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
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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 though 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 24 courses each with its own distinct, specialized body of knowledge and skill. This includes 8 UG courses and 16 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. Reformations 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	**Advanced Knowledge and Understanding:** • 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	**Clinical Competency and Patient Care:** • Equip students with the skills to assess nutritional needs, create personalized nutrition plans, and monitor patient progress. • Gain proficiency in counseling patients and families about healthy eating, lifestyle modifications, and therapeutic diets. • Demonstrate the ability to apply nutritional science to clinical settings, including hospitals, rehabilitation centers, and community health organizations.
PO3	**Research and Evidence-Based Practice:** • 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	**Interdisciplinary Collaboration:** • 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	**Ethics and Professionalism:** • 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	**Public Health and Nutrition Advocacy:** • 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	**Sustainability and Environmental Impact:** • Understand the importance of sustainable food systems and their impact on health and the environment.
PO8	**Lifelong Learning and Professional Development:** • 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 glands (pituitary, thyroid, adrenal,	**PO1, PO2**	Lecture, Practical, Demonstration,	Internal Assessment, University Exam, Theory exam,

	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' 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,	**PO2, PO4,**	Case studies, Industrial Visit	Case-study Presentation, Viva-voce, log book

	and communication skills-key traits for holistic patient care and effective collaboration in interdisciplinary healthcare teams.	**PO5, PO8**		

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	**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

	such as celiac disease and autoimmune conditions.			
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 epidemiological methods such as case-control and cohort studies.	**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
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, Guest lecture, Workshops	Internal Assessment, University Exam, Theory exam, Assignment, Seminar, Poster presentation.
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
DSE 001 T	**Nutrigenomics**	**Mapped POs**	**Teaching-Learning Methodologies**	**Assessment Tools**
CO1	**Understand Molecular Biology:** Grasp gene structure, DNA processes (replication, transcription, translation), RNA functions, and gene regulation mechanisms.	**PO1, PO2, PO3**	Lecture, Assignment, Seminar, Videos	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO2	**Learn Tools and Techniques:** Apply molecular techniques like PCR, sequencing, microarrays, and data mining for genetic research.	**PO1, PO2, PO3**	Lecture, Group Discussion, Assignment, Seminar, Guest Lecture, Videos	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO3	**Explore Foods and Genes:** Understand how nutrients regulate gene expression and influence health, including the genetic impact of bioactive foods, vitamins, minerals, and antioxidants.	**PO1, PO2, PO3**	Lecture, Group Discussion, Assignment, Seminar, Guest Lecture, Videos	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO4	**Identify Health Biomarkers:** Study genetic markers for disease prediction, metabolic dysfunction, and inflammation, using case	**PO1, PO2, PO3, PO8**	Lecture, Group Discussion, Assignment, Seminar, Guest Lecture, Videos	Internal Assessment, University Exam, Theory exam, Assignment, Seminar

	studies like IGF rs680 polymorphisms.			
CO5	**Apply Gene Approaches to Diseases:** Investigate gene-nutrient interactions in conditions like obesity, cardiovascular diseases, and cancer, and understand their role in disease prevention and treatment.	**PO1, PO2, PO3, PO8**	Lecture, Group Discussion, Assignment, Seminar, Guest Lecture, Videos	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO6	**Engage in Personalized Medicine:** Learn how genetic counseling, clinical trials, and personalized nutrition can promote health and wellness.	**PO1, PO2, PO3, PO8**	Lecture, Group Discussion, Assignment, Seminar, Guest Lecture, Videos	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
DSE 002 T	**Nutraceuticals & Drug Nutrient Interaction**	**Mapped POs**	**Teaching-Learning Methodologies**	**Assessment Tools**
CO1	**Understand Nutraceuticals:** Learn definitions, classifications, approval processes, and pharmacokinetics of nutraceuticals.	**PO1, PO2**	Lecture, Group Discussion, Assignment, Seminar, Videos	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO2	**Analyze Bioactive Components:** Study the health benefits and effects of components like polyphenols, phytosterols, and prebiotics in functional foods.	**PO1, PO2**	Lecture, Group Discussion, Assignment, Seminar, Guest Lecture, Videos	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO3	**Explore Drug-Nutrient Interactions:** Understand mechanisms and effects of drug-nutrient interactions.	**PO1, PO2**	Lecture, Group Discussion, Assignment, Seminar, Guest Lecture, Videos	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO4	**Impact of Pharmaceuticals on Nutrition:** Assess how drugs like antihypertensives, antiepileptics, and hormones influence nutritional status.	**PO1, PO2, PO3, PO8**	Lecture, Group Discussion, Assignment, Seminar, Guest Lecture, Videos	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO5	**Drug-Nutrient Interactions in Health Conditions:** Examine interactions in cancer, infections, transplants, and immune function.	**PO1, PO2, PO3, PO8**	Lecture, Group Discussion, Assignment, Seminar, Guest Lecture, Videos	Internal Assessment, University Exam, Theory exam, Assignment, Seminar
CO6	**Special Nutrition Support:** Understand interactions in enteral and parenteral nutrition, and the role of probiotics and functional foods.	**PO1, PO2, PO3, PO8**	Lecture, Group Discussion, Assignment, Seminar, Guest Lecture, Videos	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
Discipiline 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**
Discipiline 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**

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
Discipiline 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**
Discipiline 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**
Discipline Specific Elective														
DSE 001 T	Nutrigenomics	2	-	-	-	**2**	30	-	-	-	**30**	-	**50**	**50**
DSE 002 T	Nutraceuticals & Drug Nutrient Interaction													
Total		**12**	**0**	**8**	**15**	**21**	**180**	**0**	**120**	**225**	**525**	**100**	**500**	**600**