



MGM INSTITUTE OF HEALTH SCIENCES

(Deemed to be University u/s 3 of UGC Act, 1956)

Grade 'A⁺⁺' Accredited by NAAC

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CHOICE BASED CREDIT SYSTEM (CBCS)

(with effect from 2025-2026 Batch onwards)

Curriculum for M.Sc. Clinical Nutrition

Amended as per AC-52/2025, Dated 28/11/2025

Amended History

1. Amended as per AC-51/2025, [Resolution No. 3.1,(Annexure-3.4)]; [Resolution No. 3.5, (Annexure-7)]; Dated 29/04/2025.
2. Amended as per AC-52/2025, [Resolution No. 5.1,(Annexure-17D)]; [Resolution No. 5.8, (Annexure-24O)]; Dated 28/11/2025.

Resolution No. 3.1 of Academic Council (AC-51/2025):

Resolved to approve the CBCS syllabus, including Program Outcomes (POs), Course Outcomes (COs), and PO- CO Mapping for 15 two-year postgraduate programs under MGMSBS for Semesters I and II. These include: M.Sc. Medical Biotechnology, M.Sc. Medical Genetics, M.Sc. Clinical Embryology, **M.Sc. Clinical Nutrition**, M.Sc. Medical Dialysis Technology, M.Sc. Molecular Biology, M.Sc. Medical Radiology & Imaging Technology, M.Sc. Cardiac Care Technology, M.Sc. Operation Theatre and Anaesthesia Technology, M.Sc. Emergency and Trauma Care, M. Optometry, Master in Hospital Administration, Master of Public Health, M.Sc. Health Informatics & M.Sc. Clinical Research to be effective from batch admitted in Academic Year 2025-26 onwards [ANNEXURE-3.1 to 3. 30].

**Annexure-3.4 of AC-51/2025****MGM SCHOOL OF BIOMEDICAL SCIENCES, NAVI MUMBAI**

(A constituent unit of MGM INSTITUTE OF HEALTH SCIENCES)

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CHOICE BASED CREDIT SYSTEM (CBCS)

(Academic Year 2025 - 26)

Curriculum for

M.Sc. Allied Health Sciences

M.Sc. Clinical Nutrition

Semester I & II

DIRECTOR'S MESSAGE

Welcome Message from the Director

Dear Postgraduate Students,

Welcome to **MGM School of Biomedical Sciences (MGMSBS), MGMIHS**, a premier institution dedicated to advancing allied and health sciences education. As you embark on this transformative academic journey, you are joining a community that fosters excellence in research, clinical expertise, and innovation.

MGMIHS, accredited with NAAC 'A++' Grade (CGPA 3.55, 2022) and recognized as a **Category I Institution by UGC**, offers an ecosystem that nurtures both academic and professional growth. With **NIRF (151-200 rank band) recognition, NABH-accredited hospitals, NABL-accredited diagnostic labs, and JCI accreditation for MGM New Bombay Hospital**, we uphold global benchmarks in education and healthcare.

At MGMSBS, our **15 postgraduate programs** are meticulously designed to align with the National Commission for Allied and Healthcare Professionals (NCAHP) standards, National Education Policy (NEP) 2020, and the National Credit Framework (NCrF). We have implemented the **Choice-Based Credit System (CBCS)** to provide academic flexibility while ensuring rigorous training in clinical and technical skills. Our state-of-the-art research laboratories, digital classrooms, and the Central Research Laboratory (CRL) foster an environment that encourages innovation and evidence-based learning.

Postgraduate education at MGMSBS goes beyond theoretical learning—our curriculum integrates **hands-on clinical training, interdisciplinary collaboration, and exposure to real-world healthcare challenges**. We emphasize **research-driven education**, encouraging students to actively participate in **scientific discoveries, publications, and international collaborations**.

Beyond academics, we believe in **holistic development**, with initiatives such as the **AARAMBH Science and Wellness Club**, which promotes **mental well-being, leadership, and professional networking**.

As you step into this **next phase of academic and professional growth**, we encourage you to explore new ideas, engage in impactful research, and contribute meaningfully to the **healthcare ecosystem**. We are confident that your journey at MGMSBS will shape you into **skilled, compassionate, and visionary professionals**, ready to lead in the ever-evolving healthcare landscape.

We look forward to witnessing your achievements and contributions!

Dr. Mansee Thakur

Director, MGM School of Biomedical Sciences
MGM Institute of Health Sciences, Navi Mumbai

ABOUT MGM SCHOOL OF BIOMEDICAL SCIENCES

Mission

To improve the quality of life, both at individual and community levels by imparting quality medical education to tomorrow's doctors and medical scientists and by advancing knowledge in all fields of health sciences through meaningful and ethical research.

Vision

By the year 2020, MGM Institute of Health Sciences aims to be top-ranking Centre of Excellence in Medical Education and Research. Students graduating from the Institute will have the required skills to deliver quality health care to all sections of the society with compassion and benevolence, without prejudice or discrimination, at an affordable cost. As a research Centre, it shall focus on finding better, safer and affordable ways of diagnosing, treating and preventing diseases. In doing so, it will maintain the highest ethical standards.

About – School of Biomedical Sciences

MGM School of Biomedical Sciences is formed under the aegis of MGM IHS with the vision of offering basic Allied Science and Medical courses for students who aspire to pursue their career in the Allied Health Sciences, teaching as well as research.

School of Biomedical Sciences is dedicated to the providing the highest quality education in basic medical sciences by offering a dynamic study environment with well-equipped labs. The school encompasses 23 courses each with its own distinct, specialized body of knowledge and skill. This includes 8 UG courses and 15 PG courses. The college at its growing years started with mere 100 students has recorded exponential growth and is now a full-fledged educational and research institution with the student strength reaching approximately **800** at present.

Our consistent theme throughout is to encourage students to become engaged, be active learners and to promote medical research so that ultimately they acquire knowledge, skills, and understanding so as to provide well qualified and trained professionals in Allied Health Sciences to improve the quality of life.

As there is increased need to deliver high quality, timely and easily accessible patient care system the collaborative efforts among physicians, nurses and allied health providers become ever more essential for an effective patient care. Thus the role of allied health professionals in ever-evolving medical system is very important in providing high-quality patient care.

Last but by no means least, School of Biomedical Sciences envisions to continuously grow and reform. Reforms are essential to any growing institution as it fulfills our bold aspirations of providing the best for the students, for us to serve long into the future and to get ourselves updated to changing and evolving trends in the health care systems.

Introduction

Nutrition can have a direct impact on how a person feels and functions daily. A well-balanced diet can improve energy, mood, and cognitive function, which can significantly enhance quality of life, especially in those with chronic conditions. Proper nutrition is essential for preventing and managing acute and chronic conditions like diabetes, heart disease, obesity, hypertension, etc. It helps control risk factors, reduce complications, and enhance overall health outcomes.

Overall, clinical nutrition is fundamental in promoting health, preventing and managing diseases, supporting recovery, and improving patients' quality of life through personalized dietary guidance. It bridges the gap between food and health, making it a key part of medical care.

The M.Sc. in Clinical Nutrition program is designed to provide advanced knowledge in nutrition, dietetics, and clinical care. The curriculum combines foundational courses in biochemistry, physiology, and microbiology with specialized topics like clinical nutrition, therapeutic diets, and nutrition in disease management. A significant feature of the M.Sc. Clinical Nutrition program is its focus on **interdisciplinary learning**. In addition to core courses in clinical nutrition, students engage with subjects such as **public health nutrition, community nutrition, and sustainable food systems**. This approach prepares students to address nutrition-related issues not only at the individual level but also within the larger context of public health. The program also integrates practical experience through clinical postings, helping students apply theory to real-world scenarios. The program focuses on holistic development, fostering critical thinking, communication skills, and leadership, preparing graduates for diverse roles in healthcare, research, and policy.

The program prepares graduates to become proficient and compassionate nutrition experts who can address both individual and public health challenges. With its blend of core subjects, interdisciplinary learning, practical training the program equips students to lead in the evolving field of clinical nutrition. Graduates are well-prepared to take on roles in hospitals, healthcare organizations, research institutions, and policy development, making significant contributions to improving health through nutrition.

AIM of the Program

The Master's in Clinical Nutrition program aims to:

1. Provide a thorough understanding of the biochemical, physiological, and metabolic processes of nutrients and their impact on health.
2. Prepare students to assess nutritional status, create individualized nutrition care plans, and use diet to manage various health conditions.
3. Teach students how to critically analyze and apply research findings to make informed nutrition decisions in both acute and chronic health situations.
4. Enable students to work effectively within healthcare teams, collaborating with physicians, nurses, and other professionals to deliver comprehensive patient care.
5. Develop the ability to educate and guide individuals and communities in adopting healthy eating habits and making lifestyle changes to prevent disease.
6. Impart strong ethical practices, cultural sensitivity, and professionalism in clinical nutrition.

7. Support students in contributing to the advancement of the field through research and developing new clinical nutrition strategies.

Job Opportunities

After completing an MSc in Clinical Nutrition, there are various job opportunities available in healthcare, research, and other related sectors. Here are some potential career paths:

1. Clinical Dietitian/Nutritionist

- **Role:** Work in hospitals, clinics, or private practice to assess patients' nutritional needs, provide dietary counseling, and develop meal plans for patients with medical conditions (e.g., diabetes, heart disease, cancer).
- **Where:** Hospitals, clinics, rehabilitation centres, private practice.

2. Public Health Nutritionist

- **Role:** Work with government health organizations, NGOs, or community health programs to promote healthy eating habits and improve public health nutrition. May also be involved in designing and implementing nutrition-related policies.
- **Where:** Government health agencies, non-profit organizations, international organizations like WHO, UNICEF.

3. Researcher in Nutrition and Dietetics

- **Role:** Conduct research in the field of nutrition, either in academic institutions, research labs, or as part of clinical trials, to develop new dietary guidelines, supplements, and nutritional therapies.
- **Where:** Universities, research institutions, pharmaceutical companies.

4. Sports Nutritionist

- **Role:** Specialize in the dietary needs of athletes and individuals involved in physical training, advising them on optimal nutrition for performance, recovery, and overall health.
- **Where:** Sports teams, fitness centers, personal coaching, or rehabilitation centers.

5. Nutrition Consultant for Food Industry

- **Role:** Provide expertise to food companies, helping them develop healthier food products, create nutrition labels, and ensure compliance with regulations.
- **Where:** Food manufacturing companies, health and wellness brands, product development teams.

6. Corporate Wellness Consultant

- **Role:** Design nutrition programs for businesses to improve employee health, reduce absenteeism, and enhance productivity through better dietary habits.
- **Where:** Corporations, wellness organizations, employee health programs.

7. Nutrition Educator/Trainer

- **Role:** Teach nutrition-related courses, seminars, or workshops in schools, colleges, universities, or as part of public outreach programs.
- **Where:** Educational institutions, health promotion organizations, wellness programs.

8. Dietary Manager

- **Role:** Manage the dietary department in hospitals, nursing homes, or schools, overseeing food service operations, nutrition planning, and ensuring the dietary needs of individuals are met.
- **Where:** Hospitals, nursing homes, schools, long-term care facilities.

9. Food Safety and Quality Control Specialist

- **Role:** Ensure the safety and quality of food products, and work on guidelines for the proper handling, storage, and preparation of food.
- **Where:** Food manufacturing companies, quality control labs, regulatory agencies.

10. Entrepreneur in Nutrition and Wellness

- **Role:** Start own business in nutrition counseling, wellness coaching, or create a nutrition-related product line (e.g., supplements, meal plans).
- **Where:** Private practice, online business, wellness centres.

11. Medical Nutrition Therapist

- **Role:** Work with patients with medical conditions that require therapeutic diets, such as kidney disease, cancer, diabetes, and gastrointestinal disorders.
- **Where:** Hospitals, specialized clinics, rehabilitation centres.

12. Health Blogger/Vlogger or Content Creator

- **Role:** Create educational content on nutrition and wellness topics, building an online following. Can monetize through ads, partnerships with brands, and selling products or services.
- **Where:** Online platforms (YouTube, Instagram, blogs).

ELIGIBILITY FOR ADMISSION:

Eligibility students with the following undergraduate degree are eligible, B.Sc. Home Science/ Nutrition/ Dietetics/ Food Science/ Biochemistry or any Life Sciences, MBBS, BHMS, BAMS, BDS, B.Sc. Nursing. Student should have obtained minimum 50% marks in the undergraduate degree or B grade from any recognized University.

DURATION OF THE COURSE: 2 (two) academic years/4 semesters

M.Sc. CLINICAL NUTRITION

Program Outcomes (PO)

Program Code	Program Objective(s)
PO1	<p>Advanced Knowledge and Understanding:</p> <ul style="list-style-type: none"> • Develop in-depth knowledge of clinical nutrition and dietetics, including the physiological, biochemical, and metabolic processes. • Understand the role of nutrition in disease prevention, management, and treatment, with a focus on medical nutrition therapy. • Stay informed the latest advancements in nutrition science and technology.
PO2	<p>Clinical Competency and Patient Care:</p> <ul style="list-style-type: none"> • Equip students with the skills to assess nutritional needs, create personalized nutrition plans, and monitor patient progress. • Gain proficiency in counselling patients and families about healthy eating, lifestyle modifications, and therapeutic diets. • Demonstrate the ability to apply nutritional science to clinical settings, including hospitals, rehabilitation centres, and community health organizations.
PO3	<p>Research and Evidence-Based Practice:</p> <ul style="list-style-type: none"> • Foster the ability to conduct independent research in clinical nutrition, contributing to new insights in the field. • Promote a scientific, evidence-based approach to nutrition interventions and patient care.
PO4	<p>Interdisciplinary Collaboration:</p> <ul style="list-style-type: none"> • Develop skills for working in collaborative healthcare teams, integrating the expertise of medical doctors, dietitians, and other healthcare professionals. • Communicate effectively with colleagues and patients from diverse backgrounds, ensuring inclusive and culturally competent care.
PO5	<p>Ethics and Professionalism:</p> <ul style="list-style-type: none"> • Instil high ethical standards in clinical practice, including patient confidentiality, informed consent, and professional integrity. • Embrace professional conduct and responsibility in all aspects of the clinical nutrition profession.
PO6	<p>Public Health and Nutrition Advocacy:</p> <ul style="list-style-type: none"> • Promote public health nutrition through education, advocacy, and community programs. • Understand and address public health challenges, such as malnutrition, obesity, and chronic diseases, through nutrition interventions. • Engage in nutrition policy-making and advocacy for better health outcomes on a population level.
PO 7	<p>Sustainability and Environmental Impact:</p> <ul style="list-style-type: none"> • Understand the importance of sustainable food systems and their impact on health and the environment.
PO8	<p>Lifelong Learning and Professional Development:</p> <ul style="list-style-type: none"> • Encourage continuous learning and professional growth through certifications, workshops, and seminars. • Stay updated with the latest trends and innovations in the nutrition field to adapt to evolving healthcare needs.

Course Outcomes Semester I

MCN 101 T	Fundamentals of Nutrition	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Discuss the role of nutrients in human health and their contribution to preventing or managing certain disorders.	PO1, PO2	Lecture, Group Discussion, Assignment, Seminar	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO2	Describe the different forms of nutrients (carbohydrates, proteins, fats, vitamins, minerals, water, and electrolytes) and understand their procurement and requirements for the human body.	PO1, PO2, PO8	Lecture, Group Discussion, Assignment, Seminar	Theory exam, Assignment, Poster, Seminar
MCN 102 T & MCN 104 P	Nutritional Biochemistry	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Outline the structure and function of the biomolecules found in all living organisms	PO1, PO2	Lecture, Practical, Demonstration, Assignment, Seminar	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar
CO2	Describe the circulatory system, cardiac cycle, and conditions like hypertension and heart failure.	PO1, PO2	Lecture, Practical, Demonstration, Assignment, Seminar	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar
CO3	Explain respiratory system functions, breathing mechanisms, and related abnormalities.	PO1, PO2	Lecture, Practical, Demonstration, Assignment, Seminar	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar
CO4	Comprehend renal system functions, urine formation, and dialysis principles.	PO1, PO2	Lecture, Practical, Demonstration, Assignment, Seminar	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar
CO5	Understand the structure and function of the nervous system, including the blood-brain barrier.	PO1, PO2	Lecture, Practical, Demonstration, Assignment, Seminar	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book,

				Assignment, Seminar
CO6	Analyze the digestive system, digestion, absorption, and gastrointestinal hormone functions.	PO1, PO2	Lecture, Practical, Demonstration, Assignment, Seminar	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar
CO7	Study musculoskeletal system functions, muscle contraction, and nerve impulse conduction.	PO1, PO2, PO3	Lecture, Practical, Demonstration, Assignment, Seminar	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar
CO8	Understand the endocrine system's glands, their regulation, and related disorders.	PO1, PO2, PO3, PO4, PO6	Lecture, Practical, Demonstration, Assignment, Seminar	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar
CO9	Interpret blood composition, blood cell formation, coagulation, and blood groups.	PO1, PO2, PO3, PO4, PO6	Lecture, Practical, Demonstration, Assignment, Seminar	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar
MCN 103 T & MCN 105 P	Human Physiology	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Understand body systems: Gain knowledge of the structure and function of systems like circulatory, respiratory, renal, digestive, musculoskeletal, nervous, and endocrine systems.	PO1, PO2	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar
CO2	Analyze physiological processes: Learn key processes such as membrane transport, cardiac cycle, respiration, urine formation, muscle contraction, and digestion.	PO1, PO2	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar
CO3	Study special systems: Explore the functioning and disorders of the cardiovascular, respiratory, renal, and gastrointestinal systems, including blood pressure, ECG, and respiratory issues.	PO1, PO2	Lecture, Practical, Demonstration, Assignment, Seminar	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar
CO4	Comprehend endocrine and hematology: Understand the regulation and disorders of major	PO1, PO2	Lecture, Practical, Demonstration,	Internal Assessment, University Exam, Theory exam,

	glands (pituitary, thyroid, adrenal, pancreas) and blood functions like coagulation and anemia.		Assignment, Seminar	Practical exam, Viva-voce, log book, Assignment, Seminar
CO5	Integrate with clinical nutrition: Relate physiological knowledge to clinical nutrition, focusing on the connection between nutrition and health.	PO1, PO2	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar
CO6	Enhance clinical application: Develop critical thinking skills to apply physiological knowledge in clinical nutrition practice and disease management.	PO1, PO2	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar
CC 001 T & CC 001 P	Research Methodology & Biostatistics (Core Course)	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Student will be able to understand develop statistical models, research designs with the understating of background theory of various commonly used statistical techniques as well as analysis interpretation & reporting of Results and use of statistical software.	PO2	Lecture, Demonstration, Practical, Assignment, Seminar	Internal Exam, University Exam (Theory Exam, Practical Exam), Assignment
MCN 106 CP	MCN Directed Clinical Education - I	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Knowledge-Based competencies will build a robust theoretical foundation, enabling students to understand healthcare practices, disease management, and patient care, thereby empowering them to make informed decisions and adapt to evolving medical technologies.	PO2, PO4, PO5, PO8	Case studies, Industrial Visit	Case-study Presentation, Viva-voce, log book
CO2	Skill-Based competencies will emphasize hands-on training, ensuring proficiency in clinical procedures, diagnostic techniques, and the use of advanced medical equipment. This practical exposure will bridge the gap between theory and practice, enhancing students'	PO2, PO4, PO5, PO8	Case studies, Industrial Visit	Case-study Presentation, Viva-voce, log book

	confidence and competence in delivering quality patient care.			
CO3	Attitudinal competencies will focus on developing professionalism, empathy, ethical conduct, teamwork, and communication skills-key traits for holistic patient care and effective collaboration in interdisciplinary healthcare teams.	PO2, PO4, PO5, PO8	Case studies, Industrial Visit	Case-study Presentation, Viva-voce, log book

Semester II

MCN 107 T & MCN 111 P	Medical Nutrition Therapy -I	Mapped PO	Teaching-Learning Methodology	Assessment Tools
CO1	Conduct Comprehensive Nutrition Assessments: Use various clinical assessment tools (e.g., NRS, SGA, MNA) to assess patients' nutritional status, diagnose nutritional problems, and design appropriate interventions.	PO1, PO2, PO4, PO5	Lecture, Problem based learning, Demonstration, Assignment, Seminar, Group discussion, Case-study, Workshops	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar
CO2	Provide Therapeutic Nutritional Support: Implement enteral and parenteral nutrition, manage related complications, and understand the impact of drug-nutrient interactions to deliver effective nutritional support for patients with therapeutic needs.	PO1, PO2, PO3, PO4	Lecture, Problem based learning, Quiz, Assignment, Seminar, Group discussion, Case-study, Workshops, Guest lecture	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar, Case Study presentation
CO3	Manage Pediatric Nutrition: Develop and implement nutrition care plans for hospitalized infants and children, addressing conditions like low birth weight, failure to thrive, gastrointestinal issues, and congenital anomalies.	PO1, PO2, PO3, PO4	Lecture, Problem based learning, Quiz, Assignment, Seminar, Group discussion, Case-study, Workshops	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar, Case Study presentation
CO4	Manage Nutrition in Infectious Diseases: Address the nutritional needs of patients with febrile conditions and infections such as typhoid, malaria, tuberculosis, and HIV/AIDS, understanding the metabolic changes and dietary requirements during illness.	PO1, PO2, PO3, PO4	Lecture, Problem based learning, Assignment, Seminar, Group discussion, Case-study, Workshops	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar, Case Study presentation
CO5	Address Energy Imbalance and Nutritional Disorders: Manage conditions such as obesity, underweight, and eating disorders by applying dietary, behavioral, and pharmacological strategies, with a focus on energy balance regulation.	PO1, PO2, PO3, PO4	Lecture, Assignment, Seminar, Group discussion, Case-study, Workshops	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar, Case Study presentation

CO6	Handle Immune System and Food Allergy Management: Design elimination diets and nutrition strategies for patients with food allergies, intolerances, and immune system disorders such as celiac disease and autoimmune conditions.	PO1, PO2, PO3, PO4	Lecture, Practical, Assignment, Seminar, Group discussion, Case-study, Workshops	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar, Case Study presentation
CO7	Manage Nutrition in Pulmonary and Musculoskeletal Disorders: Provide nutritional care for patients with pulmonary diseases (e.g., asthma, COPD) and musculoskeletal disorders (e.g., arthritis, osteoporosis), focusing on anti-inflammatory dietary approaches.	PO1, PO2, PO3, PO4	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Case-study, Workshops	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar, Case Study presentation
CO8	Implement Gastrointestinal Nutrition Therapy: Manage gastrointestinal disorders, including diseases of the upper and lower GI tract, malabsorption syndromes, and post-surgical care, improving clinical practice in digestive health.	PO1, PO2, PO3, PO4	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Case-study, Workshops	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar, Case Study presentation
CO9	Manage Endocrine Nutrition: Assess and provide nutrition interventions for patients with endocrine disorders like thyroid diseases, polycystic ovary syndrome (PCOS), Cushing's syndrome, and Addison's disease.	PO1, PO2, PO3, PO4	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Case-study, Workshops	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar, Case Study presentation
CO10	Understand and Manage Nutrient-Drug Interactions: Evaluate the clinical significance of nutrient-drug interactions and their effects on nutritional status, ensuring optimal treatment outcomes through appropriate management strategies.	PO1, PO2, PO3, PO4	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Case-study, Workshops, Guest lecture	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar, Case Study presentation
MCN 108 T & MCN 112 P	Community and Public Health Nutrition	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Define and understand key concepts in community and public health nutrition, including biomedical, ecological, psychological, and holistic approaches, as well as	PO1, PO3, PO5, PO6	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Case-study, Workshops	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar

	epidemiological methods such as case-control and cohort studies.			
CO2	Assess nutritional status at individual and community levels using methods like anthropometry, biochemical, clinical, and dietary assessments.	PO1, PO3, PO5, PO6	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Case-study, Workshops	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar
CO3	Apply nutrition standards for growth monitoring in children and assess nutritional status in adults using WHO standards.	PO1, PO3, PO5, PO6	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Case-study, Workshops	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar
CO4	Understand and analyze food and nutrition security, including its dimensions and relevant policies in India, such as NFSA and the Public Distribution System.	PO1, PO3, PO5, PO6, PO7	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Case-study, Workshops	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar
CO5	Identify and address nutritional problems such as nutrient deficiencies, obesity, chronic diseases, and malnutrition, with an emphasis on integrated solutions and interventions.	PO1, PO3, PO5, PO6	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Case-study, Workshops, guest lecture	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar
CO6	Plan, execute, and evaluate nutrition education programs for communities, utilizing appropriate tools and overcoming implementation challenges.	PO1, PO3, PO5, PO6, PO7	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Case-study, Workshops, guest lecture	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar
CO7	Understand health and nutrition administration in India, including welfare programs, government policies, and the role of global health agencies like UNICEF and WHO.	PO1, PO3, PO5, PO6	Lecture, Practical, Demonstration, Assignment, Seminar, Group discussion, Case-study, Workshops	Internal Assessment, University Exam, Theory exam, Practical exam, Viva-voce, log book, Assignment, Seminar
MCN 109 T	Food Microbiology	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Understand the basics of food microbiology, including microbial growth and factors affecting it.	PO1	Lecture, Assignment, Seminar, Group discussion	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO2	Identify and describe microorganisms (molds, bacteria, yeasts, viruses) in food and their role in spoilage and foodborne diseases.	PO1	Lecture, Assignment, Seminar, Group discussion	Internal Assessment, University Exam, Theory exam, Assignment, Seminar

CO3	Recognize biochemical changes caused by microbes in food.	PO1	Lecture, Assignment, Seminar, Group discussion	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO4	Analyze microbial contamination and spoilage in various food types.	PO1	Lecture, Assignment, Seminar, Group discussion	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO5	Understand foodborne diseases, pathogens, and their detection methods.	PO1	Lecture, Assignment, Seminar, Group discussion	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO6	Learn about microbial toxins and their health impacts.	PO1	Lecture, Assignment, Seminar, Group discussion	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO7	Explore methods for controlling microorganisms in food, including preservation and novel processing technologies.	PO1, PO7	Lecture, Assignment, Seminar, Group discussion, Industrial Visit	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO8	Understand food sanitation, including water quality, sewage treatment, and food safety standards like GMP and HACCP.	PO1, PO7	Lecture, Assignment, Seminar, Group discussion, Industrial Visit	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO9	Apply microbiological criteria for food safety and understand the role of control agencies in ensuring food safety.	PO1, PO7	Lecture, Assignment, Seminar, Group discussion	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
MCN 110 T	Nutrition Through Life Cycle	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Understand nutritional requirements across the life cycle, from pregnancy to geriatrics.	PO1, PO2	Lecture, Assignment, Seminar, Group discussion, Role-play	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO2	Assess the impact of physiological and psychosocial changes on nutrition at each life stage.	PO1, PO2	Lecture, Assignment, Seminar, Group discussion, Role-play	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO3	Identify and manage nutrition-related challenges, such as high-risk pregnancies, childhood obesity, and aging-related issues.	PO1, PO2, PO6	Lecture, Assignment, Seminar, Group discussion, Role-play	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO4	Apply growth monitoring techniques and design dietary interventions for different age groups.	PO1, PO2	Lecture, Assignment, Seminar, Group discussion, Role-play, Guest lecture, Workshops	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO5	Address specific nutritional issues like breastfeeding, weaning, and adolescent eating disorders.	PO1, PO2, PO6	Lecture, Assignment, Seminar, Group discussion, Role-play, Demonstrations,	Internal Assessment, University Exam, Theory exam, Assignment, Seminar, Poster presentation.

			Guest lecture, Workshops	
CO6	Develop nutrition plans for preventing and managing health problems, including chronic diseases in the elderly.	PO1, PO2, PO6	Lecture, Assignment, Seminar, Group discussion, Role-play, Demonstrations, Guest lecture, Workshops	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
MCN 113 CP	MCN Directed Clinical Education - II	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Knowledge-Based competencies will build a robust theoretical foundation, enabling students to understand healthcare practices, disease management, and patient care, thereby empowering them to make informed decisions and adapt to evolving medical technologies.	PO2, PO4, PO5, PO8	Case studies, Industrial Visit	Case-study Presentation, Viva-voce, log book
CO2	Skill-Based competencies will emphasize hands-on training, ensuring proficiency in clinical procedures, diagnostic techniques, and the use of advanced medical equipment. This practical exposure will bridge the gap between theory and practice, enhancing students' confidence and competence in delivering quality patient care.	PO2, PO4, PO5, PO8	Case studies, Industrial Visit	Case-study Presentation, Viva-voce, log book
CO3	Attitudinal competencies will focus on developing professionalism, empathy, ethical conduct, teamwork, and communication skills-key traits for holistic patient care and effective collaboration in interdisciplinary healthcare teams.	PO2, PO4, PO5, PO8	Case studies, Industrial Visit	Case-study Presentation, Viva-voce, log book
SEC 001 T	Nutrition for Emergencies	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Distinguish between natural and manmade disasters, and comprehend their impact on public health and nutrition.	PO1, PO2, PO3	Lecture, Assignment, Seminar, Videos	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO2	Demonstrate knowledge of nutrition management during emergencies, including immediate rescue, first aid, and physiological support	PO1, PO2	Lecture, Assignment, Seminar, Videos	Internal Assessment, University Exam, Theory exam, Assignment, Seminar

CO3	Organize and implement nutritional assessments and individual screenings in disaster-affected populations.	PO1, PO2, PO4	Lecture, Assignment,	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO4	Develop and manage supplementary and therapeutic feeding interventions tailored to emergency contexts.	PO6, PO7, PO8	Lecture, Assignment, Case studies	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO5	Assess food needs, design effective food supply chains, and ensure equitable distribution to vulnerable groups.	PO1, PO2, PO3	Lecture, Assignment, Seminar, Group discussion, Role-play, Demonstrations, Guest lecture	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO6	Utilize local food resources, manage feeding centers, and ensure proper food storage and transportation.	PO5, PO6, PO7	Lecture, Assignment, Seminar, Group discussion,	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO7	Promote safe water supply, sanitation, and hygiene to prevent disease outbreaks during and after disasters	PO3, PO4, PO5	Group discussion, Role-play, Demonstrations	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO8	Recognize major and specific nutrient deficiencies common in emergencies and apply appropriate dietary and medical treatments.	PO1, PO2	Lecture, Assignment,	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO9	Evaluate the impact of global warming and other factors on food security, particularly in the Indian context	PO5, PO6, PO7	Lecture, Assignment, Seminar, Group discussion	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO10	Advocate for immunization, communicable disease control, and long-term nutritional rehabilitation in post-disaster settings	PO6, PO7, PO8	Group discussion, Role-play, Demonstrations	Internal Assessment, University Exam, Theory exam, Assignment, Seminar

OUTLINE OF COURSE CURRICULUM**M.Sc. Clinical Nutrition****Semester I**

Code No.	Core Course	Credits/Week					Hrs/Semester					Marks		
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation (CP)	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation (CP)	Total (hrs.)	Internal Assement (IA)	Semester End Exam (SEE)	Total
Discipline Specific Core Theory														
MCN 101 T	Fundamentals of Nutrition	3	-	-	-	3	45	-	-	-	45	20	80	100
MCN 102 T	Nutritional Biochemistry	3	-	-	-	3	45	-	-	-	45	20	80	100
MCN 103 T	Human Physiology	3	-	-	-	3	45	-	-	-	45	20	80	100
CC 001 T	Research Methodology & Biostatistics (Core Course)	3	-	-	-	3	45	-	-	-	45	-	50	50
Discipline Specific Core Practical														
MCN 104 P	Nutritional Biochemistry	-	-	2	-	1	-	-	30	-	30	10	40	50
MCN 105 P	Human Physiology	-	-	2	-	1	-	-	30	-	30	10	40	50
MCN 106 CP	MCN Directed Clinical Education - I	-	-	-	15	5	-	-	-	225	225	-	50	50
CC 001 P	Research Methodology & Biostatistics (Core Course)	-	-	4	-	2	-	-	60	-	60	-	50	50
Total		12	0	8	15	21	180	0	120	225	525	80	470	550

Resolution No. 5.8 of Academic Council (AC-52/2025):

The Academic Council resolved to approve the continuation of SWAYAM/NPTEL elective courses for postgraduate students, wherever applicable to their respective programmes. Accordingly, students admitted from the Academic Year 2025-26 onwards shall be permitted to choose any one approved elective course. The Council further approved the inclusion of 2 and 3 credit courses in the index. This approach is in alignment with the current NCAHP curriculum guidelines, which recommend flexibility for open electives through recognized national platforms.

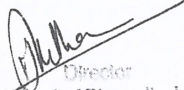
Accordingly, the names of individual elective courses shall be removed from the existing syllabi. The links of SWAYAM/NPTEL courses (https://swayam.gov.in/nc_details/NPTEL) shall be incorporated in the syllabus index under the existing course code SEC-002 T, titled: "NPTEL/SWAYAM (Name of the Course Chosen by the Student)"

In alignment with Resolution No. 3.1 of the Academic Council (AC-51/2025), the detailed syllabi of individual courses shall be removed and replaced with the approved links of SWAYAM/NPTEL or common reference pool courses. The complete course content shall remain accessible on the official SWAYAM/NPTEL portals. Students may select any one course from the provided links, in alignment with the credit requirements mentioned in their respective syllabi, as per Annexures 24A, 24B, 24C, 24D, 24E, 24F, 24G, 24H, 24I, 24J, 24K, 24L, 24M, 24N, and 24O.

**OUTLINE OF COURSE CURRICULUM
M.Sc. Clinical Nutrition**

Semester II

Code No.	Core Course	Credits/Week					Hrs/Semester					Marks			
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation (CP)	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation (CP)	Total (hrs.)	Internal Assement (IA)	Semester End Exam (SEE)	Total	
Discipline Specific Core Theory															
MCN 107 T	Medical Nutrition Therapy - I	4	-	-	-	4	60	-	-	-	60	20	80	100	
MCN 108 T	Community & Public Health Nutrition	2	-	-	-	2	30	-	-	-	30	20	80	100	
MCN 109 T	Food Microbiology	2	-	-	-	2	30	-	-	-	30	20	80	100	
MCN 110 T	Nutrition through Lifecycle	2	-	-	-	2	30	-	-	-	30	20	80	100	
Discipline Specific Core Practical															
MCN 111 P	Medical Nutrition Therapy - I	-	-	4	-	2	-	-	60	-	60	10	40	50	
MCN 112 P	Community & Public Health Nutrition	-	-	4	-	2	-	-	60	-	60	10	40	50	
MCN 113 CP	MCN Directed Clinical Education - II	-	-	-	15	5	-	-	-	225	225	-	50	50	
Skill Enhancement Course															
SEC 001 T	Nutrition in Emergencies	3	-	-	-	3	45	-	-	-	45	-	100	100	
SEC 002 T	NPTEL Swayam (Course Selected as per Below List)														
Total		13	0	8	15	22	195	0	120	225	540	100	550	650	


 Director
MEM School of Biomedical science
 Kamothe, Navi Mumbai

Common Pool of Swayam/NPTEL Courses offered as elective option (SEC 002)

Course ID	Discipline	Course Name	Institute	Duration	Start date	End date	Exam date	Enrollment End date	Exam Registration End date	UG/PG	Click here to Join the course	NPTEL URL	NPTEL ID
noc25-bt06	Biotechnology and Bioengineering	BioInformatics: Algorithms and Applications	IIT Madras	12 Weeks	20-01-2025	11-04-2025	26-04-2025	27-01-2025	28-02-2025	UG/PG	https://onlinecourses.nptel.ac.in/noc25_bt06/preview	https://nptel.ac.in/courses/102106065	https://nptel.ac.in/courses/102106065
noc25-bt13	Biotechnology and Bioengineering	Computational Genomics	IISER Bhopal	12 Weeks	20-01-2025	11-04-2025	27-04-2025	27-01-2025	28-02-2025	PG	https://onlinecourses.nptel.ac.in/noc25_bt13/preview	https://nptel.ac.in/courses/102106339	https://nptel.ac.in/courses/102106339
noc25-bt29	Biotechnology and Bioengineering	Maternal Infant Young Child Nutrition	IIT Bombay	12 Weeks	20-01-2025	11-04-2025	26-04-2025	27-01-2025	28-02-2025	UG/PG	https://onlinecourses.nptel.ac.in/noc25_bt29/preview	https://nptel.ac.in/courses/102101091	https://nptel.ac.in/courses/102101091
noc25-ge05	Multidisciplinary	Biophotonics	IIT Kharagpur	12 Weeks	20-01-2025	11-04-2025	03-05-2025	27-01-2025	28-02-2025	PG	https://onlinecourses.nptel.ac.in/noc25_ge05/preview	https://nptel.ac.in/courses/127105225	https://nptel.ac.in/courses/127105225
noc25-ge07	Multidisciplinary	Comprehensive Molecular Diagnostics and Advanced Gene Expression Analysis	IIT Kharagpur	12 Weeks	20-01-2025	11-04-2025	03-05-2025	27-01-2025	28-02-2025	UG/PG	https://onlinecourses.nptel.ac.in/noc25_ge07/preview	https://nptel.ac.in/courses/127105391	https://nptel.ac.in/courses/127105391
noc25-ge25	Multidisciplinary	One Health	ICMR - Regional Medical Research Centre, Bhubaneswar	12 Weeks	20-01-2025	11-04-2025	03-05-2025	27-01-2025	28-02-2025	PG	https://onlinecourses.nptel.ac.in/noc25_ge25/preview	https://nptel.ac.in/courses/127106233	https://nptel.ac.in/courses/127106233
noc25-ge27	Multidisciplinary	Qualitative Research Methods and Research Writing	IIT Kharagpur	12 Weeks	20-01-2025	11-04-2025	27-04-2025	27-01-2025	28-02-2025	PG	https://onlinecourses.nptel.ac.in/noc25_ge27/preview	https://nptel.ac.in/courses/109105115	https://nptel.ac.in/courses/109105115
noc25-bt21	Biotechnology and Bioengineering	Host-Pathogen Interaction (Immunology)	IISER Bhopal	12 Weeks	20-01-2025	11-04-2025	04-05-2025	27-01-2025	28-02-2025	PG	https://onlinecourses.nptel.ac.in/noc25_bt21/preview	https://onlinecourses.nptel.ac.in/noc24_bt24/preview	https://onlinecourses.nptel.ac.in/noc24_bt24/preview
noc25-bt22	Biotechnology and Bioengineering	Human Physiology	IISER Pune	12 Weeks	20-01-2025	11-04-2025	26-04-2025	27-01-2025	28-02-2025	PG	https://onlinecourses.nptel.ac.in/noc25_bt22/preview	https://onlinecourses.nptel.ac.in/noc24_bt05/preview	https://onlinecourses.nptel.ac.in/noc24_bt05/preview
noc25-hs61	Humanities and Social Sciences	Patent Law for Engineers and Scientists	IIT Madras	12 Weeks	20-01-2025	11-04-2025	03-05-2025	27-01-2025	28-02-2025	UG/PG	https://onlinecourses.nptel.ac.in/noc25_hs61/preview	https://onlinecourses.nptel.ac.in/noc24_hs155/preview	https://onlinecourses.nptel.ac.in/noc24_hs155/preview
noc25-mg05	Management	AI in Human Resource Management	IIT Guwahati	12 Weeks	20-01-2025	11-04-2025	04-05-2025	27-01-2025	28-02-2025	PG	https://onlinecourses.nptel.ac.in/noc25_mg05/preview	https://nptel.ac.in/courses/110103626	https://nptel.ac.in/courses/110103626
noc25-hs70	Humanities and Social Sciences	Science Communication: Research Productivity and Data Analytics using Open Source Software	IIT Delhi	12 Weeks	20-01-2025	11-04-2025	03-05-2025	27-01-2025	28-02-2025	PG	https://onlinecourses.nptel.ac.in/noc25_hs70/preview	https://nptel.ac.in/courses/109102392	https://nptel.ac.in/courses/109102392
noc25-ag04	Agricultural and Food Engineering	Food Science and Technology	IIT Kharagpur	12 Weeks	20-01-2025	11-04-2025	26-04-2025	27-01-2025	28-02-2025	UG/PG	https://onlinecourses.nptel.ac.in/noc25_ag04/preview		

FIRST YEAR

M.Sc. Clinical Nutrition

SEMESTER-I

Code No.	Core Subjects
Discipline Specific Core Theory	
MCN 101 T	Fundamentals of Nutrition
MCN 102 T	Nutritional Biochemistry
MCN 103 T	Human Physiology
CC 001 T	Research Methodology & Biostatistics (Core Course)
Discipline Specific Core Practical	
MCN 104 P	Nutritional Biochemistry
MCN 105 P	Human Physiology
MCN 106 CP	MCN Directed Clinical Education-I
CC 001 P	Research Methodology & Biostatistics (Core Course)

Name the Programme	M.Sc. Clinical Nutrition
Semester	Semester - I
Name of the Course	Fundamentals of Nutrition
Course Code	MCN 101 T

Learning Outcomes	<p>To apprehend the candidate with:</p> <ul style="list-style-type: none"> • The basic concept of nutrition. • The importance of nutrients for the growth and maintenance of human body.
Course Outcomes	<p>After the course accomplishment the student will be able to:</p> <ul style="list-style-type: none"> • Discuss the role of nutrients in human health and their contribution to preventing or managing certain disorders. • Describe the different forms of nutrients (carbohydrates, proteins, fats, vitamins, minerals, water, and electrolytes) and understand their procurement and requirements for the human body.

Sr. No.	Topics	No. of Hrs.
1	Basic Concepts Introduction, Food pyramid, Balanced diet, RDA.	1
2	Body Composition Significance of body composition and changes through the life cycle, Methods for assessing body composition (both classical and recent) and their applications.	2
3	Energy Estimating energy requirements of individuals, Factors affecting energy requirements, methods for measuring energy expenditure Determination of energy value of food, Components of energy expenditure- BMR PAL, RMR, PAR, Thermic control of food intake, role of hormones in energy requirements for different age groups and energy balance.	4
4	Carbohydrates Introduction, classification, physiological function, Process of digestion & absorption, Metabolic utilization of CHO, Nutritional significance of carbohydrates, requirement and deficiencies. Modification of carbohydrate intake for specific disorders - lactose intolerance, diabetes mellitus. Dietary fibre - Introduction, types, components of dietary fibre, requirements, role of dietary fibre in human nutrition. Artificial sweeteners, glycemic index of food and its uses, glycemic load.	6
5	Proteins Classification, functions, requirement and Deficiencies, Digestion, absorption and metabolic utilization of protein, Nitrogen Balance, quality of protein and protein deficiency. Amino acid – Types, functions, requirements and deficiency. Peptides of physiological significance	5
6	Lipids Fatty acid – types, function, food sources and deficiency, requirements and deficiencies. Digestion, absorption & metabolic utilization of fats. Role of lipo-protein, cholesterol and triglycerides in health and disease.	5

		Omega fats: classification & role, daily requirements, food sources, fortification of omega fats.	
7	Water & Electrolytes	Water: Distribution of water in the human body, role of water, preformed water, metabolic water, water balance intake and output determination, factors affecting water balance, role of hormones in water balance, fluid balance in stress. Electrolytes: Electrolytes content of fluid compartments, Function of electrolytes. Absorption, transport, balance. Factors influencing electrolyte balance. Maintenance of hydrogen ion concentration	6
8	Vitamins	Introduction, Physiological functions, Food sources, Requirement, Deficiency & toxicity manifestations and Interaction with other nutrients a) Water soluble Vitamins (B Complex and Vitamin C) b) Fat soluble Vitamins (Vitamin A, D, E, K)	8
9	Minerals	Introduction, Physiological role, food sources, Bioavailability and requirements, Deficiency and toxicity, Interaction with other nutrients a) Macro Minerals (Calcium, Phosphorus, Magnesium, Sodium, Potassium, Chloride) b) Micro minerals (Iron, Copper, Zinc, Iodine, Fluoride, and Manganese, chromium, selenium)	8
Total			45 hrs

References:

1. Shubhangini A. Joshi, (1992)' "Nutrition and Dietetics" Tata Mc Grow- Hill publishing Company Ltd, New Delhi.
2. Srilakshmi. B – "Nutrition Science", V Edn, New Age International (P) Ltd, Publishers, Chennai
3. Passmone R. and Eastwood M.A, (1986), "Human Nutrition and Dietetics", English language book Society/Churchill Livingstone, Eighth edition, Hong Kong.
4. Neiman N. Catherine, (1990), "Nutrition", Wm.C. Brown Publishers. USA.

Name of the Programme	M.Sc. Clinical Nutrition
Semester	Semester - I
Name of the Course	Nutritional Biochemistry
Course Code	MCN 102 T

Learning Outcomes	<p>To apprehend the candidate with:</p> <ul style="list-style-type: none"> • Understand the mechanisms adopted by the human body for regulation of metabolic pathways. • Develop an insight into interrelationships between various metabolic pathways.
Course Outcomes	<p>After the course accomplishment the student will be able to:</p> <ul style="list-style-type: none"> • Outline the structure and function of the biomolecules found in all living organisms. • Describe the circulatory system, cardiac cycle, and conditions like hypertension and heart failure. • Explain respiratory system functions, breathing mechanisms, and related abnormalities. • Comprehend renal system functions, urine formation, and dialysis principles. • Understand the structure and function of the nervous system, including the blood-brain barrier. • Analyze the digestive system, digestion, absorption, and gastrointestinal hormone functions. • Study musculoskeletal system functions, muscle contraction, and nerve impulse conduction. • Understand the endocrine system's glands, their regulation, and related disorders. • Interpret blood composition, blood cell formation, coagulation, and blood groups.

Sr. No.	Topics	No. of Hrs.
1	Enzymes Definition, classification of enzymes, Factors affecting enzyme activity, regulation of enzyme activity and inhibition. Enzymes in clinical diagnosis.	2
2	Water & Electrolyte metabolism Acid base homeostasis, blood buffer system, metabolism and disorders, and metabolism in starvation	5
3	Carbohydrate metabolism Composition and classification (self-study) - General metabolism – Glycolysis, TCA cycle, Glycogenesis, Glycogenolysis, uric acid pathway, Gluconeogenesis and HMP Shunt, Glycogen storage diseases – clinical importance, regulation and hormonal influences of carbohydrate metabolism.	8
4	Protein Metabolism Composition and classification (self-study) Amino acid pool, nitrogen balance, catabolism of amino acids. Urea – formation and its clinical significance. Creatine and creatinine – synthesis and regulation. Plasma proteins, biologically active peptides.	8

5	Lipid Metabolism	Composition and classification (self-study), Metabolism of Lipids, Oxidation of fatty acids, Unsaturated fatty acids, Metabolism of Ketone bodies, Biosynthesis of fatty acids, Biosynthesis of Cholesterol and regulation, Biosynthesis of Bile acids Biosynthesis of phospholipids –cephalin and lecithin, Plasma lipoproteins - Composition, Classification, Functions, Synthesis, Metabolism and Significance.	8
6	Biological Oxidation	Introduction, Electron transport chain and oxidative phosphorylation. Free radicals, ROS and oxidative damage Detoxification in the body, metabolism of xenobiotics.	2
7	Nucleic Acid metabolism	Introduction, Metabolism of purines and pyrimidines. Role of purine, pyrimidine, and nucleotide in metabolism. Metabolism of DNA (DNA Replication, repair, recombination), Metabolism of RNA (transcription, translation) Concept of Operons, Disorders of nucleic acid metabolism.	2
8	Function Tests	Liver – liver function tests, diagnostic tests, detoxification, excretory test (two tests each) Renal function Test - Biological functions of kidneys – manifestation of clinical symptoms, classification – glomerular filtration tests, renal plasma flow test, tubular function tests and other miscellaneous tests Gastric Function Test Test for malabsorption – Fat – Qualitative and quantitative analysis; Carbohydrate – D- xylose; Lactose breath test – lactose intolerance; Hydrogen test – H.Pylori; Schilling’s Test – B12; Protein – Serum protein, albumin. Cerebrospinal fluid - Composition, appearance, biochemical changes – clinical importance Oncogenic markers – classification and clinical uses Diabetic Profile	10
Total			45 hrs

MCN 104 P – Nutritional Biochemistry

Sr. No.	Topic	No. of Hrs.
1	Test for Monosaccharides	2
2	Test of disaccharide and polysaccharide	2
3	Colour Reactions of Proteins	4
4	Precipitation Reactions of proteins	2
5	Estimation of Blood Glucose, glycosylated Haemoglobin	4
6	LCD on Glucose Tolerance Test	4
7	LCD on Lipid Profile	2
8	Demonstration on Total Protein & A/G Ratio	2
9	Estimation of Serum Uric Acid	2
10	Demonstration on AST, ALT & ALP	2
11	LCD of Thyroid Function Test	2
12	LCD – Normal Constituents of Urine	2
Total		30 hrs

***LCD – Lecture Cum Demonstration**

References:

1. Dasgupta, S. K., Biochemistry Vol. I; N & Iii, Mc Milan Co. of India Ltd
2. Das, Debajyoti, Biochemistry 2nd Ed., 1980, Academic Publishers, India.
3. Harper, H. A. et al, A Review of Physiological Chemistry, Los Altos, Lange Medical Publications, 1985.
4. Lehninger, A. L., Principles Of Biochemistry
5. Chaterjee. Textbook of Medical Biochemistry
6. Conn, E.E., Stumpf, P.K., Bruening, G. and Doi, R.H. (2001): 5th Ed. Outlines of Biochemistry, John Wiley and Sons.

Name of the Program	M.Sc. Clinical Nutrition
Semester	Semester I
Name of the Course	Human Physiology
Course Code	MCN 103 T

Learning Outcomes	<p>To apprehend the candidate with:</p> <ul style="list-style-type: none"> • The basic physiology of various system in human body. • The functions of various organs and their regulation.
Course Outcomes	<p>After the course accomplishment the student will be able to:</p> <ul style="list-style-type: none"> • Understand body systems: Gain knowledge of the structure and function of systems like circulatory, respiratory, renal, digestive, musculoskeletal, nervous, and endocrine systems. • Analyze physiological processes: Learn key processes such as membrane transport, cardiac cycle, respiration, urine formation, muscle contraction, and digestion. • Study special systems: Explore the functioning and disorders of the cardiovascular, respiratory, renal, and gastrointestinal systems, including blood pressure, ECG, and respiratory issues. • Comprehend endocrine and hematology: Understand the regulation and disorders of major glands (pituitary, thyroid, adrenal, and pancreas) and blood functions like coagulation and anemia. • Integrate with clinical nutrition: Relate physiological knowledge to clinical nutrition, focusing on the connection between nutrition and health. • Enhance clinical application: Develop critical thinking skills to apply physiological knowledge in clinical nutrition practice and disease management.

Sr. No.	Topics	No. of Hrs.
1.	Cell Membrane Structure, composition and Transport of metabolites across the across the membrane	2
2	Circulatory system Basic structure and function of CVS, Structure and function of heart, Cardiac Impulse and cardiac cycle, Concept of haemorrhage, heart failure, shock, hypertension, Concept of Blood Pressure, Normal values, Regulation, Cardiac Output, Normal ECG	4
3.	Respiratory system Basic structure and function of RS, Mechanism of breathing, Transport of oxygen and carbon dioxide, Regulation of respiration, Respiratory abnormalities – Hypoxia, apnea, hypo and hyperventilation	4
4.	Renal system Basic structure and function of Renal System, Mechanism of urine formation GFR & Tubular functions, Maintenance of Osmolarity& Volume of ECF, Micturition & RFT (Renal handling of individual substances-inulin, urea, para –amino hippuric acid, dialysis & functions)	6
5.	Nervous system	3

	Structure & functions of brain and spinal cord Blood brain barrier	
6.	Digestive system Basic structure and function of GIT, Digestion & Absorption of food in various parts of GIT, Mechanism of secretion of digestive juices, movements of GI tract, digestion and absorption, gastrointestinal hormones – sources and action	8
7.	Musculoskeletal system Basic structure and function of skeletal muscle, Conduction of nerve impulses, role of neurotransmitters; afferent & efferent nerves, regeneration of nerve fibres, Neuromuscular Transmission and muscle contraction, Energetics of muscle contraction	6
8.	Endocrine system 1. Introduction to Endocrine system 2. Function, Regulation & Disorders of <ul style="list-style-type: none"> ● Pituitary gland ● Thyroid gland ● Parathyroid gland ● Adrenal gland ● Endocrine Pancreas gland 	6
9.	Haematology 1. Composition & Functions of Blood 2. Normal Hemogram 3. Formation of blood cells-RBC, WBC, Platelets 4. Anemia 5. Blood coagulation 6. Blood groups	6
Total		45 hrs

MCN 105 P –Human Physiology

Sr. No.	Topic	No. of Hrs.
1.	Microscopy	2
2.	Estimation of Haemoglobin	2
3.	Estimation of WBC	2
4.	Estimation of RBC	2
5.	Estimation of DLC	4
6.	Estimation of blood group	2
7.	Bleeding Time & Clotting Time	2
8.	General Examination, History taking	2
9.	Clinical Examination of Pulse	4
10.	Blood Pressure	2
11.	Demonstration of Clinical Examination of CVS	2
12.	Demonstration of Clinical Examination of RS	2
13.	Demonstration of Clinical Examination of Alimentary System	2
Total		30 hrs

References:

1. Sembulingam. K, Essentials of Medical physiology, 2010, Jaypee Medical Publishers, New Delhi
2. E. Rabsky, B.Khodorov, G.Kositskv, A. Zubkov, Human physiology, Vol II, MIR Publishers, 1989.
3. Dorothy S. Luciano, Arthur J. Vander, James H. Sherman, Human function and its structure international student edition, Me Graw Hill pub.
4. P.D Strukie, Basic physiology, Springer - Verlag pub, 1981.
5. Winter & Shourd, Review of human physiology 1982, W.B. Saunderscompany publication, 2nd edition.
6. Anil Baran & Singha Mahapatra, 1999, Essentials of medical physiology, Current book international.
7. G.K. Pal & Parvati Pal, 2010, Textbook of Practical Physiology (New), India

Name of the Program	M.Sc. Clinical Nutrition
Semester	Semester - I
Name of the Course	Research Methodology & Biostatistics (Core Course)
Course Code	CC 001 T

Learning Outcomes	<ul style="list-style-type: none"> Describe fundamental research designs and statistical models commonly used in medical and biomedical sciences. Apply appropriate statistical techniques to analyze and interpret medical research data. Evaluate the validity and reliability of research findings using statistical inference methods. Differentiate between various research methodologies and their applications in biomedical sciences. Interpret statistical results and effectively communicate research outcomes in a healthcare context. Design a basic research study, including selecting an appropriate research methodology and statistical approach.
Course Outcomes	<ul style="list-style-type: none"> Student will be able to understand develop statistical models, research designs with the understating of background theory of various commonly used statistical techniques as well as analysis interpretation & reporting of Results and use of statistical software.

Sr. No.	Topic	No. of Hrs.
A	Research Methodology:	23
1	Scientific Methods of Research: Definition of Research, Assumptions, Operations and Aims of Scientific Research. Research Process, Significance and Criteria of Good Research, Research Methods versus Methodology	4
2	Research Designs: Observational Studies: Descriptive, explanatory, and exploratory, Experimental Studies: Pre-test design, post-test design, Follow-up or longitudinal design, Cohort Studies, Case – Control Studies, Cross-sectional studies, Intervention studies, Panel Studies.	5
3	Sampling Designs: Census and Sample Survey, Need and importance for Sampling, Implications of a Sample Design, Different Types of Sample Designs (Probability sampling and non-probability sampling), Systematic sampling, Stratified sampling, Cluster sampling, Multi-stage sampling, Sampling with probability proportional to size, Sequential sampling.	5
4	Measurement in research: Measurement Scales, Sources of Error in Measurement	3
5	Methods of Data Collection: Types of data, Collection of Primary Data, Observation Method, Interview Method	4
6	Research Ethics and plagiarism	2
B	Biostatistics	22
	Data Presentation: Types of numerical data: Nominal, Ordinal, Ranked, Discrete and continuous. Tables: Frequency distributions, Relative frequency, Graph: Bar charts,	3

7	Histograms, Frequency polygons, scatter plots, line graphs	
8	Measures of Central Tendency and Dispersion: Mean, Median, Mode, Range, Inter quartile range, variance and Standard Deviation, Coefficient of variation, grouped mean and grouped standard deviation (including merits and demerits).	3
9	Testing of Hypotheses: Definition, Basic Concepts, Procedure for Hypothesis Testing, Power of Test, Normal distribution, Parametric Tests including Z-test, t-test, and ANOVA	4
10	Chi-square Test: Chi-square as a Non parametric Test, Applications.	2
11	Measures of Relationship: Correlation and Simple Regression Analysis	3
12	Non parametric Test: Sign test, Wilcoxon signed-Rank Test, Wilcoxon Rank Sum Test: Mann-Whitney U test, Kruskal Walli's test, Friedman's test, and Spearman Correlation test.	3
13	Vital Health Statistics: rate, crude rate, age specific rate, Measurement of fertility, rate, Measures of mortality.	4
Total		45 hrs

CC 001 P–Research Methodology & Biostatistics

Sr. No.	Topics	No. of Hrs.
A	Research Methodology	
1	Research Article Presentation (Seminar)	5
B	Biostatistics	
2	Data Presentation	4
3	Measures of Central Tendency and Dispersion	6
4	Testing of Hypotheses	16
5	Chi-square Test	4
6	Measures of Relationship	6
7	Analysis of Variance	5
8	Non parametric or Distribution-free Tests	8
9	Computer Application Using Statistical Software including SPSS	6
Total		60 hrs

Reference Books:

1. Daniel WW. Biostatistics: A foundation for analysis in the health sciences. 10th ed. Wiley; 2013.
2. Gupta SC, Kapoor VK. Fundamentals of mathematical statistics. Sultan Chand & Sons; 2020 Sep.
3. Kothari CR, Garg G. Research methodology: Methods and techniques. 2019.
4. Mahajan BK. Methods in biostatistics for medical students and research workers. 7th ed. Jaypee Brothers Medical Publishers; 2010.
5. Murthy MN. Sampling theory and methods. Statistical Publishing Society; 1967.
6. Singh YK. Fundamental of research methodology and statistics. New Age International; 2006.

Resolved to approve the submitted list of recommended books for M.Sc. Clinical Nutrition and the course on Biostatistics and Research Methodology [ANNEXURE-7].

Biostatistics & Research Methodology Books List

Subject	Book Name	Author
Biostatistics & Research Methodology	Biostatistics: A Foundation for Analysis in the Health Sciences (10th ed.)	Daniel WW.
	Biostatistical Analysis (5th ed.)	Zar JH.
	Research Methodology: Methods and Techniques	Kothari CR, Garg G.
	Methods in Biostatistics for Medical Students and Research Workers (7th ed.)	Mahajan BK.
	Sampling Theory and Methods	Murthy MN.
	Fundamentals of Research Methodology and Statistics	Singh YK.
	Fundamentals of Biostatistics (8th ed.)	Rosner B.
	An Introduction to Medical Statistics (4th ed.)	Bland M.

**Course code- MCN 106 CP: MCN Directed Clinical Education – I
(Total - 225 hrs.)**

<p align="center">Course Outcomes</p>	<ul style="list-style-type: none"> ● Knowledge-Based competencies will build a robust theoretical foundation, enabling students to understand healthcare practices, disease management, and patient care, thereby empowering them to make informed decisions and adapt to evolving medical technologies. ● Skill-Based competencies will emphasize hands-on training, ensuring proficiency in clinical procedures, diagnostic techniques, and the use of advanced medical equipment. This practical exposure will bridge the gap between theory and practice, enhancing students' confidence and competence in delivering quality patient care. ● Attitudinal competencies will focus on developing professionalism, empathy, ethical conduct, teamwork, and communication skills-key traits for holistic patient care and effective collaboration in interdisciplinary healthcare teams.
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Objectives

- To enable the students to Acquaint with the working protocol of the hospital’s Dietetics Department.
- Assess the nutritional status of different patients.

Work Instructions

- Each student is instructed to Nutritional Assessment of admitted patients.
- Report 3 case studies in order to familiarize with assessment methods and their interpretation for various disorders.
- Submit Hospital Posting and Case report booklet.

FIRST YEAR
M.Sc. CLINICAL NUTRITION
SEMESTER-II

Code No.	Core Subjects
Discipline Specific Core Theory	
MCN 107 T	Medical Nutrition Therapy - I
MCN 108 T	Community & Public Health Nutrition
MCN 109 T	Food Microbiology
MCN 110 T	Nutrition Through Lifecycle
Discipline Specific Core Practical	
MCN 111 P	Medical Nutrition Therapy I
MCN 112 P	Community & Public Health Nutrition
MCN 113 CP	MCN Directed Clinical Education - II
Skill Enhancement Course	
SEC 001 T	Nutrition in Emergencies
SEC 002 T	NPTEL Swayam

Name of the Program	M.Sc. Clinical Nutrition
Semester	Semester - II
Name of the Course	Medical Nutrition Therapy I
Course Code	MCN 107 T

Learning Outcomes	<p>To apprehend the candidate with:</p> <ul style="list-style-type: none"> • Understanding of basic concepts of medical nutrition therapy. • Develop an insight about the Etiology, signs and symptoms, nutritional management of diseases and disorders.
Course Outcomes	<p>After the course accomplishment the student will be able to:</p> <ul style="list-style-type: none"> • Conduct Comprehensive Nutrition Assessments: Use various clinical assessment tools (e.g., NRS, SGA, MNA) to assess patients’ nutritional status, diagnose nutritional problems, and design appropriate interventions. • Provide Therapeutic Nutritional Support: Implement enteral and parenteral nutrition, manage related complications, and understand the impact of drug-nutrient interactions to deliver effective nutritional support for patients with therapeutic needs. • Manage Pediatric Nutrition: Develop and implement nutrition care plans for hospitalized infants and children, addressing conditions like low birth weight, failure to thrive, gastrointestinal issues, and congenital anomalies. • Manage Nutrition in Infectious Diseases: Address the nutritional needs of patients with febrile conditions and infections such as typhoid, malaria, tuberculosis, and HIV/AIDS, understanding the metabolic changes and dietary requirements during illness. • Address Energy Imbalance and Nutritional Disorders: Manage conditions such as obesity, underweight, and eating disorders by applying dietary, behavioral, and pharmacological strategies, with a focus on energy balance regulation. • Handle Immune System and Food Allergy Management: Design elimination diets and nutrition strategies for patients with food allergies, intolerances, and immune system disorders such as celiac disease and autoimmune conditions. • Manage Nutrition in Pulmonary and Musculoskeletal Disorders: Provide nutritional care for patients with pulmonary diseases (e.g., asthma, COPD) and musculoskeletal disorders (e.g., arthritis, osteoporosis), focusing on anti-inflammatory dietary approaches. • Implement Gastrointestinal Nutrition Therapy: Manage gastrointestinal disorders, including diseases of the upper and lower GI tract, malabsorption syndromes, and post-surgical care, improving clinical practice in digestive health. • Manage Endocrine Nutrition: Assess and provide nutrition interventions for patients with endocrine disorders like thyroid diseases, polycystic ovary syndrome (PCOS), Cushing’s syndrome, and Addison’s disease. • Understand and Manage Nutrient-Drug Interactions: Evaluate the clinical significance of nutrient-drug interactions and their effects on nutritional status, ensuring optimal treatment outcomes through appropriate management strategies.

Sr. No.	Topics		No. of Hrs.
1	Introduction to Medical Nutrition Therapy	<p>Nutrition Education & Dietetic Counselling: Principles and objectives, role of dietitian in Interdisciplinary Medical Team & Outreach Activities. Clinical Information Resources – Medical History and Patient Profile. Routine hospital diets and modifications for different diseases or disorders, use of exchange lists in nutrient calculation and menu planning.</p> <p>Nutrition Care Process: Introduction, Nutrition Assessment- Nutritional Screening & Assessment Tools (NRS, SGA, MNA, Case Specific tools), Nutrition diagnosis, Nutrition intervention and Nutrition monitoring, Evaluation and Documentation.</p>	8
2	Nutritional support	<p>Nutrition Support Techniques: Type of Dietary Adaptations for therapeutic needs Enteral nutrition - Indications, enteral access - Routes of enteral feeding, enteral formula composition, methods of administration, monitoring, advantages of enteral feeding and management of complications; medication and enteral nutrition interactions. Parenteral nutrition - Indications for use of TPN, parenteral access, parenteral nutrition solutions, administration, monitoring and complications.</p>	8
3	Nutrition in Paediatrics -	Basic needs and plans of nutritional care of the hospitalized infant- Assessment of Pediatric patients, Special infant needs - low birth weight, failure to thrive-Gastrointestinal problems of infancy & childhood- general functional disturbances, infantile diarrhea, celiac malabsorption syndrome, cleft palate and cleft lip, dental caries and nutrition support techniques	8
4	Nutritional management of Infections and Febrile Conditions	<p>Febrile Conditions: Defence mechanism in body, metabolic changes during infection, type, Etiology, signs and symptoms, diagnosis and treatment and Nutritional management of different type of fever: Short duration (typhoid, malaria, Dengue), Long duration (Tuberculosis) and HIV/AIDS.</p>	4
5	Dietary management in Nutritional Imbalance	<p>Energy Imbalance: Neuronal & Hormonal Regulation of food intake and pathogenesis of obesity and malnutrition and starvation. Energy imbalance, Obesity: Etiology, Theories, Physiology of obese state, Obesity Management – Pharmacological, Dietary & Lifestyle management, Surgical Management. Evaluation of Common diets – Atkin’s diet, intermittent fasting & Ketogenic diet (Self-study). Underweight: Etiology & Dietary Management. Eating Disorders: Nutrition Management in Anorexia Nervosa, Bulimia</p>	6
6	Nutritional management in Immune System Diseases	Adverse food reactions: food allergy and food intolerance, Definition, Diagnosis - History, Food record, overview of Biochemical and Immune testing, Dietary Approach -Elimination diets management, Food Allergy in infancy - Milk sensitive enteropathy; Colic,	4

		Intolerance to breast milk, celiac disease (gluten sensitive enteropathy), Preventions of adverse food reactions.	
7	Nutritional Management in Pulmonary & Musculo Skeletal System	Diseases of the Pulmonary System: Asthma, COPD, Bronchopulmonary Dysplasia, Cystic Fibrosis Diseases of the Musculo-Skeletal System: Pathophysiology & Inflammation, Rheumatic Diseases, Arthritis, Gout, Osteoporosis, Sjogren's Syndrome, Systemic Lupus Erythematosus, Anti-inflammatory Diet	4
8	Nutritional Management in GI disorders	Nutrition therapy for Upper Gastrointestinal tract Diseases /Disorders: Diagnostic tests for the G.I. diseases, Signs and symptoms Nutritional care and diet therapy in diseases of oesophagus; Oesophagitis, Hiatus hernia, Disorders of stomach: Indigestion, Gastritis, Gastric and duodenal ulcers. Nutrition management in Gastric Surgery Medical Nutrition therapy for Lower gastrointestinal tract Diseases/Disorders: Common Symptoms of Intestinal dysfunction – Flatulence, constipation, haemorrhoids, diarrhoea, steatorrhea. Diseases of the large intestine: - Diverticular disease, irritable bowel syndrome, inflammatory bowel disease. Malabsorption Syndrome/Diseases of Small intestine - Celiac (Gluten –induced) sprue, tropical sprue, intestinal brush border enzyme deficiencies, Lactose intolerance, protein- losing enteropathy. Intestinal surgery: Short bowel syndrome, Ileostomy, Colostomy, Rectal surgery	8
9	Nutritional Management of Endocrinal Disorders	Medical Nutrition Therapy for Thyroid and other endocrinal Disorders: Thyroid Physiology; Assessment of Thyroid Disorders; Hypothyroidism, Polycystic Ovary Syndrome; Hyperthyroidism; Other Endocrine System Disorders- Cushing's Syndrome, Addison's Disease, Adrenal Insufficiency	6
10	Nutrient & Drug Interaction	Basic concept of nutrient drug interaction- effect of nutrition on drug, drugs effect on nutritional status, drug and drug interaction, clinical significance of drug nutrient interaction	4
Total			60 hrs

MCN 111 P: Medical Nutrition Therapy I

Sr. No.	Topic	No. of Hrs.
1	Standardization of Common Foods	4
2	Understanding and Using Food Exchange lists and Food Composition Table	2
3	Market Survey of Commercial Feeding Products – Adult & Children	2
4	Planning of Enteral Feeds	4
5	Plan & Prepare Weaning foods	4
6	Diet plan for febrile conditions 1. Typhoid 2. Tuberculosis	6
7	Diet Plan for Obesity & Underweight	6
8	Anti-inflammatory diet plan	6
9	Diet Plan for COPD	4
10	Diet plan for peptic ulcer	4
11	Diet plan for IBS	6
12	Diet plan GI Surgery	4
13	Diet Plan for Thyroid Disorders	4
14	Diet Plan for PCOD	4
Total		60 hrs

References:

- Mahan, L.K. and Escott-Stump, S. (2021): Krause's Food Nutrition and Diet Therapy, 15th Edition, W.B. Saunders Ltd.
- Anita Jatan., Daphnee DK., et.al (2022): Apollo Clinical Nutrition Handbook, 1st Edition. Jaypee Brothers Publication.
- Annalynn Skipper, Dietitian's Handbook of Enteral and Parenteral Nutrition, 2012, I edition, An ASPEN Publication
- Garrow, J.S., James, W.P.T. and Ralph, A. (2000): Human Nutrition and Dietetics, 10th Edition, Churchill Livingstone.
- Davis, J. and Sherer, K. (1994): Applied Nutrition and Diet Therapy for Nurses, 2nd Edition, W.B. Saunders Co.
- Antia F. P.: Clinical Dietetics and Nutrition, 3rd ed., Oxford University, Press, Delhi, Reprinted in 1989.
- Laura E. Matarese, Michele M. Gottschlich, Contemporary nutrition support practice: a clinical guide, 2006, I edition, Saunders Elsevier's Science, Missouri

Name of the Program	M.Sc. Clinical Nutrition
Semester	Semester - II
Name of the Course	Community and Public Health Nutrition
Course Code	MCN 108 T

Learning Outcomes	<p>To apprehend the candidate with:</p> <ul style="list-style-type: none"> • Basics of community nutrition • Understanding of nutrition related problems and nutrition interventions.
Course Outcomes	<p>After the course accomplishment the student will be able to:</p> <ul style="list-style-type: none"> • Define and understand key concepts in community and public health nutrition, including biomedical, ecological, psychological, and holistic approaches, as well as epidemiological methods such as case-control and cohort studies. • Assess nutritional status at individual and community levels using methods like anthropometry, biochemical, clinical, and dietary assessments. • Apply nutrition standards for growth monitoring in children and assess nutritional status in adults using WHO standards. • Understand and analyze food and nutrition security, including its dimensions and relevant policies in India, such as NFSA and the Public Distribution System. • Identify and address nutritional problems such as nutrient deficiencies, obesity, chronic diseases, and malnutrition, with an emphasis on integrated solutions and interventions. • Plan, execute, and evaluate nutrition education programs for communities, utilizing appropriate tools and overcoming implementation challenges. • Understand health and nutrition administration in India, including welfare programs, government policies, and the role of global health agencies like UNICEF and WHO.

Sr. No.	Topics	No. of Hrs.
1	<p>Introduction to community and Public Health</p> <p>Definition, Scope and Concept (biomedical, ecological, psychological and holistic) of community & Public health nutrition.</p> <p>Epidemiology – Definition, methods of epidemiological studies – retrospective study, prospective study, case control study, cohort study, randomized control trials, non-randomized control trials</p> <p>Role of nutritionist in community.</p>	3
2	<p>Nutritional Assessment</p> <p>Nutritional status assessment: Goal and objectives</p> <p>Methods of Nutritional status assessment at individual and community level</p> <p>Direct methods:</p> <ul style="list-style-type: none"> • Anthropometry • Biochemical assessment • Clinical assessment • Dietary assessment <p>Indirect methods:</p>	6

		<ul style="list-style-type: none"> ● Age Specific Mortality Rates ● Cause Specific Mortality Rates ● Cause Specific Nutritionally – Relevant ● Morbidity Rate Ecological Factors 	
3	Nutrition standards	<p>Determinants and Indicators of Nutritional Status</p> <p>WHO standards for children for growth monitoring, IAP Standards, Anthro plus software</p> <p>WHO standards for adults for assessment of nutritional status</p>	2
4	Food and Nutrition Security	<p>Food and Nutrition Security: Concept of food security and nutritional security. Food security in India, Dimensions of food security, Availability, Food Production, Distribution, Access, Losses, Consumption Factors affecting food availability and intake;</p> <p>Food Security and Adequacy of Diets;</p> <p>Determinants of food and nutrition Security,</p> <p>Policies and measures taken by the Government of India to achieve food security. Public distribution system, Nutrition Food security act (NFSA), GFSI, GHI</p>	6
5	Nutritional Problems in India	<p>Etiology, prevalence, clinical manifestations, preventive and therapeutic measures for:</p> <ol style="list-style-type: none"> a. Macro and micro nutrient deficiencies b. Other nutritional problems like lathyrism, dropsy, aflatoxicosis, alcoholism and fluorosis. c. Overweight, obesity and chronic degenerative diseases <p>Synergism between malnutrition and infection.</p> <p>Strategies to Overcome Malnutrition:</p> <p>Integrated Approach to Solve the Problems of Malnutrition: Nutrition Education, Nutrition Intervention Programmes, Agriculture Planning, Role of Food Technology, Environmental Sanitation and Health</p> <p>Occupational health hazards – Physical, Chemical and Biological hazards - prevalence, prevention and control; Hazards in Industries-hospital, textiles, foundry, agriculture and radiation: Controlling measures and legal provisions.</p>	6
6	Nutrition Education	<p>Meaning, Nature and Importance of Nutrition Education to the Community; Principles of Planning, Executing and Evaluating Nutrition Education Programmes; Educational Aids; Problems of Nutrition Education Programmes</p>	3
6	Health & Nutrition Administration in India	<p>Welfare Programmes – Maternal and child health (specific reference to immunization programme); Nutrition programmes; public nutrition approach to tackle nutritional problems; Policies and programmes of the government and NGO sector of vulnerable groups, Millennium Development Goals and indicators pertaining to nutrition like goals 1,4,5,6.</p> <p>Health status in India (based on current statistics)- Definition, principles and objectives of community health administration and policy; Prevalence of lifestyle diseases in India; Nutritional health policy, Health care delivery system at central, state and district level (specific reference to PHC).</p>	4

	Health Agencies –UNICEF, FAO, UNDP, ILO, UN, UNESCO, WHO, USAID, CARE, World bank Functions and beneficiaries.	
Total		30 hrs

MCN 112 P: Community & Public Health Nutrition

Sr. No.	Topics	No. of Hrs.
For each unit field visits should be undertaken and report to be prepared by the students		
1	Nutritional status assessment Anthropometric Measurement of community - Height, weight, circumference of Head and Chest, Mid-upper arm circumference of children; Comparison with norms and interpretation of the nutritional assessment data and its significance - Weight for age, height for age, weight for height Body Mass Index (BMI), Waist - Hip Ratio (WHR) for adults	16
2.	Growth monitoring Visits to Anganwadi, Assessment of height weight, MUAC etc. of children, use of growth charts and its application for assessment of nutritional status using WHO standards for children for growth monitoring, IAP Standards Use of different software Observation of ICDS activities (Supplementary feeding programs)	10
3	Dietary Assessment Estimation of food and nutrient intake - Household food consumption – using coefficient of consumer unit, 24 hours dietary recall, weighing method, food diaries, food frequency questionnaire - for households	12
4	Planning Nutritious Recipes Development of Low-cost nutritious recipes, sensory evaluation of selected recipes for nutrient deficiencies.	10
5	Nutrition Education intervention Nutrition cum Health Education for rural population- through development of selected Nutrition Education tools.	12
Total		60 hrs

References:

- 1) Parks's Textbook of Preventive and Social medicine, 26th Latest Edition 2021 Kpark, Bhanot Publisher
- 2) Srilakshmi B and V Suganthi. Community Nutrition. New Age International Private Limited; 1st edition (7 July 2022); NEW AGE International, 7/30A, Near LIC Flats, Daryaganj, ND110002
- 3) Suryatapa Das. Textbook of community. Nutrition Academic publishers (1 January, 2022)
- 4) Elizabeth Eilender. Public Health and Community Nutrition. Momentum Pr (28 September 2016s)
- 5) M. Margaret Barth, Ronny A. Bell, Karen Grimmer. Public Health Nutrition: Rural, Urban, and Global Community-Based Practice, Springer Publishing Co Inc; 1st edition (30 June 2020)

Name of the Program	M.Sc. Clinical Nutrition
Semester	Semester - II
Name of the Course	Food Microbiology
Course Code	MCN 109 T

Learning Outcomes	<p>To apprehend the candidate with:</p> <ul style="list-style-type: none"> • Morphology and life cycle of different microorganisms. • Information regarding food borne diseases. • Identification of causative organisms and their treatment measures.
Course Outcomes	<p>After the course accomplishment the student will be able to:</p> <ul style="list-style-type: none"> • Understand the basics of food microbiology, including microbial growth and factors affecting it. • Identify and describe microorganisms (molds, bacteria, yeasts, viruses) in food and their role in spoilage and foodborne diseases. • Recognize biochemical changes caused by microbes in food. • Analyze microbial contamination and spoilage in various food types. • Understand foodborne diseases, pathogens, and their detection methods. • Learn about microbial toxins and their health impacts. • Explore methods for controlling microorganisms in food, including preservation and novel processing technologies. • Understand food sanitation, including water quality, sewage treatment, and food safety standards like GMP and HACCP. • Apply microbiological criteria for food safety and understand the role of control agencies in ensuring food safety.

Sr. No.	Topics	No. of Hrs.
1	<p>Basics and Morphology</p> <p>History and scope of food microbiology- Historical development in food preservation, food spoilage and food poisoning, role of microbes in food.</p> <p>Microbial growth pattern– Growth curve of microbial cultures, its application to food preservation.</p> <p>Factors affecting microbial growth – pH, moisture content, Eh, nutrient content, antimicrobial constituents, biological structures, extrinsic factors.</p>	4
2	<p>Microorganisms in food</p> <p>Types of microorganism associated with food:</p> <p>Mold – general characteristics, morphological features, reproduction, physiological requirements, common Molds associated with foods.</p> <p>Bacteria – Morphological, physiological characteristics, important food spoilage and pathogenic bacteria, associated with foods.</p> <p>Yeast – General Characteristics, reproduction, cultural characteristics, physiological characteristics.</p> <p>Viruses – Structure and replication with particular reference to food born viruses.</p>	6

		Biochemical changes caused by micro-organisms – Degradation of carbohydrates, fermentation, degradation of lipids, degradation of proteins and amino acids, putrefaction. Hygiene – basic principles, Antisepsis, Antibiotic, Bactericidal agents.	
3	Microbial Contamination	Microbial contamination and spoilage of foods – Vegetables, cereals, pulses, oilseeds, milk and meat during handling, processing and storage Microbiology of water - Microbiological quality of water. Analysis of water. Spoilage of processed foods – Canned products, causes of spoilage, appearance of spoiled cans, types of spoilage of canned foods by yeast, moulds and bacteria.	6
4	Food Borne Diseases	Food borne disease – Staphylococcal gastroenteritis, Botulism, Listeriosis, Salmonellosis, Shigellosis, Hepatitis A, B Toxicants of microbial origins - Aflatoxins, ochratoxins, patulin, botulism, enterotoxins. Detection of food borne pathogens -Physical, chemical and immunological methods of detecting microbes in foods with special reference to Staphylococcus, Clostridium, Lysteria, Yersenia, Salmonella, Escherichia, Vibrio	6
5	Control of Microorganisms	Access, physical removal, heat, low temperature, low pH, organic acids, modified atmosphere, antimicrobial preservatives, irradiation and novel processing technologies	4
6	Microbiology in Food Sanitation	Bacteriology of water; sewage and waste treatment and disposal; good manufacturing Practices; HACCP; Microbiological criteria for foods; Control Agencies	4
Total			30 hrs

References:

1. Frazier, W. C. and Westhoff, D. C. (1988): 4th edition, Food Microbiology, McGraw Hill Inc.
2. Jay James. N. (1986) : 3rd edition, modern Food Microbiology, Van Nestrand Reinhold Company Inc
3. Peleazar, M.I. and Reid, K. D. (1978): Microbiology, McGraw Hill Company, New York.
4. Benson Harold, J. (1990) : Microbiological Application, Publishers, U.S.A.
5. Colling, C.E. and Lyne, P.M. (1976) : Microbiological Methods Butterworth. London.
6. George J. Banwart (2004), 2nd edition CBS Publishers & Distributors
7. Pelezar, M.J. and Chan, E.C.S. (Jr.), 2000: Microbiology, Tata McGraw Hill Pub. Co., New Delhi
8. G.K.Pal & Parvati Pal Textbook of Practical Physiology (New),2010 , India
9. Stanier R.Y., Adelberg E.A. and Ingraham J.L. (1987) General Microbiology, 5th Edition. Macmillan Press Ltd.

Name of the Program	M.Sc. Clinical Nutrition
Semester	Semester - II
Name of the Course	Nutrition Through Lifecycle
Course Code	MCN 110 T

Learning Outcomes	<p>To apprehend the candidate with:</p> <ul style="list-style-type: none"> • Understanding of the development of the human being at different stages • Study the importance of nutritional requirements throughout the life cycle
Course Outcomes	<p>After the course accomplishment the student will be able to:</p> <ul style="list-style-type: none"> • Understand nutritional requirements across the life cycle, from pregnancy to geriatrics. • Assess the impact of physiological and psychosocial changes on nutrition at each life stage. • Identify and manage nutrition-related challenges, such as high-risk pregnancies, childhood obesity, and aging-related issues. • Apply growth monitoring techniques and design dietary interventions for different age groups. • Address specific nutritional issues like breastfeeding, weaning, and adolescent eating disorders. • Develop nutrition plans for preventing and managing health problems, including chronic diseases in the elderly.

Sr. No.	Topics	No. of Hrs.
1	Nutrition in Pregnancy: Physiology of pregnancy, maternal physiological adjustments, maternal weight gain, subjective and objective symptoms of pregnancy, Stages of human fetal growth, mechanism and regulation of fetal growth, Nutrient requirements during prenatal, perinatal, and postnatal periods, High-risk pregnancy-teenage pregnancy, pre-eclampsia and eclampsia, hyperemesis, alcoholism, Complications of Caffeine abuse and smoking, Diet counselling for teenage and adult pregnancy.	4
2	Nutrition in Lactation: Physiology of lactation, Hormonal regulation and reflex action, the effectiveness of milk production, supply and demand for nursing and frequency of nursing; breastfeeding benefits, and duration of exclusive breastfeeding, Contraindications to breastfeeding; the association between breastfeeding and immune system, oral motor, and gastrointestinal system development; lactogenic foods; nutritional needs for lactation. Infant Formulas, cow's milk, and human milk composition and comparison.	4
3	Nutrition in Infancy: Growth & maturation, Reference standards for growth and growth monitoring; Infant feeding - nutritional requirement of full-term infants; breastfeeding Vs bottle feeding; weaning practices; feeding problems of normal infants, Sequence of development of feeding behaviour. Low birth weight and preterm infants - characteristics, growth, development, feeding practices, feeding problems, Strategies for reducing the incidence and severity of allergy in high-risk infants.	4
4	Nutrition in preschool age: Physical growth and development related to neuromuscular development, eating behavior, nutritional requirements of preschool children; factors influencing food choices, standard for growth monitoring.	6

	Nutrition in school children: Physical growth, height and skeletal maturation, weight and anthropometric measurement, Standards for growth monitoring, factors to be considered while planning a menu; feeding problems of underweight and hyperactive children, dental caries; packed lunch and its effect on nutritional status. Nutritional related health issues in childhood.	
5	Nutrition during adolescence: Growth and development – physical growth & psychosocial development, physiological malnutrition, BMR, and body composition changes; Age at menarche, factors affecting menarche, psychological problems and challenges in adolescence, body image, weight control, skipping meals, anorexia nervosa, obesity, snacking, fast foods, sense of identity- addiction to cigarettes, alcohol, and drugs. Nutritional problems in adolescence – iron deficiency anemia, obesity, and undernutrition - etiology, prevention, and control, pubescent growth assessment.	6
6	Nutrition during Adulthood: Physiological changes of adulthood – male- climacteric change, female – menopausal changes, Osteoporosis and Osteopenia; Factors influencing nutritional requirements of the adult.	2
7	Geriatric Nutrition: Ageing process - physiological, metabolic, body composition changes and impact on health and nutritional status, Nutritional and health status of the elderly, Factors influencing food and nutrient intake, health status including lifestyle pattern, medication, psychosocial aspects, etc., Chronic degenerative diseases and nutritional problems of the elderly - their etiopathogenesis, management, prevention, and control.	4
TOTAL		30 hrs

References:

1. Worthington. S and Sue Rodwell Williams, Nutrition Throughout the Life Cycle, 1996, Third Edition, The McGraw Hill, New Jersey
2. Gail Goldberg, Elizabeth Dowler, Prakash Shetty, Nutrition Through the Life Cycle, 2007, RSC publishing, London.
3. Judith Sharlin, Sari Edelstein, Essentials of Life Cycle Nutrition, 2010, I edition, Jones & Bartlett Publishers, London.
4. Jim Mann & A. Stewart, Essentials of human nutrition, 2002, II edition, Truswell, Oxford university press, New Delhi
5. Myron Winick, Nutrition and exercise, 1996, I edition, John Wiley & Sons publishing company, Singapore.
6. Ira Wolinsky, Nutrition in Exercise and Sport, 1997, III Edition, CRC press, United Kingdom.
7. Raymond, J.L. *et al.* (2023) Krause and Mahan's food and the Nutrition Care Process. St. Louis, MO: Elsevier.

**Course code- MCN 113 CP: MCN Directed Clinical Education – II
(Total – 225 hrs.)**

Course Outcomes	<ul style="list-style-type: none"> • Knowledge-Based competencies will build a robust theoretical foundation, enabling students to understand healthcare practices, disease management, and patient care, thereby empowering them to make informed decisions and adapt to evolving medical technologies. • Skill-Based competencies will emphasize hands-on training, ensuring proficiency in clinical procedures, diagnostic techniques, and the use of advanced medical equipment. This practical exposure will bridge the gap between theory and practice, enhancing students' confidence and competence in delivering quality patient care. • Attitudinal competencies will focus on developing professionalism, empathy, ethical conduct, teamwork, and communication skills-key traits for holistic patient care and effective collaboration in interdisciplinary healthcare teams.
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Objectives

To enable the students to

- Implement various techniques of dietary assessment.
- Understand clinical and pathological conditions of various diseases/ disorders along with specific dietary modification.
- Observe and study the food service management practices.
- Conduct Nutritional Assessment in field/ community setting.

Work Instructions

Each student is instructed to

- Counselling of patients during hospital stay and discharge.
- Report 3 case studies in order to familiarize on various disorders and treatments
- Submit the Hospital Posting, Community Posting and Case report

SKILL ENHANCEMENT COURSE

Name of the Programme	M.Sc. Clinical Nutrition
Semester	Semester II
Name of the Course	Nutrition for Emergencies
Course Code	SEC 001 T

Teaching Objective	<p>To apprehend the candidate with:</p> <ul style="list-style-type: none"> ● Various natural emergencies and disasters ● Impact on nutrition and health status and special nutritional arising out of these situations.
Course Outcomes	<p>After the course accomplishment the student will be able to:</p> <ul style="list-style-type: none"> ● Distinguish between natural and manmade disasters, and comprehend their impact on public health and nutrition. ● Demonstrate knowledge of nutrition management during emergencies, including immediate rescue, first aid, and physiological support. ● Organize and implement nutritional assessments and individual screenings in disaster-affected populations. ● Assess food needs, design effective food supply chains, and ensure equitable distribution to vulnerable groups. ● Develop and manage supplementary and therapeutic feeding interventions tailored to emergency contexts. ● Utilize local food resources, manage feeding centers, and ensure proper food storage and transportation. ● Promote safe water supply, sanitation, and hygiene to prevent disease outbreaks during and after disasters. ● Recognize major and specific nutrient deficiencies common in emergencies and apply appropriate dietary and medical treatments. ● Evaluate the impact of global warming and other factors on food security, particularly in the Indian context. ● Advocate for immunization, communicable disease control, and long-term nutritional rehabilitation in post-disaster settings.

Unit	Topics	No. of Hrs.
1	Types of Disaster Introduction, definition, classification – Natural disasters and manmade disasters, risk and disaster management with software applications.	7
2	Disaster Management Nutrition management during disaster, immediate rescue and first aid including physiological aid, Organization and Nutritional surveillance and Individual screening, Supply of food, Assessment of food needs in emergency situations, Food distribution strategy – define and reaching the vulnerable group, Mass and supplementary feeding, Therapeutic feeding.	10

3	Nutritional relief and rehabilitation	Assessment of food nutritional relief, local foods in rehabilitation, organizations for mass feeding food distribution, transportation and storage, feeding centres, Sanitation and hygiene. Nutritional support system in relief and rehabilitation, surveillance of nutritional status in emergency relief situations such as flood, cyclone, earthquake, drought, war, etc.	10
4	The After Effects	Control of communicable diseases – surveillance and treatment. Causes of malnutrition in emergency situations. Major and specific deficiencies in disaster and treatment.	10
5	Challenges to food security	Global warming – Challenges to food security in India. Safe water supply, Sanitation and hygiene, role of immunization and sanitation.	8
Total			45 hrs

References:

1. Beradley, A Woodruff and Arabella Duffield (July 2000) Assessment of Nutritional status in emergency affected populations. Adolescents special supplement, UNACC/SCN subcommittee on nutrition.
2. WHO website for emergencies
3. UNHCR (1999) UNHCR Hand books of emergencies 2nd edition Geneva UNHCR.
4. Young H, Means C (1998) Acceptability and use of cereal – based foods in refugee camps. Oxfain Working paper, Oxfam publishing Oxygen, U.K.
5. Refuge Nutrition Information System (RNIS) Newsletters UNACC/SCN subcommittee on Nutrition.
6. Goyet, Fish V, Seaman, J and Geijact (1978). The management of Nutritional emergencies in large populations WHO, Geneva.

Name of the Program	M.Sc. Clinical Nutrition
Semester	Semester II
Name of the Course	NPTEL Swayam
Course Code	SEC 002 T

Note: The links of SWAYAM/NPTEL courses (https://swayam.gov.in/nc_details/NPTEL)

Scheme of University Examination Theory for PG Program:

General structure / patterns for setting up question papers for Theory / Practical courses, their evaluation weightages for PG programs of MGMSBS are given in the following tables

Marks scheme for the University exam:

Final theory marks will be 100 marks (80 marks University Theory exam + 20 Marks Internal assessment).

Question		Marks distribution	Marks allotted per section	Marks
Sec: A	MCQ	10 x 1 M = 10	10	10
Sec: B	SAQ	3/4x 5 M = 15	15	35
Sec: B	LAQ	2/3 x 10 M = 10	20	
Sec: C	SAQ	3/4x 5 M = 15	15	35
Sec: C	LAQ	2/3x 10 M = 10	20	
Total				80 Marks

Marks Scheme for the University Examination (50 Marks)

Final theory marks will be 50 marks University Theory exam pattern Research Methodology & Biostatistics (Core course)

Question	Question No.	Question Type	Marks Distribution	Marks
Sec: A	1.	LAQ (2 out of 3)	2 X 10 Marks = 20	20
Sec: B	2.	SAQ (6 out of 8)	6 X 05 Marks = 30	30
Total				50 Marks

Marks Scheme for the University Examination (100 Marks)

Final theory marks will be 100 marks University Theory exam pattern Elective Course

Question	Question No.	Question Type	Marks Distribution	Marks
Sec: A	1.	LAQ (10 out of 12)	10 X 10 Marks = 100	100
Total				100 Marks

Practical exam pattern: Total 40 marks with following breakup:

Exercise	Description	Marks
Q No 1	Practical exercise - 1	1 x15=15 M
Q No 2	Station exercise	2x5M=10 M
Q No 3	VIVA	10 M
Q No 4	Journal	5M
Total		40 Marks

Practical exam pattern Research Methodology & Biostatistics (Core course)**Total 50-mark distribution:**

Exercise	Description	Marks
Q No 1	Practical/Problem-Solving: These questions can assess statistical analysis, research design, hypothesis testing, or interpretation of data etc.	2 × 10 marks each) = 20 marks
Q No 2	Identification of study designs, Critical appraisal of research papers, Application of biostatistical tools, Sampling techniques etc.	(4 × 5 marks each) = 20 marks
Q No 3	Viva Voce (Oral Examination) Assessing conceptual clarity, application of research methodology, and statistical reasoning.	10 marks
Total		50 Marks

Practical to be conducted at respective departments and marks submitted jointly by the parent department to the university.

Breakup of theory IA calculation for 20 marks:

Description	Marks
Internal exam (at department)	15 marks
Seminar	5 marks
Total	20 Marks

Breakup of practical IA calculation:

Description	Marks
Internal exam (at department)	10 marks
Viva	5 marks
Journal	5 marks
Total	20 Marks

Note –20 marks to be converted to 10 marks weightage for submission to the university.

Model Checklist for Evaluation of the Clinical Directed Posting (PG)

Name of the student: _____ Date: _____

Program: _____

Semester: _____ Name of the Internal faculty/Observer: _____

Name of the External Faculty/Observer: _____

Core Competencies	Marks allotted	Marks obtained
	Students will begin to develop critical thinking abilities utilizing the allied health personnel roles of communicator and caregiver. Students will learn principles of professional allied health personnel practice and provide direct care to individuals within a medical surgical setting while recognizing the diverse uniqueness of individuals with health alterations.	
Clinical Teaching		
a. Demonstrate beginning competency in technical skills.	10	
Independent Work by Student guided by faculty		
a. Develop effective communication skills (verbally and through charting) with patients, team members, and family	2.5	
b. Identify intra and inter-professional team member roles and scopes of practice. Establish appropriate relationships with team members.	2.5	
Hands on practical work by students		
a. Protect confidentiality of electronic/manual health records data, information, and knowledge of technology in an ethical manner	05	
Independent work by student		
a. Demonstrate expected behaviors and complete tasks in a timely manner. Arrive to clinical experiences at assigned times. Maintain professional behavior and appearance.	05	
Log book	10	
Viva	10	
Attendance	05	
Total	50 Marks	

Sign of Internal Examiner: _____

Sign of External Examiner: _____

Resolution No. 3.5 of Academic Council (AC-51/2025):

Resolved to approve the submitted list of recommended books for **M.Sc. Clinical Nutrition** and the course on **Biostatistics and Research Methodology [ANNEXURE-7]**.

Annexure-7 of AC-51/2025**M.Sc. Clinical Nutrition & Biostatistics & Research Methodology Books List**

Subject	Book Name	Author
Fundamentals of Nutrition	- <i>Nutrition Science</i> ISBNs: 9788195175574 Publishing Year: 2022	B. Srilakshmi
	- <i>Nutrition and Dietetics</i> ISBNs: 9789339220150 Publishing Year: 2017	Shubhangini A. Joshi
Medical Nutrition Therapy I	- <i>Apollo Clinical Nutrition Handbook</i> ISBNs: 9789354650895 Publishing Year: 2022	Anita Jatan, Daphnee DK, et al.
Community and Public Health Nutrition	- <i>Community Nutrition</i> ISBNs: 9788122479669 Publishing Year: 2022	B. Srilakshmi and V. Suganthi
	- <i>Textbook of Community Nutrition</i> ISBNs: 9789383420698 Publishing Year: 2016	Suryatapa Das
Food Microbiology	- <i>Food Microbiology</i> ISBNs: 9789387465886 Publishing Year: 2022	W.C. Frazier and D.C. Westhoff
	- <i>Modern Food Microbiology</i> ISBNs: 9788123904757 Publishing Year: 2005	Jay James N.
Nutrition Through Life Cycle	- <i>Nutrition Throughout the Life Cycle</i> ISBNs: 9780072927320 Publishing Year: 1999	Worthington S. and Sue Rodwell Williams
	- <i>Nutrition Through the Life Cycle</i> ISBNs: 9781606508718 Publishing Year: 2016	Gail Goldberg, Elizabeth Dowler, Prakash Shetty
Nutrigenomics	- <i>Nutritional Genomics: Discovering the Path to Personalized Nutrition</i> ISBNs: 9780471683193 Publishing Year: 2006	Jim Kaput
	- <i>Nutrigenomics and Nutrigenetics in Functional Foods and Personalized Nutrition</i> ISBNs: 9781439876800 Publishing Year: 2013	Lynnette R. Ferguson
	- <i>Dietary Modulation of Cell Signaling Pathways</i> ISBNs: 9780429128479 Publishing Year: 2008	Zigang Dong and Young Joon Surh

Nutraceuticals and Drug Interaction	- <i>Handbook of Drug-Nutrient Interactions</i> ISBNs: 9781603273633 Publishing Year: 2009	Joseph I. Boullata and Vincent T. Armenti
	- <i>Nutraceuticals in Health and Disease Prevention</i> ISBNs: 9780367397340 Publishing Year: 2019	Lester Packer and Klaus Kraemer
	- <i>Handbook of Nutraceuticals and Functional Foods</i> ISBNs: 9781498703734 Publishing Year: 2019	Robert.E.C, Wildman
Medical Nutrition Therapy II	<i>Modern Nutrition in Health and Disease</i> ISBNs: 9781605474618 Publishing Year: 2013	Shils et al.
	<i>Nutrition and Diagnosis Related Care</i> ISBNs: 9781451195323 Publishing Year: 2015	Escott-Stump
Health & Fitness	<i>Nutrition and Sport: Advances in Sport and Exercise Science</i> ISBNs: 9780443103414 Publishing Year: 2007	Don MacLaren
	<i>Energy-Yielding Macronutrients and Energy Metabolism in Sports Nutrition</i> ISBNs: 9780849307553 Publishing Year: 2000	Judy A. Driskell, Ira Wolinsky
Dietetic Techniques and Patient Counselling	<i>Modern Methods of Guidance and Counselling</i> ISBNs: 9788176253079 Publishing Year: 2005	Sharma, Tara Chand.
	<i>Textbook of Human Nutrition</i> ISBNs: 9788120417908 Publishing Year: 2019	Bamji, S.M., Rao, N.P., Reddy, V.

Resolution No. 5.1 of Academic Council (AC-52/2025):

Resolved to approve the CBCS syllabus, including Program Outcomes (POs) and Course Outcomes (COs), for Postgraduate (PG) 2-year programs under MGMSBS (semester III & IV) for M.Sc. Medical Biotechnology, M.Sc. Medical Genetics, M.Sc. Clinical Embryology, M.Sc. Clinical Nutrition, M.Sc. Medical Dialysis Technology, M.Sc. Molecular Biology, M.Sc. Medical Radiology & Imaging Technology, M.Sc. Cardiac Care Technology, M.Sc. Operation Theatre and Anaesthesia Technology, M.Sc. Emergency and Trauma Care, M. Optometry, Masters in Hospital Administration, Masters of Public Health, M.Sc. Health Informatics, M.Sc. Medical Laboratory Technology, M.Sc. Clinical Research, to be effective from batch admitted in the Academic Year 2025-26 onwards. Guidelines for selected programmes as per National Commission for Allied & Healthcare Professions will be adopted for the given programmes from academic year 2026-27 onwards [ANNEXURE-17A, 17B, 17C, 17D, 17E, 17F, 17G, 17H, 17I, 17J, 17K, 17L, 17M, 17N, 17O & 17P and ANNEXURE-18A, 18B, 18C, 18D, 18E, 18F, 18G, 18H, 18I, 18J, 18K, 18L, 18M, 18N, 18O & 18P].

Annexure-17D of AC-52/2025**MGM SCHOOL OF BIOMEDICAL SCIENCES, NAVI MUMBAI**

(A constituent unit of MGM INSTITUTE OF HEALTH SCIENCES)

(Deemed to be University u/s 3 of UGC Act 1956)

Grade “A++” Accredited by NAAC

Sector 1, Kamothe, Navi Mumbai-410209, Tel.No.022-27437631, 27437632

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CHOICE BASED CREDIT SYSTEM (CBCS)

(Academic Year 2025- 26)

Curriculum for

M.Sc. Allied Health Sciences

M.Sc. Clinical Nutrition

Semester III & IV

Course Outcome Semester III

MCN 114 T	Medical Nutrition Therapy II	Mapped POs	Teaching–Learning Methodologies	Assessment Tools
CO1	Explain the pathophysiology, etiology, and nutritional management of diabetes and its complications.	PO1, PO2, PO6	Lecture, Group Discussion, Case Study, Seminar	Theory Exam, Assignment, Case Presentation
CO2	Analyze renal diseases and formulate appropriate dietary plans considering metabolic and nutritional implications.	PO1, PO2, PO3	Lecture, Group Discussion, Assignment	Theory Exam, Assignment
CO3	Evaluate coronary heart diseases and design nutrition interventions for conditions such as dyslipidemia, hypertension, and myocardial infarction.	PO1, PO2, PO3, PO6	Lecture, Seminar, Case Study	Theory Exam, Assignment, Case Presentation
CO4	Discuss neurological disorders and assess nutritional strategies to support cognitive and neuromuscular health.	PO1, PO2	Lecture, Group Discussion	Theory Exam, Assignment
CO5	Apply principles of nutrition support in stress conditions like trauma, burns, and post-surgical recovery.	PO1, PO2, PO3	Lecture, Practical Demonstration, Group Discussion	Theory Exam, Assignment
CO6	Interpret cancer pathogenesis, side effects of therapy, and formulate individualized dietary management plans.	PO1, PO2, PO6	Lecture, Case Study, Seminar	Theory Exam, Assignment, Case Presentation
MCN 115 T	Health & Fitness	Mapped POs	Teaching–Learning Methodologies	Assessment Tools
CO1	Explain the role of nutrition in sports and exercise, including energy balance and fluid requirements.	PO1, PO2, PO6	Lecture, Seminar, Group Discussion	Theory Exam, Assignment
CO2	Evaluate carbohydrate metabolism during different types of physical activity and apply carbohydrate loading strategies.	PO1, PO2, PO8	Lecture, Case Study, Assignment	Theory Exam, Assignment
CO3	Describe fat metabolism in relation to sports performance and its modulation by diet and training.	PO1, PO2	Lecture, Group Discussion	Theory Exam
CO4	Assess protein and amino acid requirements for different exercise regimens and recovery.	PO1, PO2	Lecture, Seminar	Theory Exam, Assignment
CO5	Identify key micronutrients in exercise performance and recommend antioxidant strategies.	PO1, PO2, PO4	Lecture, Seminar	Theory Exam
CO6	Examine lifestyle factors affecting physical fitness, including substance abuse and sleep disorders.	PO1, PO2, PO6	Lecture, Group Discussion	Theory Exam
MCN 116 T	Hospital Food Service Management	Mapped POs	Teaching–Learning Methodologies	Assessment Tools
CO1	Explain the principles of food service management in hospital and healthcare settings.	PO1, PO2, PO4	Lecture, Group Discussion, Case Study	Theory Exam, Assignment
CO2	Apply menu planning and production techniques for diverse patient populations.	PO1, PO2, PO6	Lecture, Discussion, Menu Planning Exercise	Theory Exam, Assignment,
CO3	Demonstrate skills in organizing staff, workflow, and resources within a hospital food service unit.	PO2, PO4, PO5	Lecture, Group Discussion	Theory Exam, Assignment

CO4	Analyze hospital dietary operations with respect to hygiene, quality control, and food safety.	PO1, PO2, PO5, PO6	Lecture, Case Study, Seminar	Theory Exam, Assignment, Case Presentation
CO5	Evaluate financial management, budgeting, and cost-control practices in hospital dietary services.	PO1, PO2, PO3, PO5	Lecture, Seminar, Problem-Solving Exercises	Theory Exam, Assignment
CO6	Design and manage food service systems tailored to patient needs and institutional policies.	PO1, PO2, PO4, PO6, PO7	Lecture, Project Work, Case Study	Theory Exam, Assignment, Project Presentation
MCN 117	Research Project/ Dissertation	Mapped POs	Teaching–Learning Methodologies	Assessment Tools
CO1	Formulate a research question and develop a relevant study design in the field of clinical nutrition.	PO3, PO8	Research Guidance, Independent Study	Dissertation Evaluation, Viva
CO2	Collect, analyze, and interpret research data using appropriate statistical tools.	PO3, PO8	Data Collection, Statistical Analysis	Dissertation Evaluation
CO3	Review and synthesize scientific literature to support the research work.	PO3, PO8	Literature Review, Mentorship	Dissertation Evaluation
CO4	Present research findings in written and oral formats adhering to scientific guidelines.	PO3, PO4, PO8	Presentation, Report Writing	Dissertation Viva
CO5	Demonstrate ethical conduct and academic integrity in research work.	PO5, PO8	Research Guidance	Dissertation Evaluation
MCN 118 P	Medical Nutrition Therapy II	Mapped POs	Teaching–Learning Methodologies	Assessment Tools
CO1	Plan and prepare diet charts for different types of diabetes considering comorbidities.	PO1, PO2, PO3	Practical Demonstration, Diet Planning, Case Study	Practical Exam, Viva, Logbook
CO2	Design renal diets for specific conditions such as acute kidney injury, chronic kidney disease, and renal calculi.	PO1, PO2, PO3	Practical Demonstration, Case Study	Practical Exam, Viva, Assignment
CO3	Formulate dietary modifications for cardiovascular disorders based on clinical parameters.	PO1, PO2, PO3, PO6	Practical Demonstration, Group Discussion	Practical Exam, Case Study
CO4	Prepare diet plans for various liver disorders ensuring nutritional adequacy and patient compliance.	PO1, PO2, PO7	Practical Demonstration	Practical Exam, Viva
CO5	Develop appropriate nutritional strategies for neurological disorders.	PO1, PO2, PO3	Case Study, Practical Demonstration	Practical Exam, Viva
CO6	Formulate pre- and post-operative nutrition plans for patients undergoing surgery, burns, or trauma recovery.	PO1, PO2, PO3	Practical Demonstration, Diet Planning	Practical Exam, Viva
MCN 119 P	Health & Fitness	Mapped POs	Teaching–Learning Methodologies	Assessment Tools
CO1	Conduct health screening and risk stratification for different populations.	PO2, PO4, PO5	Practical Demonstration, Field Work	Practical Exam, Logbook
CO2	Perform and interpret cardio-respiratory fitness and musculoskeletal fitness	PO2, PO3, PO5	Practical Demonstration, Case Study	Practical Exam, Viva
CO3	Evaluate physical fitness levels of various age groups through case studies.	PO2, PO6	Case Study, Field Work	Practical Exam, Assignment

CO4	Conduct market survey and evaluate sports nutrition supplements.	PO1, PO2, PO5, PO6	Survey, Group Discussion	Practical Exam, Report
CO5	Formulate diet plans for athletes in different sports	PO1, PO2, PO3	Practical Demonstration, Case Study	Practical Exam, Viva
CO6	Present case studies on diet and training schedules of competitive endurance athletes.	PO1, PO2, PO4	Seminar, Case Study Presentation	Practical Exam, Viva
MCN 120 CP	MCN Directed Clinical Education – III	Mapped POs	Teaching–Learning Methodologies	Assessment Tools
CO1	Knowledge-Based competencies will build a robust theoretical foundation, enabling students to understand healthcare practices, disease management, and patient care, thereby empowering them to make informed decisions and adapt to evolving medical technologies.	PO2, PO4, PO5, PO8	Case studies, Industrial Visit	Case-study Presentation, Viva-voce, log book
CO2	Skill-Based competencies will emphasize hands-on training, ensuring proficiency in clinical procedures, diagnostic techniques, and the use of advanced medical equipment. This practical exposure will bridge the gap between theory and practice, enhancing students' confidence and competence in delivering quality patient care.	PO2, PO4, PO5, PO8	Case studies, Industrial Visit	Case-study Presentation, Viva-voce, log book
CO3	Attitudinal competencies will focus on developing professionalism, empathy, ethical conduct, teamwork, and communication skills-key traits for holistic patient care and effective collaboration in interdisciplinary healthcare teams.	PO2, PO4, PO5, PO8	Case studies, Industrial Visit	Case-study Presentation, Viva-voce, log book

SEMESTER IV

MCN 121 T	Precision Nutrition (Nutrigenomics) and Intellectual Property Rights	Mapped POs	Teaching–Learning Methodologies	Assessment Tools
CO1	Explain the fundamental concepts of molecular biology and their application in nutritional genetics and genomics.	PO1, PO3	Lecture, Seminar, Group Discussion	Theory Exam, Assignment
CO2	Analyze the influence of genetics, environment, and gene–nutrient interactions in precision medicine.	PO1, PO3, PO6	Lecture, Case Study, Seminar	Theory Exam, Assignment
CO3	Evaluate health biomarkers and genetic risk factors associated with nutrition-related diseases.	PO1, PO3, PO6	Lecture, Group Discussion, Seminar	Theory Exam, Assignment
CO4	Interpret the role of nutrients, bioactive components, and gene expression in chronic diseases.	PO1, PO3, PO6, PO7	Lecture, Seminar, Case Study	Theory Exam, Assignment
CO5	Assess the interrelationship between gene expression and gut microbiota in health and disease.	PO1, PO3, PO4, PO6	Lecture, Seminar, Case Study	Theory Exam, Assignment
CO6	Apply concepts of Intellectual Property Rights (IPR) in nutrigenomics research and practice.	PO5, PO7, PO8	Lecture, Seminar, Project Work	Theory Exam, Assignment, Project Presentation
MCN 122 P	Internship/Training	Mapped POs	Teaching–Learning Methodologies	Assessment Tools
CO1	Select the right practice from the acquired skills as a clinical nutritionist and dietician. Demonstrate an attitude of professionalism when working with colleagues and other health professional staff of the hospital.	PO2, PO4, PO5	Practical Demonstration, Role Play, Group Discussion	Practical Exam, Viva, Logbook
CO2	Utilize skills in record keeping, organizing material, presentation of case studies, and effective communication.	PO2, PO4, PO8	Seminar, Case Study Presentation, Practical Demonstration	Assignment, Case Presentation, Viva
CO3	Analyze and develop the ability to work independently and as a team member to perform critical thinking and problem-solving skills in different domains.	PO2, PO3, PO4, PO5	Group Work, Problem-Solving Exercises, Case Study	Assignment, Theory Exam, Project Presentation
CO4	Design, evaluate, and implement new methods or protocols in different cases.	PO1, PO2, PO3, PO8	Project Work, Seminar, Practical Demonstration	Assignment, Project Presentation, Viva
CO5	Evaluate the relationship between nutrition data and pathologic processes, and how nutrition data relates to health and disease.	PO1, PO2, PO3, PO6	Lecture, Case Study, Group Discussion	Theory Exam, Assignment
CO6	Develop the ability to work independently and as a team member to perform critical	PO2, PO3, PO4, PO5	Group Work, Case Study, Seminar	Assignment, Viva, Project Presentation

	thinking and problem-solving skills in different domains.			
MCN 117	Research Project/ Dissertation	Mapped POs	Teaching–Learning Methodologies	Assessment Tools
CO1	Formulate a research question and develop a relevant study design in the field of clinical nutrition.	PO3, PO8	Research Guidance, Independent Study	Dissertation Evaluation, Viva
CO2	Collect, analyze, and interpret research data using appropriate statistical tools.	PO3, PO8	Data Collection, Statistical Analysis	Dissertation Evaluation
CO3	Review and synthesize scientific literature to support the research work.	PO3, PO8	Literature Review, Mentorship	Dissertation Evaluation
CO4	Present research findings in written and oral formats adhering to scientific guidelines.	PO3, PO4, PO8	Presentation, Report Writing	Dissertation Viva
CO5	Demonstrate ethical conduct and academic integrity in research work.	PO5, PO8	Research Guidance	Dissertation Evaluation

OUTLINE OF COURSE CURRICULUM**M.Sc. Clinical Nutrition****Semester III**

Code No.	Core Course	Credits/Week					Hrs/Semester					Marks		
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation (CP)/Experiential	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation (CP)/Experiential	Total (hrs.)	Internal Assement (IA)	Semester End Exam (SEE)	Total
Discipline Specific Core Theory														
MCN 114 T	Medical Nutrition Therapy II	4	-	-	-	4	60	-	-	-	60	20	80	100
MCN 115 T	Health & Fitness	2	-	-	-	2	30	-	-	-	30	20	80	100
MCN 116 T	Hospital Food Service Management	2	-	-	-	2	30	-	-	-	30	20	80	100
MCN 117	Research Project/ Dissertation	-	-	10	-	5	-	-	-	-	150	50	-	50
Discipline Specific Core Practical														
MCN 118 P	Medical Nutrition Therapy II	-	-	4	-	2	-	-	60	-	60	10	40	50
MCN 119 P	Health & Fitness	-	-	2	-	1	-	-	30	-	30	10	40	50
MCN 120 CP	MCN Directed Clinical Education – III	-	-	-	15	5	-	-	-	225	225	-	50	50
Total		8	0	16	15	21	120	0	90	225	585	130	370	500

OUTLINE OF COURSE CURRICULUM**M.Sc. Clinical Nutrition****Semester IV**

Code No.	Core Course	Credits/Week					Hrs/Semester					Marks		
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation (CP)/Experiential	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation (CP)/Experiential	Total (hrs.)	Internal Assement (IA)	Semester End Exam (SEE)	Total
Discipline Specific Core Theory														
MCN 121 T	Precision Nutrition (Nutrigenomics) and Intellectual Property Rights	3	-	-	-	3	45	-	-	-	45	20	80	100
Discipline Specific Core Practical														
MCN 122 P	Internship/Training	-	-	-	18	6	-	-	-	270	270	-	50	50
MCN 117	Research Project/ Dissertation	-	-	22	-	11	-	-	330	-	330	-	200	200
Total		3	0	22	18	20	45	0	330	270	645	20	330	350

SECOND YEAR

M.Sc. Clinical Nutrition

SEMESTER-III

Code No.	Core Subjects
Discipline Specific Core Theory	
MCN 114 T	Medical Nutrition Therapy - II
MCN 115 T	Health & Fitness
MCN 116 T	Hospital Food Service Management
MCN 117	Research Project/ Dissertation
Discipline Specific Core Practical	
MCN 118 P	Medical Nutrition Therapy - II
MCN 119 P	Health & Fitness
MCN 120 CP	MCN Directed Clinical Education-III

Name of the Program	M.Sc. Clinical Nutrition
Semester	Semester III
Name of the Course	Medical Nutrition Therapy II
Course Code	MCN 114 T

Teaching Objective	<p>To apprehend the candidate with:</p> <ul style="list-style-type: none"> • Understanding of basic concepts of medical nutrition therapy • Develop an insight about the aetiology, signs and symptoms, nutritional management of diseases and disorders
Course Outcomes	<ul style="list-style-type: none"> • Explain the pathophysiology, etiology, and nutritional management of diabetes and its complications. • Analyze renal diseases and formulate appropriate dietary plans considering metabolic and nutritional implications. • Evaluate coronary heart diseases and design nutrition interventions for conditions such as dyslipidemia, hypertension, and myocardial infarction. • Discuss neurological disorders and assess nutritional strategies to support cognitive and neuromuscular health. • Apply principles of nutrition support in stress conditions like trauma, burns, and post-surgical recovery. • Interpret cancer pathogenesis, side effects of therapy, and formulate individualized dietary management plans.

Sr. No.	Topics	No. of Hrs.
1	<p>MNT in renal diseases Diseases of the renal system - etiology and pathogenesis - changes in function with progression of diseases, metabolic and nutritional implications, Clinical and metabolic manifestations, Diagnostic tests, Dietary management of renal diseases: Glomerulonephritis, nephrotic syndrome, acute and chronic renal failure, ESRD- types of dialysis, renal transplant, Nephrolithiasis- Types & Diet management.</p>	10
2	<p>Nutritional management of coronary heart diseases Overview, coronary heart disease: prevalence, etiology & Pathogenesis, Diagnostic Tests, Common disorders of CHD and Nutrition management: dyslipidemia, atherosclerosis, hypertension, ischemic heart disease- angina pectoris, myocardial infarction, congestive cardiac failure, rheumatic heart disease. Nutritional Implications in cardiac surgeries- CABG, Vaeries.</p>	8
3	<p>MNT for Diseases of hepato-biliary tract Pathophysiology of Liver Diseases- Progression of Liver Disease Metabolic and Nutritional Implications, alterations in liver function tests, Role of Specific Nutrients and Alcohol. Dietary management of liver diseases – Viral Hepatitis, Cirrhosis, Hepatic encephalopathy and Wilson’s disease and Liver transplant Diseases of gall bladder and Pancreas - Pathophysiologic Changes, Metabolic and Nutritional Implications of - biliary dyskinesia, cholelithiasis, cholecystitis, cholecystectomy, pancreatitis, Zollinger Ellison syndrome</p>	10
4	Nutritional Management in Diseases of Nervous System	9

	Dysphagia, Pathophysiology & Nutrition therapy in neurological disorders- Stroke, Neuro Trauma, Epilepsy, Neurodegenerative diseases – Parkinsonism, Dementia, Alzheimer's, Gullian Barrie's Syndrome, Myasthenia Gravis, Multiple Sclerosis, ADHD	
5	Nutrition during stress The stress response, physiological response to stress, SIRS (Systemic inflammatory response syndrome), Respiratory Distress, Sepsis: metabolic and catabolic response Burns: classification of burns, complications, dietary management of burns, nutrition support. Trauma: physiological response to injury, metabolic and hormonal response, dietary management. Dietary management during surgery- Pre and post operative nutritional care	9
6	Nutrition and Cancer Carcinogenesis - pathogenesis and progression of cancer, role of nutrients, foodstuffs and food additives in cancer. Types of cancer and effect on metabolism and nutritional status Cancer therapies and treatment - side effects and nutritional implications Dietary Management in Cancer.	9
7	Nutritional Management in Inborn Errors of Metabolism: Phenyl ketonuria-galactosemia, fructose and lactose intolerance, glycogen storage disorders	5
Total		60 Hrs.

Name of the Program	M.Sc. Clinical Nutrition
Semester	Semester III
Name of the Course	Medical Nutrition Therapy II
Course Code	MCN 118 P

Teaching Objective	To apprehend the candidate with: <ul style="list-style-type: none"> • Understanding of basic concepts of medical nutrition therapy • Develop an insight about the aetiology, signs and symptoms, nutritional management of diseases and disorders
Course Outcomes	<ul style="list-style-type: none"> • Plan and prepare diet charts for different types of diabetes considering comorbidities. • Design renal diets for specific conditions such as acute kidney injury, chronic kidney disease, and renal calculi. • Formulate dietary modifications for cardiovascular disorders based on clinical parameters. • Prepare diet plans for various liver disorders ensuring nutritional adequacy and patient compliance. • Develop appropriate nutritional strategies for neurological disorders. • Formulate pre- and post-operative nutrition plans for patients undergoing surgery, burns, or trauma recovery.

Sr. No.	Topic	No. of Hrs.
1.	Diet Plan for Diabetes <ul style="list-style-type: none"> - Diabetes with Obesity - Gestational Diabetes 	12

	<ul style="list-style-type: none"> - Diabetes with CVD - Diabetes with Hypertension - Diabetes with Nephropathy - Type-1 Diabetes Mellitus 	
2.	Diet Plan for Renal Diseases <ul style="list-style-type: none"> - Nephritis - Acute Renal Failure with hyperkalemia - Chronic Renal Failure with hypokalemia - Renal Calculi (Urates, Oxalates, Carbonates & Phosphates) 	10
3.	Diet in Cardiovascular Diseases <ul style="list-style-type: none"> - Acute Myocardial Infraction - CVD for Hypertension - CVD with COPD - CVD with Hyperlipidemia - Congestive Cardiac Failure - Congestive Cardiac Failure with Hypertension - Essential Hypertension 	10
4.	Diet in Liver Diseases <ul style="list-style-type: none"> - Acute Hepatitis - Chronic Hepatitis - Liver Cirrhosis - Hepatic Encephalopathy 	8
5.	Diet Plan for Neurological Disorders <ul style="list-style-type: none"> - Epilepsy - Gullian Barrie Syndrome - Parkinson's Disease 	5
6.	Diet Plan for Stress <ul style="list-style-type: none"> - Diet for burns - Diet for surgical procedures 	5
7.	Diet Plan for Cancer <ul style="list-style-type: none"> - Head & Neck Cancer - GI Cancers - Nutritional management for patients with stoma 	6
8.	Diet Plan for Inborn Metabolic Disorders <ul style="list-style-type: none"> - Phenyl Ketonuria - Galactosemia - Fructose Intolerance - Lactose intolerance - Glycogenstorage disorders - Maple sugar urine disease 	4
Total		60 hrs

References:

1. Mahan, L.K. and Escott-Stump, S. (2000): Krause's Food Nutrition and Diet Therapy, 10th Edition, W.B. Saunders Ltd.
2. Shils, M.E., Olson, J.A., Shike, M. and Ross, A.C. (1999): Modern Nutrition in Health and Disease, 9th Edition, Williams and Wilkins.
3. Escott-Stump, S. (1998): Nutrition and Diagnosis Related Care, 4th Edition, Williams and Wilkins.

4. Garrow, J.S., James, W.P.T. and Ralph, A. (2000): Human Nutrition and Dietetics, 10th Edition, Churchill Livingstone.
 5. Williams, S.R. (1993): Nutrition and Diet Therapy, 7th Edition, Times Mirror/Mosby College Publishing.
 6. Davis, J. and Sherer, K. (1994): Applied Nutrition and Diet Therapy for Nurses, 2nd Edition, W.B. Saunders Co.
 7. Antia F. P.: Clinical Dietetics and Nutrition, 3rd ed., Oxford University, Press, Delhi, Reprinted in 1989.
 8. Thomas, B.: Manual of Dietetic Practice, 1996.
 9. Laura E. Matarese, Michele M. Gottschlich, Contemporary nutrition support practice: a clinical guide, 2006, I edition, Saunders Elseviers Science, Missouri
 10. Scott A. Shikora, George L. Blackburn, Nutrition Support: Theory and Therapeutics, 1996, I edition, International Thomas Publishing (ITP) online publishing –thomson.com
 11. Michele M. Gottschlich, The Science and Practice Of Nutrition Support: A Case-Based Core Curriculum, 2007, I edition, American Society of Parenteral and enteral Nutrition (aspen)
 12. Annalynn Skipper, Dietitian's Handbook of Enteral and Parenteral Nutrition, 2012, I edition, An ASPEN Publication.
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Name of the Program	M.Sc. Clinical Nutrition
Semester	Semester III
Name of the Course	Health & Fitness
Course Code	MCN 115 T

Teaching Objective	<p>To apprehend the candidate with:</p> <ul style="list-style-type: none"> • The principles of wellness through physical fitness • Motivation for a physically active life • Techniques of assessment of physical fitness of various groups of population
Course Outcomes	<ul style="list-style-type: none"> • Explain the role of nutrition in sports and exercise, including energy balance and fluid requirements. • Evaluate carbohydrate metabolism during different types of physical activity and apply carbohydrate loading strategies. • Describe fat metabolism in relation to sports performance and its modulation by diet and training. • Assess protein and amino acid requirements for different exercise regimens and recovery. • Identify key micronutrients in exercise performance and recommend antioxidant strategies. • Examine lifestyle factors affecting physical fitness, including substance abuse and sleep disorders.

Sr. No.	Topics	No. of Hrs.
1	<p>Introduction Nutritional considerations for sports / exercising personas compare to normal active person. Energy substrate for activities of different intensity and duration, aerobic and anaerobic activities. Effect of exercise on muscular, skeletal, cardiovascular and respiratory activities, Energy balance, PAL (Physical Activity Level) equation,</p>	3
2	<p>Macro Nutrients</p> <ul style="list-style-type: none"> • Carbohydrate as an energy source for sport and exercise. Carbohydrate stores, Fuel for aerobic and anaerobic metabolism, Glycogenre-synthesis, CHO Loading, CHO composition for pre-exercise, during and recovery period. • Fat stores, regulation of fat metabolism, factors affecting fat oxidation (intensity, duration, training status, CHO feeding), effect of fasting and fat ingestion. • Protein requirement and metabolism during endurance exercise, resistance exercise and recovery process. Protein supplement. 	10
3	<p>Micronutrients and Hydration for exercise</p> <ul style="list-style-type: none"> • B complex vitamin and specific minerals. Exercise induced oxidative stress and role of antioxidants. Stress management techniques. • Fluid balance in sports and exercise, importance, symptoms and prevention of dehydration, Sports drinks available in market. 	7
4	<p>Dietary Supplements and Ergogenic Aids Dietary supplements and ergogenic aids (nutritional, pharmacological and physiological), nutritional factors causing fatigue.</p>	5

	Rehabilitation	
5.	Complications Smoking, alcoholism and drug addiction. Chronic dieting and eating disorder. Female athletic triad, sports anaemia. Drug – Consequences of use, misuse and abuse, tolerance, dependence and addiction, legal drugs, psychoactive and vasoactive substances – occurrence, etiology, pathology and treatment, health related issues in coffee consumption, exercise and sleep apnea.	5
Total		30 hrs.

Name of the Program	M.Sc. Clinical Nutrition
Semester	Semester III
Name of the Course	Health & Fitness
Course Code	MCN 119 P

Teaching Objective	To apprehend the candidate with: <ul style="list-style-type: none"> • The principles of wellness through physical fitness • Motivation for a physically active life • Techniques of assessment of physical fitness of various groups of population
Course Outcomes	<ul style="list-style-type: none"> • Conduct health screening and risk stratification for different populations. • Perform and interpret cardio-respiratory fitness and musculoskeletal fitness • Evaluate physical fitness levels of various age groups through case studies. • Conduct market survey and evaluate sports nutrition supplements. • Formulate diet plans for athletes in different sports • Present case studies on diet and training schedules of competitive endurance athletes.

Sr. No.	Topic	No. of Hrs.
1.	Health Screening & Risk Stratification- Nutritional Assessment, Body Composition	2
2.	Theoretical explanation, demonstration and assessment of <ul style="list-style-type: none"> • Cardio - respiratory fitness <ul style="list-style-type: none"> ○ Treadmill stress test, Spirometry, Step tests ○ Resting assessments: Heart rate monitoring, Blood Pressure, - Cycle ergo meter test etc. ○ Aerobic fitness testing (VO₂max testing) • Skeleton muscular fitness- <ul style="list-style-type: none"> ○ Muscle strength ○ Endurance ○ Strength • Flexibility & agility <ul style="list-style-type: none"> ○ Bench press, Jumps, Push ups, Sit and Reach Test, Sit-ups, Shuttle run, Handgrip dynamometer, etc Visit to Fitness center/ Demonstration	10
4.	Assessment of physical fitness of various groups of population- children, adolescents, adults & elderly –case study	5
5.	Market Survey on nutritional supplements for sports personnel	2

6.	<ul style="list-style-type: none"> • Planning & preparation of diets for Distance Running, Marathon, Ultra marathon, Obstacle racing and Triathlon • Nutrition for Road Cycling, Mountain Biking, Track Cycling, and Cyclo-Cross, Cross-country skiing, Nutrition for Rowers and swimmers 	8
8.	Case study presentations on the Diet & Training schedule of competitive endurance athletes	3
Total		30 hrs

References:

1. Advances in Sport and Exercise Science: Nutrition and Sport, Edited by Don Mac Laren., Ch. Published by Churchill Livingstone, Elsevier. 2007
2. Nutrition for Serious Athletes. Dan Banardot. 2000; Human Kinetics.
3. Energy-Yielding Macronutrients and Energy Metabolism in Sports Nutrition. Edited by Judy A Driskell, Ira Wolinsky, CRC Press 2000.
4. Davier, A, Blakeley, G. H. and Kidd, C (2001) Human Physiology, Harcourt Pub., 1st ed. Edinburgh Churchill Livingstone.
5. Laboratory Manual, NIN
6. Rhodes, R & P flouzer, R (2003) Human Physiology, Thomson Brooks & Cole, (4th Ed).
7. Waugh, A. and Grant, A. (2006) Anatomy and Physiology in Health and illness Churchill Livingstone, 10th ed.
8. Browns Fred and Caustan – Cargill (2002) Essentials of Sports Nutrition – 2nd edition John Wiley and Sons, England.
9. Burke Louise and Deakin Vicki (2006) Clinical Sports Nutrition, McGraw – Hill Pvt. Ltd. Australia.
10. Summerfield Lianne M (2001), Nutrition Exercise and Behavior An integrated approach to weight management, Belmont (USA). Wadsworth/Thompson Learning.
11. Wolinsky Ira, Driskell J. (2004) Nutritional Ergogenic Aids, CRC Press NY.f

Name of the Program	M.Sc. Clinical Nutrition
Semester	Semester III
Name of the Course	Hospital Food Service Management
Course Code	MCN 116 T

Learning Objective	<ul style="list-style-type: none"> To understand the principles and functions of hospital food service administration. To acquire skills in planning, organizing, and evaluating food service operations in a hospital. To gain knowledge of budgeting, staffing, quality control, and legal/ethical considerations in food service. To develop competency in managing therapeutic diets, bulk food production, and patient-centered services.
Course Outcome	<ul style="list-style-type: none"> Explain the principles of food service management in hospital and healthcare settings. Apply menu planning and production techniques for diverse patient populations. Demonstrate skills in organizing staff, workflow, and resources within a hospital food service unit. Analyze hospital dietary operations with respect to hygiene, quality control, and food safety. Evaluate financial management, budgeting, and cost-control practices in hospital dietary services. Design and manage food service systems tailored to patient needs and institutional policies.

Sr. No.	Topics	No. of Hrs.
1	Introduction to Hospital Food Service <ul style="list-style-type: none"> Concept and scope of hospital food service management- Types of hospital dietary services (centralized vs decentralized) Conventional, commissary, ready-prepared, assembly-serve systems Workflow in hospital kitchen and dietary department Integration of Clinical Nutrition and Food Service Organization of dietary department: hierarchy, roles & responsibilities 	5
2.	Menu Planning for Hospitals <ul style="list-style-type: none"> Principles of menu planning for patients and staff Types of menus: cyclic, selective, non-selective Menu planning for therapeutic diets & special needs- Translation of diet prescriptions into meals Recipe standardization & portion sizes 	5
3.	Procurement, Storage & Inventory Management <ul style="list-style-type: none"> Purchasing systems (centralized vs decentralized) Vendor selection & tendering Receiving & inspection of raw materials Storage of perishables & non-perishables Inventory control (FIFO, LIFO, perpetual inventory) 	5
4.	Food Production & Services	5

	<ul style="list-style-type: none"> • Large-scale food production methods • Equipment used in hospital dietary services • Portion control & plate service • Meal service systems: trolley, centralized tray, ward kitchen 	
5.	Hygiene, Sanitation & Food Safety <ul style="list-style-type: none"> • Kitchen & equipment hygiene- Sanitation practices & waste disposal • HACCP in hospital food service- Food safety standards (FSSAI, NABH, ISO) • Infection control in dietary services 	5
6.	Financial & Quality Management <ul style="list-style-type: none"> • Budgeting & cost control in dietary services • Pricing policies for staff/visitors • Financial records & audits • Quality assurance & patient feedback surveys 	5
TOTAL		30 hrs.

Name of the Program	M.Sc. Clinical Nutrition
Semester	Semester III
Name of the Course	Research Project/ Dissertation
Course Code	MCN 117

Course Outcome	<ul style="list-style-type: none">• Formulate a research question and develop a relevant study design in the field of clinical nutrition.• Collect, analyze, and interpret research data using appropriate statistical tools.• Review and synthesize scientific literature to support the research work.• Present research findings in written and oral formats adhering to scientific guidelines.• Demonstrate ethical conduct and academic integrity in research work.
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The Dissertation work will begin from 3rdSemester and will continue through the 4thSemester. (150 hrs)

Course code- MCN 120 CP: MCN Directed Clinical Education – III

Course Outcome:

- **Knowledge-Based competencies** will build a robust theoretical foundation, enabling students to understand healthcare practices, disease management, and patient care, thereby empowering them to make informed decisions and adapt to evolving medical technologies.
- **Skill-Based competencies** will emphasize hands-on training, ensuring proficiency in clinical procedures, diagnostic techniques, and the use of advanced medical equipment. This practical exposure will bridge the gap between theory and practice, enhancing students' confidence and competence in delivering quality patient care.
- **Attitudinal competencies** will focus on developing professionalism, empathy, ethical conduct, teamwork, and communication skills-key traits for holistic patient care and effective collaboration in interdisciplinary healthcare teams.

Objectives:

To enable the students to:

- Counsel the patients at hospital stay, to be discharged and outpatients.
- Take follow up of inpatients and outpatients.
- Observe and study the food service management practices.
- Conduct Nutritional Assessment and provide counselling in field/ community setting.

Work Instructions:

Each student is instructed to:

- Report 5 case studies in order to familiarize on various disorders and treatments
 - Submit the Hospital Posting, Community Posting and Case report
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SECOND YEAR

M.Sc. Clinical Nutrition

SEMESTER-IV

Code No.	Core Subjects
Discipline Specific Core Theory	
MCN 121 T	Precision Nutrition (Nutrigenomics) and Intellectual Property Rights
Discipline Specific Core Practical	
MCN 122 P	Internship/Training
MCN 117	Research Project/ Dissertation

Name of the Program	M.Sc. Clinical Nutrition
Semester	Semester IV
Name of the Course	Precision Nutrition (Nutrigenomics) and Intellectual Property Rights
Course Code	MCN 121 T

Teaching Objective	<p>To apprehend the candidate with:</p> <ul style="list-style-type: none"> • The concept of nutrigenomics and nutrigenetics. • Importance of nutrition and its effects on gene expression. • Learn nutrient and gene interactions as they relate to disease prevention and intervention.
Course Outcomes	<ul style="list-style-type: none"> • Explain the fundamental concepts of molecular biology and their application in nutritional genetics and genomics. • Analyze the influence of genetics, environment, and gene–nutrient interactions in precision medicine. • Evaluate health biomarkers and genetic risk factors associated with nutrition-related diseases. • Interpret the role of nutrients, bioactive components, and gene expression in chronic diseases. • Assess the interrelationship between gene expression and gut microbiota in health and disease. • Apply concepts of Intellectual Property Rights (IPR) in nutrigenomics research and practice.

Sr. No.	Topics		No. of Hrs.
1	Basic molecular biology	Introduction to nutritional genetics and genomics, Gene and DNA structure: Concepts of nucleic acid, gene concept, gene structure, central dogma (replication, transcription, translation, DNA repair mechanism) operon concept, RNA processing, Structure and functions of different types of RNA, RNA transport, gene regulation.	3
2	Introduction to tools and techniques	PCR, RT-PCR, different sequencing approach, microarray, SNP, genotyping, Electrophoresis, Chromatography, and Spectrometry. Introduction to different types of public database, Datamining strategies, Primer designing.	2
3	Precision Medicine	Influence of Genetics and Environmental Factors in Complex Diseases, Gene- Nutrient Interaction, Need for Precision: The problem of Missing Heritability Concept of Interaction Precision Nutrition vs. Community Nutrition, Current Basis of Nutritional Research Integrated approach toward personalized nutrition Role of AI in Nutrition System and Precision Health	6
4	Health Biomarkers	Identification and validation of compounds in tissues, blood and fluids; genetic screening for predisposition and occurrence in inflammatory	6

		diseases; genetic markers associated with increased risk for chronic disease, metabolic dysfunction. SNPs Predisposing to Complex Nutrition-Related Diseases - Genetic Risk Scores (GRS). Diet-gene interaction: polygenic risk score: Type II Diabetes, Hypertension Arteriosclerosis, Hyperlipidemia, Cancer SNP vs. Allergies vs. Intolerances	
5	Gene and Nutrition	Circadian Rhythm and gene : Chronobiology, Appetite and Satiety, Central Clock Peripheral Clocks, Circadian Rhythm Hormones, Intake Control (Leptin and Ghrelin) Exercise Genotype: Adrenergic genotype, Food Specific Genotype : Caffeine, Lactose Gluten Nutrigenetics, SNPs Associated with Nutrition-Related Diseases (Diet-Dependent), Vascular health, Cardiovascular diseases, Oxidative stress (eNOS SOD) ApoE Metabolic Health, Obesity (Snacking), Diabetes Type 2, Methylation Detoxification : Liver health Role of Bioactive Components of Diet on Gene Expression The Effect of Micro and Macro Nutrients on Gene Expression	10
6	Gene-Gut interrelationship	Human Microbiota Composition Enterotypes and Diet, Microbiota and Metabolic Syndrome, Microbiota and Cardiovascular Diseases Effect of the Oral and Intestinal Microbiota, Gut-brain Axis, Microbiota and Neurodegenerative Diseases Microbiota and Neuropsychiatric Diseases, Schizophrenia, Anxiety, Depression, Autism, Microbiota and Obesity Gut microbiome and disease diagnosis and prognosis Diet-Modulated MicroRNAs Nutrition Systems Biology	8
7	IPR	Copyright: Definition, meaning of copyright, duration, copyright protection, Related Rights : meaning, distinction between related rights and copyright, Rights covered by copyright Geographical Indications: geographical indication, geographical indication protection and its reasons. Patents: Patents and kinds of inventions protected by a patent, patent document, and how to protect your inventions. Granting of patent, Rights of a patent, Drafting and Filing of a patent. Trademarks: meaning, rights of trademark, of signs can be used as trademarks, trademark protection, trademark registration, length of trademark protection, Trade secrets, and know-how agreements. Enforcement Of Intellectual Property Rights: Infringement of intellectual property rights, Enforcement Measures	10
Total			45 hrs

References:

1. Nutritional Genomics: Discovering the path to personalized nutrition , Edited by Jim Kaput, 2013, Wiley
2. Nutrigenomics and Nutrigenetics in functional foods and personalized nutrition, Edited by Lynnette R Ferguson, 2013, CRC Press
3. Genomics and proteomics in nutrition Edited by Carolyn D Berdeiner and Namia Moustaid Moussa, 2004, CRC Press
4. Dietary modulation of Cell Signaling pathways by Zigang Dong and Young Joon Surh, 2008, CRC Press

Name of the Program	M.Sc. Clinical Nutrition
Semester	Semester IV
Name of the Course	Internship/Training
Course Code	MCN 122 P

Course Outcomes	<ul style="list-style-type: none"> • Select the right practice from the acquired skills as a clinical nutritionist and Dietitian. Demonstrate an attitude of professionalism when working with colleagues and other health professional staff of the hospital • Utilize skills in record keeping, organizing material, presentation of case studies, and effective communication. • Analyse and develop the ability to work independently and as a team member to perform critical thinking and problem-solving skills in different domains. • Design, evaluate and implement new methods or protocols in different cases. • Evaluate the relationship between nutrition data and pathologic processes, and how nutrition data relates to health and disease • Develop the ability to work independently and as a team member to perform critical thinking and problem-solving skills in different domains.
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Duration: 2 months

Content	Competencies
Orientation	Define the role of dietitian in hospitals Outline the functioning of the Dietetics Services in a hospital and learn about its working schedules and plans. List and summarize the knowledge about the maintenance of the patient's case file and how the details are entered/registered in it.
Food Service Area	Interpret the therapeutic and normal diet settings in the kitchen Interpret acquiring skills in food procurement quality maintenance and patient food service. Acquire skills in Menu system, Personnel Management, Food supply, procurement and control, Food production.
Nephrology and Urology (1 case)	Illustrate the assessment of nutritional status among patients. Interpret and apply dietary interventions to patients with disease conditions Explain and develop the dietary counselling given to the patients. Illustrate and relate the condition in which enteral and parenteral nutrition is provided and its administration and formulation
Cardiology (1 case)	Illustrate the assessment of nutritional status among patients. Interpret and apply dietary interventions to patients with disease conditions Explain and develop the dietary counselling given to the patients. Illustrate and relate the condition in which enteral and parenteral nutrition is provided and its administration and formulation
Gastroenterology (1 case)	Illustrate the assessment of nutritional status among patients. Interpret and apply dietary interventions to patients with disease conditions Explain and develop the dietary counselling given to the patients. Illustrate and relate the condition in which enteral and parenteral nutrition is provided and its administration and formulation
Oncology (1 case)	Illustrate the assessment of nutritional status among patients.

	<p>Interpret and apply dietary interventions to patients with disease conditions Explain and develop the dietary counselling given to the patients.</p> <p>Illustrate and relate the condition in which enteral and parenteral nutrition is provided and its administration and formulation</p>
Obstetrics Gynaecology (1 case)	<p>Illustrate the assessment of nutritional status among patients.</p> <p>Interpret and apply dietary interventions to patients with disease conditions Explain and develop the dietary counselling given to the patients.</p> <p>Illustrate and relate the condition in which enteral and parenteral nutrition is provided and its administration and formulation</p>
Pediatrics (1 case)	<p>Illustrate the assessment of nutritional status among patients.</p> <p>Interpret and apply dietary interventions to patients with disease conditions Explain and develop the dietary counselling given to the patients.</p> <p>Illustrate and relate the condition in which enteral and parenteral nutrition is provided and its administration and formulation</p>
Surgery (1 Case)	<p>Illustrate the assessment of nutritional status among patients.</p> <p>Interpret and apply dietary interventions to patients with disease conditions Explain and develop the dietary counselling given to the patients.</p> <p>Illustrate and relate the condition in which enteral and parenteral nutrition is provided and its administration and formulation</p>
Intensive care unit (1 Case)	<p>Illustrate the assessment of nutritional status among patients.</p> <p>Interpret and apply dietary interventions to patients with disease conditions Explain and develop the dietary counselling given to the patients.</p> <p>Illustrate and relate the condition in which enteral and parenteral nutrition is provided and its administration and formulation</p>
Endocrinology (1 case)	<p>Illustrate the assessment of nutritional status among patients.</p> <p>Interpret and apply dietary interventions to patients with disease conditions Explain and develop the dietary counselling given to the patients.</p> <p>Illustrate and relate the condition in which enteral and parenteral nutrition is provided and its administration and formulation</p>

Work Instructions

Each student is instructed to

- Report any 5 case studies in order to familiarize on the disorders and treatments
- Submit Detailed Case report
- University examination will be held in the form of case presentation

Name of the Program	M.Sc. Clinical Nutrition
Semester	Semester IV
Name of the Course	Research Project/ Dissertation
Course Code	MCN 117

Course Outcome	<ul style="list-style-type: none"> • Formulate a research question and develop a relevant study design in the field of clinical nutrition. • Collect, analyze, and interpret research data using appropriate statistical tools. • Review and synthesize scientific literature to support the research work. • Present research findings in written and oral formats adhering to scientific guidelines. • Demonstrate ethical conduct and academic integrity in research work.
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The Dissertation work will begin from 3rdSemester and will continue through the 4thSemester. (330 hrs)

<ol style="list-style-type: none"> 1. Dissertation/Project work should be carried out as an individual Dissertation and actual bench work. 2. The students will carry independent project work under the supervision of the staff of Department on an advanced topic assigned to him/her. In house projects are encouraged. Students may be allowed to carry out the project work in other Departmental laboratories /Research institutes /Industries as per the availability of Infrastructure. 3. Co guides from the other institutions may be allowed. 4. The Dissertation/Project work will begin from 3rd Semester, and will continue through the 4th Semester. 5. The Dissertation/Project report (also work book shall be presented at the time of presentation and viva voce) will be submitted at the end of the 4th Semester and evaluated. 6. Five copies of the project report shall be submitted to the Director, SBS. 7. For the conduct of the End Semester Examination and evaluation of Dissertation/Project work the University will appoint External Examiners. 8. Since the dissertation is by research, Dissertation/Project work carries a total of 250 marks and evaluation will be carried out by both internal and external evaluators. 9. The student has to defend his/her Dissertation/Project Work in a seminar which will be evaluated by a internal and external experts appointed by the University. 10. The assignment of marks for Project/Dissertation is as follows: Part I- Topic Selection, Review of Literature, Novelty of works-50 marks Part-II- a. Continuous Internal Assessment, Novelty, Overall Lab Work Culture - 100 Marks b. Dissertation/Project work book: 50 Marks c. Viva-Voce: 50 Marks
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Scheme of University Examination Theory for PG Program:

General structure / patterns for setting up question papers for Theory / Practical courses, their evaluation weightages for PG programs of MGMSBS are given in the following tables

Marks scheme for the University exam:

Final theory marks will be 100 marks (80 marks University Theory exam + 20 Marks Internal assessment).

Question		Marks distribution	Marks allotted per section	Marks
Sec: A	MCQ	10 x 1 M = 10	10	10
Sec: B	SAQ	3/4x 5 M = 15	15	35
Sec: B	LAQ	2/3 x 10 M = 10	20	
Sec: C	SAQ	3/4x 5 M = 15	15	35
Sec: C	LAQ	2/3x 10 M = 10	20	
Total				80 Marks

Practical exam pattern: Total 40 marks with following breakup:

Exercise	Description	Marks
Q No 1	Practical exercise - 1	1 x15=15 M
Q No 2	Station exercise	2x5M=10 M
Q No 3	VIVA	10 M
Q No 4	Journal	5M
Total		40 Marks

Practical to be conducted at respective departments and marks submitted jointly by the parent department to the university.

Breakup of theory IA calculation for 20 marks

Description	Marks
Internal exam (at department)	15 marks
Seminar	5 marks
Total	20 Marks

Breakup of practical IA calculation:

Description	Marks
Internal exam (at department)	10 marks
Viva	5 marks
Journal	5 marks
Total	20 Marks

Note –20 marks to be converted to 10 marks weightage for submission to the university.

Model Checklist for Evaluation of the Clinical Directed Posting (PG)

Name of the student: _____ Date: _____

Program: _____

Semester: _____ Name of the internal faculty/Observer: _____

Name of the External Faculty/Observer: _____

Core Competencies	Marks allotted	Marks obtained
	Students will begin to develop critical thinking abilities utilizing the allied health personnel roles of communicator and caregiver. Students will learn principles of professional allied health personnel practice and provide direct care to individuals within a medical surgical setting while recognizing the diverse uniqueness of individuals with health alterations.	
Clinical Teaching		
a. Demonstrate beginning competency in technical skills.	10	
Independent Work by Student guided by faculty		
a. Develop effective communication skills (verbally and through charting) with patients, team members, and family	2.5	
b. Identify intra and inter-professional team member roles and scopes of practice. Establish appropriate relationships with team members.	2.5	
Hands on practical work by students		
a. Protect confidentiality of electronic/manual health records data, information, and knowledge of technology in an ethical manner	05	
Independent work by student		
a. Demonstrate expected behaviors and complete tasks in a timely manner. Arrive to clinical experiences at assigned times. Maintain professional behavior and appearance.	05	
Log book	10	
Viva	10	
Attendance	05	
Total	50 Marks	

Sign of Internal Examiner: _____

Sign of External Examiner: _____

Evaluation for Semester III – Dissertation (PG) (Internal Assessment)

Dissertation/Project Proposal : overall performance of the student	Marks allotted	Marks Obtained
Open mindedness/ Receptivity to feedback Integrates feedback	5 Marks	
Meets deadlines / Regularity in meeting / Consistency in communication	10 Marks	
Continuous Internal evaluation (CIE)		
Interest shown in selecting topic	5 marks	
Appropriate review	10 marks	
Discussion with guide and other faculty	10 marks	
Quality of protocol	5marks	
Preparation of proforma / log book / daily reports	5marks	
TOTAL	Out of 50	

Evaluation for Semester IV - Evaluation parameter (Research Project / Dissertation)

Evaluation parameter (Semester IV)	Continuous Internal Evaluation (CIE)	Semester End Evaluation (SEE)	
	Guide	Internal examiner	External examiner
Thesis preparation, Novelty, Overall Lab Work Culture	25	-	-
Dissertation/Project work book	25	25	25
Evaluation of thesis including Viva Voce	-	50	50
Total	50	75	75
Overall Total = 200			

Evaluation for Semester IV - Evaluation of the Internship/Training (Clinical/Industrial) (PG)

Name of the student: _____ Date: _____

Program: _____

Semester: _____ Name of the internal faculty/Observer: _____

Name of the External Faculty/Observer: _____

Final Evaluation (50 Marks)

1. Technical Knowledge & Application (10 marks): _____
2. Problem-Solving & Critical Thinking (5 marks): _____
3. Communication & Teamwork (5 marks): _____
4. Professionalism & Punctuality (5 marks): _____
5. Quality of Log Book Maintenance (5 marks): _____
6. Learning Outcome & Skill Development (5 marks): _____
7. Final Internship Report Quality (5 marks): _____
8. Student's Initiative & Engagement (5 marks): _____
9. Overall Performance (5 marks): _____
10. Total: _____
11. **Final Remark:**

Sign of Internal Examiner: _____

Sign of External Examiner: _____



MGM INSTITUTE OF HEALTH SCIENCES

(Deemed to be University u/s 3 of UGC Act,1956)

Grade 'A⁺⁺' Accredited by NAAC

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