M.Sc. in Clinical Nutrition & Dietetics (2 Years, 4 Semesters)

Overview

The M.Sc. in Clinical Nutrition & Dietetics is a specialized postgraduate program designed to provide advanced knowledge and skills in medical nutrition therapy, dietary planning, and disease prevention. This interdisciplinary program integrates aspects of biochemistry, food science, medical nutrition therapy, and public health, preparing graduates for roles in clinical practice, healthcare institutions, research, and the food industry.

With the increasing prevalence of lifestyle-related disorders such as diabetes, obesity, cardiovascular diseases, and malnutrition, there is a growing demand for experts in clinical nutrition and dietetics. The program covers the principles of nutrition assessment, diet therapy, metabolism, food safety, and nutritional counselling, ensuring graduates are well-equipped to provide evidence-based dietary interventions.

Affiliated Institution: School of Medical Sciences and Technology, Malla Reddy Vishwavidyapeeth (Deemed to be University)
Eligibility: A pass in B.Sc. (Nutrition, Dietetics, Food Science, Life Sciences, or related fields) with at least 50% marks in the qualifying examination.

Key Highlights

- **Comprehensive Nutrition Training** – Covers the role of nutrition in health, disease prevention, and medical conditions.
- **Multidisciplinary Approach** – Collaboration with physicians, dietitians, public health experts, and food scientists.
- **Clinical Exposure** – Practical training in hospitals, community health centers, and research institutions.
- **Advanced Nutritional Assessment & Therapy** – Includes diet planning, metabolic analysis, and disease-specific nutrition.
- **Research and Evidence-Based Practice** – Students conduct research in nutrition science, food technology, and dietetics.

Course Curriculum

The program spans two years, comprising theoretical coursework, practical training, clinical internships, and research projects.

Year 1

Core Modules:

- **Principles of Human Nutrition** – Understanding macro and micronutrient metabolism.
- **Nutritional Biochemistry** – Role of nutrients in biochemical pathways and disease prevention.
- **Food Science & Technology** – Processing, preservation, and functional foods.
- **Medical Nutrition Therapy-I** – Dietary management of metabolic disorders such as diabetes, obesity, and cardiovascular diseases.
- **Community Nutrition & Public Health** – Nutritional epidemiology, government policies, and nutrition programs.
- **Nutritional Counseling & Patient Education** – Techniques for behavior modification and therapeutic diet planning.

Clinical Training:

- Hands-on experience in hospitals and clinical settings focusing on nutrition intervention.

Year 2

Advanced Modules:

- **Medical Nutrition Therapy-II** – Dietetic management of renal diseases, gastrointestinal disorders, and critical care nutrition.
- **Pediatric & Geriatric Nutrition** – Special dietary needs of infants, children, and older adults.
- **Sports & Performance Nutrition** – Nutrition for athletes, exercise metabolism, and supplementation.
- **Food Safety & Quality Control** – HACCP principles, food microbiology, and regulations.
- **Research Methodology & Biostatistics in Nutrition** – Conducting nutrition-related research and statistical analysis.
- **Entrepreneurship in Dietetics & Food Industry** – Business aspects of nutrition, product development, and consulting.

Dissertation & Research Project:

- Independent research on clinical nutrition, dietetics, or food science.

Internships & Clinical Practice:

- Specialized training in hospitals, community nutrition programs, and food industries.

Career and Academic Opportunities

Career Opportunities:

- **Clinical Dietitian** – Providing medical nutrition therapy in hospitals and healthcare settings.
- **Nutritionist & Wellness Coach** – Designing dietary plans for individuals and corporate wellness programs.
- **Public Health Nutritionist** – Working in government nutrition programs, NGOs, and global health initiatives.
- **Sports & Performance Dietitian** – Specializing in nutrition for athletes and fitness professionals.
- **Pediatric & Geriatric Dietitian** – Catering to the nutritional needs of children and elderly populations.
- **Researcher in Clinical Nutrition** – Conducting studies on diet-disease relationships and new therapeutic diets.
- **Food Safety & Quality Control Specialist** – Ensuring food safety standards in the industry.
- **Entrepreneur in Nutrition & Dietetics** – Launching diet consulting services, nutrition apps, or functional food products.

Higher Education & Research Prospects:

- **Ph.D. in Nutrition & Dietetics** – Advanced research in metabolic nutrition, dietetics, and food science.
- **Fellowship in Clinical Nutrition** – Specialization in enteral & parenteral nutrition, oncology nutrition, etc.
- **Master of Public Health (MPH) in Nutrition** – Focusing on nutrition policy, epidemiology, and global health.

Labs & Training Facilities

- **Nutritional Biochemistry & Metabolism Lab** – Studying nutrient functions and deficiencies.
- **Clinical Nutrition Assessment Lab** – Body composition analysis, dietary intake assessment.
- **Food Science & Technology Lab** – Processing, sensory evaluation, and fortification techniques.
- **Sports & Performance Nutrition Lab** – Studying energy metabolism and supplement efficacy.
- **Community Nutrition & Public Health Lab** – Researching malnutrition and food security.
- **Clinical Research & Biostatistics Lab** – Conducting nutrition-related clinical trials and statistical analysis.

PROGRAM OUTCOMES (POs)

PO	Program Outcomes
PO-1	Apply advanced principles of human nutrition to prevent and manage diseases.
PO-2	Develop personalized dietary plans based on clinical and biochemical assessments.
PO-3	Integrate research-based evidence into nutritional practices for various health conditions.
PO-4	Promote public health nutrition and design community-based interventions.
PO-5	Adhere to ethical, legal, and professional standards in dietetics and nutrition counseling.
PO-6	Engage in lifelong learning and research to improve dietetic and nutritional outcomes.

COURSE STRUCTURE – M.Sc. Clinical Nutrition and Dietetics

SEMESTER – I

Sl. No.	Broad Category	Course Code	Name of the Subject/Practical	Contact hours/week			Credits
				L	T	P	
1.	**Major (Core)**	MSCDC101	Human Physiology & Biochemistry in Nutrition	2	1	0	3
2.		MSCDC102	Principles of Clinical Nutrition and Metabolism	2	1	0	3
3.		MSCDC103	Food Science & Functional Foods	2	1	0	3
4.		MSCDC104	Medical Nutrition Therapy – I (Diseases and Dietary Interventions)	2	0	2	3
5.	**Minor**	MSCDC105	1. Public Health Nutrition and Epidemiology	2	0	2	6

	Select any two minor courses, each worth 3 credits, for a maximum of 6 credits per semester		2. Food Safety, Hygiene, and Quality Control 3. Nutrigenomics and Personalized Nutrition 4. Geriatric and Pediatric Nutrition 5. Sports and Exercise Nutrition 6. Research Methodology & Biostatistics	2	0	2	
6.	**Skill Enhancement Courses**	MSCDC106	1. Diet Planning and Nutritional Assessment Techniques	0	0	2	2
			2. Communication and Counseling Skills for Dietitians	0	0	2	
Total				12	3	10	**20**
Total Contact Hours				**25**			

Course Outcomes for B.Sc. Clinical Nutrition & Dietetics MAJOR - Human Physiology & Biochemistry in Nutrition

Sr. No.	Course Outcome	Description
1	Understand the Basics of Human Physiology	Discuss the key concepts of human physiology, including the structure and function of various organ systems (e.g., cardiovascular, digestive, respiratory, and endocrine systems) and their roles in maintaining homeostasis.
2	Explore the Role of Nutrition in Physiological Processes	Examine how nutrients (proteins, carbohydrates, fats, vitamins, and minerals) are utilized by the body in various physiological processes, such as energy production, growth, and immune function.
3	Understand the Biochemical Basis of Metabolism	Review the biochemical processes involved in metabolism, including glycolysis, the citric acid cycle, oxidative phosphorylation, and the role of enzymes, coenzymes, and hormones in regulating metabolic pathways.

Sr. No.	Course Outcome	Description
4	Discuss the Digestive System and Nutrient Absorption	Explore the anatomy and physiology of the digestive system, including the processes of digestion, absorption, and assimilation of nutrients, and how deficiencies or imbalances in nutrient intake affect overall health.
5	Analyze Carbohydrate, Protein, and Fat Metabolism	Investigate the biochemistry of macronutrient metabolism, including the conversion of carbohydrates, proteins, and fats into usable energy, and their role in maintaining blood glucose levels, muscle mass, and energy homeostasis.
6	Explore the Role of Vitamins and Minerals in Metabolism	Examine the functions of essential vitamins and minerals in biochemical reactions, their role in enzyme activation, immune function, and cellular processes, and the consequences of deficiencies or excesses.
7	Understand the Endocrine System and Its Role in Nutrition	Discuss the role of the endocrine system in regulating metabolism, including the function of hormones like insulin, glucagon, thyroid hormones, and cortisol, and their impact on nutrient utilization and energy balance.
8	Discuss the Physiological Response to Exercise and Nutrition	Explore the physiological changes that occur during exercise, including the utilization of different nutrients (carbs, fats, and proteins), and how proper nutrition supports physical performance, recovery, and muscle repair.
9	Examine the Biochemistry of Metabolic Disorders	Review the biochemical basis of metabolic disorders, such as diabetes, obesity, and metabolic syndrome, and how nutrition can play a role in managing or preventing these conditions.
10	Explore the Role of Gut Microbiota in Health and Nutrition	Investigate the role of the gut microbiome in digestion, nutrient absorption, immune function, and its impact on overall health, including the influence of diet on microbiome composition and function.
11	Understand the Impact of Nutrition on Aging and Longevity	Discuss how aging affects metabolism and the physiological needs of older adults, and how nutrition can help mitigate age-related changes, promote healthy aging, and improve quality of life.

Sr. No.	Course Outcome	Description
12	Apply Knowledge of Human Physiology and Biochemistry to Nutritional Interventions	Learn to design evidence-based nutritional interventions by integrating knowledge of human physiology, biochemistry, and nutrition to support optimal health outcomes in different populations, including those with specific health conditions.

Course Outcomes for B.Sc. Clinical Nutrition & Dietetics MAJOR - Principles of Clinical Nutrition and Metabolism

Sr. No.	Course Outcome	Description
1	Understand the Basics of Clinical Nutrition	Discuss the fundamental principles of clinical nutrition, including the role of nutrition in health promotion, disease prevention, and therapeutic management of various health conditions.
2	Explore the Biochemistry of Metabolism	Review the key biochemical pathways in metabolism, including carbohydrate, lipid, and protein metabolism, and their role in energy production and utilization in the body.
3	Understand Macronutrient and Micronutrient Requirements	Examine the dietary requirements of macronutrients (proteins, carbohydrates, fats) and micronutrients (vitamins and minerals) across different age groups and health conditions.
4	Discuss Nutritional Assessment Techniques	Review the various methods for assessing nutritional status, such as dietary recall, biochemical markers, anthropometric measurements, and clinical evaluation, and their application in clinical practice.
5	Examine Nutritional Therapy in Acute and Chronic Diseases	Explore the role of nutrition in managing acute and chronic diseases, such as diabetes, cardiovascular disease, renal disease, cancer, and gastrointestinal disorders, with a focus on therapeutic diets and medical nutrition therapy (MNT).
6	Understand the Role of Nutrition in Metabolic Disorders	Discuss the pathophysiology of metabolic disorders like diabetes, obesity, metabolic syndrome, and inborn errors of metabolism, and how nutrition plays a role in managing or preventing these conditions.

Sr. No.	Course Outcome	Description
7	Explore the Impact of Nutrition on Immune Function	Investigate the relationship between nutrition and immune function, including the role of specific nutrients (e.g., vitamins A, C, D, zinc) in enhancing immune response and preventing infections.
8	Discuss Nutritional Management in Critical Care	Learn the principles of nutritional support in critically ill patients, including enteral and parenteral nutrition, and how to assess and monitor nutritional needs in intensive care settings.
9	Examine the Role of Nutrition in Weight Management	Explore strategies for the clinical management of obesity and undernutrition, including the role of diet, exercise, and behavior modification in achieving and maintaining a healthy weight.
10	Understand the Impact of Nutrition on Metabolic Rate and Energy Balance	Discuss how metabolic rate and energy balance are influenced by factors such as age, gender, physical activity, and health status, and how to adjust nutritional interventions accordingly.
11	Explore Clinical Nutrition in Special Populations	Examine the unique nutritional needs of specific populations, such as pregnant women, infants, children, older adults, and individuals with disabilities or chronic illness, and how nutrition interventions are tailored for these groups.
12	Apply the Principles of Clinical Nutrition in Practice	Integrate knowledge of clinical nutrition and metabolism into clinical practice, developing evidence-based nutritional plans for patients with various health conditions, and emphasizing individualized nutrition therapy.

Course Outcomes for B.Sc. Clinical Nutrition & Dietetics MAJOR - Food Science & Functional Foods

Sr. No.	Course Outcome	Description
1	Understand the Basics of Food Science	Introduce the fundamentals of food science, including the composition, properties, and characteristics of food, and how processing, storage, and preparation affect nutritional value and safety.
2	Explore the Nutritional Components of Food	Examine the primary nutritional components of food: macronutrients (carbohydrates, proteins, fats), micronutrients (vitamins and minerals), and water, and their roles in human health.
3	Discuss Food Processing and Its Impact on Nutrition	Review various food processing techniques (e.g., cooking, fermentation, freezing, pasteurization) and their effects on the nutritional content, flavor, texture, and safety of food.
4	Understand Food Safety and Foodborne Illnesses	Explore the principles of food safety, including hygiene practices, temperature control, contamination prevention, and the identification and prevention of foodborne illnesses caused by pathogens.
5	Define Functional Foods and Their Role in Health	Discuss the concept of functional foods and their potential health benefits beyond basic nutrition, including foods that contain bioactive compounds that promote health or reduce the risk of disease.
6	Explore Bioactive Compounds in Food	Investigate the role of bioactive compounds, such as antioxidants, polyphenols, flavonoids, fiber, and omega-3 fatty acids, and how they contribute to disease prevention, immune function, and overall health.
7	Understand the Impact of Probiotics and Prebiotics	Review the role of probiotics (live beneficial microorganisms) and prebiotics (compounds that promote beneficial bacteria growth) in gut health, immunity, and disease prevention.
8	Discuss the Role of Functional Foods in Disease Prevention	Explore how functional foods can be used to prevent or manage chronic diseases like cardiovascular disease, diabetes, obesity, and cancer through their specific health-promoting properties.
9	Examine the Role of Dietary Supplements vs. Functional Foods	Compare and contrast dietary supplements and functional foods, discussing their uses, benefits, safety, and efficacy, and how functional foods provide nutrients in their natural, whole-food form.

Sr. No.	Course Outcome	Description
10	Investigate the Relationship Between Diet and Mental Health	Examine emerging research on how certain foods and functional ingredients (e.g., omega-3 fatty acids, B-vitamins, fermented foods) may influence mental health and cognitive function.
11	Explore the Regulatory Aspects of Functional Foods	Discuss the regulation of functional foods, including the differences between foods, dietary supplements, and drugs, and how claims regarding health benefits are evaluated and regulated by authorities like the FDA.
12	Develop a Plan for Integrating Functional Foods into Diets	Learn how to incorporate functional foods into balanced diets for different populations, and explore how to design meal plans or interventions that maximize health benefits based on scientific evidence.

Course Outcomes for B.Sc. Clinical Nutrition & Dietetics MAJOR - Medical Nutrition Therapy – I (Diseases and Dietary Interventions)

Sr. No.	Course Outcome	Description
1	Understand the Principles of Medical Nutrition Therapy (MNT)	Introduce the concept of Medical Nutrition Therapy (MNT), its role in the prevention, management, and treatment of diseases, and the application of individualized nutrition care plans.
2	Explore the Role of MNT in Chronic Diseases	Discuss the importance of MNT in managing chronic diseases such as cardiovascular disease, diabetes, hypertension, obesity, and renal disease, focusing on dietary interventions and nutrition goals.
3	Examine Nutritional Management of Cardiovascular Disease	Review the dietary interventions for managing cardiovascular diseases (CVD), including the role of fats, cholesterol, sodium, and the impact of dietary patterns like the DASH and Mediterranean diets.
4	Discuss Medical Nutrition Therapy for Diabetes	Explore the role of MNT in the management of Type 1 and Type 2 diabetes, including carbohydrate counting, insulin therapy, and

Sr. No.	Course Outcome	Description
		dietary strategies to control blood sugar levels and prevent complications.
5	Understand the Role of MNT in Hypertension	Investigate the use of dietary approaches to manage high blood pressure, such as reducing sodium intake, increasing potassium, and implementing the DASH diet, and the role of other nutrients like calcium and magnesium.
6	Nutritional Management of Obesity	Discuss the role of MNT in obesity management, including the principles of energy balance, the importance of portion control, weight loss strategies, and the role of macronutrients in weight management.
7	Examine Renal Disease and Nutritional Intervention	Explore the nutritional requirements and dietary modifications for patients with chronic kidney disease (CKD) and end-stage renal disease (ESRD), focusing on protein intake, sodium, potassium, phosphorus, and fluid restrictions.
8	Discuss the Role of MNT in Gastrointestinal Disorders	Review the application of MNT in managing gastrointestinal disorders such as irritable bowel syndrome (IBS), Crohn's disease, celiac disease, and peptic ulcers, with a focus on food intolerance, elimination diets, and symptom relief.
9	Explore Nutritional Interventions in Liver Disease	Investigate the nutritional needs of patients with liver diseases such as cirrhosis, fatty liver, and hepatitis, focusing on protein requirements, vitamin and mineral deficiencies, and managing fluid balance.
10	Examine the Role of MNT in Cancer	Discuss the impact of cancer on nutritional status and the role of MNT in managing symptoms, improving treatment outcomes, and addressing issues such as cachexia, malnutrition, and altered taste perception.
11	Nutritional Management in Inflammatory and Autoimmune Diseases	Explore the role of MNT in managing inflammatory and autoimmune diseases, such as rheumatoid arthritis, lupus, and inflammatory bowel disease (IBD), and how dietary modifications can help reduce inflammation and manage symptoms.

Sr. No.	Course Outcome	Description
12	Integrate MNT into Multidisciplinary Healthcare Plans	Learn to develop individualized MNT plans that integrate with other aspects of healthcare, including medication management, physical therapy, and psychological support, and how to collaborate with healthcare teams to provide holistic patient care.

Course Outcomes for B.Sc. Clinical Nutrition & Dietetics MINOR - Public Health Nutrition and Epidemiology

Sr. No.	Course Outcome	Description
1	Understand the Fundamentals of Public Health Nutrition	Introduce the basic principles of public health nutrition, including its role in promoting health, preventing disease, and improving the nutritional status of populations.
2	Explore the Relationship Between Nutrition and Public Health	Discuss how nutrition impacts public health at a population level, and examine the role of nutrition in preventing chronic diseases, managing malnutrition, and promoting overall well-being.
3	Understand the Scope and Importance of Epidemiology in Nutrition	Introduce epidemiology as a tool for studying the distribution and determinants of health-related events and diseases, with a focus on nutrition-related issues and the use of epidemiological data in public health nutrition.
4	Discuss the Various Types of Epidemiological Studies	Review different types of epidemiological studies, including observational studies (cross-sectional, cohort, and case-control) and experimental studies (randomized controlled trials), and their role in nutrition research.
5	Analyze Nutritional Epidemiology Methods	Explore the methods used in nutritional epidemiology to assess dietary intake, including food diaries, 24-hour recall, food frequency questionnaires, and biomarkers, and their strengths and limitations.
6	Examine the Impact of Nutrition on Population Health	Discuss the broader impact of dietary habits on the health of populations, including the role of diet in the prevention of chronic

Sr. No.	Course Outcome	Description
		diseases such as cardiovascular diseases, diabetes, obesity, and cancer.
7	Investigate the Role of Public Health Nutrition in Disease Prevention	Explore the role of public health nutrition programs in disease prevention, including nutrition interventions targeting key health issues such as maternal and child health, undernutrition, and obesity prevention.
8	Understand the Socioeconomic and Cultural Determinants of Nutrition	Examine how socioeconomic status, culture, education, and access to healthcare affect nutritional intake and health outcomes, and how public health programs address these social determinants of health.
9	Discuss Global Nutrition Challenges and Solutions	Analyze global nutrition issues such as undernutrition, micronutrient deficiencies, obesity, and food insecurity, and discuss global strategies and policies to improve nutrition on a worldwide scale.
10	Explore the Role of Nutrition Policies and Interventions	Investigate public health nutrition policies and interventions, including government nutrition programs (e.g., school meals, food fortification, nutrition labeling) and strategies to reduce dietary-related health disparities.
11	Evaluate the Impact of Nutrition Education and Advocacy	Discuss the role of nutrition education in public health, including community-based programs, health promotion campaigns, and advocacy efforts to change food environments and public policy.
12	Apply Epidemiological and Public Health Nutrition Knowledge	Learn to apply the principles of public health nutrition and epidemiology to design and evaluate nutrition interventions, policies, and programs aimed at improving the health of populations and addressing nutrition-related diseases.

Course Outcomes for B.Sc. Clinical Nutrition & Dietetics MINOR - Food Safety, Hygiene, and Quality Control

Sr. No.	Course Outcome	Description
1	Understand the Principles of Food Safety	Introduce the fundamental concepts of food safety, including the importance of preventing foodborne illness, the key principles of food safety, and the role of hygiene in maintaining safe food supply chains.
2	Explore Foodborne Diseases and Pathogens	Discuss common foodborne diseases caused by bacteria, viruses, parasites, and toxins, including their symptoms, transmission, and methods for prevention, along with the importance of foodborne illness surveillance.
3	Examine the HACCP System (Hazard Analysis and Critical Control Points)	Introduce the HACCP system as a preventive approach to food safety, focusing on identifying potential hazards in food production, processing, and handling, and implementing control measures to ensure safe food.
4	Discuss Food Contamination and Cross-Contamination Prevention	Explore the sources of food contamination (biological, chemical, physical), how contamination occurs, and methods to prevent cross-contamination during food handling, storage, and preparation.
5	Understand Food Hygiene Practices	Review essential food hygiene practices at every stage of food handling, from raw food preparation to cooking, storage, and serving, with a focus on personal hygiene, cleanliness, and sanitization practices.
6	Examine Food Quality Control Principles	Discuss the importance of maintaining consistent food quality in terms of sensory characteristics (taste, appearance, texture, aroma), and how quality control measures ensure food products meet established standards.
7	Explore Food Labeling and Regulatory Standards	Review food labeling regulations, including the required nutritional information, ingredient listings, allergen labeling, and country-specific regulations that ensure transparency and consumer safety.
8	Investigate the Role of Temperature Control in Food Safety	Discuss the significance of temperature control in preventing microbial growth in food, including the use of refrigeration, freezing, and cooking temperatures to ensure food safety and quality.

Sr. No.	Course Outcome	Description
9	Understand Food Storage and Shelf Life Management	Examine the principles of food storage, including the proper storage conditions for different types of foods (perishable, non-perishable), and how shelf life is determined to prevent spoilage and maintain food safety.
10	Explore Food Quality Assurance Systems	Introduce food quality assurance systems, including ISO 22000, Good Manufacturing Practices (GMP), and Total Quality Management (TQM), and how these systems ensure food safety, consistency, and quality in food production.
11	Discuss the Role of Traceability in Food Safety	Explain the importance of traceability in the food supply chain, including tracking food from farm to table, and how traceability systems help identify sources of contamination and improve food safety management.
12	Review Global and Local Food Safety Regulations	Review international food safety standards (e.g., Codex Alimentarius, WHO) and local regulations governing food safety practices, and understand how compliance with these regulations protects public health.

Course Outcomes for B.Sc. Clinical Nutrition & Dietetics MINOR - Nutrigenomics and Personalized Nutrition

Sr. No.	Course Outcome	Description
1	Understand the Basics of Nutrigenomics	Introduce the concept of nutrigenomics, the study of how genes interact with nutrients, and how genetic variations can influence individual responses to different diets and nutritional interventions.
2	Explore the Role of Genetics in Nutritional Health	Discuss how genetic predispositions affect nutritional status, metabolism, and the risk of developing nutrition-related chronic diseases like obesity, diabetes, cardiovascular disease, and cancer.

Sr. No.	Course Outcome	Description
3	Examine the Mechanisms of Gene-Diet Interactions	Explore the molecular mechanisms by which nutrients influence gene expression, including the roles of transcription factors, epigenetics, and regulatory pathways that mediate the effects of diet on health.
4	Investigate the Concept of Personalized Nutrition	Introduce personalized nutrition as an approach that tailors dietary recommendations to individuals based on their genetic makeup, lifestyle, and environmental factors, in contrast to a one-size-fits-all approach.
5	Understand the Role of SNPs (Single Nucleotide Polymorphisms) in Nutrient Metabolism	Examine how variations in specific genes (SNPs) can impact the metabolism of nutrients like vitamins, minerals, and fats, and how this influences disease risk and individual nutritional needs.
6	Discuss Nutritional Interventions for Genetic Predispositions	Review how personalized nutrition strategies can be used to address genetic predispositions to chronic conditions such as cardiovascular disease, diabetes, and obesity, and the role of diet in modifying genetic risks.
7	Explore the Impact of Epigenetics on Nutrition	Discuss the concept of epigenetics and how environmental factors, including diet, can influence gene expression and contribute to long-term health outcomes, even in the absence of genetic mutations.
8	Examine the Use of Genetic Testing in Nutrition	Explore the current state of genetic testing in the field of nutrition, including how genetic information can be used to personalize dietary recommendations, and the ethical, privacy, and practical considerations involved.
9	Discuss the Role of Microbiome in Nutrigenomics	Investigate the emerging field of microbiome research and how individual gut microbiota may interact with nutrients to affect health, metabolism, and disease risk, and how this is integrated into personalized nutrition plans.
10	Explore the Role of Nutritional Genomics in Disease Prevention	Discuss how nutrigenomics can be applied to the prevention of chronic diseases, focusing on specific nutrients that can modify

Sr. No.	Course Outcome	Description
		gene expression to reduce disease risk and improve health outcomes.
11	Understand the Ethical Considerations in Nutrigenomics	Examine the ethical issues surrounding nutrigenomics and personalized nutrition, including the privacy of genetic data, the potential for genetic discrimination, and the need for informed consent.
12	Apply Knowledge of Nutrigenomics in Clinical Nutrition Practice	Learn how to integrate nutrigenomics into clinical nutrition practice by evaluating individual genetic profiles and developing personalized nutrition plans to address specific health concerns and optimize health.

Course Outcomes for B.Sc. Clinical Nutrition & Dietetics MINOR - Geriatric and Pediatric Nutrition

Sr. No.	Course Outcome	Description
1	Understand the Fundamentals of Geriatric and Pediatric Nutrition	Introduce the principles of nutrition in both geriatric and pediatric populations, emphasizing the unique nutritional needs and challenges faced by individuals at these life stages.
2	Explore the Nutritional Requirements of the Elderly	Discuss the specific nutritional needs of older adults, including changes in metabolism, digestion, and absorption, and how aging affects nutrient requirements, particularly for macronutrients, micronutrients, and hydration.
3	Examine the Impact of Chronic Diseases on Geriatric Nutrition	Investigate how chronic diseases commonly encountered in older adults, such as diabetes, cardiovascular disease, arthritis, and osteoporosis, influence nutritional requirements and dietary management.
4	Understand the Role of Nutrients in Aging	Explore the role of specific nutrients (e.g., protein, vitamin D, calcium, omega-3 fatty acids) in aging and how they contribute to

Sr. No.	Course Outcome	Description
		maintaining muscle mass, bone health, cognitive function, and immune system support in older adults.
5	Discuss Nutrition and Healthy Aging	Learn about the relationship between diet and healthy aging, including the importance of maintaining a balanced diet to prevent frailty, manage weight, and support overall well-being in the elderly population.
6	Explore Nutritional Issues in Pediatric Populations	Review the nutritional needs of infants, children, and adolescents, with a focus on growth and development, energy needs, macronutrient requirements, and the importance of vitamins and minerals during these critical stages.
7	Examine the Impact of Growth and Development on Pediatric Nutrition	Investigate how the growth and developmental stages of childhood and adolescence influence nutritional needs, including the impact of rapid growth periods, puberty, and the need for adequate nutrition for brain development.
8	Discuss Feeding Practices and Challenges in Pediatrics	Explore the challenges related to feeding infants and children, including breastfeeding, infant formulas, introduction of solid foods, picky eating, food allergies, and the role of family and cultural factors in dietary habits.
9	Review Pediatric Nutritional Disorders	Examine common pediatric nutritional disorders such as iron deficiency anemia, rickets, obesity, and failure to thrive, and how to manage and prevent these conditions through appropriate dietary interventions.
10	Investigate the Role of Nutrition in Pediatric Chronic Conditions	Discuss the nutritional management of chronic pediatric conditions like asthma, cystic fibrosis, and childhood diabetes, and how nutrition interventions can optimize growth and development while managing symptoms.
11	Explore Strategies for Nutrition Intervention in Both Populations	Learn about the development of nutrition intervention plans for both geriatric and pediatric populations, focusing on individual needs, cultural considerations, food preferences, and the involvement of caregivers and healthcare teams.

Sr. No.	Course Outcome	Description
12	Apply Knowledge of Geriatric and Pediatric Nutrition in Clinical Settings	Integrate knowledge of geriatric and pediatric nutrition into clinical practice, including patient assessment, creating individualized care plans, and evaluating outcomes based on age-specific nutritional needs and challenges.

Course Outcomes for B.Sc. Clinical Nutrition & Dietetics MINOR - Sports and Exercise Nutrition

Sr. No.	Course Outcome	Description
1	Understand the Fundamentals of Sports and Exercise Nutrition	Introduce the basic principles of sports nutrition, focusing on how diet and nutrition play a critical role in enhancing athletic performance, improving recovery, and supporting overall health for athletes and active individuals.
2	Explore the Role of Macronutrients in Sports Performance	Discuss the role of macronutrients (carbohydrates, proteins, and fats) in fueling exercise, supporting muscle repair, and enhancing endurance, strength, and recovery during different types of physical activity.
3	Examine the Importance of Hydration in Exercise	Review the role of hydration in physical performance, the risks of dehydration, and the importance of electrolyte balance during exercise. Discuss the strategies for maintaining fluid balance before, during, and after exercise.
4	Discuss the Role of Micronutrients in Athletic Performance	Investigate how vitamins and minerals (e.g., vitamin D, calcium, iron, magnesium) influence energy metabolism, muscle function, and overall health, and how deficiencies can impair athletic performance.
5	Understand the Energy Systems Used During Exercise	Explore the three primary energy systems (phosphagen, glycolytic, and oxidative) and how they are used during different types of exercise (e.g., short sprints vs. long-distance running), including the impact of nutrition on energy production.

Sr. No.	Course Outcome	Description
6	Explore Nutrition Strategies for Endurance Athletes	Discuss specific nutritional strategies for endurance athletes (e.g., marathon runners, cyclists), including carbohydrate loading, fueling during long-duration exercise, and post-exercise recovery nutrition.
7	Examine Nutrition for Strength and Power Athletes	Explore the nutritional needs of athletes focused on strength and power (e.g., weightlifters, sprinters), including protein requirements, meal timing for muscle growth, and the role of supplements in optimizing performance.
8	Investigate Nutritional Supplements for Sports Performance	Review common nutritional supplements used by athletes, such as protein powders, creatine, caffeine, and branched-chain amino acids (BCAAs), and evaluate their efficacy, safety, and potential role in enhancing performance.
9	Discuss the Timing of Nutrition for Optimal Performance and Recovery	Explore the concept of nutrient timing, including pre-, during, and post-exercise nutrition, and how proper meal timing can maximize performance, enhance recovery, and promote muscle repair and glycogen replenishment.
10	Explore Special Nutrition Considerations for Youth and Older Athletes	Discuss the unique nutritional needs and considerations for youth athletes (including growth and development) and older athletes (addressing sarcopenia, joint health, and recovery needs) to optimize performance and minimize injury risks.
11	Understand the Impact of Nutrition on Injury Prevention and Rehabilitation	Investigate how nutrition can help prevent sports injuries and assist in the rehabilitation process by promoting tissue repair, reducing inflammation, and supporting overall recovery.
12	Develop Personalized Nutrition Plans for Athletes	Learn how to design individualized nutrition plans for athletes based on their sport, training load, goals, and health status, taking into account dietary preferences, cultural considerations, and practical recommendations for long-term success.

Course Outcomes for B.Sc. Clinical Nutrition & Dietetics MINOR - Research Methodology & Biostatistics

Sr. No.	Course Outcome	Description
1	Understand the Basics of Research Methodology	Introduce the fundamental concepts of research methodology, including the principles of scientific inquiry, research design, and the importance of ethics in conducting research.
2	Explore Types of Research Designs	Discuss the different types of research designs (descriptive, experimental, observational, cross-sectional, longitudinal, etc.), their applications, advantages, and limitations in health-related research.
3	Understand the Steps in the Research Process	Review the key steps in the research process, including formulating research questions, conducting literature reviews, hypothesis formulation, data collection, and interpretation of results.
4	Discuss Sampling Methods and Techniques	Explore the concepts of sampling, including random sampling, stratified sampling, convenience sampling, and sample size determination, and discuss their relevance and impact on the generalizability of research findings.
5	Learn about Data Collection Methods	Examine various data collection methods, including surveys, interviews, observations, and clinical measurements, and evaluate their reliability, validity, and applicability to different research contexts.
6	Introduction to Biostatistics	Provide an overview of biostatistics, focusing on the role of statistical methods in health research, data analysis, and decision-making. Discuss the importance of statistical thinking in understanding research results.
7	Explore Descriptive Statistics	Discuss the basics of descriptive statistics, including measures of central tendency (mean, median, mode), measures of variability (standard deviation, variance), and data visualization tools like histograms and pie charts.
8	Understand Probability and Statistical Distributions	Introduce the concept of probability, types of probability distributions (normal distribution, binomial distribution), and their relevance in hypothesis testing and confidence intervals.

Sr. No.	Course Outcome	Description
9	Explore Inferential Statistics	Discuss inferential statistics, including hypothesis testing, p-values, confidence intervals, and types of errors (Type I and Type II), and how to apply these methods to draw conclusions from sample data.
10	Learn about Common Statistical Tests	Explore common statistical tests used in health research, such as t-tests, chi-square tests, ANOVA, correlation, regression analysis, and non-parametric tests, and understand when to apply each test based on data types.
11	Discuss the Interpretation and Presentation of Results	Learn how to interpret statistical results and present findings in a clear, meaningful way for academic, clinical, or policy-making audiences, including the use of tables, graphs, and written summaries.
12	Understand Ethical Issues in Research	Review ethical principles in research, including informed consent, confidentiality, research integrity, and the protection of vulnerable populations, and how to ensure ethical standards are maintained throughout the research process.

Course Structure & Syllabus

Total Course Duration: 2 Years (4 Semesters)

Total Credits: 80

Total Teaching & Training Hours: ~3,600

Assessment Methods (Tabular Format)

Assessment Component	Weightage (%)	Details
Continuous Internal Assessment (CIA)	**40%**	Includes internal exams, assignments, presentations, case studies, and practical performance
End-Semester Examination (ESE)	**60%**	Divided into theory (40%) and practical (20%)

Assessment Component	Weightage (%)	Details
Mid-Semester Exams	**20%** (Part of CIA)	Two internal tests per semester
Assignments & Case Studies	**5%** (Part of CIA)	Research-based assignments, literature reviews, clinical case reports
Seminars & Presentations	**5%** (Part of CIA)	Oral/poster presentations on clinical nutrition topics
Practical Performance & Clinical Evaluation	**5%** (Part of CIA)	Skill-based assessments in labs/hospitals
Attendance & Participation	**5%** (Part of CIA)	Regularity in theory & practical sessions
Theory Examination (Final)	**40%** (Part of ESE)	Structured written paper covering subject knowledge
Practical Examination (Final)	**20%** (Part of ESE)	Includes viva, skill demonstration, case handling
Dissertation/Research Project	**Mandatory**	Evaluated in the final year by internal & external examiners
Clinical Internship/Training	**Pass/Fail**	Logbook-based evaluation with hospital mentor review

Marking System & Grading

Marks (%)	Grade	Grade Point (GPA/CGPA Equivalent)	Classification
90 - 100	O (Outstanding)	10	First Class with Distinction
80 - 89	A+ (Excellent)	9	First Class with Distinction
70 - 79	A (Very Good)	8	First Class
60 - 69	B+ (Good)	7	First Class
50 - 59	B (Satisfactory)	6	Second Class
<50 (Fail)	F (Fail)	0	Fail (Re-exam Required)

Pass Criteria:

- **Minimum 50% marks in each subject** (Theory & Practical separately).

- **Aggregate of 55% required for progression** to the next semester.
- **No more than two backlogs** allowed for promotion to the final year.

Exam Pattern for Theory & Practical

A. Theory Examination Pattern

Total Marks: 100 (Converted to 40% for End-Semester Assessment)
Duration: 3 Hours

Section	Question Type	No. of Questions	Marks per Question	Total Marks
Section A	Short Answer Type (SAQ)	10 (Attempt all)	2	20
Section B	Long Answer Type (LAQ)	5 (Attempt any 4)	10	40
Section C	Case-Based/Clinical Scenario	3 (Attempt any 2)	15	30
Section D	MCQs/Objective Type	10 (Compulsory)	1	10
Total				**100**

Weightage:

- Clinical Nutrition & Therapeutic Diets – 40%
- Medical Nutrition Therapy (MNT) – 30%
- Research & Case Studies – 20%
- Public Health & Community Nutrition – 10%

Passing Criteria: Minimum **50% (50/100 marks)**

B. Practical Examination Pattern

Total Marks: 100 (Converted to 20% for End-Semester Assessment)
Duration: 4–6 Hours

Component	Marks Distribution
Clinical Case Presentation & Nutritional Assessment	30
OSCE (Objective Structured Clinical Examination) – Skill Demonstration	25
Diet & Lifestyle Counseling for Various Medical Conditions	20

Component	Marks Distribution
Lab-Based Examination (Food Analysis, Diet Planning, Anthropometric & Biochemical Assessment)	15
Record Work (Logbook & Assignments)	10
Total	**100**

OSCE (Skill-based Assessment) includes stations on:

- Anthropometric Measurements (BMI, Waist-Hip Ratio, Body Fat Analysis)
- Meal Planning for Clinical Conditions (Diabetes, Renal Disorders, Cardiovascular Diseases, Metabolic Disorders)
- Nutrition Counseling & Dietary Modifications
- Interpretation of Biochemical Markers (HbA1c, Lipid Profile, Serum Proteins)

Passing Criteria: Minimum 50% (50/100 marks) in practicals.

Recommended Books & E-Resources

Textbooks

- "Krause's Food & Nutrition Therapy" – L. Kathleen Mahan
- "Modern Nutrition in Health & Disease" – Maurice E. Shils
- "Clinical Nutrition: A Functional Approach" – Jeffrey Bland
- "Food Science & Technology" – Geoffrey Campbell-Platt

E-Resources & Journals

- Journal of Clinical Nutrition
- Academy of Nutrition & Dietetics Resources
- WHO Guidelines on Nutrition & Dietetics
- International Journal of Food & Nutritional Sciences

Conclusion

The M.Sc. in Clinical Nutrition & Dietetics prepares graduates to work in diverse healthcare settings, integrating science-based nutrition strategies for disease management and health promotion. The program offers strong career prospects in hospitals, research, public health, and the food industry, making it an essential field in modern healthcare.