nutritional adequacy			
6	Finalized feasible diet plan			

Supervisor Remarks & Signature:

Skill 2.4: Case-Based Clinical Meal Planning

Purpose:
To prepare individualized meal plans based on disease conditions.

Equipment / Materials Required:
• Patient case file
• Diet prescription
• Food exchange lists
• Calculator
• Pen

Checklist

Sr. No	Tasks	Yes	No	Comments
1	Reviewed clinical diagnosis			
2	Identified nutrition-related problems			
3	Planned meals for disease condition			
4	Adjusted macronutrients as required			
5	Incorporated dietary restrictions			
6	Prepared complete daily meal plan			
7	Provided clinical justification			

Applicable Conditions:
☐ Obesity ☐ Diabetes / PCOS ☐ Hypertension ☐ Food Intolerance

Supervisor Remarks & Signature:

Skill 2.5: Hospital Diet Sheet Review & Modification

Purpose:
To critically evaluate and update hospital diet sheets.

Equipment / Materials Required:
• Hospital diet sheets
• Patient diet orders
• Nutrient standards
• Pen

Checklist

Sr. No	Tasks	Yes	No	Comments
1	Reviewed existing hospital diet sheet			
2	Identified nutritional gaps			
3	Suggested evidence-based modifications			
4	Ensured diet safety for clinical condition			
5	Updated meal components			
6	Documented changes with rationale			

Supervisor Remarks & Signature:

Skill 2.6: Presentation of Clinical Diet Plan with Justification

Purpose:
To present diet plans with nutrient analysis and clinical reasoning.

Equipment / Materials Required:
• Completed diet plan
• Nutrient analysis data
• Patient case summary

Checklist

Sr. No	Tasks	Yes	No	Comments
1	Presented patient case clearly			
2	Explained dietary goals			
3	Justified food selections			
4	Explained nutrient modifications			
5	Answered supervisor questions			
6	Maintained professional communication			

Supervisor Remarks & Signature:

SECTION 3

FUNCTIONAL FOODS & NUTRACEUTICALS

Skill 3.1: Identification of Functional Food Needs in Patients

Purpose:
To identify patients who may benefit from functional foods based on clinical condition.

Equipment / Materials Required:
• Patient medical file
• Diet history
• Functional food reference list
• Pen

Checklist

Sr. No	Tasks	Yes	No	Comments
1	Reviewed patient diagnosis			
2	Identified nutrition-related risk factors			
3	Screened for chronic disease conditions			
4	Identified potential functional food benefits			
5	Linked food choices with clinical goals			
6	Documented findings clearly			

Applicable Conditions:
☐ CVD ☐ Diabetes ☐ Gut disorders ☐ Osteoporosis ☐ Metabolic syndrome

Supervisor Remarks & Signature:

Skill 3.2: Evaluation of Nutraceuticals & Supplements

Purpose:
To assess safety, dosage, and appropriateness of nutraceutical use.

Equipment / Materials Required:
• Supplement labels
• Patient medication chart
• Nutrient reference values
• Pen

Checklist

Sr. No	Tasks	Yes	No	Comments
1	Reviewed supplement name and ingredients			
2	Checked dosage against recommended limits			
3	Identified contraindications			
4	Assessed potential drug–nutrient interactions			
5	Observed signs of over-supplementation			
6	Documented supplement evaluation			

Supervisor Remarks & Signature:

Skill 3.3: Observation of Adverse Effects & Toxicity

Purpose:
To recognize signs of nutraceutical overuse or intolerance.

Equipment / Materials Required:
• Patient observation chart
• Clinical notes
• Pen

Checklist

Sr. No	Tasks	Yes	No	Comments
1	Assessed GI symptoms (nausea, bloating)			
2	Identified signs of vitamin toxicity			
3	Observed herb–drug interaction effects			
4	Correlated symptoms with supplement intake			
5	Reported findings to supervisor			
6	Documented adverse effects			

Supervisor Remarks & Signature:

Skill 3.4: Evidence-Based Counselling Support (Observation Level)

Purpose:
To observe counselling practices related to functional foods.

Equipment / Materials Required:
• Counselling observation form
• Patient education materials

Checklist

Sr. No	Tasks	Yes	No	Comments
1	Observed counselling session respectfully			
2	Identified disease-specific advice			
3	Noted communication techniques used			
4	Observed use of evidence-based guidance			
5	Identified patient understanding level			
6	Recorded learning observations			

Applicable Areas:
☐ Diabetes ☐ CVD ☐ Oncology ☐ PCOS / Metabolic syndrome

Supervisor Remarks & Signature:

Skill 3.5: Meal Planning with Functional Components

Purpose:
To incorporate functional foods into disease-specific meal plans.

Equipment / Materials Required:
• Patient case file
• Functional food list
• Exchange lists
• Calculator
• Pen

Checklist

Sr. No	Tasks	Yes	No	Comments
1	Reviewed clinical condition			
2	Selected appropriate functional components			
3	Incorporated functional foods into meals			
4	Ensured nutrient balance			
5	Prepared complete meal plan			
6	Documented clinical rationale			

Supervisor Remarks & Signature:

Skill 3.6: Monitoring Response to Nutraceutical Interventions

Purpose:
To observe patient response to functional food or supplement use.

Equipment / Materials Required:
• Anthropometric data
• Biochemical reports (if available)
• Clinical observation notes

Checklist

Sr. No	Tasks	Yes	No	Comments
1	Reviewed baseline measurements			
2	Observed changes in body weight/composition			
3	Assessed GI tolerance			
4	Reviewed biochemical trends			
5	Linked changes to intervention			
6	Documented response			

Supervisor Remarks & Signature:

Skill 3.7: Functional Food & Nutraceutical Education Material Support

Purpose:
To assist in development of simple patient education materials.

Equipment / Materials Required:
• Sample charts/posters
• Patient education leaflets
• Pen

Checklist

Sr. No	Tasks	Yes	No	Comments
1	Identified patient education needs			
2	Selected appropriate content			
3	Ensured accuracy of information			
4	Simplified language for patient use			
5	Assisted in chart/handout preparation			
6	Reviewed material with supervisor			

Supervisor Remarks & Signature:

SECTION 4

NUTRITION THROUGHOUT THE LIFE CYCLE

Skill 4.1: Infant & Young Child Nutrition Assessment

Purpose:
To assess feeding practices, growth patterns, and nutritional adequacy in infants and young children.

Materials Required:
• Growth charts (WHO)
• Feeding history form
• Anthropometric tools
• Pen / clipboard

Pre-Procedure Preparation:
• Verify child's age and caregiver identity
• Explain procedure to caregiver
• Ensure child comfort

Checklist

Sr. No	Task	Yes	No	Comments
1	Verified child's age and feeding stage			
2	Reviewed breastfeeding / complementary feeding history			
3	Assessed meal frequency and food consistency			
4	Measured weight and length accurately			
5	Plotted measurements on WHO growth charts			
6	Identified risk of undernutrition/overfeeding			
7	Documented findings clearly			

Post-Procedure Care:
• Thank caregiver
• Record findings
• Inform supervisor

Supervisor Signature & Date: _____

Skill 4.2: Pediatric Dietary Planning (Observation Level)

Purpose:
To observe age-appropriate meal planning for children.

Materials Required:
• Pediatric meal plans
• Exchange lists
• Feeding guidelines

Checklist

Sr. No	Task	Yes	No	Comments
1	Reviewed child's age and growth status			
2	Observed energy and protein calculation			
3	Noted micronutrient focus (iron, calcium, zinc)			
4	Observed texture progression planning			
5	Reviewed feeding schedule			
6	Documented learning points			

Supervisor Signature & Date: _____

Skill 4.3: Nutrition Assessment in Pregnancy

Purpose:
To assess nutritional status and requirements during pregnancy.

Materials Required:
• Antenatal record
• Weight chart
• Dietary recall form
• Pen

Pre-Procedure Preparation:
• Explain procedure
• Ensure privacy

Checklist

Sr. No	Task	Yes	No	Comments
1	Reviewed gestational age			
2	Recorded pre-pregnancy weight			
3	Monitored gestational weight gain			
4	Assessed dietary intake			
5	Identified micronutrient risks (iron, folate, calcium)			
6	Observed counselling session			
7	Documented findings			

Supervisor Signature & Date: _____

Skill 4.4: Lactation Nutrition Assessment

Purpose:
To assess maternal diet and feeding practices during lactation.

Materials Required:
• Dietary recall form
• Feeding pattern history
• Pen

Checklist

Sr. No	Task	Yes	No	Comments
1	Confirmed lactation stage			
2	Reviewed breastfeeding frequency			
3	Assessed maternal calorie and fluid intake			
4	Identified micronutrient adequacy			
5	Observed counselling session			
6	Recorded observations			

Supervisor Signature & Date: _____

Skill 4.5: Adolescent Nutrition Assessment

Purpose:
To identify nutritional risks during adolescence.

Materials Required:
• Anthropometric tools
• Diet history form
• Growth reference charts

Checklist

Sr. No	Task	Yes	No	Comments
1	Recorded height, weight, BMI			
2	Assessed dietary habits			
3	Identified anemia risk			
4	Assessed calcium and vitamin D intake			
5	Evaluated physical activity			
6	Documented findings			

Supervisor Signature & Date: _____

Skill 4.6: Adult Nutrition Assessment

Purpose:
To assess nutrition-related risk factors in adults.

Materials Required:
• Anthropometric data
• Dietary assessment tools
• Screening tools

Checklist

Sr. No	Task	Yes	No	Comments
1	Calculated BMI			
2	Assessed waist circumference			
3	Reviewed dietary intake			
4	Identified lifestyle risk factors			
5	Observed diet counselling			
6	Documented assessment			

Supervisor Signature & Date: _____

Skill 4.7: Geriatric Nutrition Assessment

Purpose:
To identify malnutrition risk and dietary limitations in elderly patients.

Materials Required:
• MNA/GNRI forms
• MUAC tape
• Diet history form

Checklist

Sr. No	Task	Yes	No	Comments
1	Assessed weight history			
2	Measured MUAC			
3	Evaluated appetite and chewing issues			
4	Screened using MNA/GNRI			
5	Identified sarcopenia risk			
6	Documented findings			

Supervisor Signature & Date: _____

Skill 4.8: Life-Cycle Based Meal Planning (Integrated)

Purpose:
To observe meal planning adjustments across life stages.

Materials Required:
• Case files
• Exchange lists
• Meal plans

Checklist

Sr. No	Task	Yes	No	Comments
1	Identified life stage			
2	Adjusted calorie requirements			
3	Modified protein and micronutrients			
4	Considered cultural preferences			
5	Observed implementation			
6	Recorded learning outcomes			

Supervisor Signature & Date: _____

STUDENT DECLARATION

I hereby declare that the clinical competencies and assessment activities recorded in this workbook are my own and were completed according to program requirements.

Student Signature: _____
Date: _____

FACULTY VERIFICATION

This is to certify that the above-mentioned student has satisfactorily completed the required clinical competencies for **NOURISH–III (Semester–IV)**.

Faculty Name: _____
Signature: _____
Date: _____

SEMESTER–V NOURISH–IV

Hospital Food Systems, Dietetics & Medical Nutrition Therapy

Clinical Competency Workbook / Logbook
Program: BS Human Nutrition & Dietetics
Credit Hours: 03 (Clinical)
Clinical Attachment: Supervised Clinical Dietetics & Hospital Foodservice Exposure

COURSE DESCRIPTION

NOURISH–IV is an advanced clinical competency module designed to integrate hospital food systems management with structured Medical Nutrition Therapy (MNT). The module emphasizes supervised clinical exposure in therapeutic diet planning, hospital foodservice supervision, disease-specific nutrition intervention, and application of the Nutrition Care Process (NCP).

Students develop competency in hospital meal logistics, diet prescription accuracy, therapeutic meal planning for major diseases, interdisciplinary communication, and complete NCP documentation. This module prepares students for independent clinical reasoning and advanced therapeutic decision-making in subsequent professional practice.

CLINICAL ROTATION / EXPOSURE PLAN

Duration: Semester-long (as per academic calendar)

Nature of Exposure:

- Hospital diet office and foodservice department
- Clinical wards and nutrition OPD
- Supervised therapeutic diet planning
- Case-based MNT discussions

Student Role:

- Supervised performer
- Assisted therapeutic diet planner
- No independent clinical prescription

Supervision:

- Faculty Clinical Instructor
- Senior Clinical Dietitian
- Hospital Foodservice Manager

CLINICAL OBJECTIVES

By the end of NOURISH–IV, the student will be able to:

1. Analyze hospital food supply chain and patient meal logistics.

2. Supervise therapeutic diet preparation and tray accuracy.
3. Apply the complete Nutrition Care Process (NCP).
4. Develop individualized therapeutic meal plans for major diseases.
5. Interpret clinical and biochemical parameters in MNT planning.
6. Integrate hospital food systems with disease-specific nutrition therapy.
7. Document structured clinical case records under supervision.

EVALUATION CRITERIA (CLINICAL PORTFOLIO)

Sr. No	Clinical Portfolio Content	Weightage	Frequency
1	Achievement of Clinical Objectives	10%	Weekly
2	Hospital Food Systems Observation Reports	15%	Minimum 5
3	Therapeutic Meal Planning Records	20%	Minimum 10
4	Disease-Specific MNT Case Files	20%	Minimum 8
5	NCP Documentation Sheets	15%	Minimum 8
6	Foodservice Supervision Logs	10%	Minimum 5
7	Comprehensive Integrated Case Study	10%	One submission

LIST OF CLINICAL COMPETENCIES

Levels of Competency: 1–5 (Novice to Expert)

A. Hospital Food Systems & Foodservice Management

Sr. No	Skill / Competency	Level (1–5)	Minimum Frequency
1	Analyze hospital food procurement and supply chain process	4	4
2	Evaluate therapeutic menu cycles for adequacy	4	4
3	Supervise therapeutic tray accuracy and portion control	4	6
4	Monitor temperature control and food safety compliance	4	5
5	Assess workflow efficiency in hospital kitchen	3	3
6	Apply allergen-control protocols in hospital diets	4	4
7	Document foodservice quality control observations	4	5

B. Nutrition Care Process (NCP)

Sr. No	Skill	Level (1–5)	Minimum Frequency
1.	Conduct comprehensive nutrition assessment	4	8
2.	Formulate accurate PES statements	4	8
3.	Develop individualized diet prescriptions	4	8
4.	Implement therapeutic nutrition interventions	4	8
5.	Monitor and evaluate measurable outcomes	4	6
6.	Complete structured NCP documentation	4	8

C. Medical Nutrition Therapy (Disease-Specific)

Sr. No	Skill	Level (1–5)	Minimum Frequency
1.	Develop calorie-controlled diet for obesity	4	4
2.	Plan carbohydrate-controlled diet for diabetes	4	6

3.	Design high-protein rehabilitation diet for PEM	4	4
4.	Develop cardioprotective diet for CVD	4	4
5.	Plan sodium-restricted diet for hypertension	4	4
6.	Develop therapeutic diet for liver disorders	3	3
7.	Plan diet for pancreatitis (acute/chronic stages)	3	3
8.	Design diet for GERD and peptic ulcer disease	3	3
9.	Develop elimination diet for food allergies	4	3

D. Integrated Clinical Reasoning

Sr. No	Skill	Level (1–5)	Minimum Frequency
1.	Identify food–drug interactions	4	5
2.	Interpret laboratory findings for MNT planning	4	6
3.	Develop integrated case-based nutrition interventions	4	4
4.	Demonstrate interdisciplinary communication in patient care	4	4

CLINICAL COMPETENCY LOGBOOK

Sr. No	Competency	Faculty Signature	Date	Clinical Supervisor Signature	Date
1	Analyze hospital food supply chain and patient meal distribution				
2	Supervise therapeutic tray preparation and portion accuracy				
3	Apply food safety and allergen-control measures in foodservice				

4	Conduct comprehensive nutrition assessment				
5	Formulate accurate PES statements				
6	Develop individualized diet prescriptions under supervision				
7	Implement therapeutic nutrition interventions				
8	Monitor and evaluate patient nutrition outcomes				
9	Develop therapeutic meal plan for diabetes mellitus				
10	Develop therapeutic meal plan for obesity				
11	Develop therapeutic meal plan for cardiovascular disease				
12	Develop therapeutic meal plan for hypertension				
13	Develop therapeutic meal plan for liver disorders				
14	Develop therapeutic meal plan for gastrointestinal disorders				
15	Identify and document food–drug interactions				
16	Complete structured NCP documentation				
17	Submit integrated comprehensive clinical case study				

DETAILED SKILL CHECKLISTS

SECTION A: HOSPITAL FOOD SYSTEMS & FOODSERVICE MANAGEMENT

Skill A1: Analysis of Hospital Food Procurement & Supply Chain

Purpose:
To evaluate the hospital food procurement system and trace the supply chain from vendor sourcing to patient meal delivery, identifying quality, safety, and efficiency gaps.

Materials Required:
• Procurement records and vendor contracts
• Inventory stock registers
• Storage inspection checklist
• Food receiving logbook
• Supply chain observation sheet
• Pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review vendor selection and procurement procedures			
2	Trace food pathway from receiving to patient plate			
3	Evaluate food quality at receiving stage			
4	Assess storage practices (dry, refrigerated, frozen)			
5	Identify potential safety compromise points			
6	Document supply chain inefficiencies			

Skill A2: Evaluation of Therapeutic Menu Cycles

Purpose:
To assess hospital menu cycles for nutritional adequacy, therapeutic appropriateness, cost-efficiency, and patient acceptability.

Materials Required:
• Hospital menu cycle (weekly/monthly)
• Therapeutic diet standards
• Nutrient calculation sheets
• Cost analysis sheet
• Patient feedback forms

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review menu cycle for nutritional adequacy			
2	Compare menus with therapeutic diet guidelines			
3	Assess variety and seasonal appropriateness			
4	Evaluate affordability and cost control measures			
5	Identify gaps in meeting patient needs			
6	Document recommendations for improvement			

Skill A3: Supervision of Therapeutic Tray Accuracy & Portion Control

Purpose:
To ensure accuracy in therapeutic tray assembly and compliance with prescribed diet orders.

Materials Required:
• Diet slips and medical charts
• Tray audit checklist
• Portion control tools (ladles, scoops, scales)
• Exchange list reference

Checklist:

Sr. No	Task	Yes	No	Comments
1	Verify prescribed diet with medical chart			
2	Cross-check tray contents with diet slip			
3	Evaluate portion sizes against standards			
4	Identify incorrect substitutions			
5	Report discrepancies to diet office			
6	Document tray supervision findings			

Skill A4: Monitoring Temperature Control & Food Safety Compliance

Purpose:
To monitor temperature maintenance and adherence to food safety protocols during preparation and distribution.

Materials Required:
• Food thermometer
• Temperature log sheets
• HACCP checklist
• Food safety compliance form

Checklist:

Sr. No	Task	Yes	No	Comments
1	Record hot and cold holding temperatures			
2	Verify compliance with HACCP principles			
3	Assess hygiene practices of staff			
4	Observe cross-contamination prevention measures			
5	Identify food safety violations			
6	Document corrective actions			

Skill A5: Assessment of Workflow Efficiency in Hospital Kitchen

Purpose:
To evaluate operational workflow efficiency from receiving to sanitation and identify bottlenecks affecting patient meal delivery.

Materials Required:
• Workflow observation sheet
• Kitchen layout plan
• Staff duty roster
• Time tracking log

Checklist:

Sr. No	Task	Yes	No	Comments
1	Observe receiving to preparation workflow			
2	Assess coordination between diet office and kitchen			
3	Identify delays in meal preparation			
4	Evaluate sanitation workflow post-service			
5	Document inefficiencies and improvement areas			

Skill A6: Application of Allergen-Control Protocols

Purpose:
To ensure prevention of allergen cross-contamination and safe preparation of allergen-free diets.

Materials Required:
• Allergen-control policy manual
• Allergen identification checklist
• Dedicated allergen-free equipment list
• Food labeling guidelines

Checklist:

Sr. No	Task	Yes	No	Comments
1	Identify common hospital food allergens			
2	Verify separate preparation areas if applicable			
3	Confirm use of dedicated equipment			
4	Check labeling of allergen-free trays			
5	Observe cross-contamination prevention practices			
6	Document allergen-control compliance			

Skill A7: Documentation of Foodservice Quality Control

Purpose:
To systematically record quality control observations in hospital foodservice operations.

Materials Required:
• Quality control checklist
• Audit reporting form
• Incident report format
• Pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Conduct structured foodservice audit			
2	Record deviations from standards			
3	Document corrective recommendations			
4	Submit quality control report to supervisor			
5	Follow up on implemented improvements			

SECTION B: NUTRITION CARE PROCESS (NCP)

Skill B1: Conduct Comprehensive Nutrition Assessment

Purpose:
To systematically collect and interpret anthropometric, biochemical, clinical, dietary, and psychosocial data for accurate identification of nutrition problems.

Materials Required:
• Patient medical records
• Anthropometric tools (weighing scale, stadiometer, MUAC tape)
• Laboratory reports
• 24-hour dietary recall form
• Food frequency questionnaire
• Nutrition assessment format
• Pen, calculator

Checklist:

Sr. No	Task	Yes	No	Comments
1	Collect anthropometric measurements (weight, height, BMI)			
2	Review relevant biochemical parameters			
3	Assess clinical signs and medical history			
4	Conduct detailed dietary intake assessment			
5	Evaluate medication use and nutrition impact symptoms			
6	Assess socioeconomic and lifestyle factors			
7	Identify potential nutrition risk factors			
8	Document findings in structured format			

Skill B2: Formulate Accurate PES Statements

Purpose:
To develop clear and evidence-based PES (Problem–Etiology–Signs/Symptoms) statements based on assessment findings.

Materials Required:
• Completed nutrition assessment form
• PES reference guidelines
• Diagnostic terminology reference
• Pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Identify primary nutrition problem			
2	Determine root cause (etiology)			
3	Link signs and symptoms with assessment data			
4	Write complete PES statement using correct format			
5	Ensure problem is nutrition-related and actionable			
6	Validate PES statement with supervisor			

Skill B3: Develop Individualized Diet Prescriptions

Purpose:
To formulate patient-specific therapeutic diet plans based on medical diagnosis, biochemical findings, and nutrition assessment.

Materials Required:
• PES statement
• Diet calculation sheets
• Exchange list manual
• DRIs/RDA reference
• Therapeutic diet guidelines
• Calculator

Checklist:

Sr. No	Task	Yes	No	Comments
1	Calculate energy requirements			
2	Determine macronutrient distribution			
3	Adjust micronutrients as per disease condition			
4	Use exchange list for meal planning			
5	Customize diet according to patient preferences			
6	Align diet with medical diagnosis			
7	Document complete diet prescription			

Skill B4: Implement Therapeutic Nutrition Interventions

Purpose:
To execute nutrition interventions effectively in coordination with healthcare team and patient.

Materials Required:
• Individualized diet prescription
• Patient counseling materials
• Educational handouts
• Monitoring sheet
• Pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Explain diet plan to patient clearly			
2	Provide culturally appropriate meal guidance			
3	Coordinate diet implementation with nursing staff			
4	Address patient concerns and barriers			
5	Ensure therapeutic diet delivery in ward			
6	Document intervention implementation			

Skill B5: Monitor and Evaluate Measurable Outcomes

Purpose:
To assess effectiveness of nutrition intervention using measurable clinical and dietary indicators.

Materials Required:
• Follow-up assessment forms
• Weight monitoring chart
• Laboratory follow-up reports
• Intake monitoring sheets
• Pen, calculator

Checklist:

Sr. No	Task	Yes	No	Comments
1	Monitor changes in body weight			
2	Review follow-up laboratory results			
3	Evaluate dietary adherence			
4	Assess symptom improvement			
5	Modify diet plan if required			
6	Document measurable outcomes			

Skill B6: Complete Structured NCP Documentation

Purpose:
To accurately document all four steps of the Nutrition Care Process in hospital records.

Materials Required:
• Hospital patient file
• NCP documentation template
• Assessment and monitoring data
• Pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Document Assessment findings			
2	Record finalized PES statement			
3	Document Intervention plan			
4	Record Monitoring & Evaluation plan			
5	Ensure documentation clarity and completeness			
6	Obtain supervisor verification if required			

SECTION C

MEDICAL NUTRITION THERAPY (DISEASE-SPECIFIC)

Skill C1: Calorie-Controlled Diet for Obesity

Purpose:
To facilitate gradual, sustainable weight reduction through energy deficit planning while preserving lean body mass.

Materials Required:
• Anthropometric tools (weight, height, BMI chart)
• Dietary recall form
• Calorie calculation sheets
• Physical activity assessment form

Checklist:

Sr. No	Task	Yes	No	Comments
1	Assess BMI and obesity classification			
2	Calculate total energy expenditure			
3	Prescribe appropriate calorie deficit			
4	Plan balanced macronutrient distribution			
5	Include fiber-rich and low-energy dense foods			
6	Counsel on behavior modification strategies			
7	Document measurable weight goals			

Skill C2: Carbohydrate-Controlled Diet for Diabetes Mellitus

Purpose:
To optimize glycemic control through structured carbohydrate distribution and meal planning.

Materials Required:
• Blood glucose records
• HbA1c report
• Exchange list / carbohydrate counting sheets
• Diet calculation sheet

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review blood glucose trends			
2	Calculate carbohydrate allowance			
3	Distribute carbohydrates evenly across meals			
4	Select low glycemic index foods			
5	Integrate fiber-rich foods			
6	Counsel on hypoglycemia prevention			
7	Document dietary plan and monitoring strategy			

Skill C3: High-Protein Rehabilitation Diet for PEM

Purpose:
To correct protein-energy malnutrition and restore nutritional status safel

Checklist:

Sr. No	Task	Yes	No	Comments
1	Assess grade of malnutrition			
2	Calculate increased energy requirements			
3	Calculate high protein needs			
4	Plan energy-dense meals			
5	Monitor weight and clinical recovery			
6	Document rehabilitation progress			

Skill C4: Cardioprotective Diet for Cardiovascular Disease

Purpose:
To reduce cardiovascular risk through lipid and sodium modification.

Checklist:

Sr. No	Task	Yes	No	Comments
1	Interpret lipid profile			
2	Reduce saturated and trans fats			
3	Encourage omega-3 intake			
4	Increase soluble fiber			
5	Control sodium intake			
6	Monitor weight and lipid trends			

Skill C5: Sodium-Restricted Diet for Hypertension

Purpose:
To manage elevated blood pressure through controlled sodium intake.

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review blood pressure readings			
2	Calculate sodium allowance			
3	Eliminate high-sodium processed foods			
4	Educate on label reading			
5	Encourage potassium-rich foods			
6	Document BP response			

Skill C6: MNT for Acute Viral Hepatitis

Purpose:
To support hepatic regeneration, maintain adequate nutritional intake during anorexia and fatigue, and prevent protein-energy malnutrition during the acute inflammatory phase.

Materials Required:
• Liver function test reports (ALT, AST, bilirubin, ALP)
• Clinical symptom assessment notes
• Dietary recall format
• Energy and protein calculation sheets
• Diet planning worksheet
• Monitoring chart

Checklist:

Sr. No	Task	Yes	No	Comments
1	Interpret LFT results			
2	Assess appetite and nausea			
3	Calculate energy needs			
4	Provide high-carbohydrate, moderate-protein diet			
5	Modify fat intake if needed			
6	Monitor recovery progress			

Skill C7: MNT for Compensated Cirrhosis

Purpose:
To prevent sarcopenia and malnutrition in chronic liver disease through adequate protein-energy intake and structured meal timing.

Materials Required:
• LFT and albumin reports
• Anthropometric assessment tools
• Muscle wasting assessment form
• Protein requirement calculation sheets
• Meal distribution chart

Checklist:

Sr. No	Task	Yes	No	Comments
1	Assess muscle wasting			
2	Calculate higher protein needs			
3	Plan small frequent meals			
4	Include late evening snack			
5	Monitor weight and labs			

Skill C8: MNT for Cirrhosis with Ascites

Purpose:
To manage sodium and fluid imbalance, control ascites, and maintain adequate nutrition in decompensated liver disease.

Materials Required:
• Sodium calculation chart
• Fluid balance sheet
• Weight monitoring chart
• Diet planning worksheet
• Electrolyte reports

Checklist:

Sr. No	Task	Yes	No	Comments
1	Assess fluid retention			
2	Implement sodium restriction			
3	Monitor fluid balance			
4	Track daily weight			
5	Adjust diet per clinical response			

Skill C9: MNT for Hepatic Encephalopathy

Purpose:
To reduce nitrogen load and ammonia production while preserving nutritional status and preventing muscle breakdown.

Materials Required:
• Serum ammonia reports
• Mental status assessment chart
• Protein modification guidelines
• Diet calculation sheets
• Monitoring chart

Checklist:

Sr. No	Task	Yes	No	Comments
1	Assess mental status			
2	Modify protein intake temporarily			
3	Prefer plant-based proteins			
4	Monitor ammonia levels			
5	Gradually liberalize diet			

Skill C10: MNT for NAFLD / NASH

Purpose:
To reduce hepatic steatosis and improve metabolic parameters through weight reduction and dietary modification.

Materials Required:
• BMI and anthropometric data
• Lipid profile
• Fasting glucose / insulin reports
• Calorie calculation sheets
• Meal planning template

Checklist:

Sr. No	Task	Yes	No	Comments
1	Assess BMI and metabolic risk			
2	Prescribe calorie deficit			
3	Reduce refined carbohydrates			
4	Encourage Mediterranean-style pattern			
5	Monitor weight reduction			

Skill C11: MNT for Acute Pancreatitis

Purpose:
To minimize pancreatic stimulation during acute inflammation and ensure safe, gradual reintroduction of oral feeding.

Materials Required:
• Serum amylase and lipase reports
• Pain assessment chart
• Diet progression protocol
• Low-fat diet planning sheet
• Monitoring record

Checklist:

Sr. No	Task	Yes	No	Comments
1	Confirm diagnosis			
2	Initiate NPO if indicated			
3	Begin clear liquids when stable			
4	Progress to low-fat diet			
5	Monitor tolerance			

Skill C12: MNT for Chronic Pancreatitis

Purpose:
To manage malabsorption, prevent nutrient deficiencies, and maintain body weight in chronic pancreatic insufficiency.

Materials Required:
• Clinical malabsorption assessment sheet
• Weight monitoring chart
• Fat-soluble vitamin evaluation
• Diet planning sheet
• PERT reference guidelines

Checklist:

Sr. No	Task	Yes	No	Comments
1	Assess malabsorption signs			
2	Plan moderate-fat diet with PERT			
3	Monitor fat-soluble vitamins			
4	Encourage small frequent meals			
5	Track weight changes			

Skill C13: MNT for GERD

Purpose:
To reduce frequency and severity of reflux episodes through dietary modification and behavioral counseling.

Materials Required:
• Symptom diary
• Dietary recall form
• Trigger food checklist
• Meal timing counseling guide
• Diet planning sheet

Checklist:

Sr. No	Task	Yes	No	Comments
1	Identify trigger foods			
2	Avoid fatty and acidic foods			
3	Plan small frequent meals			
4	Counsel on meal timing			
5	Monitor symptom improvement			

Skill C14: MNT for Peptic Ulcer Disease

Purpose:
To promote gastric mucosal healing and reduce dietary irritation.

Materials Required:
• Symptom assessment form
• Diet planning worksheet
• Irritant food checklist
• Monitoring record

Checklist:

Sr. No	Task	Yes	No	Comments
1	Assess ulcer symptoms			
2	Eliminate irritant foods			
3	Ensure adequate protein intake			
4	Avoid alcohol and smoking triggers			
5	Monitor healing progress			

Skill C15: MNT for Gastritis

Purpose:
To reduce gastric inflammation and improve dietary tolerance.

Materials Required:
• Clinical symptom record
• Diet planning sheet
• Bland diet guidelines
• Monitoring chart

Checklist:

Sr. No	Task	Yes	No	Comments
1	Identify irritant factors			
2	Provide bland soft diet			
3	Ensure micronutrient adequacy			
4	Monitor symptom resolution			

Skill C16: Elimination Diet for Food Allergies

Purpose:
To identify and manage food allergens while maintaining nutritional adequacy.

Materials Required:
• Detailed dietary history form
• Allergen identification checklist
• Label reading guide
• Diet substitution chart
• Monitoring and reintroduction plan

Checklist:

Sr. No	Task	Yes	No	Comments
1	Identify suspected allergen			
2	Eliminate allergen from diet			
3	Ensure nutritional adequacy			
4	Educate on label reading			
5	Monitor reintroduction phase			

SECTION D

INTEGRATED CLINICAL REASONING

Skill D1: Identify Food–Drug Interactions

Purpose:
To recognize and manage clinically significant food–drug and nutrient–drug interactions that may alter drug efficacy, nutrient absorption, or patient safety.

Materials Required:
• Patient medication chart
• Drug reference manual / interaction database
• Dietary recall form
• Food–drug interaction reference sheet
• Documentation format

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review complete medication list			
2	Identify drugs with food-related restrictions			
3	Assess nutrient depletion risks (e.g., diuretics, antacids)			
4	Evaluate timing of meals and medication administration			
5	Provide dietary modifications accordingly			
6	Educate patient on critical food–drug precautions			
7	Document identified interactions and recommendations			

Skill D2: Interpret Laboratory Findings for MNT Planning

Purpose:
To analyze biochemical parameters and correlate findings with clinical nutrition diagnosis and intervention planning.

Materials Required:
• Laboratory reports (CBC, LFT, RFT, lipid profile, glucose, electrolytes)
• Reference value chart
• Clinical notes
• Nutrition assessment form
• Documentation sheet

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review complete laboratory profile			
2	Compare values with reference ranges			
3	Identify nutrition-related abnormalities			
4	Correlate lab findings with clinical signs			
5	Prioritize nutrition problems based on severity			
6	Modify diet prescription accordingly			
7	Document interpretation in NCP format			

Skill D3: Develop Integrated Case-Based Nutrition Interventions

Purpose:
To synthesize assessment data, laboratory findings, and clinical diagnosis into a comprehensive, individualized nutrition care plan.

Materials Required:
• Complete patient case file
• Nutrition assessment data
• PES statement template
• Diet calculation sheets
• Monitoring and evaluation format

Checklist:

Sr. No	Task	Yes	No	Comments
1	Conduct comprehensive nutrition assessment			
2	Formulate accurate PES statement			
3	Establish measurable nutrition goals			
4	Develop individualized diet prescription			
5	Integrate medical and dietary considerations			
6	Plan monitoring and evaluation strategy			
7	Document complete NCP cycle			

Skill D4: Demonstrate Interdisciplinary Communication in Patient Care

Purpose:
To effectively collaborate with physicians, nurses, pharmacists, and other healthcare professionals to optimize patient nutrition outcomes.

Materials Required:
• Patient progress notes
• Case discussion format
• Communication documentation sheet
• Clinical rounds observation sheet

Checklist:

Sr. No	Task	Yes	No	Comments
1	Participate in case discussions or rounds			
2	Present nutrition assessment findings clearly			
3	Communicate diet modifications to healthcare team			
4	Clarify medication-related dietary concerns			
5	Document interdisciplinary communication			
6	Incorporate team feedback into care plan			

SEMESTER–VI NOURISH–V

Community Nutrition, Counseling Skills & Medical Nutrition Therapy–II
Clinical Competency Workbook / Logbook
Program: BS Human Nutrition & Dietetics
Credit Hours: 03 (Clinical)
Clinical Attachment: Community Health Centers, Pediatric OPDs, Nutrition Rehabilitation Centers (NRC), Hospital Dietetics Units, Counseling Clinics

COURSE DESCRIPTION

NOURISH–V is an advanced clinical and community-based competency module designed to integrate **community nutrition practices, therapeutic nutrition skills, medical nutrition therapy (MNT-II), and patient-centered counseling techniques**.

This course provides structured exposure to **growth monitoring, malnutrition management, therapeutic feeding protocols, advanced Nutrition Care Process (NCP), disease-specific diet modification, perioperative nutrition, oncology care, infectious disease nutrition management, and behavioral counseling strategies**.

Emphasis is placed on applying **evidence-based clinical decision-making**, completing full **ADIME documentation**, and delivering **psychologically informed nutrition counseling** in hospital and community settings.

Students are expected to demonstrate competency in both **technical diet therapy planning** and **behavior-focused patient communication**, preparing them for integrated clinical practice.

CLINICAL ROTATION / EXPOSURE PLAN

- **Duration:** Semester-long (as per academic calendar)
- **Nature of Exposure:**
    - Community health centers and maternal-child health clinics
    - Pediatric OPD and Nutrition Rehabilitation Centers (NRC)
    - Hospital dietetics and therapeutic nutrition units
    - Oncology and infectious disease wards
    - Counseling clinics and behavioral nutrition sessions
- **Student Role:**
  Observer and supervised performer (no independent prescriptions)
- **Supervision:**
  Clinical instructor / hospital dietitian / community nutrition supervisor

CLINICAL OBJECTIVES

By the end of NOURISH–V, the student will be able to:

1. Conduct growth monitoring and assess infant and child nutritional status using standard anthropometric tools.
2. Classify and manage malnutrition (SAM/MAM) using CMAM and therapeutic feeding protocols.
3. Apply advanced Nutrition Care Process (NCP) and complete ADIME documentation accurately.
4. Develop disease-specific MNT plans for gastrointestinal, pulmonary, endocrine, infectious, oncologic, and perioperative conditions.
5. Modify food texture and consistency using IDDSI guidelines where indicated.
6. Utilize biochemical and clinical indicators to adjust diet prescriptions.
7. Deliver patient-centered nutrition counseling using motivational interviewing and CBT-based strategies.
8. Screen and assess eating disorders using validated tools.
9. Integrate biological, psychological, and sociocultural factors into nutrition care planning.
10. Evaluate counseling outcomes and modify interventions accordingly.

EVALUATION CRITERIA (CLINICAL PORTFOLIO)

Sr. No	Clinical Portfolio Content	Weightage	Minimum Frequency
1	Achievement of Clinical Objectives	10%	Weekly
2	Community Nutrition & Growth Monitoring Logs	15%	Minimum 6
3	Malnutrition (SAM/MAM) Case Logs	10%	Minimum 5
4	Advanced NCP (ADIME) Documentation Cases	15%	Minimum 6
5	Disease-Specific MNT (GI, Pulmonary, Endocrine, Oncology, etc.)	25%	Minimum 10
6	Surgery & Perioperative Nutrition Cases	5%	Minimum 3
7	Nutrition Counseling Sessions & Behavioral Case Logs	15%	Minimum 6
8	Eating Disorder Screening & Assessment Cases	5%	Minimum 3
9	Integrated Case Presentation	5%	One submission

LIST OF CLINICAL COMPETENCIES

A. Community & Public Health Nutrition – Clinical Skills

Sr. No	Skill / Competency	Level (1–5)	Minimum Frequency
1	Growth monitoring, growth plotting & identification of faltering		5
2	Management of SAM/MAM using therapeutic feeds & CMAM protocols		5
3	Feeding support for LBW, preterm, cleft lip/palate infants		4

B. Dietetics-II – Advanced Therapeutic Nutrition Skills

Sr. No	Skill / Competency	Level (1–5)	Minimum Frequency
1	Complete Nutrition Care Process (ADIME) documentation		6
2	Biochemical interpretation for diet modification		5
3	Texture modification using IDDSI guidelines		4

C. Medical Nutrition Therapy (MNT-II)

Sr. No	Skill / Competency	Level (1–5)	Minimum Frequency
1.	MNT – Lower Gastrointestinal Disorders		4
2.	MNT – pulmonary diseases		4
3.	MNT – Thyroid Disorders		3
4.	MNT – Adrenal Disorders		3
5.	MNT – PCOS & Endocrine Disorders		4
6.	MNT – HIV/AIDS		3

7.	MNT – Infectious Diseases (TB, viral, parasitic)		4
8.	MNT – Oncology & Cancer Cachexia		3
9.	MNT – Surgery & Perioperative Nutrition		4

D. Nutrition Education & Counseling Skills

Sr. No	Skill / Competency	Level (1–5)	Minimum Frequency
1.	Psychological trait & eating behavior assessment		3
2.	Application of CBT & food behavior models		4
3.	Eating disorder screening (SCOFF, EAT-26, DSM-5 criteria)		3
4.	Motivational interviewing & behavior change counseling		4
5.	Integrated biopsychosocial case presentation		2

CLINICAL COMPETENCY VERIFICATION

Sr. No	Competency	Faculty Signature	Date	Clinical Supervisor Signature	Date
1	Growth monitoring, growth plotting & identification of growth faltering				
2	Management of SAM/MAM using CMAM protocols & therapeutic feeding				
3	Feeding support for LBW, preterm & cleft lip/palate infants				

4	Complete Nutrition Care Process (ADIME) documentation				
5	Interpretation of biochemical investigations for diet modification				
6	Texture modification using IDDSI guidelines				
7	MNT – Lower Gastrointestinal Disorders				
8	MNT – pulmonary diseases				
9	MNT – Thyroid Disorders				
10	MNT – Adrenal Disorders				
11	MNT – PCOS & Endocrine Disorders				
12	MNT – HIV/AIDS				
13	MNT – Infectious Diseases (TB, viral, parasitic)				
14	MNT – Oncology & Cancer Cachexia				
15	MNT – Surgery & Perioperative Nutrition				
16	Psychological trait & eating behavior assessment				
17	Application of CBT & food behavior models				
18	Eating disorder screening (SCOFF, EAT-26, DSM-5 criteria)				
19	Motivational interviewing & behavior change counseling				
20	Integrated biopsychosocial case presentation				

SECTION A

COMMUNITY & PUBLIC HEALTH NUTRITION

Skill 1.1: Growth Monitoring & Identification of Growth Faltering

Purpose:
To assess nutritional status of infants and children using standardized anthropometric techniques and WHO growth standards in order to detect undernutrition, overnutrition, and early growth deviations requiring timely nutrition intervention.

Materials Required:
• Calibrated infant weighing scale
• Digital weighing scale
• Infantometer and stadiometer
• MUAC tape
• WHO growth charts (age appropriate)
• Z-score reference tables
• Growth monitoring register
• Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Verify child's identification and exact age in months			
2	Measure weight accurately using standard protocol			
3	Measure length/height using correct positioning technique			
4	Measure MUAC at correct mid-arm location			
5	Plot weight-for-age, height-for-age, and weight-for-height on WHO charts			
6	Calculate and interpret Z-scores			
7	Identify growth faltering or abnormal growth trends			
8	Provide age-appropriate nutrition counseling to caregiver			
9	Document findings in growth monitoring register			

Skill 1.2: Management of Severe and Moderate Acute Malnutrition (SAM/MAM)

Purpose:
To identify, classify, and manage children with severe and moderate acute malnutrition using standardized CMAM and therapeutic feeding protocols.

Materials Required:
• MUAC tape
• WHO growth charts
• Edema assessment chart
• Appetite test materials
• Ready-to-Use Therapeutic Food (RUTF)
• F-75 and F-100 therapeutic formulas
• Treatment monitoring sheet
• Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Screen child using MUAC and weight-for-height criteria			
2	Assess bilateral pitting edema			
3	Classify child as SAM or MAM according to criteria			
4	Conduct appetite test were indicated			
5	Calculate therapeutic feeding requirement (kcal/kg/day)			
6	Initiate appropriate feeding protocol (RUTF/F-75/F-100)			
7	Monitor weight gain during follow-up visits			
8	Educate caregiver on feeding practices and hygiene			
9	Document management plan and follow-up schedule			

Skill 1.3: Feeding Support for LBW, Preterm & Cleft Lip/Palate Infants

Purpose:
To provide individualized nutrition support and safe feeding strategies for infants with low birth weight, prematurity, or anatomical feeding difficulties to ensure adequate growth and development.

Materials Required:
• Neonatal assessment form
• Preterm growth charts
• Special feeding bottles or cups
• Breast pump (if required)
• Human milk fortifier (if prescribed)
• Feeding monitoring sheet
• Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Record birth weight and gestational age accurately			
2	Assess feeding reflexes and swallowing coordination			
3	Identify feeding difficulty or aspiration risk			
4	Calculate daily caloric and fluid requirements			
5	Recommend appropriate feeding method and positioning			
6	Counsel caregiver on feeding frequency and technique			
7	Monitor feeding tolerance and weight gain			
8	Document feeding plan and progress			

SECTION B

DIETETICS–II: ADVANCED THERAPEUTIC NUTRITION

Skill 2.1: Complete Nutrition Care Process (ADIME) Documentation

Purpose:
To systematically apply the Nutrition Care Process (NCP) framework by conducting comprehensive assessment, identifying nutrition diagnosis (PES statement), planning intervention, and documenting monitoring and evaluation for individualized patient care.

Materials Required:
• Patient medical records
• Anthropometric measurement tools
• Laboratory reports
• Nutrition assessment forms
• ADIME documentation sheets
• Diet calculation sheets
• Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review medical diagnosis and clinical history			
2	Conduct detailed nutrition assessment (dietary, anthropometric, biochemical, clinical)			
3	Identify nutrition problems and formulate PES statement			
4	Calculate individualized energy, protein, and fluid requirements			
5	Develop evidence-based nutrition intervention			
6	Design therapeutic meal plan according to condition			
7	Define measurable goals and expected outcomes			
8	Establish monitoring and evaluation criteria			
9	Complete ADIME documentation accurately			

Skill 2.2: Interpretation of Biochemical Investigations for Diet Modification

Purpose:
To interpret laboratory parameters and correlate biochemical findings with clinical condition in order to modify nutrient intake appropriately.

Materials Required:
• Patient laboratory reports (CBC, electrolytes, glucose, lipid profile, renal and liver function tests)
• Reference value charts
• Clinical guidelines
• Diet prescription sheet
• Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review complete biochemical profile			
2	Identify abnormal laboratory parameters			
3	Correlate lab findings with medical diagnosis			
4	Determine nutrient restrictions or modifications required			
5	Adjust macronutrient distribution accordingly			
6	Modify micronutrient intake if indicated			
7	Update therapeutic diet plan based on findings			
8	Document interpretation and dietary changes			

Skill 2.3: Texture Modification Using IDDSI Guidelines

Purpose:
To assess swallowing ability and modify food and fluid consistency according to IDDSI standards to ensure safe oral intake in patients with dysphagia.

Materials Required:
• IDDSI framework chart
• Thickening agents
• Blender or food processor
• Spoon and syringe for flow test
• Modified diet preparation guide
• Patient assessment form
• Pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review medical diagnosis and swallowing assessment			
2	Identify appropriate IDDSI level for food and fluids			
3	Prepare food according to recommended texture level			
4	Perform spoon tilt test or flow test for verification			
5	Educate patient/caregiver on preparation techniques			
6	Monitor tolerance and swallowing safety			
7	Document prescribed texture level in patient file			

SECTION C

MEDICAL NUTRITION THERAPY (MNT–II)

Skill 3.1: MNT for Inflammatory Bowel Disease (IBD)

Purpose:
To provide individualized nutrition therapy to manage inflammation, prevent nutrient deficiencies, and maintain remission in patients with Crohn's disease and Ulcerative Colitis.

Materials Required:
• Patient medical records and colonoscopy reports
• Laboratory reports (CRP, ESR, hemoglobin, albumin)
• Anthropometric tools
• Dietary recall form
• Diet calculation sheets
• Low-residue and high-protein diet guidelines
• Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review diagnosis and disease activity status			
2	Assess weight loss and nutritional risk			
3	Identify food intolerances during flare phase			
4	Calculate energy and protein requirements			
5	Plan low-residue diet during active disease			
6	Ensure adequate iron, B12, folate, and vitamin D intake			
7	Adjust fiber intake based on tolerance			
8	Develop individualized meal plan			
9	Document intervention and follow-up plan			

Skill 3.2: MNT for Irritable Bowel Syndrome (IBS)

Purpose:
To manage gastrointestinal symptoms such as bloating, diarrhea, and constipation through structured dietary modification and symptom-based nutrition planning.

Materials Required:
• Patient medical records
• Dietary recall form
• Symptom diary template
• Low-FODMAP diet guidelines
• Diet calculation sheets
• Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review symptom pattern and IBS subtype			
2	Assess dietary triggers			
3	Initiate low-FODMAP elimination phase if indicated			
4	Adjust fiber intake based on subtype			
5	Plan small frequent meals			
6	Guide reintroduction phase systematically			
7	Educate patient on long-term dietary management			
8	Document nutrition care plan			

Skill 3.3: MNT for Chronic Diarrhea

Purpose:
To restore fluid and electrolyte balance and provide nutrient-dense, easily digestible diet to prevent malnutrition in patients with persistent diarrhea.

Materials Required:
- Patient medical records
- Laboratory reports (electrolytes)
- Oral rehydration solution guidelines
- Low-fiber diet guidelines
- Diet calculation sheets
- Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Assess duration and severity of diarrhea			
2	Evaluate hydration and electrolyte status			
3	Recommend oral rehydration therapy			
4	Provide low-fiber, low-fat diet during acute phase			
5	Avoid lactose if intolerance suspected			
6	Ensure adequate protein intake			
7	Monitor stool frequency and tolerance			
8	Document intervention and monitoring plan			

Skill 3.4: MNT for Constipation

Purpose:
To relieve constipation and improve bowel regularity through dietary fiber modification, hydration management, and lifestyle counseling.

Materials Required:
• Patient medical records
• Dietary recall form
• Fiber requirement chart
• Hydration assessment sheet
• Diet calculation sheets
• Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Assess bowel pattern and dietary intake			
2	Evaluate fiber intake adequacy			
3	Gradually increase dietary fiber intake			
4	Ensure adequate fluid intake			
5	Encourage physical activity			
6	Educate on natural laxative foods			
7	Monitor symptom improvement			
8	Document care plan and follow-up			

PULMONARY DISORDERS

Skill 3.5: MNT for Chronic Obstructive Pulmonary Disease (COPD)

Purpose:
To provide individualized nutrition therapy aimed at preventing malnutrition, preserving respiratory muscle mass, and optimizing energy balance in patients with COPD.

Materials Required:
• Patient medical records and pulmonary function reports
• Anthropometric assessment tools
• Laboratory reports (albumin, ABGs if available)
• Dietary recall form
• Diet calculation sheets
• High-calorie, high-protein diet guidelines
• Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review COPD severity and medical history			
2	Assess weight loss and muscle wasting			
3	Calculate energy requirements considering increased work of breathing			
4	Determine appropriate macronutrient distribution			
5	Plan high-protein diet to preserve lean body mass			
6	Recommend small frequent meals to reduce dyspnea			
7	Monitor hydration status			
8	Provide nutrition counseling			
9	Document nutrition care plan and follow-up			

Skill 3.6: MNT for Asthma

Purpose:
To manage inflammation and reduce symptom triggers through appropriate dietary modifications and weight management strategies in patients with asthma.

Materials Required:
• Patient medical records
• Allergy history documentation
• Anthropometric tools
• Dietary recall form
• Anti-inflammatory diet guidelines
• Diet calculation sheets
• Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review asthma severity and trigger history			
2	Assess nutritional status and BMI			
3	Identify food-related triggers if present			
4	Encourage antioxidant-rich food intake			
5	Promote omega-3 fatty acid intake			
6	Address weight management if overweight			
7	Counsel on avoidance of sulfite-containing foods if sensitive			
8	Develop individualized meal plan			
9	Document intervention and follow-up plan			

Skill 3.7: MNT for Respiratory Failure

Purpose:
To provide appropriate nutrition support to minimize carbon dioxide production, maintain energy balance, and support recovery in patients with respiratory failure.

Materials Required:
• Patient medical records
• Laboratory reports (ABGs, electrolytes)
• Anthropometric tools
• Enteral/parenteral nutrition guidelines
• Diet calculation sheets
• Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review diagnosis and ventilation status			
2	Assess nutritional risk and recent weight changes			
3	Calculate energy and protein requirements			
4	Determine appropriate macronutrient ratio			
5	Select suitable feeding route (oral/enteral/parenteral)			
6	Monitor tolerance to nutrition support			
7	Evaluate fluid balance			
8	Adjust nutrition plan based on clinical response			
9	Document nutrition management plan			

Skill 3.8: MNT for Hypothyroidism

Purpose:
To manage reduced metabolic rate and associated weight gain through appropriate calorie control, micronutrient optimization, and dietary adjustments in patients with hypothyroidism.

Materials Required:
• Patient medical records
• Thyroid function test reports (TSH, T3, T4)
• Anthropometric assessment tools
• Dietary recall form
• Diet calculation sheets
• Micronutrient reference guidelines
• Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review thyroid function test results			
2	Assess weight changes and metabolic symptoms			
3	Calculate individualized energy requirements			
4	Plan calorie-controlled balanced diet			
5	Ensure adequate iodine and selenium intake			
6	Monitor fiber intake to avoid interference with medication			
7	Counsel on timing of meals with levothyroxine			
8	Encourage physical activity as appropriate			
9	Document nutrition intervention and monitoring plan			

Skill 3.9: MNT for Hyperthyroidism

Purpose:
To meet increased metabolic demands, prevent weight loss, and maintain nutrient balance in patients with hyperthyroidism.

Materials Required:
• Patient medical records
• Thyroid function test reports (TSH, T3, T4)
• Anthropometric assessment tools
• Dietary recall form
• Diet calculation sheets
• High-calorie, high-protein diet guidelines
• Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review thyroid function test results			
2	Assess recent weight loss and appetite changes			
3	Calculate increased energy requirements			
4	Plan high-calorie, high-protein diet			
5	Ensure adequate calcium and vitamin D intake			
6	Limit excessive caffeine intake			
7	Monitor hydration status			
8	Provide nutrition counseling regarding symptom management			
9	Document nutrition care plan and follow-up			

Skill 3.10: MNT for Cushing's Syndrome

Purpose:
To manage hypercortisolism-related complications such as hyperglycemia, hypertension, muscle wasting, and central obesity through appropriate dietary modifications.

Materials Required:
- Patient medical records
- Laboratory reports (blood glucose, lipid profile, electrolytes)
- Anthropometric assessment tools
- Dietary recall form
- Diet calculation sheets
- Sodium-restricted and calorie-controlled diet guidelines
- Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review diagnosis and laboratory findings			
2	Assess weight changes and fat distribution			
3	Evaluate blood glucose levels			
4	Plan calorie-controlled diet to manage weight gain			
5	Restrict sodium intake if hypertension present			
6	Ensure adequate protein intake to prevent muscle wasting			
7	Provide calcium and vitamin D support			
8	Educate patient on portion control and balanced meals			
9	Document nutrition intervention and follow-up plan			

Skill 3.11: MNT for Addison's Disease

Purpose:
To manage adrenal insufficiency by maintaining electrolyte balance, preventing hypoglycemia, and ensuring adequate energy intake.

Materials Required:
• Patient medical records
• Laboratory reports (sodium, potassium, glucose levels)
• Anthropometric assessment tools
• Dietary recall form
• Diet calculation sheets
• Electrolyte-modified diet guidelines
• Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review diagnosis and laboratory findings			
2	Assess electrolyte imbalance			
3	Evaluate recent weight changes and appetite			
4	Calculate individualized energy requirements			
5	Encourage adequate sodium intake as prescribed			
6	Monitor potassium intake if elevated			
7	Prevent prolonged fasting to avoid hypoglycemia			
8	Educate patient on balanced meal distribution			
9	Document nutrition care plan and monitoring strategy			

REPRODUCTIVE & ENDOCRINE DISORDERS

Skill 3.12: MNT for Polycystic Ovary Syndrome (PCOS)

Purpose:
To manage insulin resistance, hyperandrogenism, menstrual irregularities, and weight-related complications through structured dietary modification and lifestyle intervention in patients with PCOS.

Materials Required:
- Patient medical records
- Hormonal profile reports (LH, FSH, insulin, glucose)
- Anthropometric assessment tools
- Dietary recall form
- Diet calculation sheets
- Low glycemic index diet guidelines
- Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review diagnosis and hormonal profile			
2	Assess BMI, waist circumference, and body composition			
3	Evaluate dietary pattern and carbohydrate intake			
4	Calculate individualized energy requirements			
5	Plan low glycemic index, high-fiber diet			
6	Ensure adequate lean protein intake			
7	Advise reduction of refined sugars and processed foods			
8	Incorporate weight management strategies if overweight			
9	Counsel on lifestyle modification and physical activity			
10	Document nutrition care plan and monitoring indicators			

Skill 3.13: MNT for HIV/AIDS

Purpose:
To prevent weight loss, maintain immune function, manage opportunistic infections, and address metabolic complications through individualized nutrition therapy in patients with HIV/AIDS.

Materials Required:
• Patient medical records
• Laboratory reports (CD4 count, viral load, lipid profile)
• Anthropometric assessment tools
• Dietary recall form
• Diet calculation sheets
• High-protein, high-calorie diet guidelines
• Food safety education material
• Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review diagnosis, CD4 count, and viral load			
2	Assess weight history and presence of wasting			
3	Evaluate dietary intake and appetite status			
4	Calculate individualized energy and protein requirements			
5	Plan high-protein, high-calorie meals if underweight			
6	Address micronutrient needs and supplementation			
7	Provide guidance on food hygiene and safety			
8	Manage nutrition-related side effects of ART			
9	Monitor lipid profile and metabolic complications			
10	Document nutrition care plan and follow-up strategy			

Skill 3.14: MNT for Tuberculosis

Purpose:
To correct malnutrition, enhance immune response, and support recovery during anti-tubercular therapy through adequate energy, protein, and micronutrient intake.

Materials Required:
• Patient medical records
• Laboratory reports
• Anthropometric assessment tools
• Dietary recall form
• Diet calculation sheets
• High-protein, high-calorie diet guidelines
• Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review diagnosis and treatment regimen			
2	Assess nutritional status and weight loss			
3	Calculate increased energy and protein needs			
4	Plan nutrient-dense, frequent meals			
5	Ensure adequate intake of iron, zinc, and vitamins			
6	Address anorexia and poor appetite			
7	Monitor weight and dietary compliance			
8	Document nutrition care plan and monitoring indicators			

Skill 3.15: MNT for Acute Infectious Conditions (Fever, Viral Illness)

Purpose:
To prevent dehydration, maintain energy balance, and support immune function during acute infectious states.

Materials Required:
• Patient medical records
• Vital signs chart
• Dietary recall form
• Diet calculation sheets
• Fluid balance chart
• Oral rehydration guidelines
• Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review diagnosis and duration of illness			
2	Assess hydration status			
3	Evaluate appetite and food tolerance			
4	Plan soft, easily digestible diet			
5	Ensure adequate fluid intake			
6	Provide small, frequent meals			
7	Monitor tolerance and recovery progress			
8	Document dietary advice and follow-up plan			

ONCOLOGY & SURGICAL NUTRITION

Skill 3.16: MNT for Oncology (General Cancer Nutrition Care)

Purpose:
To prevent malnutrition, preserve lean body mass, manage metabolic alterations, and improve treatment tolerance in patients diagnosed with cancer.

Materials Required:
• Patient medical records
• Laboratory reports
• Anthropometric assessment tools
• Dietary recall form
• Diet calculation sheets
• High-protein, high-calorie diet guidelines
• Oral nutrition supplement guidelines
• Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review cancer diagnosis and treatment modality			
2	Assess weight history and recent weight loss			
3	Evaluate dietary intake and appetite			
4	Calculate individualized energy and protein requirements			
5	Plan high-protein, high-calorie nutrient-dense diet			
6	Recommend oral nutrition supplements if required			
7	Address micronutrient adequacy			
8	Monitor nutrition-related complications			
9	Provide patient and caregiver counseling			
10	Document nutrition care plan and follow-up			

Skill 3.17: MNT for Cancer Cachexia

Purpose:
To manage involuntary weight loss, muscle wasting, anorexia, and systemic inflammation associated with cancer cachexia through aggressive and individualized nutrition support.

Materials Required:
• Patient medical records
• Weight history and body composition data
• Laboratory reports
• Dietary recall form
• Diet calculation sheets
• High-calorie, high-protein meal planning guides
• Oral/enteral nutrition support guidelines
• Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Assess degree of weight and muscle loss			
2	Evaluate inflammatory markers if available			
3	Calculate elevated energy and protein requirements			
4	Plan small, frequent, energy-dense meals			
5	Incorporate high biological value protein sources			
6	Recommend oral or enteral nutrition support if needed			
7	Address anorexia and early satiety			
8	Monitor tolerance and weight trends			
9	Document intervention and progression plan			

Skill 3.18: MNT During Chemotherapy & Radiation Therapy

Purpose:
To manage treatment-related side effects such as nausea, vomiting, mucositis, taste alterations, diarrhea, and poor appetite through tailored nutrition intervention.

Materials Required:
• Patient treatment schedule
• Laboratory reports
• Dietary recall form
• Diet calculation sheets
• Symptom management diet guidelines
• Fluid balance chart
• Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review treatment protocol and schedule			
2	Assess nutrition-related side effects			
3	Evaluate hydration status			
4	Modify texture if mucositis present			
5	Plan bland, easily digestible meals for nausea			
6	Manage diarrhea or constipation as indicated			
7	Ensure adequate protein intake			
8	Monitor weight and dietary tolerance			
9	Provide individualized dietary counseling			
10	Document nutrition intervention and follow-up			

Skill 3.19: MNT for Preoperative Nutrition

Purpose:
To optimize nutritional status prior to surgery in order to reduce postoperative complications and enhance recovery.

Materials Required:
• Patient medical records
• Laboratory reports
• Anthropometric assessment tools
• Dietary recall form
• Diet calculation sheets
• Preoperative nutrition guidelines
• Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Assess nutritional risk and weight history			
2	Evaluate laboratory parameters			
3	Calculate individualized energy and protein needs			
4	Plan nutrient-dense diet prior to surgery			
5	Recommend nutrition support if malnourished			
6	Counsel patient on preoperative fasting guidelines			
7	Document nutrition optimization plan			

Skill 3.20: MNT for Postoperative Nutrition

Purpose:
To promote wound healing, prevent infection, restore gastrointestinal function, and support recovery following surgical procedures.

Materials Required:
• Patient medical records
• Postoperative progress notes
• Laboratory reports
• Diet progression chart
• Diet calculation sheets
• Enteral/parenteral nutrition guidelines
• Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Assess postoperative status and surgical type			
2	Evaluate gastrointestinal tolerance			
3	Initiate appropriate diet progression (NPO to oral)			
4	Calculate increased protein requirements for healing			
5	Monitor fluid and electrolyte balance			
6	Manage complications affecting intake			
7	Adjust nutrition support as required			
8	Document diet progression and patient response			

Section D: Nutrition Education & Counselling Skills

Skill 4.1: Assessment of Psychological Traits & Eating Behavior

Purpose:
To identify personality traits, emotional influences, and cognitive patterns affecting eating behaviors, to inform individualized nutrition counseling.

Materials Required:
• Patient intake and medical records
• Anthropometric tools (weight, height, BMI chart)
• DASS-21 questionnaire
• Food–mood diaries
• Body-image worksheets
• Portion distortion tools
• Pen, clipboard, calculator

Checklist:

Sr. No	Task	Yes	No	Comments
1	Identify personality traits affecting eating behavior			
2	Assess stress, anxiety, and depression impacts on appetite using DASS-21			
3	Collect and review food–mood diaries			
4	Observe emotional eating patterns			
5	Evaluate portion perception and visualization			
6	Detect distorted body image or cognitive eating errors			
7	Document observations for counseling plan			

Skill 4.2: Food Choice & Cognitive Psychology Assessment

Purpose:
To evaluate cognitive, sociocultural, and behavioral determinants of food choice to facilitate tailored nutrition interventions.

Materials Required:
• Patient dietary recall and intake logs
• Food Choice Questionnaire (FCQ)
• Cultural dietary recall tools
• Cognitive-behavioral therapy (CBT) worksheets
• Visual analog scales (VAS) for appetite
• Pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Apply CBT techniques to modify maladaptive eating			
2	Assess cognitive influences on food choice			
3	Analyze sociocultural dietary influences using FCQ			
4	Evaluate attitude–behavior gaps using structured interviews			
5	Measure hedonic hunger and appetite cues using VAS			
6	Document cognitive and behavioral assessment results			

Skill 4.3: Assessment & Diagnosis of Eating Disorders

Purpose:
To screen, identify, and document clinical and behavioral signs of eating disorders for appropriate nutrition intervention.

Materials Required:
• Patient history and medical records
• SCOFF questionnaire
• EAT-26 questionnaire
• DSM-5 diagnostic criteria
• Psychosocial history forms
• Appetite and food intake logs
• Pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Screen for eating disorders using SCOFF and EAT-26			
2	Take detailed psychosocial and body image history			
3	Identify physical signs of anorexia, bulimia, and binge eating			
4	Observe behavioral indicators during meals and interviews			
5	Document diagnosis and counseling recommendations			

Skill 4.4: Nutrition Counseling for Behavior Change

Purpose:
To apply evidence-based behavior change strategies, motivational interviewing, and cognitive interventions to improve dietary habits and adherence.

Materials Required:
- Patient dietary recall
- CBT worksheets and ABC journals
- Motivational interviewing guides
- Readiness/confidence rulers
- Role-play scenarios
- Pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Explore beliefs, intentions, and perceived barriers using TRA/TPB			
2	Conduct motivational interviewing with reflective listening			
3	Apply open-ended questioning and readiness rulers			
4	Address cognitive distortions using ABC journals and stimulus control			
5	Conduct role-play sessions for individual counseling			
6	Conduct group session role-plays for weight stigma, food anxiety, and emotional eating			
7	Document counseling sessions and behavioral goals			

Skill 4.5: Case Studies & Clinical Integration

Purpose:
To integrate psychological, social, and biological factors affecting eating behaviors into structured case-based nutrition interventions.

Materials Required:
• Patient case files and dietary intake records
• Psychosocial history and assessment forms
• SMART goal templates
• Food–mood diaries
• Follow-up tracking sheets
• Pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Analyze clinical cases with emotional/stress-related eating patterns			
2	Write SMART behavior-focused nutrition goals			
3	Integrate biological, psychological, social, and cultural factors in case presentation			
4	Monitor counseling outcomes using follow-up dietary intake and mood ratings			
5	Document evaluation and intervention results			

STUDENT DECLARATION

I hereby declare that the clinical competencies and assessment activities recorded in this workbook are my own and were completed according to program requirements.

Student Signature: _____
Date: _____

FACULTY VERIFICATION

This is to certify that the above-mentioned student has satisfactorily completed the required clinical competencies for **NOURISH–V (Semester–VI)**.

Faculty Name: _____
Signature: _____
Date: _____

SEMESTER–VII NOURISH–VI

Clinical Nutrition Practices in Critical Care, Diet Therapy for Special Needs, and Inborn Errors of Metabolism
Clinical Competency Workbook / Logbook
Program: BS Human Nutrition & Dietetics
Credit Hours: 03 (Clinical)
Clinical Attachment: ICU, Dialysis Unit, Transplant Wards, Pediatric Metabolic Units, Hospital Diet Services

COURSE DESCRIPTION

NOURISH–VI is a clinically advanced competency module designed to strengthen students' applied skills in **medical nutrition therapy (MNT) for critical care, diet therapy for individuals with special needs, and inborn errors of metabolism (IEM)**.
The course emphasizes hospital-based clinical exposure, including **ICU, dialysis units, transplant wards, pediatric metabolic units, and specialized diet therapy settings**.
Students develop competencies in **assessment, individualized diet planning, enteral and parenteral nutrition, monitoring therapeutic outcomes, and multidisciplinary collaboration**, preparing them for independent clinical practice in complex care settings.

CLINICAL ROTATION / EXPOSURE PLAN

- **Duration:** Semester-long (as per academic calendar)
- **Nature of Exposure:**
    - ICU & critical care wards
    - Dialysis & transplant units
    - Pediatric metabolic and IEM clinics
    - Special needs and geriatric care units
    - Hospital diet services & clinical nutrition rounds
- **Student Role:** Observer and supervised performer (no independent prescriptions)
- **Supervision:** Faculty clinical instructor and hospital clinical nutritionist

CLINICAL OBJECTIVES

By the end of NOURISH–VI, the student will be able to:

1. Apply evidence-based MNT principles for **acute and chronic conditions**, including burns, renal failure, transplant, infections, and sepsis.
2. Evaluate biochemical, anthropometric, and clinical indicators for individualized nutrition planning.
3. Implement and monitor **enteral and parenteral nutrition** safely.

4. Plan diet therapy for **inborn errors of metabolism (IEM)** and monitor patient response.
5. Adapt diets for **special populations**, including physically challenged individuals, high-risk pregnancy, lactation, and geriatrics.
6. Participate in **multidisciplinary collaboration** to optimize patient nutrition care.
7. Document and critically evaluate patient response to clinical nutrition interventions.

EVALUATION CRITERIA (CLINICAL PORTFOLIO)

Sr. No	Clinical Portfolio Content	Weightage	Minimum Frequency
1	Achievement of Clinical Objectives	10%	Weekly
2	MNT – Acute & Chronic Conditions Logs	25%	Minimum 8
3	Enteral & Parenteral Nutrition Logs	20%	Minimum 6
4	MNT for Inborn Errors of Metabolism Logs	15%	Minimum 6
5	MNT for Special Populations Logs	15%	Minimum 6
6	Critical Care Nutrition Assessment Logs	10%	Minimum 4
7	Integrated Clinical Case Study	5%	One submission

LIST OF CLINICAL COMPETENCIES

Levels of Competency: 1–5 (Novice to Expert)

A. MEDICAL NUTRITION THERAPY – ACUTE & CHRONIC CONDITIONS

Sr. No	Skill / Competency	Level (1–5)	Minimum Frequency
1	MNT for Burns – assess TBSA, hypermetabolic needs, and plan high-calorie/protein diets		5
2	MNT for Renal Failure & Dialysis – biochemical evaluation, stage-specific protein & electrolyte management		5
3	MNT for Organ Transplant – pre/post transplant metabolic needs, immunosuppression-compatible diets		4
4	MNT for ICU & Critical Care – energy needs, APACHE/SOFA risk assessment, refeeding prevention		5
5	MNT for Infections & Sepsis – catabolic stress, inflammation, and fluid/electrolyte coordination		4

B. ENTERAL & PARENTERAL NUTRITION PRACTICE

Sr. No	Skill / Competency	Level (1–5)	Minimum Frequency
1	Tube Feeding (EN) – indications, formula selection, rate & volume calculation, tolerance monitoring		5
2	Parenteral Nutrition (PPN & TPN) – calculation, monitoring labs, recognizing complications		5
3	Infection control & hygiene during EN/PN preparation		6

C. MNT FOR INBORN ERRORS OF METABOLISM (IEM)

Sr. No	Skill / Competency	Level (1–5)	Minimum Frequency
1	Celiac Disease – gluten-free diet planning, hidden sources identification		5

2	Phenylketonuria (PKU) – low-Phe diet planning, growth & plasma monitoring		5
3	Galactosemia – lactose/galactose restriction and monitoring		4
4	Maple Syrup Urine Disease (MSUD) – BCAA restriction, crisis prevention		4
5	Other IEMs – tyrosinemia, urea cycle disorders, fructose intolerance		3

D. MNT FOR SPECIAL POPULATIONS & CONDITIONS

Sr. No	Skill / Competency	Level (1–5)	Minimum Frequency
1	Diet therapy for individuals with physical/behavioral disabilities, texture modification (IDDSI levels)		5
2	Nutrition in high-risk pregnancy & lactation – GDM, preeclampsia, anemia, hyperemesis		5
3	Geriatric nutrition – sarcopenia, frailty, dysphagia, nutrient-dense diets		5

E. NUTRITIONAL PRACTICE IN CRITICAL CARE SETTINGS

Sr. No	Skill / Competency	Level (1–5)	Minimum Frequency
1	ICU Nutrition Assessment – EN/PN monitoring, labs, fluid balance		6
2	Diet progression in critical care – NPO to oral/therapeutic diet transitions		4
3	Multidisciplinary collaboration – ICU rounds, team communication, documentation		5

SECTION 1: MEDICAL NUTRITION THERAPY (MNT) – ACUTE & CHRONIC CONDITIONS

Skill 1.1: MNT for Burns

Purpose:
To assess burn severity, calculate hypermetabolic needs, and provide individualized high-protein, high-calorie, micronutrient-rich diets to support wound healing and recovery.

Materials Required:

- Patient medical records, burn charts (TBSA, burn depth)
- Anthropometric measurement tools (weight scale, height board, BMI chart)
- Nutrition assessment forms
- Diet calculation sheets
- Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Assess burn depth, TBSA, and type of burn			
2	Calculate energy and protein requirements using stress and injury factors			
3	Plan diet rich in micronutrients (zinc, vitamin C, vitamin A, arginine)			
4	Choose appropriate feeding route (oral, enteral, parenteral)			
5	Monitor tolerance and adjust feeding mode			
6	Document diet plan and patient response			

Skill 1.2: MNT for Renal Failure & Dialysis

Purpose:
To provide renal-specific nutrition based on disease stage, biochemical markers, and dialysis type to prevent complications and support recovery.

Materials Required:

- Patient biochemical reports (BUN, creatinine, electrolytes)
- Dialysis schedule and records
- Renal diet charts and guidelines
- Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Evaluate renal function labs and dialysis schedule			
2	Determine protein requirements based on pre-dialysis, hemodialysis, or PD stage			
3	Plan low potassium, low phosphorus, controlled sodium, and fluid allowance			
4	Review and select renal-specific enteral formulas if needed			
5	Monitor biochemical parameters and adjust diet			
6	Record patient response and adherence			

Skill 1.3: MNT for Organ Transplant (Liver/Kidney)

Purpose:
To manage nutrition pre- and post-transplant, supporting metabolic recovery and maintaining immunosuppression safety while preventing infections.

Materials Required:

- Patient transplant records and lab reports
- Immunosuppressant medication list
- Diet guidelines for transplant patients
- Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review transplant type and patient metabolic status			
2	Plan diet compatible with immunosuppressants			
3	Adjust energy and protein intake during recovery phase			
4	Ensure food safety protocols to prevent infections			
5	Monitor clinical parameters (weight, labs, recovery)			
6	Document and communicate with multidisciplinary team			

Skill 1.4: MNT in ICU & Critical Care

Purpose:
To assess nutritional risk in critically ill patients, calculate energy requirements, and prevent complications like refeeding syndrome.

Materials Required:

- Patient ICU charts, APACHE or SOFA scores
- Nutrition assessment sheets
- Indirect calorimetry (if available)
- Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Assess hemodynamic stability before initiating feeds			
2	Interpret APACHE/SOFA scores for nutrition risk			

3	Calculate energy and protein requirements			
4	Identify and prevent refeeding syndrome			
5	Choose feeding route (oral/enteral/parenteral)			
6	Monitor tolerance and adjust nutrition plan			
7	Document nutrition notes daily			

Skill 1.5: MNT for Infections & Sepsis

Purpose:
To provide nutrition that meets elevated energy and protein needs, supports immune function, and prevents muscle wasting in septic or infected patients.

Materials Required:

- Patient infection and lab reports (CRP, lactate, electrolytes)
- Nutrition assessment forms
- Feeding guidelines for critical care patients
- Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Identify catabolic stress indicators and metabolic demands			
2	Calculate energy and protein needs			
3	Modify diet for inflammation, fever, and fluid balance			
4	Coordinate with critical care team on fluid/electrolyte management			
5	Monitor muscle mass and nutritional markers			
6	Document patient progress			

SECTION 2: ENTERAL & PARENTERAL NUTRITION PRACTICE SKILLS

Skill 2.1: Tube Feeding (Enteral Nutrition – EN)

Purpose:
To safely administer enteral nutrition, calculate patient-specific requirements, select appropriate formulas, and monitor tolerance to support nutrition in patients unable to meet oral intake needs.

Materials Required:

- Patient medical and diet records
- Tube feeding equipment (NG, NJ, PEG tubes)
- Feeding formulas (polymeric, elemental, disease-specific)
- Feeding pump and accessories
- GRV monitoring tools (syringe, measuring cup)
- Infection control supplies (gloves, hand sanitizer, PPE)
- Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Identify indications and contraindications for enteral feeding			
2	Select appropriate tube type (NG, NJ, PEG)			
3	Calculate enteral nutrition requirements (calories, protein, fluid)			
4	Choose suitable formula type (polymeric, elemental, disease-specific)			
5	Set feeding rate and volume according to patient needs			
6	Monitor tolerance: GRVs, vomiting, diarrhea, abdominal distension			
7	Check for aspiration risk and implement preventive measures			
8	Maintain infection control during preparation and administration			
9	Document feeding plan, tolerance, and adjustments			

Skill 2.2: Parenteral Nutrition (PN – PPN & TPN)

Purpose:
To provide intravenous nutrition safely, calculate macronutrient and electrolyte needs, monitor for complications, and adjust therapy to meet metabolic demands in patients unable to receive enteral nutrition.

Materials Required:

- Patient medical records and lab reports
- PN formulation guidelines (PPN, TPN)
- IV administration sets and pumps
- Laboratory monitoring tools (triglycerides, glucose, liver enzymes)
- Calculator, pen, clipboard
- PPE and aseptic preparation supplies

Checklist:

Sr. No	Task	Yes	No	Comments
1	Differentiate PPN and TPN indications, concentration, and osmolarity			
2	Calculate energy, protein, and macronutrient distribution			
3	Determine electrolyte requirements and fluid volume			
4	Select appropriate PN solution according to patient condition			
5	Monitor for PN complications: hyperglycemia, liver dysfunction, infection			
6	Check lab values regularly and adjust PN as required			
7	Maintain strict aseptic technique during preparation and administration			
8	Document PN plan, administration, patient response, and complications			

Skill 2.3: Monitoring Tolerance & Complications in EN & PN

Purpose:
To assess patient response to enteral and parenteral nutrition, detect complications early, and ensure safe and effective nutrition support.

Materials Required:

- Patient clinical charts and lab reports
- Monitoring tools (GRV, bowel movement logs, fluid balance charts)
- PN lab results (triglycerides, glucose, liver function)
- Pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Monitor for GI intolerance: nausea, vomiting, diarrhea, constipation			
2	Measure GRV and assess risk of aspiration			
3	Monitor metabolic complications: hyperglycemia, electrolyte imbalance			
4	Assess catheter site for infection (PN)			
5	Adjust feeding plan based on tolerance and lab results			
6	Communicate findings with the clinical care team			
7	Document all observations and interventions			

Skill 2.4: Formula Selection & Customization (EN & PN)

Purpose:
To select and, if needed, customize enteral or parenteral formulas according to patient medical condition, nutrient requirements, and tolerance.

Materials Required:

- Patient medical history and lab reports
- Formula reference guides (disease-specific EN, PN composition tables)
- Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review patient diagnosis and nutrient needs			
2	Select formula appropriate for disease-specific requirements			
3	Adjust calorie density or macronutrient composition if needed			

4	Evaluate protein sources and compatibility with organ function			
5	Monitor formula tolerance and efficacy			
6	Document rationale for formula selection and modifications			

Skill 2.5: Multidisciplinary Collaboration in Nutrition Support

Purpose:
To coordinate with ICU teams, nurses, pharmacists, and dietitians for safe, effective, and timely nutrition interventions.

Materials Required:

- Patient care charts and nutrition notes
- ICU rounds schedule and documentation sheets
- Pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Participate in ICU rounds with multidisciplinary team			
2	Share nutrition assessment and recommendations			
3	Collaborate on feeding schedule, formula choice, and tolerance adjustments			
4	Monitor lab results and communicate changes promptly			
5	Document team decisions and patient response			

SECTION 3: MEDICAL NUTRITION THERAPY FOR INBORN ERRORS OF METABOLISM (IEM)

Skill 3.1: Celiac Disease – Gluten-Free Diet Management

Purpose:
To plan, implement, and monitor strict gluten-free diets for patients with celiac disease, preventing gluten exposure and addressing nutrient deficiencies.

Materials Required:

- Patient medical file (diagnosis, biopsy/serology reports)
- Dietary recall and intake history
- Gluten-free food list and hospital menus
- Nutrient reference charts (iron, folate, calcium)
- Pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Confirm diagnosis and review medical records			
2	Identify sources of gluten in patient diet			
3	Plan a strict gluten-free diet according to age and energy needs			
4	Ensure adequate micronutrient intake (iron, folate, calcium, vitamin D)			
5	Counsel patient/caregiver on hidden gluten sources in hospital and home foods			
6	Monitor adherence and tolerance			
7	Document dietary plan and follow-up recommendations			

Skill 3.2: Phenylketonuria (PKU) – Low Phenylalanine Diet

Purpose:
To calculate phenylalanine allowances, plan specialized low-Phe diets, and monitor growth and plasma Phe levels in PKU patients.

Materials Required:

- Patient medical file (age, weight, lab results)
- Phenylalanine allowance charts
- Medical formulas and protein substitutes
- Growth charts
- Pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review diagnosis, age, weight, and metabolic status			
2	Calculate daily phenylalanine allowance			
3	Select appropriate low-Phe foods and medical formulas			
4	Plan meals to meet energy and micronutrient needs			
5	Monitor growth parameters and biochemical Phe levels			
6	Counsel caregiver/patient on strict dietary adherence			
7	Document dietary plan and monitoring schedule			

Skill 3.3: Galactosemia – Galactose-Free Diet Management

Purpose:
To prevent galactose intake, ensure safe nutrition, and monitor liver function and development in patients with galactosemia.

Materials Required:

- Patient medical file and lab results
- Dietary recall and feeding history
- Galactose-free food list (including hidden sources in medications/formulas)
- Liver function reports
- Pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Confirm diagnosis and review lab results			
2	Identify hidden galactose/lactose sources in foods and medications			
3	Plan galactose/lactose-free diet to meet age-appropriate needs			
4	Monitor growth, liver function, and developmental outcomes			
5	Educate caregiver on safe food choices and label reading			
6	Document dietary plan and follow-up schedule			

Skill 3.4: Maple Syrup Urine Disease (MSUD) – BCAA Restriction

Purpose:
To restrict branched-chain amino acids (Leucine, Isoleucine, Valine), provide BCAA-free specialized formulas, and monitor for metabolic crises in MSUD patients.

Materials Required:

- Patient medical file, growth charts, lab results
- BCAA-free medical formulas
- Food list with BCAA content
- Biochemical monitoring data
- Pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Confirm diagnosis and review metabolic status			
2	Calculate BCAA intake limits according to age and weight			
3	Plan diet with BCAA restriction and formula supplementation			
4	Monitor biochemical parameters and growth			
5	Identify early signs of metabolic crisis (neurological symptoms, vomiting)			
6	Educate caregivers on crisis prevention and emergency feeding			
7	Document dietary plan and monitoring outcomes			

Skill 3.5: Tyrosinemia – Low Tyrosine & Phenylalanine Diet

Purpose:
To manage tyrosinemia with restricted tyrosine and phenylalanine intake while ensuring adequate growth and nutrition.

Materials Required:

- Patient medical file and lab results
- Tyrosine- and phenylalanine-restricted diet guidelines
- Medical formulas and supplements
- Growth charts
- Pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Confirm diagnosis and review lab results			
2	Calculate safe tyrosine and phenylalanine intake			
3	Plan restricted diet using appropriate formulas			
4	Monitor growth and metabolic markers			
5	Educate caregivers on dietary adherence and monitoring			
6	Document dietary plan and outcomes			

Skill 3.6: Urea Cycle Disorders (UCD) – Low Protein + Essential AA Formulas

Purpose:
To provide low-protein diets supplemented with essential amino acids, prevent hyperammonemia, and monitor for growth and neurological outcomes.

Materials Required:

- Patient medical file and ammonia levels
- Low-protein diet charts and essential AA formulas
- Growth and developmental monitoring tools
- Pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review diagnosis, lab values (ammonia, BUN)			
2	Calculate safe protein intake			
3	Select essential amino acid formulas			
4	Plan meals to meet energy and micronutrient needs			
5	Monitor ammonia levels, growth, and neurodevelopment			
6	Educate caregivers on dietary compliance and crisis management			
7	Document dietary plan and monitoring outcomes			

Skill 3.7: Fructose Intolerance – Fructose/Sucrose-Free Diet

Purpose:
To prevent fructose/sucrose ingestion, plan safe diets, and monitor growth and metabolic stability in patients with hereditary fructose intolerance.

Materials Required:

- Patient medical file and lab reports
- Fructose/sucrose-free food list
- Dietary recall and meal plans
- Growth charts and metabolic monitoring tools
- Pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Confirm diagnosis and review lab results			
2	Identify hidden sources of fructose/sucrose in foods and medications			
3	Plan safe diet meeting energy and nutrient requirements			
4	Monitor growth, liver function, and metabolic stability			
5	Educate caregiver/patient on label reading and diet adherence			
6	Document dietary plan and follow-up schedule			

SECTION D: MNT FOR SPECIAL POPULATIONS & CONDITIONS

Skill D.1: Diet Therapy for Individuals with Physical/Behavioral Disabilities & Texture Modification (IDDSI Levels)

Purpose:
To adapt diet for patients with physical or behavioral disabilities, ensuring safe swallowing, proper nutrition, and appropriate texture modification based on IDDSI guidelines.

Materials Required:

- Patient medical/dietary history
- Feeding assistance tools (spoon, cup, adaptive utensils)
- IDDSI level guides (1–7)
- Hospital diet sheets
- Anthropometric tools (weight scale, height/length tape)
- Pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review patient's disability and feeding limitations			
2	Assess chewing, swallowing, and behavioral factors			
3	Determine appropriate IDDSI texture level			
4	Plan energy- and protein-dense meals within texture constraints			
5	Modify hospital diet sheets or meal components accordingly			
6	Observe feeding sessions and tolerance			
7	Educate caregiver or staff on feeding techniques			
8	Document meal plan, modifications, and outcomes			

Skill D.2: Nutrition in High-Risk Pregnancy & Lactation (GDM, Preeclampsia, Anemia, Hyperemesis)

Purpose:
To assess and plan nutrition for high-risk pregnant and lactating women, monitor weight gain, micronutrient adequacy, and coordinate care with the obstetric team.

Materials Required:

- Antenatal/gestational records
- Weight chart and BMI calculator
- Dietary recall forms
- Biochemical reports (Hb, iron, glucose, etc.)
- Prenatal/micronutrient reference charts
- Hospital diet sheets
- Pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review gestational age and pregnancy history			
2	Assess weight gain according to gestational age and BMI			
3	Evaluate dietary intake (macro- and micronutrients)			
4	Identify risk for GDM, preeclampsia, anemia, or hyperemesis			
5	Plan diet to meet energy, protein, and micronutrient needs			
6	Observe counselling session and adherence			
7	Adjust diet based on tolerance, biochemical, and clinical findings			
8	Document assessment, diet plan, and interventions			

Skill D.3: Geriatric Nutrition – Sarcopenia, Frailty, Dysphagia, Nutrient-Dense Diets

Purpose:
To assess nutritional risks in elderly patients, plan nutrient-dense diets considering sarcopenia, frailty, dysphagia, and other age-related limitations.

Materials Required:

- Geriatric assessment tools (MNA, GNRI, MUAC tape)
- Anthropometric tools (weight scale, height tape)
- Hospital diet sheets
- Texture-modified diet guides (IDDSI)
- Biochemical reports (albumin, electrolytes)
- Pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Assess weight history, appetite, and food intake			
2	Screen for sarcopenia and frailty			
3	Evaluate chewing/swallowing issues (dysphagia)			
4	Plan nutrient-dense, easy-to-chew diets			
5	Adjust protein, energy, and micronutrient intake			
6	Observe patient tolerance and feeding assistance needs			
7	Document dietary plan, modifications, and outcomes			

SECTION E: NUTRITIONAL PRACTICE IN CRITICAL CARE SETTINGS

Skill E.1: ICU Nutrition Assessment – EN/PN Monitoring, Labs, Fluid Balance

Purpose:
To assess the nutritional status of critically ill patients in ICU, monitor enteral/parenteral nutrition, evaluate biochemical markers, and ensure proper fluid balance for safe and effective nutrition interventions.

Materials Required:

- ICU patient charts and medical records
- EN (Enteral Nutrition) & PN (Parenteral Nutrition) monitoring sheets
- Laboratory reports (electrolytes, glucose, triglycerides, liver function tests, ABGs)
- Fluid balance charts
- Anthropometric data (weight trends, edema assessment)
- Calculator, pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review patient diagnosis and ICU admission notes			
2	Assess current nutrition support (EN/PN) type and prescription			
3	Monitor tolerance: GRVs, diarrhea, vomiting, aspiration risk			
4	Evaluate lab trends: electrolytes, glucose, triglycerides, liver enzymes			
5	Assess fluid balance: input/output, edema, hydration status			
6	Monitor weight changes and nutritional risk indicators			
7	Document findings, adjustments, and interventions			
8	Communicate nutrition assessment to ICU team			

Skill E.2: Diet Progression in Critical Care – NPO to Oral/Therapeutic Diet Transitions

Purpose:
To safely transition critically ill patients from NPO (nil per os) status to oral/therapeutic diets according to clinical stability, swallowing ability, and tolerance.

Materials Required:

- ICU diet orders and progress notes
- Swallowing assessment forms
- Hospital diet sheets (clear liquids, soft diet, therapeutic diets)
- Feeding equipment (nasogastric tube, spoon, cup, adaptive tools)
- Pen, clipboard

Checklist:

Sr. No	Task	Yes	No	Comments
1	Review patient's clinical stability and NPO duration			
2	Assess swallowing ability and aspiration risk			
3	Plan diet progression: NPO → clear liquids → soft → regular/therapeutic			
4	Adjust diet consistency for neurological or respiratory limitations			
5	Monitor tolerance to each diet stage (GI symptoms, intake, labs)			
6	Provide feeding assistance as needed			
7	Document progression, complications, and recommendations			

Skill E.3: Multidisciplinary Collaboration – ICU Rounds, Team Communication, Documentation

Purpose:
To participate effectively in ICU rounds, collaborate with healthcare team members, and maintain accurate documentation of nutrition interventions for critically ill patients.

Materials Required:

- ICU patient charts and nutrition notes
- Rounding sheets / communication logs
- Pen, clipboard
- Reference hospital protocols for ICU nutrition

Checklist:

Sr. No	Task	Yes	No	Comments
1	Attend ICU rounds with multidisciplinary team			
2	Communicate nutrition assessments and recommendations clearly			
3	Discuss EN/PN tolerance, lab trends, fluid management with team			
4	Collaborate with intensivists, nurses, pharmacists, respiratory therapists			
5	Document nutrition interventions and follow-ups in patient chart			
6	Review response to interventions and update care plan accordingly			
7	Maintain professional and confidential communication			

STUDENT DECLARATION

I hereby declare that the clinical competencies and assessment activities recorded in this workbook are my own and were completed according to program requirements.

Student Signature: _____

Date: _____

FACULTY VERIFICATION

This is to certify that the above-mentioned student has satisfactorily completed the required clinical competencies for **NOURISH–VI (Semester–VII)**.

Faculty Name: _____

Signature: _____

Date: _____