PROGRAM OUTCOME (POs)	
Course Code	**M.Sc. CLINICAL NUTRITION**
PO1	**Advanced Knowledge and Understanding:** 1. Develop in-depth knowledge of clinical nutrition and dietetics, including the physiological, biochemical, and metabolic processes. 2.Understand the role of nutrition in disease prevention, management, and treatment, with a focus on medical nutrition therapy. 3. Stay informed the latest advancements in nutrition science and technology.
PO2	**Clinical Competency and Patient Care:** 1. Equip students with the skills to assess nutritional needs, create personalized nutrition plans, and monitor patient progress. 2. Gain proficiency in counseling patients and families about healthy eating, lifestyle modifications, and therapeutic diets. 3.Demonstrate the ability to apply nutritional science to clinical settings, including hospitals, rehabilitation centers, and community health organizations.
PO3	**Research and Evidence-Based Practice:** 1. Foster the ability to conduct independent research in clinical nutrition, contributing to new insights in the field. 2. Promote a scientific, evidence-based approach to nutrition interventions and patient care.
PO4	**Interdisciplinary Collaboration:** 1. Develop skills for working in collaborative healthcare teams, integrating the expertise of medical doctors, dietitians, and other healthcare professionals. 2. Communicate effectively with colleagues and patients from diverse backgrounds, ensuring inclusive and culturally competent care.
PO5	**Ethics and Professionalism:** 1. Instil high ethical standards in clinical practice, including patient confidentiality, informed consent, and professional integrity. 2. Embrace professional conduct and responsibility in all aspects of the clinical nutrition profession.
PO6	**Public Health and Nutrition Advocacy:** 1. Promote public health nutrition through education, advocacy, and community programs. 2. Understand and address public health challenges, such as malnutrition, obesity, and chronic diseases, through nutrition interventions. 3. Engage in nutrition policy-making and advocacy for better health outcomes on a population level.
PO 7	**Sustainability and Environmental Impact:** 1.Understand the importance of sustainable food systems and their impact on health and the environment.
PO8	**Lifelong Learning and Professional Development:** 1. Encourage continuous learning and professional growth through certifications, workshops, and seminars. 2. Stay updated with the latest trends and innovations in the nutrition field to adapt to evolving healthcare needs.
Course Outcomes (COs)	
Course Code	**M.Sc. CLINICAL NUTRITION**
SEMESTER I	
MCN 101 T	**Fundamentals of Nutrition**
CO1	Discuss the role of nutrients in human health and their contribution to preventing or managing certain disorders.
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.
MCN 102 T	**Nutritional Biochemistry**
CO1	Outline the structure and function of the biomolecules found in all living organisms
CO2	Describe the circulatory system, cardiac cycle, and conditions like hypertension and heart failure.
CO3	Explain respiratory system functions, breathing mechanisms, and related abnormalities.
CO4	Comprehend renal system functions, urine formation, and dialysis principles.
CO5	Understand the structure and function of the nervous system, including the blood-brain barrier.
CO6	Analyze the digestive system, digestion, absorption, and gastrointestinal hormone functions.
CO7	Study musculoskeletal system functions, muscle contraction, and nerve impulse conduction.
CO8	Understand the endocrine system’s glands, their regulation, and related disorders.
CO9	Interpret blood composition, blood cell formation, coagulation, and blood groups.

MCN 103 T	**Human Physiology**
CO1	Understand body systems: Gain knowledge of the structure and function of systems like circulatory, respiratory, renal, digestive, musculoskeletal, nervous, and endocrine systems.
CO2	Analyze physiological processes: Learn key processes such as membrane transport, cardiac cycle, respiration, urine formation, muscle contraction, and digestion.
CO3	Study special systems: Explore the functioning and disorders of the cardiovascular, respiratory, renal, and gastrointestinal systems, including blood pressure, ECG, and respiratory issues.
CO4	Comprehend endocrine and hematology: Understand the regulation and disorders of major glands (pituitary, thyroid, adrenal, pancreas) and blood functions like coagulation and anemia.
CO5	Integrate with clinical nutrition: Relate physiological knowledge to clinical nutrition, focusing on the connection between nutrition and health.
CO6	Enhance clinical application: Develop critical thinking skills to apply physiological knowledge in clinical nutrition practice and disease management.
CC 001 T	**Research Methodology & Biostatistics (Core Core)**
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.
MCN 106 CP	**MCN Directed Clinical Education - I**
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.
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.
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.
SEMESTER II	
MCN 107 T	**Medical Nutrition Theraoy - I**
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.
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.
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.
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.
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.
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.
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.
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.
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.
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.
MCN 108 T	**Community and Public Health Nutrition**
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.
CO2	Assess nutritional status at individual and community levels using methods like anthropometry, biochemical, clinical, and dietary assessments.

CO3	Apply nutrition standards for growth monitoring in children and assess nutritional status in adults using WHO standards.
CO4	Understand and analyze food and nutrition security, including its dimensions and relevant policies in India, such as NFSA and the Public Distribution System.
CO5	Identify and address nutritional problems such as nutrient deficiencies, obesity, chronic diseases, and malnutrition, with an emphasis on integrated solutions and interventions.
CO6	Plan, execute, and evaluate nutrition education programs for communities, utilizing appropriate tools and overcoming implementation challenges.
CO7	Understand health and nutrition administration in India, including welfare programs, government policies, and the role of global health agencies like UNICEF and WHO.
MCN 109 T	**Food Microbiology**
CO1	Understand the basics of food microbiology, including microbial growth and factors affecting it.
CO2	Identify and describe microorganisms (molds, bacteria, yeasts, viruses) in food and their role in spoilage and foodborne diseases.
CO3	Recognize biochemical changes caused by microbes in food.
CO4	Analyze microbial contamination and spoilage in various food types.
CO5	Understand foodborne diseases, pathogens, and their detection methods.
CO6	Learn about microbial toxins and their health impacts.
CO7	Explore methods for controlling microorganisms in food, including preservation and novel processing technologies.
CO8	Understand food sanitation, including water quality, sewage treatment, and food safety standards like GMP and HACCP.
CO9	Apply microbiological criteria for food safety and understand the role of control agencies in ensuring food safety.
MCN 110 T	**Nutrition Through Lifecycle**
CO1	Understand nutritional requirements across the life cycle, from pregnancy to geriatrics.
CO2	Assess the impact of physiological and psychosocial changes on nutrition at each life stage.
CO3	Identify and manage nutrition-related challenges, such as high-risk pregnancies, childhood obesity, and aging-related issues.
CO4	Apply growth monitoring techniques and design dietary interventions for different age groups.
CO5	Address specific nutritional issues like breastfeeding, weaning, and adolescent eating disorders.
CO6	Develop nutrition plans for preventing and managing health problems, including chronic diseases in the elderly.
MCN 113 CP	**MCN Directed Clinical Education - II**
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.
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.
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.
SKILL EHANCEMENT COURSES	
SEC 001 T	**Nutrition for Emergencies**
CO1	Distinguish between natural and manmade disasters, and comprehend their impact on public health and nutrition
CO2	Demonstrate knowledge of nutrition management during emergencies, including immediate rescue, first aid, and physiological support
CO3	Organize and implement nutritional assessments and individual screenings in disaster-affected populations.
CO4	Develop and manage supplementary and therapeutic feeding interventions tailored to emergency contexts.
CO5	Assess food needs, design effective food supply chains, and ensure equitable distribution to vulnerable groups.
CO6	Utilize local food resources, manage feeding centers, and ensure proper food storage and transportation.
CO7	Promote safe water supply, sanitation, and hygiene to prevent disease outbreaks during and after disasters
CO8	Recognize major and specific nutrient deficiencies common in emergencies and apply appropriate dietary and medical treatments.
CO9	Evaluate the impact of global warming and other factors on food security, particularly in the Indian context
CO10	Advocate for immunization, communicable disease control, and long-term nutritional rehabilitation in post-disaster settings

SEC 002 T	Maternal Infant Young Child Nutrition (NPTEL)
CO1	Understand the maternal and child health landscape in India
CO2	Differentiate between Type 1 and Type 2 nutrients, and understand the role of key micronutrients like omega-3, folate, and vitamin B12 in maternal and child health.
CO3	Examine the causes and effects of nutrient deficiencies, assess the impact of junk food, and suggest nutrient-rich dietary alternatives
CO4	Outline essential nutrition actions for pregnant women and young children, and recommend appropriate dietary interventions during this window
CO5	Demonstrate breastfeeding techniques including cross cradle hold and address common lactation challenges through visual aids and counseling points.
CO6	Explain the golden hour of breastfeeding, benefits over substitutes, and legal protections for breastfeeding in India.
CO7	Apply techniques like Football, Cradle, Sidelying, and Laid-Back Holds, and assess feeding practices using standardized forms.
CO8	Ensure proper newborn care and promote Kangaroo Mother Care (KMC)
CO9	Create age-appropriate, nutritious recipes from 6 to 24 months, emphasize hygiene in food handling, and troubleshoot feeding challenges.
CO10	Design targeted diet plans for women across reproductive stages and for adolescent girls, including vegetarian and non-vegetarian options.
CO11	Interpret WHO growth charts, use Z-score and percentile methods, and conduct accurate anthropometric assessments.

MGM SCHOOL OF BIOMEDICAL SCIENCES, NAVI MUMBAI

(A constituent unit of MGM INSTITUTE OF HEALTH SCIENCES)
(Deemed University u/s 3 of UGC Act 1956)
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CO PO Mapping
Programe - M.Sc. Clinical Nutrition
Semester I and II

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.
PO7	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.

PO Mapping same with correlation level 3,2,1 The notation of 1 - low, 2 - moderate , 3 - high

Semester	Course / Course Code	Course Outcome	Course Outcome	Advanced Knowledge and Understanding	Clinical Competency and Patient Care	Research and Evidence-Based Practice	Interdisciplinary Collaboration	Ethics and Professionalism	Public Health and Nutrition Advocacy	Sustainability and Environmental Impact	Lifelong Learning and Professional Development	Average
				PO1	P02	PO3	PO4	PO5	PO6	PO7	PO8	
Semester 1	Fundamentals of Nutrition (MCN 101 T	CO1	Discuss the role of nutrients in human health and their contribution to preventing or managing certain disorders.	3	3	1	0	0	1	1	1	1.3
		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.	3	3	1	0	0	1	1	3	1.3
		Average		3.0	3.0	1.0	0.0	0.0	1.0	1.0	2.0	1.3
	Nutritional Biochemistry (MCN 102 T)	CO1	Outline the structure and function of the biomolecules found in all living organisms	3	3	2	1	0	2	0	2	1.6
		CO2	Describe the circulatory system, cardiac cycle, and conditions like hypertension and heart failure.	3	3	2	1	0	2	0	2	1.6
		CO3	Explain respiratory system functions, breathing mechanisms, and related abnormalities.	3	3	2	1	0	2	0	2	1.6
		CO4	Comprehend renal system functions, urine formation, and dialysis principles.	3	3	2	1	0	2	0	2	1.6
		CO5	Understand the structure and function of the nervous system, including the blood-brain barrier.	3	3	2	1	0	2	0	2	1.6
		CO6	Analyze the digestive system, digestion, absorption, and gastrointestinal hormone functions.	3	3	2	1	0	2	0	2	1.6

		CO7	Study musculoskeletal system functions, muscle contraction, and nerve impulse conduction.	3	3	2	1	0	2	0	2	1.6
		CO8	Understand the endocrine system's glands, their regulation, and related disorders.	3	3	2	1	0	2	0	2	1.6
		CO9	Interpret blood composition, blood cell formation, coagulation, and blood groups.	3	3	2	1	0	2	0	2	1.6
		Average		3	3	2	1	0	2	0	2	1.6
	Human Physiology (MCN 103 T)	CO1	Understand body systems: Gain knowledge of the structure and function of systems like circulatory, respiratory, renal, digestive, musculoskeletal, nervous, and endocrine systems.	3	3	2	1	0	2	0	2	1.6
		CO2	Analyze physiological processes: Learn key processes such as membrane transport, cardiac cycle, respiration, urine formation, muscle contraction, and digestion.	3	3	2	1	0	2	0	2	1.6
		CO3	Study special systems: Explore the functioning and disorders of the cardiovascular, respiratory, renal, and gastrointestinal systems, including blood pressure, ECG, and respiratory issues.	3	3	2	1	0	2	0	2	1.6
		CO4	Comprehend endocrine and hematology: Understand the regulation and disorders of major glands (pituitary, thyroid, adrenal, pancreas) and blood functions like coagulation and anemia.	3	3	2	1	0	2	0	2	1.6
		CO5	Integrate with clinical nutrition: Relate physiological knowledge to clinical nutrition, focusing on the connection between nutrition and health.	3	3	2	1	0	2	0	2	1.6
		CO6	Enhance clinical application: Develop critical thinking skills to apply physiological knowledge in clinical nutrition practice and disease management.	3	3	2	1	0	2	0	2	1.6
		Average		3	3.0	2.0	1	0	2	0	2.0	1.6
	Research Methodology & Biostatistics (Core Course) (CC 001 T)	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.	1	0	3	2	1	0	0	1	1.0
		Average		1	0	3	2.0	1	0	0	1.0	1.0
Semester 2	**Medical Nutrition therapy -I (MCN 107 T)**	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.	3	3	1	3	3	2	1	2	2.3
		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.	3	3	3	3	1	2	1	2	2.3
		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.	3	3	3	3	1	2	1	2	2.3
		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.	3	3	3	3	1	2	1	2	2.3
		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.	3	3	3	3	1	2	1	2	2.3
		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.	3	3	3	3	1	2	1	2	2.3
		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.	3	3	3	3	1	2	1	2	2.3
		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.	3	3	3	3	1	2	1	2	2.3
		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.	3	3	3	3	1	2	1	2	2.3
		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.	3	3	3	3	1	2	1	2	2.3
		Average		3.0	3.0	2.8	3.0	1.2	2.0	1.0	2.0	2.3

Community and Public Health Nutrition (MCN 108 T)	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.	3	2	3	1	3	3	1	2	2.3
	CO2	Assess nutritional status at individual and community levels using methods like anthropometry, biochemical, clinical, and dietary assessments.	3	2	3	1	3	3	1	2	2.3
	CO3	Apply nutrition standards for growth monitoring in children and assess nutritional status in adults using WHO standards.	3	2	3	1	3	3	1	2	2.3
	CO4	Understand and analyze food and nutrition security, including its dimensions and relevant policies in India, such as NFSA and the Public Distribution System.	3	2	3	1	3	3	3	2	2.5
	CO5	Identify and address nutritional problems such as nutrient deficiencies, obesity, chronic diseases, and malnutrition, with an emphasis on integrated solutions and interventions.	3	2	3	1	3	3	3	2	2.5
	CO6	Plan, execute, and evaluate nutrition education programs for communities, utilizing appropriate tools and overcoming implementation challenges.	3	2	3	1	3	3	3	2	2.5
	CO7	Understand health and nutrition administration in India, including welfare programs, government policies, and the role of global health agencies like UNICEF and WHO.	3	2	3	1	3	3	1	2	2.3
	Average		3.0	2.0	3.0	1.0	3.0	3.0	1.8	2.0	2.4
Food Microbiology (MCN 109 T)	CO1	Understand the basics of food microbiology, including microbial growth and factors affecting it.	3	1	1	1	0	2	1	2	1.4
	CO2	Identify and describe microorganisms (molds, bacteria, yeasts, viruses) in food and their role in spoilage and foodborne diseases.	3	1	1	1	0	2	1	2	1.4
	CO3	Recognize biochemical changes caused by microbes in food.	3	1	1	1	0	2	1	2	1.4
	CO4	Analyze microbial contamination and spoilage in various food types.	3	1	1	1	0	2	1	2	1.4
	CO5	Understand foodborne diseases, pathogens, and their detection methods.	3	1	1	1	0	2	1	2	1.4
	CO6	Learn about microbial toxins and their health impacts.	3	1	1	1	0	2	1	2	1.4
	CO7	Explore methods for controlling microorganisms in food, including preservation and novel processing technologies.	3	1	1	1	0	2	3	2	1.6
	CO8	Understand food sanitation, including water quality, sewage treatment, and food safety standards like GMP and HACCP.	3	1	1	1	0	2	3	2	1.6
	CO9	Apply microbiological criteria for food safety and understand the role of control agencies in ensuring food safety.	3	1	1	1	0	2	3	2	1.6
	Average		3	1	1	1	0	2	1.7	2	1.5
Nutrition Through Life Cycle (MCN 110 T)	CO1	Understand nutritional requirements across the life cycle, from pregnancy to geriatrics.	3	3	2	2	1	2	1	2	2.0
	CO2	Assess the impact of physiological and psychosocial changes on nutrition at each life stage.	3	3	2	2	1	2	1	2	2.0
	CO3	Identify and manage nutrition-related challenges, such as high-risk pregnancies, childhood obesity, and aging-related issues.	3	3	2	2	1	3	1	2	2.1
	CO4	Apply growth monitoring techniques and design dietary interventions for different age groups.	3	3	2	2	1	2	1	2	2.0
	CO5	Address specific nutritional issues like breastfeeding, weaning, and adolescent eating disorders.	3	3	2	2	1	3	1	2	2.1
	CO6	Develop nutrition plans for preventing and managing health problems, including chronic diseases in the elderly.	3	3	2	2	1	3	1	2	2.1
	Average		3	3.0	2.0	2	1	2.5	1	2	2.1
Nutrition for Emergencies (SEC 001 T)	CO1	Distinguish between natural and manmade disasters, and comprehend their impact on public health and nutrition	3	0	1	0	0	2	2	1	1.1
	CO2	Demonstrate knowledge of nutrition management during emergencies, including immediate rescue, first aid, and physiological support	3	3	1	2	1	3	2	2	2.1
	CO3	Organize and implement nutritional assessments and individual screenings in disaster-affected populations.	3	3	1	1	2	2	2	2	2.0
	CO4	Develop and manage supplementary and therapeutic feeding interventions tailored to emergency contexts.	3	3	3	1	1	3	3	3	2.5
	CO5	Assess food needs, design effective food supply chains, and ensure equitable distribution to vulnerable groups.	2	2	2	2	2	2	2	2	2.0
	CO6	Utilize local food resources, manage feeding centers, and ensure proper food storage and transportation.	2	2	2	2	2	3	3	3	2.4
	CO7	Promote safe water supply, sanitation, and hygiene to prevent disease outbreaks during and after disasters	3	3	2	2	1	3	3	3	2.5
	CO8	Recognize major and specific nutrient deficiencies common in emergencies and apply appropriate dietary and medical treatments.	3	3	2	1	1	3	3	3	2.4
	CO9	Evaluate the impact of global warming and other factors on food security, particularly in the Indian context	3	3	2	1	1	3	2	2	2.1
	CO10	Advocate for immunization, communicable disease control, and long-term nutritional rehabilitation in post-disaster settings	3	2	2	2	1	3	2	2	2.1
	Average		2.8	2.4	1.8	1.4	1.2	2.7	2.4	2.3	2.1

	Maternal Infant Young Child Nutrition (NPTEL) (SEC 002 T)	CO1	Understand the maternal and child health landscape in India	3	3	1	0	0	2	2	2	1.6
		CO2	Differentiate between Type 1 and Type 2 nutrients, and understand the role of key micronutrients like omega-3, folate, and vitamin B12 in maternal and child health.	3	3	1	0	0	1	2	2	1.5
		CO3	Examine the causes and effects of nutrient deficiencies, assess the impact of junk food, and suggest nutrient-rich dietary alternatives	3	3	1	3	1	2	1	3	2.1
		CO4	Outline essential nutrition actions for pregnant women and young children, and recommend appropriate dietary interventions during this window	3	3	1	2	1	3	3	3	2.4
		CO5	Demonstrate breastfeeding techniques including cross cradle hold and address common lactation challenges through visual aids and counseling points.	3	3	2	0	2	3	3	3	2.4
		CO6	Explain the golden hour of breastfeeding, benefits over substitutes, and legal protections for breastfeeding in India.	3	2	0	0	0	1	1	2	1.1
		CO7	Apply techniques like Football, Cradle, Sidelying, and Laid-Back Holds, and assess feeding practices using standardized forms.	3	2	0	0	0	1	1	3	1.3
		CO8	Ensure proper newborn care and promote Kangaroo Mother Care (KMC)	3	3	1	1	1	3	2	3	2.1
		CO9	Create age-appropriate, nutritious recipes from 6 to 24 months, emphasize hygiene in food handling, and troubleshoot feeding challenges.	3	3	3	2	1	3	3	2	2.5
		CO10	Design targeted diet plans for women across reproductive stages and for adolescent girls, including vegetarian and non-vegetarian options.	3	3	2	2	1	3	3	2	2.4
		CO11	Interpret WHO growth charts, use Z-score and percentile methods, and conduct accurate anthropometric assessments.	3	3	2	1	2	3	1	3	2.3
		Average		3.0	2.8	1.3	1.0	0.8	2.3	2.0	2.5	2.0

PROGRAM OUTCOME (POs)	
Course Code	**M.Sc. CLINICAL NUTRITION**
PO1	**Advanced Knowledge and Understanding:** 1. Develop in-depth knowledge of clinical nutrition and dietetics, including the physiological, biochemical, and metabolic processes. 2.Understand the role of nutrition in disease prevention, management, and treatment, with a focus on medical nutrition therapy. 3. Stay informed the latest advancements in nutrition science and technology.
PO2	**Clinical Competency and Patient Care:** 1. Equip students with the skills to assess nutritional needs, create personalized nutrition plans, and monitor patient progress. 2. Gain proficiency in counseling patients and families about healthy eating, lifestyle modifications, and therapeutic diets. 3.Demonstrate the ability to apply nutritional science to clinical settings, including hospitals, rehabilitation centers, and community health organizations.
PO3	**Research and Evidence-Based Practice:** 1. Foster the ability to conduct independent research in clinical nutrition, contributing to new insights in the field. 2. Promote a scientific, evidence-based approach to nutrition interventions and patient care.
PO4	**Interdisciplinary Collaboration:** 1. Develop skills for working in collaborative healthcare teams, integrating the expertise of medical doctors, dietitians, and other healthcare professionals. 2. Communicate effectively with colleagues and patients from diverse backgrounds, ensuring inclusive and culturally competent care.
PO5	**Ethics and Professionalism:** 1. Instil high ethical standards in clinical practice, including patient confidentiality, informed consent, and professional integrity. 2. Embrace professional conduct and responsibility in all aspects of the clinical nutrition profession.
PO6	**Public Health and Nutrition Advocacy:** 1. Promote public health nutrition through education, advocacy, and community programs. 2. Understand and address public health challenges, such as malnutrition, obesity, and chronic diseases, through nutrition interventions. 3. Engage in nutrition policy-making and advocacy for better health outcomes on a population level.
PO 7	**Sustainability and Environmental Impact:** 1.Understand the importance of sustainable food systems and their impact on health and the environment.
PO8	**Lifelong Learning and Professional Development:** 1. Encourage continuous learning and professional growth through certifications, workshops, and seminars. 2. Stay updated with the latest trends and innovations in the nutrition field to adapt to evolving healthcare needs.
Course Outcomes (COs)	
Course Code	**M.Sc. CLINICAL NUTRITION**
	SEMESTER III
MCN 114 T	**Medical Nutrition Therapy II**
CO1	**Explain** the pathophysiology, etiology, and nutritional management of diabetes and its complications.
CO2	**Analyze** renal diseases and **formulate** appropriate dietary plans considering metabolic and nutritional implications.
CO3	**Evaluate** coronary heart diseases and **design** nutrition interventions for conditions such as dyslipidemia, hypertension, and myocardial infarction.
CO4	**Discuss** neurological disorders and **assess** nutritional strategies to support cognitive and neuromuscular health.
CO5	**Apply** principles of nutrition support in stress conditions like trauma, burns, and post-surgical recovery.
CO6	**Interpret** cancer pathogenesis, side effects of therapy, and **formulate** individualized dietary management plans.
MCN 115 T	**Health & Fitness**
CO1	**Explain** the role of nutrition in sports and exercise, including energy balance and fluid requirements.
CO2	**Evaluate** carbohydrate metabolism during different types of physical activity and **apply** carbohydrate loading strategies.
CO3	**Describe** fat metabolism in relation to sports performance and its modulation by diet and training.
CO4	**Assess** protein and amino acid requirements for different exercise regimens and recovery.
CO5	**Identify** key micronutrients in exercise performance and **recommend** antioxidant strategies.

CO6	**Examine** lifestyle factors affecting physical fitness, including substance abuse and sleep disorders.
MCN 116 T	**Hospital Food Service Management**
CO1	**Explain** the principles of food service management in hospital and healthcare settings.
CO2	**Apply** menu planning and production techniques for diverse patient populations.
CO3	**Demonstrate** skills in organizing staff, workflow, and resources within a hospital food service unit.
CO4	**Analyze** hospital dietary operations with respect to hygiene, quality control, and food safety.
CO5	**Evaluate** financial management, budgeting, and cost-control practices in hospital dietary services.
CO6	**Design and manage** food service systems tailored to patient needs and institutional policies.
MCN 117	**Research Project/ Dissertation**
CO1	**Formulate** a research question and **develop** a relevant study design in the field of clinical nutrition.
CO2	**Collect, analyze,** and **interpret** research data using appropriate statistical tools.
CO3	**Review** and **synthesize** scientific literature to support the research work**.**
CO4	**Present** research findings in written and oral formats adhering to scientific guidelines**.**
CO5	**Demonstrate** ethical conduct and academic integrity in research work.
MCN 118 P	**Medical Nutrition Therapy II**
CO1	**Plan** and **prepare** diet charts for different types of diabetes considering comorbidities.
CO2	**Design** renal diets for specific conditions such as acute kidney injury, chronic kidney disease, and renal calculi.
CO3	**Formulate** dietary modifications for cardiovascular disorders based on clinical parameters.
CO4	**Prepare** diet plans for various liver disorders ensuring nutritional adequacy and patient compliance.
CO5	**Develop** appropriate nutritional strategies for neurological disorders.
CO6	**Formulate** pre- and post-operative nutrition plans for patients undergoing surgery, burns, or trauma recovery.
MCN 119 P	**Health & Fitness**
CO1	**Conduct** health screening and risk stratification for different populations.
CO2	**Perform** and **interpret** cardio-respiratory fitness and musculoskeletal fitness
CO3	**Evaluate** physical fitness levels of various age groups through case studies.
CO4	**Conduct** market survey and **evaluate** sports nutrition supplements.
CO5	**Formulate** diet plans for athletes in different sports

CO6	**Present** case studies on diet and training schedules of competitive endurance athletes.
MCN 120 CP	**MCN Directed Clinical Education – III**
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.
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.
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.
	SEMESTER IV
MCN 121 T	**Precision Nutrition (Nutrigenomics) and Intellectual Property Rights**
CO1	Explain the fundamental concepts of molecular biology and their application in nutritional genetics and genomics.
CO2	Analyze the influence of genetics, environment, and gene–nutrient interactions in precision medicine.
CO3	Evaluate health biomarkers and genetic risk factors associated with nutrition-related diseases.
CO4	Interpret the role of nutrients, bioactive components, and gene expression in chronic diseases.
CO5	Assess the interrelationship between gene expression and gut microbiota in health and disease.
CO6	Apply concepts of Intellectual Property Rights (IPR) in nutrigenomics research and practice.
MCN 122 P	**Internship/Training**
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.
CO2	Utilize skills in record keeping, organizing material, presentation of case studies, and effective communication.
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.
CO4	Design, evaluate, and implement new methods or protocols in different cases.
CO5	Evaluate the relationship between nutrition data and pathologic processes, and how nutrition data relates to health and disease.
CO6	Develop the ability to work independently and as a team member to perform critical thinking and problem-solving skills in different domains.
MCN 117	**Research Project/ Dissertation**
CO1	**Formulate** a research question and **develop** a relevant study design in the field of clinical nutrition.
CO2	**Collect, analyze,** and **interpret** research data using appropriate statistical tools.
CO3	**Review** and **synthesize** scientific literature to support the research work**.**
CO4	**Present** research findings in written and oral formats adhering to scientific guidelines**.**
CO5	**Demonstrate** ethical conduct and academic integrity in research work.

MGM SCHOOL OF BIOMEDICAL SCIENCES, NAVI MUMBAI
(A constituent unit of MGM INSTITUTE OF HEALTH SCIENCES)
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CO PO Mapping
Programe - M.Sc. Clinical Nutrition
Semester III and IV

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.
PO7	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.

PO Mapping same with correlation level 3,2,1 The notation of 1 - low, 2 - moderate , 3 - high

Semester	Course / Course Code	Course Outcome	Course Outcome	Advanced Knowledge and Understanding	Clinical Competency and Patient Care	Research and Evidence-Based Practice	Interdisciplinary Collaboration	Ethics and Professionalism	Public Health and Nutrition Advocacy	Sustainability and Environmental Impact	Lifelong Learning and Professional Development	Average
				PO1	P02	PO3	PO4	PO5	PO6	PO7	PO8	
	Medical Nutrition Therapy II (MCN 114 T)	CO1	Explain the pathophysiology, etiology, and nutritional management of diabetes and its complications.	3	3	0	0	0	2	0	0	1.1
		CO2	Analyze renal diseases and formulate appropriate dietary plans considering metabolic and nutritional implications.	3	3	2	0	0	0	0	0	1
		CO3	Evaluate coronary heart diseases and design nutrition interventions for conditions such as dyslipidemia, hypertension, and myocardial infarction.	3	3	2	0	0	2	0	0	1.3
		CO4	Discuss neurological disorders and assess nutritional strategies to support cognitive and neuromuscular health.	3	3	0	0	0	0	0	0	0.8
		CO5	Apply principles of nutrition support in stress conditions like trauma, burns, and post-surgical recovery.	3	3	2	0	0	0	0	0	1
		CO6	Interpret cancer pathogenesis, side effects of therapy, and formulate individualized dietary management plans.	3	3	0	0	0	2	0	0	1
		Average		3	3	1	0	0	1	0	0	1
	Health & Fitness	CO1	Explain the role of nutrition in sports and exercise, including energy balance and fluid requirements.	3	3	0	0	0	2	0	0	1
		CO2	Evaluate carbohydrate metabolism during different types of physical activity and apply carbohydrate loading strategies.	3	3	0	0	0	0	0	2	1
		CO3	Describe fat metabolism in relation to sports performance and its modulation by diet and training	3	3	0	0	0	0	0	0	0.8

	Health & Fitness (MCN 115 T)	CO4	Assess protein and amino acid requirements for different exercise regimens and recovery	3	3	0	0	0	0	0	0	0	0.8
		CO5	Identify key micronutrients in exercise performance and recommend antioxidant strategies.	3	3	0	2	0	0	0	0	0	1
		CO6	Examine lifestyle factors affecting physical fitness, including substance abuse and sleep disorders.	3	3	0	0	0	2	0	0	0	1
		Average		3	3	0	0.3	0	0.7	0	0.3	1	
	Hospital Food Service Management (MCN 116 T)	CO1	Explain the principles of food service management in hospital and healthcare settings.	3	3	0	2	0	0	0	0	0	1
		CO2	Apply menu planning and production techniques for diverse patient populations	3	3	0	0	0	2	0	0	0	1
		CO3	Demonstrate skills in organizing staff, workflow, and resources within a hospital food service unit.	0	3	0	2	2	0	0	0	0	0.9
		CO4	Analyze hospital dietary operations with respect to hygiene, quality control, and food safety	3	3	0	0	2	2	0	0	0	1.3
		CO5	Evaluate financial management, budgeting, and cost-control practices in hospital dietary services.	3	3	2	0	2	0	0	0	0	1.3
		CO6	Design and manage food service systems tailored to patient needs and institutional policies.	3	3	0	2	0	2	2	0	0	1.5
		Average		2.5	3	0.3	1	1	1	0.3	0	0	1.1
	Research Project/Dissertation (MCN 117)	CO1	Formulate a research question and develop a relevant study design in the field of clinical nutrition.	0	0	3	0	0	0	0	2	0	1.3
		CO2	Collect, analyze, and interpret research data using appropriate statistical tools	0	0	3	0	0	0	0	2	0	1.3
		CO3	Review and synthesize scientific literature to support the research work.	0	0	3	0	0	0	0	2	0	1.3
		CO4	Present research findings in written and oral formats adhering to scientific guidelines.	0	0	3	2	0	0	0	2	0	1.4
		CO5	Demonstrate ethical conduct and academic integrity in research work.	0	0	0	0	3	0	0	2	0	0.6
		Average		0	0	2.4	0.4	0.6	0	0	2	0	0.9
	Medical Nutrition Therapy II (MCN 118 P)	CO1	**Plan** and **prepare** diet charts for different types of diabetes considering comorbidities.	3	3	2	0	0	0	0	0	0	1.0
		CO2	Design renal diets for specific conditions such as acute kidney injury, chronic kidney disease, and renal calculi	3	3	2	0	0	0	0	0	0	1.0
		CO3	Formulate dietary modifications for cardiovascular disorders based on clinical parameters.	3	3	3	0	0	2	0	0	0	1.4
		CO4	Prepare diet plans for various liver disorders ensuring nutritional adequacy and patient compliance.	2	3	3	0	0	0	2	0	0	1.3
		CO5	Develop appropriate nutritional strategies for neurological disorders.	3	2	2	0	0	0	0	0	0	0.9
		CO6	Formulate pre- and post-operative nutrition plans for patients undergoing surgery, burns, or trauma recovery.	2	3	2	0	0	0	0	0	0	0.9
		Average		2.7	2.8	2.3	0.0	0.0	0.3	0.3	0.0	0	1.1
	Health & Fitness (MCN 119 P)	CO1	**Conduct** health screening and risk stratification for different populations.	0	3	0	2	3	0	0	0	0	1.0
		CO2	Perform and interpret cardio-respiratory fitness and musculoskeletal fitness	0	3	2	0	2	0	0	0	0	0.9
		CO3	Evaluate physical fitness levels of various age groups through case studies.	0	3	0	0	0	3	0	0	0	0.8
		CO4	Conduct market survey and evaluate sports nutrition supplements.	2	2	0	0	2	3	0	0	0	1.1
		CO5	Formulate diet plans for athletes in different sports	2	3	2	0	0	0	0	0	0	0.9
		CO6	Present case studies on diet and training schedules of competitive endurance athletes.	2	3	0	2	0	0	0	0	0	0.9
		Average		1	2.8	0.7	0.7	1.2	1	0	0	0	0.9
	MCN Directed Clinical Education – III MCN 120 CP	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	0	2	0	3	3	0	0	3	0	1.4
		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.	0	3	0	3	3	0	0	3	0	1.5
		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.	0	3	0	3	3	0	0	3	0	1.5
		Average		0.0	2.7	0.0	3.0	3.0	0.0	0.0	3.0	0	1.5
Sem 3		CO1	Explain the fundamental concepts of molecular biology and their application in nutritional genetics and genomics.	3	0	2	0	0	0	0	0	0	1.3

Sem 4	**Precision Nutrition (Nutrigenomics) and Intellectual Property Rights (MCN 121 T)**	CO2	Analyze the influence of genetics, environment, and gene–nutrient interactions in precision medicine.	3	0	2	0	0	2	0	0	1.3
		CO3	Evaluate health biomarkers and genetic risk factors associated with nutrition-related diseases	3	0	2	0	0	2	0	0	1.3
		CO4	Interpret the role of nutrients, bioactive components, and gene expression in chronic diseases.	3	0	2	0	0	2	2	0	1.4
		CO5	Assess the interrelationship between gene expression and gut microbiota in health and disease.	3	0	2	2	0	2	0	0	1.4
		CO6	Apply concepts of Intellectual Property Rights (IPR) in nutrigenomics research and practice.	0	0	0	0	3	0	2	2	0.9
		Average		2.5	0	1.7	0.3	0.5	1.3	0.7	0.3	1.2
	Internship/Training (MCN 122 P)	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.	0	3	0	2	2	0	0	0	0.9
		CO2	Utilize skills in record keeping, organizing material, presentation of case studies, and effective communication.	0	3	0	2	0	0	0	2	0.9
		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.	0	3	2	2	2	0	0	0	1.1
		CO4	Design, evaluate, and implement new methods or protocols in different cases.	3	3	2	0	0	0	0	2	1.3
		CO5	Evaluate the relationship between nutrition data and pathologic processes, and how nutrition data relates to health and disease.	3	3	2	0	0	2	0	0	1.3
		CO6	Develop the ability to work independently and as a team member to perform critical thinking and problem-solving skills in different domains.	0	3	2	2	2	0	0	0	1.1
		Average		1.5	3	1.3	1.3	1	0.3	0	0.7	1.1
	Research Project/Dissertation (MCN 117)	CO1	**Formulate** a research question and **develop** a relevant study design in the field of clinical nutrition.	0	0	3	0	0	0	0	2	1.3
		CO2	**Collect, analyze,** and **interpret** research data using appropriate statistical tools.	0	0	3	0	0	0	0	2	1.3
		CO3	**Review** and **synthesize** scientific literature to support the research work**.**	0	0	3	0	0	0	0	2	1.3
		CO4	**Present** research findings in written and oral formats adhering to scientific guidelines**.**	0	0	3	2	0	0	0	2	1.4
		CO5	**Demonstrate** ethical conduct and academic integrity in research work.	0	0	0	0	3	0	0	2	0.6
		Average		0	0	2.4	0.4	0.6	0	0	2	0.9