AC –
Item No. –

As Per NEP 2020

University of Mumbai

Post-Graduate Programme (M.Sc.)

A- P.G. Diploma in Home Science – Foods, Nutrition and Dietetics

B- M.Sc. (Home Science – Foods, Nutrition and Dietetics) (Two Years)

2023-24

C- M.Sc. (Home Science – Foods, Nutrition and Dietetics) (One Year) **2027-28**

Syllabus for

Semester – Sem. - III & IV
Ref: GR dated 16th May, 2023 for Credit Structure of PG

(With effect from the academic year 2024-25)

University of Mumbai

(As per NEP 2020)

Sr. No.	Heading	Particulars
1	**Title of program** **O:_____ B**	**M.Sc. (Home Science – Foods, Nutrition and Dietetics) (Two Years)**
2	**Scheme of Examination** **R: _____**	NEP 50% Internal 50% External, Semester End Examination Individual Passing in Internal and External Examination
3	**Standards of Passing** **R: _____**	40%
4	**Credit Structure** **R: _____**	Attached herewith
5	**Semesters**	Sem. III
6	**Program Academic Level**	6.5
7	**Pattern**	Semester
8	**Status**	New
9	**To be implemented from Academic Year**	2024-25

Sign of the BOS Chairman
Name of the Chairman
BOS in

Sign of the Offg. Associate Dean
Name of the Associate Dean
Faculty of

Sign of the Offg. Associate Dean
Name of the Associate Dean
Faculty of

Sign of the Offg. Dean
Name of the Dean
Faculty of

Preamble

1) Introduction

The emphasis on health and wellness, and the role of nutrition in health maintenance, disease prevention and disease management increased through the 1960s and the 1970s. With the understanding that there was a need for guidance of the community with respect to nutrition and lifestyle, the College of Home Science Nirmala Niketan started the Department of Foods and Nutrition in the year 1972, which was amended to Foods, Nutrition and Dietetics later. In the 50 years of its existence, we have had more than 500 students graduate from this programme and they have had opportunities to be professionally employed, finding success in diverse fields of foods, nutrition and dietetics. The department has produced many alumnae who have been and are in many leadership positions as heads of dietetics departments, research centers, NGOs and sports agencies and as lead nutritionists in food companies. Many of our alumnae are highly successful entrepreneurs in the food industry, wellness and dietetics, digital dietetics and nutrition education.

The Programme of the M.Sc. in Foods, Nutrition and Dietetics is a distinctive one as it involves aspects from three interconnected disciplines of Foods, Nutrition and Dietetics. Whilst this course has its unique niche, it confers the advantage of the graduate being able to branch out professionally in local, national and global settings, into any of the following: the food industry, dietetics practice in preventive as well as clinical settings, community and public health nutrition, as a researcher and academician. and in various entrepreneurial opportunities.

The M.Sc. Programme in Foods, Nutrition and Dietetics provides a detailed input into creating a strong knowledge and skill base of both theoretical and practical components across the diverse areas of the subject, making it one of the most sought after and prestigious programmes affiliated to the University of Mumbai. The coursework includes advanced concepts of physiology, nutritional biochemistry, and nutrition across the lifecycle, food science, processing and quality control, clinical nutrition and dietetics, public health nutrition, sports nutrition, entrepreneurship in the area of Foods, Nutrition and Dietetics and emphasizes on the values and methods of safeguarding the nutritional status of the community in a holistic way.

Mandatory course, elective courses, and their corresponding practical along with internships (On the Job training) form an integral part of the syllabus. Great attention has been paid to ensure that through the mandatory courses, the student placed in the food industry, clinical nutrition, public health nutrition and sports nutrition will adequately possess the required knowledge and skills to enable them to effectively contribute in professional and community settings.

The elective courses have been designed in order to provide students with opportunities to obtain insights and skill development in newer areas of food production, diet management and community education using latest research and trends with emphasis on multidisciplinary aspects and the use of technology and innovative ideas.

Focus has been given to areas of innovation, entrepreneurship and sustainability in health. Through this course the student will get multiple opportunities to create and innovate with regards to food product development, dietary and lifestyle consultations and nutrition education which they can continue ahead into their professional career. In the current times of evolution of though with respect

to sustainable practices, this syllabus ensures that the UN Sustainable Development Goals (SDGs) related to health are featured to gear the students thinking towards it. The syllabus also incorporates national nutrition policies into its subjects thus being aligned to the national goals for health.

The strong emphasis of research methods, descriptive and advanced statistics and research project strengthens the course with provision of research knowledge and applications. Research is a core component in current evidence based dietetics practice, used for food product development in the food industry and in understanding the incidence of diseases and effects of nutrition initiatives in the public health sector. Thus, the extensive inputs into research methods and statistics will facilitate the postgraduate to conduct research projects across diverse streams in the specialization of Foods, Nutrition and Dietetics.

The M.Sc. in Foods, Nutrition and Dietetics will deliver a holistic education that is in line with the goals of the National Education Policy 2020. The theory and practical learnings will help the students establish a niche career for themselves. They will be moulded to be a contributor to the health and wellness of individuals, communities and the nation and thereby participate in the creation of sustainable health.

2) Aims and Objectives

a. To help students create a strong understanding of fundamental and advanced concepts in the field of Foods, Nutrition and Dietetics
b. To enable students with knowledge, skills and research competencies for professional application into the areas of food science and processing, clinical nutrition and dietetics, sports nutrition and public health nutrition
c. To empower the students with analytical reasoning skills, research competencies; awareness of, open-mindedness to, and ability to use recent technologies; creativity for contribution to individuals' and the community's health, and an entrepreneurial bend of thought and action.
d. To create competent professionals who work with acknowledgement of the dynamism and evolution in the field and are capable of keeping up with the emerging trends and practices in the field and have a vision to contribute to National and Global Development.

3) Learning Outcomes

The programme encompasses a comprehensive range of skills and knowledge, enabling graduates to excel in the multifaceted field of Foods, Nutrition and Dietetics. On successful completion of the programme, student will be able to be a competent and valuable member of the fraternity as outlined below:

Programme Outcome (PO)	Definition	Graduate Attribute
To be able to…		
PO1	Demonstrate an in-depth knowledge and understanding of core fundamentals of concepts of Biochemistry, Nutrition, Food Science and Processing, Clinical Dietetics and Public Health Nutrition with the integration of all allied subjects required to professionally practice in Foods, Nutrition and Dietetics competently.	Disciplinary Knowledge
PO2	Effectively develop nutritious and sustainability based food products, communicate therapeutic diets, counsel patients effectively and to explain complex nutritional concepts in simple and understandable terms both orally and in writing to fellow professionals as well as the community	Communication Skills
PO3	Design efficient methods of food analysis and food products, nutritional diagnosis and evaluate the modes of nutritional therapies as well as programmes to better community health.	Critical Thinking
PO4	Creatively construct Dietary, Nutritional and Lifestyle strategies to preserve health, manage diseases, address nutrition related health issues in the community, to support the industry as a knowledge partner in formulation of healthy food products and to engage in entrepreneurial initiatives to solve individual and community health problems	Problem Solving Innovation Entrepreneurship
PO5	Competently evaluate traditional as well as recent Nutrition practices in relation to evidence based nutrition and draw applicable conclusions, using a scientific and an open mind with the vision of bettering food and nutrition practice	Analytical and Scientific Reasoning
PO6	Proficiently explore the cause and effect relationships of food, nutrition and lifestyles on health and to construct and follow through a research problem using research techniques and statistical analysis, thus drawing up adequate conclusions for applications of research in the food industry, community and clinical set ups as employee or entrepreneur	Research related skills
PO7	Successfully work in teams, cooperate and derive meaningful beneficial conclusions for food consumers' requirements as well as patients' and community health through interdisciplinary and collaborative efforts in clinical, community, research, industry and organizations.	Cooperation/ Team work
PO8	Translate research, recent innovations and personal and professional experiences into applications to benefit food industry, clinical management of disease, community health; and entrepreneurial ventures with self-awareness and introspection	Reflective Thinking
PO9	Use technology for foods, nutrition and dietetic communications, consumer information, hospital	Information/digital literacy

	administration, diet planning, nutrition education as well as be aware of using digitation for entrepreneurial ventures.	
PO10	Work independently, identify appropriate resources for a project and manage a project to completion.	Self-Directed Learning
PO11	Be adept with regards to national and global multi-cultural aspects of foods and nutrition, thus being able to deliver food products and nutrition and lifestyle strategies for health in harmony with the existing cultural practices of the individual and the community.	Multicultural competence
PO12	Practice principles of food preservation, processing, dietetics and community health in the most sustainable and effective manner, placing consumer, patient, community and fraternity well-being at the center of operations and to refrain from unethical behavior at workplace, the community and research.	Moral and Ethical awareness and reasoning
PO13	Take on leadership positions formulating and sharing an inspiring vision and the eagerness to bring productive and sustainable positive results for the professional group, the community and the foods, nutrition and dietetics fraternity using organizational, entrepreneurial and managerial skills	Leadership readiness/qualities
PO14	Continue lifelong learning and be updated with cutting edge knowledge and practices in the field and the understanding that ongoing learning must be the personal and professional way of life; thus, being continuously involved in evolving, up scaling, reinventing and reskilling to the requirements of the times.	Lifelong learning

4) Any other point (if any)

5) Credit Structure of the Program (Sem III & IV) (Table as per Parishisht 1 with sign of HOD and Dean)

R_____

Post Graduate Programs in University:

- **PG Diploma in Home Science – Foods, Nutrition and Dietetics**
- **M.Sc. (Home Science – Foods, Nutrition and Dietetics) (Two Years)**

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Exit option: PG Diploma (44 Credits) after Three Year UG Degree									
II	**6.5**	**Sem III**	**Course 1:** Advances in Human Nutrition- I Theory **Credits 4** **Course 2:** Advances in Clinical Nutrition- I Theory (2cr) Medical Nutrition Therapy- I Practical (2cr) **Credits 4** **Course 3:** Public Health Nutrition and Epidemiology Theory (2 Cr) Nutritional Assessment and Education Practical (2 Cr) **Credits 4** **Course 4:** Sports and Fitness Nurtition Theory (2 Cr)	**Credits 4** **Course 1:** Innovation and Entrepreneurship in Foods, Nutrition and Dietetics Theory (2 Cr) Innovation and Entrepreneurship in Foods, Nutrition and Dietetics Practical (2 Cr) **OR** **Course 2:** Current and Emerging Digital Technologies in Foods, Nutrition and Dietetics Theory (2 Cr) Current and Emerging Digital Technologies in Foods, Nutrition and Dietetics Practical			Research Project (4cr) **Credits 4**	22	**PG Degree After 3-YrUG**

			Credits 2	(2 Cr)					
		Sem IV	**Course 1:** Advances in Human Nutrition- II Theory (4 Cr) **Credits 4** **Course 2:** Advances in Clinical Nutrition- II Theory (2 Cr) Medical Nutrition Therapy – 2 Practical (2 Cr) **Credits 4** **Course 3:** Food Preservation, Processing and Quality Assurance Theory (4 Cr) **Credits 4**	**Credits 4** **Course 1:** Food Psychology and Nutritional Counseling Theory (2 Cr) Food Psychology and Nutritional Counseling Practical (2 Cr) **OR** **Course 2:** Novel and Emerging Strategies in Disease Management Theory (2 Cr) Novel and Emerging Strategies in Disease Management Practical (2 Cr)			Research Project (6 Cr) **Credits 6**	22	
Cum. Cr. for 1 Yr PG Degree			**26**	**8**			**10**	**44**	
Cum. Cr. for 2 Yr PG Degree			**54**	**16**	**4**	**4**	**10**	**88**	

Note: * The number of courses can vary for totaling 14 Credits for Major Mandatory Courses in a semester as illustrated.

Sem. - III

Syllabus
M.Sc. (Foods, Nutrition and Dietetics)
(Sem. - III)

Course Code	Course Title	Theory/ Practical	Credits
FND03C1	Advances in Human Nutrition—I	Theory	4

Course Objectives: To enable students to:

1. Understand the recent advances of the basis of nutritional requirements and to compare different National nutrient requirement data.
2. Gain knowledge on the importance of nutrition in maintaining optimum body composition.
3. Be updated on the recent advances in human nutrition and nutrient metabolism with reference to the requirements of macro-nutrients (carbohydrate, protein and fats), micronutrients and nutraceuticals and functional foods
4. Design nutrition strategies to promote health and that will/may have a role in disease prevention and treatment.

Course Outcomes (CO)

On successful completion of the course, the student will be able to:

CO No.	Course Outcomes
CO1	To understand fundamental concepts of nutrient requirements and the basis of arriving at it.
CO2	To classify the various types of macronutrients and comprehend their physical, physicochemical and nutritional properties
CO3	To comprehend the role of various nutrients their dietary or food forms in human metabolism and apply this information for disease prevention and health promotion.
CO4	To compare the various changes in body composition and relate it to the macronutrient intake and to remember the different methods that can be used to assess body composition.
CO5	To plan various nutritional guidelines and dietary recommendations for optimal human nutrient intake within a complex multi-factorial eco-system.
CO6	To interpret and analyse the effects of nutrient-nutrient interaction, bio-availability and other factors that may aid in optimal use of nutrient in human beings.

Unit No.	Course Content	No. of Hours
I	**A. Concept of Dietary Nutrient Recommendations:** Development and recent concepts a. Various methods of determining human nutrient needs b. Description of basic terms and concepts in relation to human nutritional requirements. c. Guidelines and Recommendations - International and National Nutritional Requirements - Translation of nutritional requirements into Dietary Guidelines **B. Human Body Composition:** • Models of body composition, changes in and factors influencing body composition through life cycle – with a focus on sarcopenia, dynapenia, myopenia, frailty, cachexia. • Assessment of body composition through current techniques used and newer methods being developed with a focus on principles, protocol, prediction equations, interpretation, applications and advantages & disadvantages	15

	• Direct (cadaver studies and muscle biopsy) • Indirect methods (Anthropometry, bio electrical impedance, air displacement/ BOD-POD, under water weighing, DEXA, doubly labeled water (DLW) technique, ways to study muscle quantity and quality and other newer methods. **C. Energy** • Concepts of Energy: • Units of energy, Energy intake vs Energy expenditure (EE) • Advanced study of components of energy expenditure and ways to measure it: • Estimation of BM and RMR - Calorimetry (Direct & Indirect) and Non calorimetric techniques • Activity induced thermogenesis/ Physical activity - calculation of energy expenditure using MET (Metabolic equivalent) • Diet induced thermogenesis and ways to measure it. • GEV & MEV; Atwater factors -Advantages & Disadvantages. • Energy imbalances -Excess & deficiency (acute and Chronic) Metabolic and physiological adaptations to over and under nutrition	
II	**A. Carbohydrates:** Over view of classification, functions, digestion and absorption. Recent advances in • Role in Human nutrition (metabolic & physiological/organ specific) • Carbohydrate recommendations • Glycemic Index and Glycemic Load-Applications in the diet (Insulin index) • Dietary fiber and resistant starch-Types, Health benefits and • Sugar substitutes-Nutritive and non -nutritive sweeteners- Synthetic and Natural sweeteners • Carbohydrates and gene expression Carbohydrate intake and its relation to chronic degenerative diseases.	**15**
III	**A: Fats and Fatty acids:** Overview of classification, functions, digestion and absorption Recent advances in 1. Role in fats and fatty acids in Human nutrition (metabolic & physiological/organ specific) • Requirements of total dietary fat and fatty acid consumption; Fatty acid ratios • Role of total fat intake, SFA, MUFA & PUFAs (Metabolic & physiological/organ specific) and in health & diseases. • Role of the following in human nutrition and health: a. n-3 and n-6 fatty acids b. Prostaglandins c. Trans Fatty Acids d. Conjugated linoleic acid e. Medium chain triglyceride (MCT) • Nutritional requirements and dietary guidelines (International & National) for visible and invisible fats in diets. • Lipids and gene expression • Lipid intake and its relation to chronic degenerative diseases.	**15**

	Oil blends (Composition and its role in health)	
IV	**A: Proteins and Amino acids** Overview of Classification, Functions, digestion and absorption Recent advances in • Role of amino acids and protein in human nutrition (metabolic & physiological/organ specific) • Protein and amino acid metabolism (aromatic, BCAA and sulphur containing amino acid) • Amino acid - derived biomolecules (nitrogen containing) • Amino acid and peptide transporters • Essential Amino acid requirements and Amino acid imbalances • Recommendations and requirements of protein • Assessment of quality of Food protein-Biological and chemical methods • Assessment of protein nutritional status: Anthropometry, biochemical, (muscle quantity and quality), Tracer techniques, Functional test (handgrip ergometer) • Therapeutic applications of specific amino acids • Peptides of physiological significance Proteins, amino acids and gene expression	**15**
	Total Hours	**60**

References:

Agarwal, A., & Udipi, S. (2012). *Textbook Of Human Nutrition* (1st ed.). Jaypee Brothers Medical Publishers.

Bodwell, C.E..and Erdman, J.W. (2008) Nutrient Interactions. Marcel Dekker Inc. New York

Chandra, R.K. (eds) (2002): Nutrition and Immunology, ARTS Biomedical. St. John's Newfoundland.

Garrow, J.S., James, W.P.T. and Ralph, A. (2000) Human Nutrition and Dietetics. 10th Edition, Churchill Livingstone Press, London, 145-152.

Sareen, S, James Groff, J (2005). Advanced Nutrition in Human Metabolism, 4th Edition, Thomson Wordsworth Publication, USA.

Shils, M.E., Olson, J., Shike, M. and Roos, C (2003). Modern Nutrition in Health and **Disease,** 9" edition Williams and Williams. A Beverly Co. London.

Evaluation:

4 CREDITS COURSE FOR TOTAL MARKS OF 100	
CONTINUOUS INTERNAL EVALUATION:	**MARKS**
Class participation, Class test/Open book test	20
Presentations using audio visual aids on any topic of recent advances in human nutrition	20
Attending seminars on any topic of human nutrition (online/offline)	10
Total Marks for Internal Assessment	**50**
SEMESTER-END EXAMINATION	**MARKS**
All questions are compulsory with internal choice.	
Question 1 from Unit 1	10
Question 2 from Unit 2	10
Question 3 from Unit 3	10
Question 4 from unit 4	10
Question 5 from all units	10
Total Marks for Semester End Examination	**50**
TOTAL MARKS FOR THE COURSE	**100**

Syllabus
M.Sc. (Foods, Nutrition and Dietetics)
(Sem. - III)

Course Code	Course Title	Theory/ Practical	Credits
FND03C2A	**Advances in Clinical Nutrition I**	**Theory**	**2**

Course Objectives:

To help students:

1. Gain a deep understanding of prevalence, etiology, pathophysiology, symptomatology, diagnosis, multipronged management approaches, medical nutrition therapy and lifestyle modifications in preventing and managing diseases.
2. Gain a deep understanding of biochemical and physiological basis of nutritional needs and metabolism in critically ill patients and their significance in tackling disease burden.
3. Acquire advanced learnings from current trends and research and apply the theories in patient management
4. Apply concepts of therapeutic dietetics in community/ clinical settings.

Course Outcomes (CO)

On successful completion of the course, the student will be able to:	
CO No.	**Course Outcomes**
CO1	List key lifestyle factors that contribute to the development of diseases.
CO2	Explain the physiological basis of various diseases and conditions, including their impact on nutrient metabolism and requirements.
CO3	Describe the role of therapeutic diets in the prevention and management of medical conditions.
CO4	Utilize dietary modification techniques to address the nutritional needs of patients with specific medical conditions.
CO5	Analyze patient case studies to identify nutritional risk factors, assess dietary intake, and recommend appropriate therapeutic diets.
CO6	Evaluate the effectiveness of dietary interventions in improving patient health outcomes and managing medical conditions.
CO7	Design comprehensive nutrition care plans for patients with complex medical conditions, integrating dietary recommendations with medical treatment plans.
CO8	Develop innovative strategies for promoting dietary adherence and patient education in clinical settings.

Unit No.	Course Content	No. of Hours
I	**A. The Hypercatabolic State** Metabolic Response to Stress Guidelines for nutrition support for hypometabolic starved patient and hypermetabolic stressed patient **B. Nutrition Support:** **i. Enteral Nutrition** • Indications and contraindications and ethical considerations • Techniques of Enteral Nutrition Administration –	**15**

- ❖ Routes of administration: nasogastric, nasojejunal, gastrostomy, jejunostomy
- ❖ Insertion and maintenance of feeding tubes
- ❖ Equipment used in enteral nutrition: Ryles tube, pumps, gravity sets
- ❖ Methods of delivery: bolus, intermittent, continuous

- Enteral Nutrition Formulas and Components
- ❖ Macronutrients, micronutrients and fluids
- ❖ Fiber content and its importance
- ❖ Choosing the right formula based on patient needs
- ❖ Types of enteral formulas: standard, elemental, semi-elemental, disease-specific

- Monitoring and Managing Enteral Nutrition
- Documentation and communication in patient care
- Complications of Enteral Nutrition and prevention and management strategies - Gastrointestinal; Metabolic; Mechanical complications
- Home enteral nutrition: indications, preparation, and monitoring

ii.) Parenteral Nutrition

- Indications and contraindications and ethical considerations
- Comparison with enteral nutrition
- Components and Formulations of Parenteral Nutrition
- Compounding of parenteral nutrition solutions
- Administration of Parenteral Nutrition - Venous access: peripheral vs. central
- Protocols for initiating and advancing parenteral nutrition
- Continuous vs. cyclic administration
- Infusion pumps and delivery systems
- Monitoring and Management of Parenteral Nutrition
- Complications; Metabolic; Infectious; Mechanical complications and its prevention and management strategies

C. Management of specific hypercatabolic states in with focus on:

- Etiology and Pathophysiology
- Clinical and metabolic aspects
- Diagnosis, Nutritional screening and nutritional status assessment
- Overview of medical therapy and drug nutrient interactions
- Nutritional goals and management
- Special Nutritional considerations and lifestyle modifications
- Role of immune enhancers and conditionally essential nutrients

- ➢ Surgery
- ➢ Burns
- ➢ Trauma
- ➢ Head Injury
- ➢ Sepsis
- ➢ Multiorgan failure
- ➢ ARDS
- ➢ Respiratory Crisis – Ventilator support, Guillain Barre's Disease, COPD, Chronis Bronchitis, Asthma, Cystic Fibrosis
- ➢ Nutrition support in use of ECMO

D. Nutritional Management of Cancers

- The mechanism of oncogenesis
- Cancer prevention through nutrition and lifestyle choice
- Etiology, Pathophysiology and progression of cancers
- Medical Management and drug nutrient interactions
- Malnutrition and Cancer Cachexia

	• Symptoms and diagnosis • Nutritional Management of cancers with focus on the various treatment approaches of Chemotherapy, radiation and surgery	
II	• Study of the following disease conditions that occurs in adult and pediatric populations with respect to prevalence, etiology, pathophysiology, symptomatology, diagnostics, nutritional assessment, medical therapy and drug nutrient interactions, medical nutrition therapy and lifestyle interventions for prevention and management of the condition and appropriate counselling and nutrition education strategies required for sustainable management **A. Disorders of the Gastro Intestinal system** • GERD and esophagitis • Gastroparesis • Gastritis • Peptic Ulcers **B. Diseases of the intestine** • Diarrhoea and Steatorrhoea • Lactose Intolerance • Constipation • Gluten Induced Enteropathy • Lactose intolerance • Inflammatory bowel Disease • Short Bowel Syndrome • Small intestinal Bacterial Overgrowth and Dysbiosis • Irritable Bowel Syndrome • Diverticulitis and Hemorrhoids • Infections of the small intestine **C. Neurological Diseases** • Neuro degenerative diseases and epilepsy • Stroke and lesions – Nutritional requirements and issues, paralysis, pressure ulcers and dysphagia • Psychiatric diseases • Developmental disabilities – Cerebral Palsy, Down's syndrome and Autism **D. Nutritional management of Nutritional anemias and Infections** – Typhoid, Tuberculosis, HIV and AIDS.	**15**
	Total Hours	**30**

References:

Barrer. K. (2007) Basic Nutrition Counselling Skill Development. Wadsworth Pub

Bendich, A., & Deckelbaum, R. J. (Eds.). (2006). Preventive Nutrition: The Comprehensive Guide for Health Professionals. Springer.

Bendich, A., & Deckelbaum, R. J. (Eds.). (2016). Preventive Nutrition: The Comprehensive Guide for Health Professionals. Humana Press.

Blake, J. S. (2018). Nutrition: From Science to You. Pearson.

Blake, J. S. (2020). Nutrition and You: Core Concepts for Good Health. Pearson.

Brown, J. E. (2019). Nutrition Through the Life Cycle. Cengage Learning.

Journal of American Dietetic Association.

Lutz, C. A., Przytulski, K. R., & Rutherford, K. L. (2015). Nutrition and Diet Therapy. F.A. Davis Company.

Mahan, L. K., & Raymond, J. L. (2021). Krause's Food & the Nutrition Care Process. 15th edition. Elsevier.
Nutrition in Critical Care. (2014). United Kingdom: Cambridge University Press.
Pope, J., & Berman, M. (2017). Nutrition for a Changing World. Wadsworth Publishing.
Shills. M. (2006). Modern Nutrition in Health and Disease.10th ed. Lippincot William and Wilkins.
Sizer, F., & Whitney, E. (2020). Nutrition: Concepts and Controversies. Cengage Learning.
Smolin, L. A., & Grosvenor, M. B. (2018). Nutrition: Science and Applications. Wiley.

Evaluation:

2 CREDIT COURSE FOR TOTAL MARKS OF 50	
CONTINUOUS INTERNAL EVALUATION:	**MARKS**
Create a brand (website/ logo), create a nutrition care process model and use social media for nutrition education/ Design a preventive module for community on a chosen topic using oral, written and social media communication/ developing a nutrition education resources on preventive health for nurses/ doctors/ dietitians	10
Literature review of the given topic and its presentation	10
Quiz/ Debate/ Class discussion/ Debate	05
Total Marks for Internal Assessment	**25**
SEMESTER-END EXAMINATION	**MARKS**
All questions are compulsory with internal choice.	
Question 1 from Unit 1	10
Question 2 from Unit 2	10
Question 3 from multiple units	5
Total Marks for Semester End Examination	**25**
TOTAL MARKS FOR THE COURSE	**50**

Syllabus
M.Sc. (Foods, Nutrition and Dietetics)
(Sem. - III)

Course Code	Course Title	Theory/ Practical	Credits
FND03C2BP	**Medical Nutrition Therapy I**	**Practical**	**2**

Course Objectives:

1. To provide a detailed practical aspect to the clinical conditions studied in theory.
2. To enable students to:
   - Do a detailed study of Medical Nutrition Therapy with appropriate literature review.
   - Analyze the given case.
   - Make a nutritional diagnosis with problem, etiology and symptom (PES) Statement and outline the goals of therapy.
   - Study of medical and surgical interventions which require nutritional management.
   - Propose a nutrition plan for the patient – with suggested outline of medical nutrition therapy with appropriate literature review, diet plan with detailed calculations and suggested supplements and adjuncts.
   - Prepare the selected meal.
   - Evaluate the suggested diet plans.
   - Prepare patient education resources.

Course Outcomes (CO)

On successful completion of the course, the student will be able to:	
CO No.	**Course Outcomes**
CO1	Recall key principles of intensive care nutrition and their application in clinical settings.
CO2	Explain the rationale behind different diseases and their effects on health.
CO3	Apply knowledge of dietary modifications to create personalized meal plans for different medical conditions.
CO4	Demonstrate the ability to calculate nutrient content in intensive care setup.
CO5	Compare and contrast various dietary approaches for managing similar health conditions.
CO6	Judge the suitability of diets for patients with comorbidities or special dietary requirements.
CO7	Design comprehensive dietary plans that integrate therapeutic requirements, patient preferences, and cultural considerations.

Unit No.	Course Content	No. of Hours
I	**A. Planning Nutrition support** **B. Planning and preparation of the prescribed therapeutic diets for specified cases in the following detail:** • Planning diets using Medical Nutrition Therapy to prescribe energy, macronutrients, fiber, micronutrients and fluids • Menu Planning for oral diets or nutrition support • Detailed calculation to understand the efficacy of the plan • Supplement usage • Outline recommendations in easily understood format	**30**

	i. Hypercatabolic states: ➢ Surgery ➢ Burns ➢ Trauma ➢ Head Injury ➢ Sepsis ➢ Multiorgan failure ➢ ARDS ➢ Respiratory Crisis – Ventilator support, Guillain Barre's Disease, COPD, Chronis Bronchitis, Asthma, Cystic Fibrosis **ii. Cancers:** Head and neck, pulmonary, reproductive, GI, Liver, pancreatic, Metastatic cancers, cancer cachexia, blood cancers and palliative care – inclusive of various modalities of management like surgery, chemotherapy, radiotherapy and bone marrow transplant	
II	**Planning and preparation of the prescribed therapeutic diets for specified cases in the following detail:** • Planning diets using Medical Nutrition Therapy to prescribe energy, macronutrients, fiber, micronutrients and fluids • Menu Planning for oral diets or nutrition support • Detailed calculation to understand the efficacy of the plan • Supplement usage • Outline recommendations in easily understood format **i. Disorders of the Gastro Intestinal system** ➢ GERD and esophagitis ➢ Gastroparesis ➢ Gastritis ➢ Peptic Ulcers **ii. Diseases of the intestine** ➢ Diarrhoea and Steatorrhoea ➢ Lactose Intolerance ➢ Constipation ➢ Gluten Induced Enteropathy ➢ Lactose intolerance ➢ Inflammatory bowel Disease ➢ Short Bowel Syndrome ➢ Small intestinal Bacterial Overgrowth and Dysbiosis ➢ Irritable Bowel Syndrome ➢ Diverticulitis and Hemorrhoids ➢ Infections of the small intestine **iii. Neurological Diseases** ➢ Neuro degenerative diseases and epilepsy ➢ Stroke and lesions – Nutritional requirements and issues, paralysis, pressure ulcers and dysphagia ➢ Psychiatric diseases ➢ Developmental disabilities – Cerebral Palsy, Down's syndrome and Autism **iv. Nutritional management of Nutritional anemias, Infections** – Typhoid, Tuberculosis, HIV and AIDS. **v. Allergies and food intolerances**	**30**

Total Hours	**60**

References:

Barrer. K. (2007) Basic Nutrition Counselling Skill Development. Wadsworth Pub

Bendich, A., & Deckelbaum, R. J. (Eds.). (2006). Preventive Nutrition: The Comprehensive Guide for Health Professionals. Springer.

Bendich, A., & Deckelbaum, R. J. (Eds.). (2016). Preventive Nutrition: The Comprehensive Guide for Health Professionals. Humana Press.

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Lutz, C. A., Przytulski, K. R., & Rutherford, K. L. (2015). Nutrition and Diet Therapy. F.A. Davis Company.

Nutrition in Critical Care. (2014). United Kingdom: Cambridge University Press.

Mahan, L. K., & Raymond, J. L. (2021). Krause's Food & the Nutrition Care Process. 15th edition. Elsevier.

Pope, J., & Berman, M. (2017). Nutrition for a Changing World. Wadsworth Publishing.

Shills. M. (2006). Modern Nutrition in Health and Disease.10th ed. Lippincot William and Wilkins.

Sizer, F., & Whitney, E. (2020). Nutrition: Concepts and Controversies. Cengage Learning.

Smolin, L. A., & Grosvenor, M. B. (2018). Nutrition: Science and Applications. Wiley.

Research article:

Recent published guidelines from ESPEN, ASPEN

Evaluation:

2 CREDITS COURSE FOR TOTAL MARKS OF 50	
CONTINUOUS INTERNAL EVALUATION:	**MARKS**
Journal	5
Continuous Evaluation: Assessment of case studies	10
Continuous Evaluation: Assessment of Cooking Skills and Techniques	10
Total Marks for Internal Assessment	**25**
SEMESTER-END EXAMINATION	**MARKS**
All questions are compulsory with internal choice.	
Construction of a case specific diet plan	20
Viva Voce examination	5
Total Marks for Semester End Examination	**25**
TOTAL MARKS FOR THE COURSE	**50**

Syllabus
M.Sc. (Foods, Nutrition and Dietetics)
(Sem. - III)

Course Code	Course Title	Theory/ Practical	Credits
FND03C3A	**Public Health Nutrition and Epidemiology**	**Theory**	**2**

Course Objectives:

1. Describe the current state of epidemiological evidence for relationships of the diet to the selected diseases
2. Be proficient in concepts of Public Health Nutrition and Epidemiology and with its relevance in health and disease in populations.
3. Learn about public health problems in India and the national health care delivery system.
4. Learn and critically evaluate nutritional assessment methodologies used for the populations.
5. Develop strategies to address public health issues

Course Outcomes (CO)

On successful completion of the course, the student will be able to:	
CO No.	**Course Outcomes**
CO1	Learn and remember the principles of basic epidemiology and public health discipline.
CO2	Understand and apply the appropriate epidemiological concepts and health behaviour models to understand health issues.
CO3	Apply the knowledge of various public health problems to design effective health and nutrition education programmes.
CO4	Examine the relevance and role of various institutions and policies in promotion of public health.

Unit No.	Course Content	No. of Hours
I	**Introduction to Public health Nutrition and Epidemiology** • Meaning, Definition and scope of Public Health Nutrition and Epidemiology. The 7 steps of the Public health nutrition cycle. • Role of Nutritionists in Public Health. • Approaches in epidemiology: Disease burden, natural history of diseases and measures of risk and death. **Nutritional Epidemiology Measurements** • Measurement of exposure and outcome and their relation. • Socio-demographic and psychosocial variables. • Overview of Health indicators, Morbidity, Mortality, Rates and Ratios-Incidence, Prevalence, Odds ratio and relative risk. • Biomarkers and their importance in diagnosis **Public Health Nutrition strategies** • Intervention at the Ecological level- Key Principles, Guidelines for using the ecological approach to design nutrition interventions and change eating habits. • Intervention at the Individual level- Possible approaches, Theoretical models for behaviour change, Key steps involved in planning, implementing and evaluating an intervention **National Goals, Policies, Schemes and Programmes related to Nutrition and Health.** • Nutrition Related Health Goals- SDGs, Millennium Development Goals (MDGs). • Nutritional Policy and Planning- Aims, Government guidelines and Policy, Governmental and Non-Governmental organization, Health care delivery system in rural and urban India • National Rural Health Mission-Vision, objectives, strategies and outcomes of the mission. • Universal Immunization Programme.	**15**

	• Role of National and International Agencies to improve the nutritional status of the community (WHO, UNICEF, NIN, ICAR, FAO, CSIR) • Food Security –in Anthropocene Era. National Food Security Act Nutrition related problems in natural disasters and emergency situations. (Epidemics and Pandemics)	
II	**Dietary Guidelines** - Dietary goals versus dietary guidelines. Quantitative and Qualitative dietary guidelines. Steps involved in devising dietary guidelines. **Food Choice -** Population and Individual issues affecting food choice. **New-born care, child survival, child under nutrition** • Infant and Young Child feeding practices. Strategies to reach under two. • PEM among children - Medium Acute Malnutrition, Severe Acute Malnutrition in children and their management. **Nutritional Status of Women** • Dual nutrition burden in women: causes, consequences and control measures. Interventions to improve dietary intake and nutritional status in women. • Nutrition and Reproductive health • Maternal nutrition, Intrauterine Growth Retardation (IUGR) and foetal outcome. • Geriatric Nutrition and Common health problems. **Micro nutrient deficiency (Hidden Hunger)** - Vitamin A deficiency, Vitamin D deficiency, Iodine Deficiency Disorders, Iron deficiency and anaemia, Zinc Deficiency. **HIV and macronutrients and micronutrient nutrition** **Public Health Nutrition strategies related to non-communicable chronic disorders** Prevalence of non-communicable diseases at global and national level Public Health Impact of Obesity Prevention and Control of NCDs – Cancer, Diabetes, Hypertension and Cardiovascular diseases.	**15**
	Total Hours	**30**

References:

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Jelliffe, D.B. (1966). *The Assessment of the Nutritional Status of the community*, WHO Geneva.

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Sheila Chander Vir (ed) (2021) *Public Health Nutrition in Developing countries* –Part I & **Part II** Woodhead Publishing India Pvt. Ltd, New Delhi

Nutrition in Public Health: A Handbook for Developing Programs and Services. (2006). United Kingdom: Jones and Bartlett Publishers.

Evaluation:

2 CREDITS COURSE FOR TOTAL MARKS OF 50	
CONTINUOUS INTERNAL EVALUATION:	**MARKS**
Seminar and class presentations	10
Unit specific Class Tests (MCQ or Objective)	10
Class participation and evaluation	5
Total Marks for Internal Assessment	**25**
SEMESTER-END EXAMINATION	**MARKS**
All questions are compulsory with internal choice.	
Question 1 from Unit 1	10
Question 2 from Unit 2	10
Question 3 from multiple units	5
Total Marks for Semester End Examination	**25**
TOTAL MARKS FOR THE COURSE	**50**

M.Sc. (Foods, Nutrition and Dietetics)
(Sem. - III)

Course Code	Course Title	Theory/ Practical	Credits
FND03C3BP	Nutritional Assessment and Education	Practical	2

Course Objectives:

1. Gain knowledge related to the concept and the process of Public Health Nutrition.
2. Understand in detail the current and emerging issues in Public Health Nutrition.
3. Apply the knowledge to solve nutrition related health problems

Course Outcomes (CO)

On successful completion of the course, the student will be able to:	
CO No.	**Course Outcomes**
CO1	Remember and understand the various techniques of nutritional assessment.
CO2	Apply the principles of nutritional anthropometry to develop tools to be used in the field situation.
CO3	Analyze and interpret data.
CO4	Design questionnaires, interview schedules and evaluate its precision.
CO5	Develop various health education programmes.

Unit No.	Course Content	No. of Hours
I	**A. Nutritional assessment** i. Anthropometry: Measurement and interpretation of height, weight, circumference of chest, Mid–upper-arm-circumference in specific population groups. ii. Estimation of food and nutrient intake: Household food consumption data, adult consumption unit, 24 hours dietary recall 24 hours record, Weighment method, food diaries, food frequency data, use of each of the above, information available through each individual, collection of data, estimation of intakes. iii. Study and use the existing and emerging standardized assessment tools, scores and scales for socio-economic status, dietary diversity, risk for NCDs, sleep, stress and other relevant required assessments iv. Study various software and applications used in nutritional assessment **B. Data Collection Strategies – Make a detailed study of existing methods with a focus on addressing challenges of that method (Practical methods to overcome language barriers, addressing cultural competencies) and develop data collection tools for specific conditions** • Interview schedule • Focus Group Discussion Pre and Post intervention KAP schedules	**15**
II	**Nutrition Education Strategies and Tools for bettering health of communities:** The following strategies and tools will be learnt, developed and applied with a focus on inclusivity across socioeconomic groups, addressing language barriers and cultural competencies across all stages of life cycle stages. Interactive nutrition education and engagement models in in person both offline and	**15**

	online modes using: • Radio script • Charts, posters, flip cards, leaflets • Puppet shows • Food models • Skits and street plays etc. • Recipe demonstration **Effective use of digital technology in nutrition education of communities**	
	Total Hours	**30**

References:

Gibson, R.S. (1990). Principles of Nutritional Assessment. Oxford University Press. New Delhi.

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Mann, S.K., Sangha, J.K., Mehta, U. & Jain, R. (1999). Manual on Community Nutrition. College of Home Science, PAU, Ludhiana.

Obert, J.C. (1986). Community Nutrition. Mac Millan New York.

Park, K. (2000). Park's Text Book of Preventive and Social Medicine 16th Ed. Banarsidas Bhanot Publishing Jabalpur, India.

Shukla, P.K. (1982). Nutritional Problems of India. Prentice Hall of India.

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Longvah T, Ananthan R, Bhaskarachary K, Venkaiah K (2017) Indian food composition tables. National Institute of Nutrition.

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WHO (2007) WHO Reference Data for Children and Adolescents (5-19 years). WHO reference. Available at http://www.who.int/growthref/en/

WHO (2009) WHO Child growth standards: Growth velocity based on weight, length and head circumference Available at http://www.who.int

Khanna, K, Gupta, S, Sethi, R, Mahna, R,Rekhi, T (2004) The Art and science of cooking-A Practical Manual. Elite Publishing House Pvt. Ltd.

Chadha R, Mathur, P (2015) Nutrition A life cycle Approach. Orient BlackSwan Pvt. Ltd., Lady Irwin College.

Raina U, Kashyap S, Narula V, Thomas S, Suvira, Vir S, Chopra S (2010) Basic food preparation. (4th ed.) Lady Irwin Colle

Evaluation:

2 CREDITS COURSE FOR TOTAL MARKS OF 50	
CONTINUOUS INTERNAL EVALUATION:	**MARKS**
Anthropometric assessments, interpretations and presentation if data	10
Create info graphs, educational resources as brochures/videos/or other resources for creating community awareness in healthcare workers/community	15
Total Marks for Internal Assessment	**25**
SEMESTER-END EXAMINATION	**MARKS**
All questions are compulsory with internal choice.	
Create nutrition/health education program using the various techniques learnt	15
Viva Voce and journal	10
Total Marks for Semester End Examination	**25**
TOTAL MARKS FOR THE COURSE	**50**

Syllabus
M.Sc. (Foods, Nutrition and Dietetics)
(Sem. - III)

Course Code	Course Title	Theory/ Practical	Credits
FND03C4	**Sports and Fitness Nutrition**	**Theory**	**2**

Course Objectives:

To enable the student to

1. Gain knowledge about principles of physical education, fitness and sports for overall health and wellbeing.
2. Make a detailed study on the importance of nutrition in sports and fitness.
3. Design and evaluate diets for sports person.

Course Outcomes (CO)

On successful completion of the course, the student will be able to:	
CO No.	**Course Outcomes**
CO1	Understand the basic principles of physical fitness and sports and its role in health and wellness.
CO2	Instruct various physical activities for fitness.
CO3	Gain a better understanding of various fitness tests and its evaluation.
CO4	Design and evaluate diets for sports person.

Unit No.	Course Content	No. of Hours
I	**Nutrition for Fitness** Exercise physiology ● Components of fitness and wellness - physical, mental, social and spiritual ● Fitness tests and evaluation ● Exercise strategies to achieve fitness with focus on types, benefits, schedules and nutrition requirements Aerobic exercises Weight and resistance training and exercises for strength Exercises for flexibility Sports, games, team games and dance forms as strategies of fitness Strategies for mental, emotional, social and spiritual wellness	**15**
II	**Sports Nutrition** ● Recommended Dietary Allowances for sportspersons ● Each category of sports to be studied with focus on Somatotypes, Body composition, Nutritional requirements - Energy, Macro and micronutrients, hydration, pre and post workout snacks, supplements and ergogenic aids and nutrition education 1. Endurance sports 2. Power and resistance sports 3. Team sports 4. Combat sports ● Issues in sportspersons Doping and guidelines to prevent and assess it Female athlete triad	**15**

	Weight cutting ● Factors that improve sports performance Motivation and mindset Training and coaching Resilience and spirit of sportsmanship	
	Total Hours	**30**

References:

Bucher, C. A. (n.d.) Foundation of physical education. St. Louis: The C.V. Mosby Co. Deshpande, S. H. (2014). Physical Education in Ancient India. Amravati: Degree college of Physical education.

Mohan, V. M. (1969). Principles of physical education. Delhi: Metropolitan Book Dep. Nixon, E. E. & Cozen, F.W. (1969). An introduction to physical education. Philadelphia: W.B. Saunders Co.

William, J. F. (1964). The principles of physical education. Philadelphia: W.B. Saunders Co.

Coalter, F. (2013) Sport for Development: What game are we playing?.Routledge.

Singh Hardayal (1991), Science of Sports Training, DVS Publication, New Delhi

Muller, J. P.(2000). Health, Exercise and Fitness. Delhi : Sports.

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Amit Arjun Budhe, (2015) Career aspects and Management in Physical Education, Sports Publication, New Delhi

Pinto John and Ramachandra K (2021) Kannada Version, Daihika Shikshanada Parichaya, Louis Publications, Mangalore

Evaluation:

2 CREDITS COURSE FOR TOTAL MARKS OF 50	
CONTINUOUS INTERNAL EVALUATION:	**MARKS**
Class participation, Written Short Quizzes	10
SPSS data entry & descriptive statistical analysis assignment	05
Problem-solving Exercises (in pairs or individually) & Practice Sums (individually)	10
Total Marks for Internal Assessment	**25**
SEMESTER-END EXAMINATION	**MARKS**
All questions are compulsory with internal choice.	
Question 1 from Unit 1	10
Question 2 from Unit 2	10
Question 3 from multiple units	05
Total Marks for Semester End Examination	**25**
TOTAL MARKS FOR THE COURSE	**50**

Syllabus
M.Sc. (Foods, Nutrition and Dietetics)
(Sem. - III)

Course Code	Course Title	Theory/ Practical	Credits
FND03C5E1A	**Innovation and Entrepreneurship in Foods, Nutrition and Dietetics**	**Theory**	**2**

Course Objectives:

To enable students to

1. Gain knowledge on the key elements of innovation and entrepreneurship in Foods, Nutrition and Dietetics.
2. Understand the financial, ethical and legal aspects of entrepreneurship.
3. Develop an entrepreneurial skill set through creation of business plans
4. Design entrepreneurial strategies and develop plans to implement it

Course Outcomes (CO)

On successful completion of the course, the student will be able to:

CO No.	Course Outcomes
CO1	Describe the principles of innovation, business, marketing and financial planning.
CO2	Understand financial, ethical and legal issues pertinent to business plans and models.
CO3	Apply their knowledge of Foods, Nutrition and Dietetics in developing business models for niche markets.
CO4	Analyse the unique features as well as limitations of various business models of products and services in the field of Foods, Nutrition and Dietetics
CO5	Evaluate the feasibility of proposed business models
CO6	Generate novel ideas and create a business model plan for an innovative product or service

Unit No.	Course Content	No. of Hours
I	**A. Innovation and Entrepreneurship** i. Innovation and Entrepreneurship Ecosystem in Foods, Nutrition and Dietetics. ii. Role of mentorship in entrepreneurial success. iii. Types of Innovation in Foods, nutrition and Dietetics- product innovation, service innovation, process innovation, technology innovation and others. iv. Steps in the Innovation process. **B. Concept of Design Thinking** i. Steps in Design Thinking- Empathise, Define, Ideate, Prototype, Test. **C. Market research and competitive analysis for start-ups** i. Segmentation, Targeting, and Positioning (STP) strategy in marketing. **D. Creation of a business Models in Foods, Nutrition and Dietetics** i. Types of business models. ii. Business Model Canvas- components and role in creation of a business plan. iii. Business Model Failure/ Start up failure- Reasons and Remedies. **E. Marketing of Innovation** Branding and positioning methods	**15**

	F. Social Entrepreneurship in Foods, Nutrition and Dietetics Profit and Not-for-Profit Models	
II	**A. Financial Considerations in entrepreneurship** Government schemes/ initiatives to support start-ups Other sources of capital **B. Legal and Ethical concerns in Innovation and Entrepreneurship** Legal requirements for business ventures Ethical Issues- Fairness, Personnel and Customer Relations, Unfair Competition, Non-respect of Agreements, Environmental Degradation, conflict of interest. **C. Intellectual Property (IP) and management of Intellectual Property Rights (IPR)** i. Concept of IP and its importance ii. Types of IP (Patents, Trademarks, Industrial Designs, Copyrights, Geographical Indication, and Trade Secrets). iii. Licensing and Technology Transfer	**15**
	Total Hours	**30**

References:

De Bernardi, P., Azucar, D. (2019). Innovation in Food Ecosystems: Entrepreneurship for a Sustainable Future. Germany: Springer International Publishing.

Boyle, M. A., Holben, D. H. (2010). Community Nutrition in Action: An Entrepreneurial Approach. United States: Wadsworth, Cengage Learning.

Edelstein, S. Managing Food and Nutrition Services: For the Culinary, Hospitality, and Nutrition Professions. (2008). United States: Jones and Bartlett Publishers.

Green, K. (2017). Recipe for success – the ingredients of a profitable food business. Troubador Publishing Limited.

King, K. (2009). The Entrepreneurial Nutritionist. United Kingdom: Wolters Kluwer Health/Lippincott William & Wilkins.

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Mitchell, F. B., Silver, A. M. (2011). Making Nutrition Your Business. United States: American Dietetic Association.

Tokarski, K. O. (2012). Social Entrepreneurship and Social Business: An Introduction and Discussion with Case Studies. Germany: Gabler Verlag.

Evaluation:

2 CREDITS COURSE FOR TOTAL MARKS OF 50	
CONTINUOUS INTERNAL EVALUATION	**MARKS**
Class test/ quiz	10
Class participation/ group discussion	5
Seminar/ Power-point Presentation on latest trends in food preservation and processing	10
Total Marks for Internal Assessment	**25**
Semester-end Examination	**Marks**
All questions are compulsory with internal choice.	
Question 1 from Unit 1	10
Question 2 from Unit 2	10
Question 3 from multiple units	5
Total Marks for Semester End Examination	**25**
TOTAL MARKS FOR THE COURSE	**50**

M.Sc. (Foods, Nutrition and Dietetics)
(Sem. - III)

Course Code	Course Title	Theory/ Practical	Credits
FND03C5E1BP	**Innovation and Entrepreneurship in Foods, Nutrition and Dietetics**	**Practical**	**2**

Course Objectives:

To enable students to

1. Identify entrepreneurial ventures offering innovative products and services in Foods, Nutrition and Dietetics and describe their structure and business models.
2. Develop their own business enterprise with the application of principles of design thinking and innovation.
3. Familiarize them with various food products and services protected through Intellectual Property Rights (IPR) in the country.

Course Outcomes (CO)

On successful completion of the course, the student will be able to:	
CO No.	**Course Outcomes**
CO1	Identify business ventures in Foods, Nutrition and Dietetics and outline the models ascribed to the success of the enterprise.
CO2	Understand the unique features of various food processes, products and services protected using Intellectual Property Rights (IPR) in India.
CO3	Review food and nutrition related problems and propose novel solutions through ideation of business models.
CO4	Analyse the financial aspects and legal requirements crucial for establishing an enterprise.
CO5	Evaluate marketing strategies and proficiently employ them to market the business model to targeted population groups.
CO6	Create a business model and launch their own food and nutrition enterprise.

Unit No.	Course Content	No. of Hours
I.	**A. Survey of entrepreneurial ventures in the field of Foods, Nutrition and Dietetics with emphasis on:** i. Products and services offered ii. Business model **B. Conceptualization of an entrepreneurial venture in the area of Food product development, Nutrition and wellness communication and others:** i. Idea generation ii. Market research iii. Creation of a business model iv. Development of branding strategies	30

II.	**A. Financial and legal aspects** i. Compilation of a list of possible sources of capital for the proposed business venture. ii. Listing of the requisite legal framework applicable for the proposed business enterprise. **B. Survey of Intellectual Property** i. Patents and Copyrights- Database search of Indian innovations and content creation in the field of Foods, Nutrition and Dietetics (Innovative food processes and products, digital technology, literary content and others). ii. Survey of foods and food products with Geographic Indication and review of food products, designs and services protected through other forms of IP (trade secrets, registered trademarks and industrial designs)	30
	Total Hours	60

References:

Boyle, M. A., Holben, D. H. (2010). Community Nutrition in Action: An Entrepreneurial Approach. United States: Wadsworth, Cengage Learning.

Edelstein, S. Managing Food and Nutrition Services: For the Culinary, Hospitality, and Nutrition Professions. (2008). United States: Jones and Bartlett Publishers.

Green, K. (2017). Recipe for success – the ingredients of a profitable food business. Troubador Publishing Limited.

King, K. (2009). The Entrepreneurial Nutritionist. United Kingdom: Wolters Kluwer Health/Lippincott William & Wilkins.

Mitchell, F. B., Silver, A. M. (2011). Making Nutrition Your Business. United States: American Dietetic Association.

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Evaluation:

2 CREDITS COURSE FOR TOTAL MARKS OF 50	
CONTINUOUS INTERNAL EVALUATION:	**MARKS**
Class participation/ quiz	10
Group Project	10
Journal	5
Total Marks for Internal Assessment	**25**
SEMESTER-END EXAMINATION	**MARKS**
All questions are compulsory with internal choice.	
Question 1 from Unit 1	10
Question 2 from Unit 2	10
Question 3 from multiple units	5
Total for Semester End Examination	**25**
TOTAL MARKS FOR THE COURSE	**50**

M.Sc. (Foods, Nutrition and Dietetics)
(Sem. - III)

Course Code	Course Title	Theory/ Practical	Credits
FND03C5E2A	**Current and Emerging Digital Technologies in Foods, Nutrition and Dietetics**	**Theory**	**2**

Course Objectives:

To help students:

1. Understand and use digital tools and applications for dietary assessment, analysis, and client communication.
2. Collect dietary data digitally and ensure accuracy, completeness, and data privacy.
3. Analyze nutrition information generated by digital tools to provide evidence-based recommendations.
4. Evaluate the reliability and usability of digital dietary assessment tools.
5. Explore innovations in digital technology and their impact on dietetics and nutrition research.
6. Integrate digital technology into dietetics practice, optimizing workflows and enhancing client care.
7. Address ethical considerations related to data privacy, cultural sensitivity, and informed consent in digital dietetics practice.

Course Outcomes (CO)

On successful completion of the course, the student will be able to:

CO No.	Course Outcomes
CO1	Recall the basic principles of digital technology and its relevance in the field of dietetics.
CO2	Explain the significance of digital technology in dietetics for data collection, analysis, and communication with clients.
CO3	Describe the various digital tools and software commonly employed in dietary assessment and nutrition planning.
CO4	Apply digital technology to collect and analyze dietary intake data from clients or research participants.
CO5	Evaluate the effectiveness of digital technology in enhancing dietary counseling and nutrition education for clients.
CO6	Develop strategies for integrating digital technology into dietetics practice to improve efficiency and effectiveness.

Unit No.	Course Content	No. of Hours
I.	**A. Introduction** a. Principles, characteristics, classification b. Ethics in digital marketing and technology c. Scope of using digital technologies and resources in Nutrition, lifestyle and health considerations **B. Digital technology, resources and applications in nutrition assessments** a. Digital resources for data collection for nutrition assessment b. Using mobile-phone technology, AI (Artificial Intelligence), Robotics, Softwares c. Applications: digital food and lifestyle diaries, food choice and lifestyle monitoring, apps for screening tools, digital score generation of risk factors and knowledge attitudes and practices using add in apps d. Health monitoring: Wearable devices to monitor parameters, ambulatory BP monitoring, blood sugar monitoring	**15**

	C. Digital technology, resources and applications in Dietetics Practice a. Digital consultations and coaching b. Software for diet planning c. Softwares for documentation of Nutrition Care Process in clinics and hospitals d. AI based Nutrition counselling e. Interactive Chatbots for patient support f. Camera Interface for Nutrition and Facial recognition-based applications in dietetics **Exposure/ Inputs with new emerging technology/ innovation**	
II.	**A. Digital technology, resources and applications in Nutrition and Lifestyle education** a. Websites, blogs and E learning resources and platforms b. Social media in nutrition education and support - Facebook, Instagram, WhatsApp c. Applications for Lifestyle betterment d. Nutrition labelling **B. Digital technology, resources and applications in hospital kitchens** a. Software for Purchasing, inventory and Menu planning b. Automated manufacturing units in hospital kitchens and cloud kitchen using software, robotics and AI c. Software for Meal scheduling and disbursal d. Digitisations, automations and software in the food industry **C. Digital technology, resources and applications in sustainable practices** 1. Tools for Digital Technology for sustainability in Food industry and Dietetics: a. Smart Kitchen Appliances b. Meal Planning Apps with Sustainable Recipes c. Blockchain for Food Traceability d. AI and Robotics in the food industry 2. Resources for Understanding Digital Technology in Sustainable Dietetics: a. Sustainable Nutrition Guidelines b. Online Courses on Sustainable Nutrition 3. Applications of Digital Technology in Sustainable Dietetics: a. Telehealth Platforms for Virtual Consultations b. Personalized Nutrition Apps with continuous measurements with sustainable results c. Digital Tools for Food Waste Reduction d. Educational Apps on Sustainable Eating e. Smart Agriculture Platforms for Locally Sourced Foods **D. Overview of Development of Software's/ Apps** **E. Exposure/ Inputs with new emerging technology/ innovation**	**15**
	Total Hours	30

References:

Digital Food Cultures. (2020). United Kingdom: Taylor & Francis.

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Trends in Personalized Nutrition. (2019). Netherlands: Elsevier Science.
Wardlaw, G. M., Byrd-Bredbenner, C. (2012). Wardlaw's Perspectives in Nutrition. United Kingdom: McGraw-Hill Higher Education.

Evaluation:

2 CREDITS COURSE FOR TOTAL MARKS OF 50	
CONTINUOUS INTERNAL EVALUATION:	**MARKS**
Literature Review	10
Create a resource or complete a course	10
Class discussion	5
Total Marks for Internal Assessment	**25**
SEMESTER-END EXAMINATION	**MARKS**
All questions are compulsory with internal choice.	
Question 1 from Unit 1	10
Question 2 from Unit 2	10
Question 3 from multiple units	5
TOTAL MARKS FOR SEMESTER END EXAMINATION	**25**
TOTAL MARKS FOR THE COURSE	**50**

M.Sc. (Foods, Nutrition and Dietetics)
(Sem. - III)

Course Code	Course Title	Theory/ Practical	Credits
FND03C5E2BP	**Current and Emerging Digital Technologies in Foods, Nutrition and Dietetics**	**Practical**	**2**

Course Objectives:

To help students:

1. Understand and use digital tools and applications for dietary assessment, analysis, and client communication.
2. Collect dietary data digitally and ensure accuracy, completeness, and data privacy.
3. Analyze nutrition information generated by digital tools to provide evidence-based recommendations.
4. Evaluate the reliability and usability of digital dietary assessment tools.
5. Explore innovations in digital technology and their impact on dietetics and nutrition research.
6. Integrate digital technology into dietetics practice, optimizing workflows and enhancing client care.
7. Address ethical considerations related to data privacy, cultural sensitivity, and informed consent in digital dietetics practice.

Course Outcomes (CO)

On successful completion of the course, the student will be able to:	
CO No.	**Course Outcomes**
CO1	Recall the basic principles of digital technology and its relevance in the field of dietetics.
CO2	Explain the significance of digital technology in dietetics for data collection, analysis, and communication with clients.
CO3	Describe the various digital tools and software commonly employed in dietary assessment and nutrition planning.
CO4	Apply digital technology to collect and analyze dietary intake data from clients or research participants.
CO5	Evaluate the effectiveness of digital technology in enhancing dietary counseling and nutrition education for clients.
CO6	Develop strategies for integrating digital technology into dietetics practice to improve efficiency and effectiveness.

Unit No.	Course Content	No. of Hours
I.	**1. Digital Technology in Dietetics:** a. Hands-on experience with mobile apps for data collection. b. Simulation of digital consultations and AI-based counseling. **2. Digital Technology in Nutrition Assessments:** a. Practical use of apps for nutrition assessment. b. Exploration of screening tools and health monitoring apps. **3. Digital Technology in Dietetics Practice:** a. Simulated digital consultations. b. Introduction to diet planning software and AI-driven counseling. c. Hands-on experience with interactive chatbots. **4. Digital Technology in Nutrition and Lifestyle Education:** a. Creation of an educational blog. b. Hands-on session on social media for nutrition education. **5. Digital Technology in Hospital Kitchens:** Practical exercises with software for menu planning and inventory.	**30**
II.	**Case study presentation, Guest Speaker Series and visits:** a. Inviting guest speakers who have successfully launched clinical nutrition startups, existing wellness, sports and fitness industry, digital technology, clinical products, health kitchen, nutrition education. b. Sharing their experiences, challenges, and insights. c. Q&A session with guest speakers. d. Make a detailed case study using literature or real time examples and present the learnings Visit to dietetics and food industry facilities using digital technology, AI and robotics	**30**
	Total Hours	**60**

References:

Digital Food Cultures. (2020). United Kingdom: Taylor & Francis.

Digital Health Technology for Better Aging: A Multidisciplinary Approach. (2021). Germany: Springer International Publishing.

Emerllahu, D. (2022). Technology Use by Registered Dietitians for Patient Care in an Outpatient Setting. United States: Rochester Institute of Technology.

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Šmahel, D., Macháčková, H., Šmahelová, M., Čevelíček, M., Almenara, C. A., Holubčíková, J. (2018). Digital Technology, Eating Behaviors, and eating disorders. Germany: Springer International Publishing.

Trends in Personalized Nutrition. (2019). Netherlands: Elsevier Science.

Wardlaw, G. M., Byrd-Bredbenner, C. (2012). Wardlaw's Perspectives in Nutrition. United Kingdom: McGraw-Hill Higher Education.

Evaluation:

2 CREDITS COURSE FOR TOTAL MARKS OF 50	
CONTINUOUS INTERNAL EVALUATION	**MARKS**
Create a digital module for assessment, counseling and nutrition education	15
Continuous marking for each practical component	10
Total Marks for Internal Assessment	**25**
SEMESTER-END EXAMINATION	**MARKS**
All questions are compulsory with internal choice.	
Developing a strategy for creating a digital portal for management of specific health condition or in dietetic practice	15
Journal	5
Viva-voce examination	5
Total Marks for Semester End Examination	**25**
TOTAL MARKS FOR THE COURSE	**50**

Syllabus
M.Sc. (Foods, Nutrition and Dietetics)
(Sem. - III)

Course Code	Course Name	Theory/ Practical	Credits	Hours
FND03C6	**Research Project**	**Practical**	**4**	**180**

Course Objectives:

To enable students to

1. Conduct independent research under supervision in Foods, Nutrition and Dietetics and allied areas.
2. Work in conjunction with relevant food industries, institutes, Governmental and non-governmental agencies, NGOs, hospitals, clinics, schools, sports and fitness ventures, entrepreneurs, communities and other relevant agencies.
3. Develop general research skills as well as research skills specific to their specialization and adopt best practices in research.
4. Design the beginning steps of the research process, formulate and defend a research proposal, begin data collection, and write the first four chapters of the dissertation (Introduction, Review of Literature; Aims and Objectives and Method).

Course Outcomes:

On successful completion of the course, the student will be able to:	
CO No.	**Course Outcomes**
CO1	Demonstrate the ability to design and conduct independent research projects in the field of Foods, Nutrition and Dietetics and related disciplines, under the guidance of faculty mentors.
CO2	Establish effective partnerships and collaborations with relevant industries, institutes, NGOs, hospitals, schools, and other stakeholders to enrich research endeavors and enhance practical applications of research findings.
CO3	Develop and apply advanced research methodologies, techniques, and tools specific to their area of specialization, while also honing general research skills such as critical thinking, problem-solving, and data analysis.
CO4	Adhere to ethical standards and best practices in research, including the responsible conduct of research, proper citation and referencing, and maintaining integrity in data collection, analysis, and reporting.
CO5	Successfully complete key milestones in the research process, including formulating and defending a well-structured research proposal, initiating data collection procedures, and drafting the initial chapters of the dissertation (Introduction and Review of Literature; Methodology) with clarity, coherence, and scholarly rigor.

Unit No.	Course Content	No. of Hours
I	**Understanding tools for review of literature** • Metanalaysis and Literature review- differences • PubMed, Cochrane Databases, Research Gate, Google Scholar • RefWorks, Citethisforme, • Understanding various referencing styles AMA, Vancouver, APA (6^{th} Ed) • Plagiarism Check Softwares	

II	**Review of Literature** • Explore and finalize the area of interest for research with guidance from experts for feasibility, relevance and significance. • Refer national and international journals and other relevant literature like dissertations, thesis, books. • Contacting and communicating with experts (locally, nationally, and internationally) initially and periodically throughout the research process • Identifying possible focus areas with regard to one topic; specifying one such focus area (using relevant reading and communication with experts); writing research objectives/ questions/ hypotheses; conducting a thorough literature review; presenting a clear and convincing argument in support of the study; writing the first chapter of the dissertation, namely, the *Introduction and Review of Literature*, with due acknowledgement of source of ideas.	
III	**Proposed Methodology** • Specifying variables; defining variables (citing relevant literature) • Selecting an appropriate research design • Writing the second chapter of the dissertation, namely, the *Method*, with due acknowledgement of source of ideas; orally defending a research proposal; integrating feedback. • Obtaining consent from participants and relevant agencies/authorities; starting data collection; integrating changes if any; scheduling remaining data collection; starting data entry; revising the first two chapters of the dissertation.	
IV	**4. Beginning Data Collection** • Obtaining consent from participants and relevant agencies/authorities; • At least starting data collection; • Integrating changes if any; • Scheduling remaining data collection; • Starting data entry; • Revising the first two chapters of the dissertation.	
	Total Hours	**120**

References:

Dissertations in the College Library
Relevant Research Literature as per selected topic from scientific journals, dissertations, theses, books, literature on the internet.

Evaluation:

4 CREDITS COURSE FOR TOTAL MARKS OF 100	
CONTINUOUS INTERNAL EVALUATION	**MARKS**
Research Guide's Evaluation for Examining the Student's expertise with regard to Research: Proactive / Initiative / Responsibility / Flexibility/ Receptivity to feedback/ Thoroughness/ Meeting deadlines / Regularity in meeting/ Ethics / Absence of Plagiarism/ Networking, collaboration/ contacting experts.	25
Research Guide's Evaluation for Examining the Quality of Chapters 1 and 2 of the M.Sc. Dissertation: Chapter 1: Literature Review; Research Purpose (Objectives/Hypotheses/Questions); Chapter 2: Tools/Measurement	25
Total Marks for Internal Assessment	**50**
SEMESTER-END EXAMINATION	**MARKS**
All questions are compulsory with internal choice.	
External Examiner's Evaluation of the Submitted Document: Relevance of research topic; Accuracy/Thoroughness of Literature Review; Clarity & Appropriateness of the Research Purpose; Accuracy & quality of methodology-related decisions; Quality & appropriateness (including ethics) of measurement/tools	25
External Examiner's Evaluation through Viva Voce, of Student's expertise with regard to Research: Clarity/Soundness/Accuracy with regard to selection of topic; Ability to clarify and contextualize Non-Indian vs Indian Literature; Clarity/Soundness/Accuracy with regard to the review of literature , research design & sampling, measurement/tools & plan of analysis, the beginning steps of the research process; student's emerging research expertise	25
Total Marks for Semester End Examination	**50**
TOTAL MARKS FOR THE COURSE	**100**

Sem. - IV

Syllabus
M.Sc. (Foods, Nutrition and Dietetics)
(Sem. - IV)

Course Code	Course Title	Theory/ Practical	Credits
FND04C1	**Advances in Human Nutrition—II**	**Theory**	**4**

Course Objectives:

To enable students to:

1. Gain a deep understanding of the recent advances of the role of micronutrients (vitamin and mineral) in human nutrition
2. Understand the recent advances of the role and interactions between micronutrients, the bioavailability of various nutrients and ways to improve it; and the effects of nutrient-nutrient interaction
3. Be updated on the recent advances in human nutrition and nutrient metabolism with reference to the requirements of macro-nutrients (carbohydrate, protein and fats), micronutrients and nutraceuticals and functional foods
4. Understand advanced concepts of special nutritional considerations in altered climatic conditions, the role of complementary nutrition, probiotics and functional foods and apply them to concepts of health
5. Design nutrition strategies to promote health and that will/may have a role in disease prevention and treatment.

Course Outcomes (CO)

On successful completion of the course, the student will be able to:

CO No.	Course Outcomes
CO1	To understand fundamental concepts of micronutrient requirements and the basis of arriving at it.
CO2	To classify the various types of micronutrients and comprehend their bioavailability and nutritional properties.
CO3	To comprehend the role of various micronutrients their dietary or food forms in human metabolism and apply this information for disease or deficiency prevention and health promotion.
CO4	To compare the role of various types of vitamins and minerals and their inter-relationship with each other and with macronutrients.
CO5	To plan various nutritional guidelines and dietary recommendations for optimal human nutrient intake within a complex multi-factorial eco-system and preventing a possibility of vitamin and mineral deficiency and toxicity both subclinical and clinical.
CO6	To interpret and analyse the effects of nutrient-nutrient interaction, bio-availability and other factors that may aid in optimal use of nutrient in human beings.

Unit No.	Course Content	No. of Hours
I	A. Micronutrients-Vitamins: A study of advanced concepts of the following vitamins with respect to • Structure, food sources, digestion, absorption and transportation; factors affecting bio-availability • Current research in the functions (metabolic & physiological/organ specific), requirements, deficiency & toxicity; assessment of nutritional status ❖ Fat soluble –A, D, E& K ❖ Water soluble vitamins (B-Complex vitamins and vitamin C).	**15**

	Quasi vitamins (in brief) - choline/betaine, inositol, carnitine bioflavinoids, lipoic acid, co-enzyme Q	
II	A. Micronutrients- Minerals : A study of advanced concepts of the following minerals with respect to • Structure, food sources, digestion, absorption and transportation; factors affecting bio-availability • Current research in the functions (metabolic & physiological/organ specific), requirements, deficiency & toxicity; assessment of nutritional status ❖ Macro minerals- Soduim, potassium, calcium, phosphorus and magnesium Micro minerals-Iron, iodine, zinc and fluorine, manganese	**15**
III	**A. Micronutrients – Trace and Ultra trace Minerals:** A study of advanced concepts of the following minerals with respect to • Structure, food sources, digestion, absorption and transportation; factors affecting bio-availability • Current research in the functions (metabolic & physiological/organ specific), requirements, deficiency & toxicity; assessment of nutritional status ❖ Trace Minerals- copper, selenium , cobalt, chromium and molybdneum ❖ Ultra Trace Elements – vanadium, silicon, boron, nickel, lithium, lead, cadmium, sulphur and arsenic • **Nutrient interrelationships and interactions:** • Vitamins and macronutrient • Vitamins and macronutrients • Mineral-Mineral interactions • Minerals and macronutrients Vitamins and Minerals	**15**
IV	**A: Nutritional Requirements for Special Conditions -** Extreme climatic conditions, high altitude and space nutrition **B: Complementary Nutrition –** A study of basic and advanced aspects of the following with respect to • Classification, structure, food sources, digestion, absorption and transportation; factors affecting bio-availability • Current research in the functions and health benefits (metabolic & physiological/organ specific), mechanism of action, requirements and dosages, sources, toxicity and challenges • Prebiotics, Probiotics, Synbiotics and postbiotics -Types, Sources of prebiotics and probiotics from foods and supplements, health benefits - gut, and other organ systems, immune system, cognitive and neurological health, role in disease prevention and management, Regulations • Bioactive Dietary Components, Functional foods, Phytochemicals, (Flavonoids, Phytoestrogens), dietary supplements, ergogenic aids, nutraceuticals and ayurceuticals (adaptogens, immune and cognition enhancers) . Meal Replacers - Classification, health benefits, mechanism of action, recommendations & concerns	**15**
	Total Hours	**60**

References:

Agarwal, A., & Udipi, S. (2012). *Textbook Of Human Nutrition* (1st ed.). Jaypee Brothers Medical Publishers.

Bodwell, C.E..and Erdman, J.W. (2008) Nutrient Interactions. Marcel Dekker Inc. New York

Chandra, R.K. (eds) (2002): Nutrition and Immunology, ARTS Biomedical. St. John's Newfoundland.

Garrow, J.S., James, W.P.T. and Ralph, A. (2000) Human Nutrition and Dietetics. 10th Edition, Churchill Livingstone Press, London, 145-152.

Geissler, C., Powers, H (11th ed.) (2005) Human Nutrition ELSEVIER Churchill Livinstone

Grodd, J.L. and Gropper, S.S. (1999) Advanced Nutrition and human metabolism. Belmount CA Wodworth/ Thomson learning.

Paul, I, Turner, E.R., Ross, Don – 2006 (2nd ed.) Discovering Nutrition – Jones and Bartlett Publishers – Canada.

Sareen, S, James Groff, J (2005). Advanced Nutrition in Human Metabolism, 4th Edition, Thomson Wordsworth Publication, USA.

Shils, M.E., Olson, J., Shike, M. and Roos, C (2003). Modern Nutrition in Health and Disease, 9" edition Williams and Williams. A Beverly Co. London.

Stipanuk Martha H. 2006 Biochemical, physiological, molecular aspects of human nutrition – Saunders ELSEVIER.

Zegler, E.E and Filer, L.J. (1996) Present knowledge in nutrition. Washington D.C. International Life Sciences Institute

Journals: 1. Nutrition Reviews 2. Journal of Nutrition 3. Journal of nutritional science 4. American Journal of Clinical Nutrition 5. British Journal of Nutrition 6. European Journal of Clinical Nutrition 7. International Journal of Vitamin and Nutrition Research 8. International Journal of Food Science and Nutrition 9. Nutrition Research 10. Annals of Nutrition & Metabolism

Evaluation:

4 CREDITS COURSE FOR TOTAL MARKS OF 100	
CONTINUOUS INTERNAL EVALUATION:	**MARKS**
Class participation, Class test/Open book test	20
Presentations using audio visual aids on any topic of recent advances in human nutrition	20
Attending seminars on any topic of human nutrition (online/offline)	10
Total Marks for Internal Assessment	**50**
SEMESTER-END EXAMINATION	**MARKS**
All questions are compulsory with internal choice.	
Question 1 from Unit 1	10
Question 2 from Unit 2	10
Question 3 from Unit 3	10
Question 4 from unit 4	10
Question 5 from all units	10
Total Marks for Semester End Examination	**50**
TOTAL MARKS FOR THE COURSE	**100**

Syllabus
M.Sc. (Foods, Nutrition and Dietetics)
(Sem. - IV)

Course Code	Course Title	Theory/ Practical	Credits
FND04C2A	**Advances in Clinical Nutrition II**	**Theory**	**2**

Course Objectives:

To help students:

- Gain a deep understanding of prevalence, etiology, pathophysiology, symptomatology, diagnosis, multipronged management approaches, medical nutrition therapy and lifestyle modifications in preventing and managing diseases.
- Gain a deep understanding of biochemical and physiological basis of nutritional needs and metabolism in critically ill patients and their significance in tackling disease burden.
- Acquire advanced learnings from current trends and research and apply the theories in patient management
- Apply concepts of therapeutic dietetics in community/ clinical settings.

Course Outcomes (CO)

On successful completion of the course, the student will be able to:

CO No.	Course Outcomes
CO1	List key lifestyle factors that contribute to the development of diseases.
CO2	Explain the physiological basis of various diseases and conditions, including their impact on nutrient metabolism and requirements.
CO3	Describe the role of therapeutic diets in the prevention and management of medical conditions.
CO4	Utilize dietary modification techniques to address the nutritional needs of patients with specific medical conditions.
CO5	Analyze patient case studies to identify nutritional risk factors, assess dietary intake, and recommend appropriate therapeutic diets.
CO6	Evaluate the effectiveness of dietary interventions in improving patient health outcomes and managing medical conditions.
CO7	Design comprehensive nutrition care plans for patients with complex medical conditions, integrating dietary recommendations with medical treatment plans.
CO8	Develop innovative strategies for promoting dietary adherence and patient education in clinical settings.

Unit No.	Course Content	No. of Hours
I	Advanced study of the following disease conditions that occurs in adult and pediatric populations with respect to prevalence, etiology, pathophysiology, symptomatology, diagnostics, nutritional assessment, medical therapy and drug nutrient interactions, medical nutrition therapy and lifestyle interventions for prevention and management of the condition and appropriate counselling and nutrition education strategies required for sustainable management **A. Diseases of the Liver** • Viral Hepatitis • Non-Alcoholic Fatty Liver Disease	**15**

	• Alcoholic Liver Disease • Cirrhosis – Compensated and decompensated • Hepatic Encephalopathy • Liver Transplant **B. Diseases of the pancreas and gall bladder** • Acute pancreatitis • Chronic pancreatitis • Cholecystitis • Cholelithiasis • Chyle Leak **C. Inborn errors of metabolism** • Amino acids metabolism • Carbohydrate metabolism • Fatty acid metabolism • Others with nutrition at the core of its management	
II	Advanced study of the following disease conditions that occurs in adult and pediatric populations with respect to prevalence, etiology, pathophysiology, symptomatology, diagnostics, nutritional assessment, medical therapy and drug nutrient interactions, medical nutrition therapy and lifestyle interventions for prevention and management of the condition and appropriate counselling and nutrition education strategies required for sustainable management **A. Renal diseases** • Glomerular nephritis • Nephrotic syndrome • Acute kidney injury • Chronic kidney disease • Renal replacement therapy ➢ Haemodialysis ➢ Peritoneal dialysis ➢ Renal Transplant • Nephro and urolithisis **B. Endocrine, rheumatic and autoimmune diseases** • Cushing's syndrome • Addison's disease • Thyroid diseases • PCOS • Fibromyalgia • Osteoarthritis • Rheumatoid arthritis • Gout • Systemic Lupus Erythromatosus • Myasthenia Gravis • Multiple sclerosis • Skin conditions	**15**

Total Hours	**30**

References:

Barrer. K. (2007) Basic Nutrition Counselling Skill Development. Wadsworth Pub

Bendich, A., & Deckelbaum, R. J. (Eds.). (2006). Preventive Nutrition: The Comprehensive Guide for Health Professionals. Springer.

Bendich, A., & Deckelbaum, R. J. (Eds.). (2016). Preventive Nutrition: The Comprehensive Guide for Health Professionals. Humana Press.

Blake, J. S. (2018). Nutrition: From Science to You. Pearson.

Blake, J. S. (2020). Nutrition and You: Core Concepts for Good Health. Pearson.

Brown, J. E. (2019). Nutrition Through the Life Cycle. Cengage Learning.

Journal of American Dietetic Association.

Lutz, C. A., Przytulski, K. R., & Rutherford, K. L. (2015). Nutrition and Diet Therapy. F.A. Davis Company.

Mahan, L. K., & Raymond, J. L. (2021). Krause's Food & the Nutrition Care Process. 15th edition. Elsevier.

Nutrition in Critical Care. (2014). United Kingdom: Cambridge University Press.

Pope, J., & Berman, M. (2017). Nutrition for a Changing World. Wadsworth Publishing.

Shills. M. (2006). Modern Nutrition in Health and Disease.10th ed. Lippincot William and Wilkins.

Sizer, F., & Whitney, E. (2020). Nutrition: Concepts and Controversies. Cengage Learning.

Smolin, L. A., & Grosvenor, M. B. (2018). Nutrition: Science and Applications. Wiley.

Evaluation:

2 CREDIT COURSE FOR TOTAL MARKS OF 50	
CONTINUOUS INTERNAL EVALUATION:	**MARKS**
Create a brand (website/ logo), create a nutrition care process model and use social media for nutrition education/ Design a preventive module for community on a chosen topic using oral, written and social media communication/ developing a nutrition education resources on preventive health for nurses/ doctors/ dietitians	10
Literature review of the given topic and its presentation	10
Quiz/ Debate/ Class discussion/ Debate	05
Total Marks for Internal Assessment	**25**
SEMESTER-END EXAMINATION	**MARKS**
All questions are compulsory with internal choice.	
Question 1 from Unit 1	10
Question 2 from Unit 2	10
Question 3 from multiple units	5
Total Marks for Semester End Examination	**25**
TOTAL MARKS FOR THE COURSE	**50**

Syllabus
M.Sc. (Foods, Nutrition and Dietetics)
(Sem. - IV)

Course Code	Course Title	Theory/ Practical	Credits
FND04C2BP	**Medical Nutrition Therapy II**	**Practical**	**2**

Course Objectives:

1. To provide a detailed practical aspect to the clinical conditions studied in theory.
2. To enable students to:
    - Do a detailed study of Medical Nutrition Therapy with appropriate literature review.
    - Analyze the given case.
    - Make a nutritional diagnosis with problem, etiology and symptom (PES) Statement and outline the goals of therapy.
    - Study of medical and surgical interventions which require nutritional management.
    - Propose a nutrition plan for the patient – with suggested outline of medical nutrition therapy with appropriate literature review, diet plan with detailed calculations and suggested supplements and adjuncts.
    - Prepare the selected meal.
    - Evaluate the suggested diet plans.
    - Prepare patient education resources.

Course Outcomes (CO)

On successful completion of the course, the student will be able to:	
CO No.	**Course Outcomes**
CO1	Recall key principles of intensive care nutrition and their application in clinical settings.
CO2	Explain the rationale behind different diseases and their effects on health.
CO3	Apply knowledge of dietary modifications to create personalized meal plans for different medical conditions.
CO4	Demonstrate the ability to calculate nutrient content in intensive care setup.
CO5	Compare and contrast various dietary approaches for managing similar health conditions.
CO6	Judge the suitability of diets for patients with comorbidities or special dietary requirements.
CO7	Design comprehensive dietary plans that integrate therapeutic requirements, patient preferences, and cultural considerations.

Unit No.	Course Content	No. of Hours
I	**A. Planning Nutrition support** **B. Planning and preparation of the prescribed therapeutic diets for specified cases in the following detail:** • Planning diets using Medical Nutrition Therapy to prescribe energy, macronutrients, fiber, micronutrients and fluids • Menu Planning for oral diets or nutrition support • Detailed calculation to understand the efficacy of the plan	**30**

	• Supplement usage • Outline recommendations in easily understood format **A. Diseases of the Liver** • Viral Hepatitis • Non-Alcoholic Fatty Liver Disease • Alcoholic Liver Disease • Cirrhosis – Compensated and decompensated • Hepatic Encephalopathy • Liver Transplant **B. Diseases of the pancreas and gall bladder** • Acute pancreatitis • Chronic pancreatitis • Cholecystitis • Cholelithiasis • Chyle Leak **C. Inborn errors of metabolism** • Amino acids metabolism • Carbohydrate metabolism • Fatty acid metabolism	
II	**B. Endocrine, rheumatic and autoimmune diseases** • Cushing's syndrome • Addison's disease • Thyroid diseases • PCOS • Fibromyalgia • Osteoarthritis • Rheumatoid arthritis • Gout • Systemic Lupus Erythromatosus • Myasthenia Gravis • Multiple sclerosis • Skin conditions	**30**
	Total Hours	**60**

References:

Barrer. K. (2007) Basic Nutrition Counselling Skill Development. Wadsworth Pub

Bendich, A., & Deckelbaum, R. J. (Eds.). (2006). Preventive Nutrition: The Comprehensive Guide for Health Professionals. Springer.

Bendich, A., & Deckelbaum, R. J. (Eds.). (2016). Preventive Nutrition: The Comprehensive Guide for Health Professionals. Humana Press.

Blake, J. S. (2018). Nutrition: From Science to You. Pearson.

Blake, J. S. (2020). Nutrition and You: Core Concepts for Good Health. Pearson.

Brown, J. E. (2019). Nutrition Through the Life Cycle. Cengage Learning.

Lutz, C. A., Przytulski, K. R., & Rutherford, K. L. (2015). Nutrition and Diet Therapy. F.A. Davis Company.

Nutrition in Critical Care. (2014). United Kingdom: Cambridge University Press.

Mahan, L. K., & Raymond, J. L. (2021). Krause's Food & the Nutrition Care Process. 15th edition. Elsevier.

Pope, J., & Berman, M. (2017). Nutrition for a Changing World. Wadsworth Publishing.

Shills. M. (2006). Modern Nutrition in Health and Disease.10th ed. Lippincot William and Wilkins.

Sizer, F., & Whitney, E. (2020). Nutrition: Concepts and Controversies. Cengage Learning.

Smolin, L. A., & Grosvenor, M. B. (2018). Nutrition: Science and Applications. Wiley.

Research article:

Recent published guidelines from ESPEN, ASPEN

Evaluation:

2 CREDITS COURSE FOR TOTAL MARKS OF 50	
CONTINUOUS INTERNAL EVALUATION:	**MARKS**
Journal	5
Continuous Evaluation: Assessment of case studies	10
Continuous Evaluation: Assessment of Cooking Skills and Techniques	10
Total Marks for Internal Assessment	**25**
SEMESTER-END EXAMINATION	**MARKS**
All questions are compulsory with internal choice.	
Construction of a case specific diet plan	20
Viva Voce examination	5
Total Marks for Semester End Examination	**25**
TOTAL MARKS FOR THE COURSE	**50**

Syllabus
M.Sc. (Foods, Nutrition and Dietetics)
(Sem. - IV)

Course Code	Course Title	Theory/ Practical	Credits
FND03C3	**Food Preservation, Processing and Quality Assurance**	**Theory**	**4**

Course Objectives:

To enable students to

1. Gain knowledge of conventional and novel techniques of food preservation and processing used by the food industry.
2. Learn and apply food laws and regulations applicable nationally and globally.
3. Develop food products keeping in mind food quality, food safety as well as sustainability.

Course Outcomes (CO)

On successful completion of the course, the student will be able to:	
CO No.	**Course Outcomes**
CO1	Describe the principles of food preservation.
CO2	Understand the impact of food processing on food quality.
CO3	Apply the knowledge of food preservation to enhance the shelf life of food products.
CO4	Analyse the technologies available and utilise them based on their suitability.
CO5	Appraise major laws and regulations governing food safety.
CO6	Create novel and sustainable food products for consumers with varied needs.

Unit No.	Course Content	No. of Hours
I	**A. Principles of Food Preservation:** General principles of Food preservation: Meaning, mode of action and changes in foods- An overview **B. Methods of Food Preservation: Principle and techniques** i. Overview of use of High temperature, low temperature, dehydration, concentration, fermentation and chemical preservatives in Food Preservation. ii. Use of Ionizing and nonionizing radiations in food preservation (Gamma radiation, electron beam radiation, UV radiation, infrared waves, radiowaves and microwaves). iii. Other techniques used in food preservation- Ohmic heating, High Pressure Processing and Hurdle Technology. iv. Emerging technologies in Food preservation- Cold Plasma technique, Ultrasound, Ozone technology, Pulsed electric field and Magnetic field technology. Emerging trends in sustainable food preservation (Use of Natural additives, nanotechnology and novel techniques of packaging for extension of shelf life etc.)	**15**
II	**A. Processing of Plant Foods** i. Cereals, Millets and legumes: Basic processing techniques- Cleaning and Grading, Parboiling, Milling, Polishing, Malting, Flaking and Puffing. Processing Technology of Bread, Pasta, Cakes and Biscuits	**15**

	Corn Syrup and High Fructose Corn Syrup (Overview) Basic processing of pulses (Overview) Soybean based products- Unfermented and fermented products Extrusion technology- Plant based meat analogues. Plant protein- Concentrates, Isolates and Hydrolysates (Overview) ii. Nuts and oils seeds Techniques of oil extraction- Traditional (Expeller/ rendering), hydraulic and solvent extraction. Process of Oil Refining Hydrogenation and interesterification of fat- Brief process and applications in manufacture of margarine, shortenings and spreads, non-dairy whipping cream. Oil blends iii. Fruits and vegetables Dehydrated, canned and frozen fruits and vegetables Jams, jellies, marmalades, gummies and fruit leather Chutneys, sauces and pickles (Overview) Fruit and vegetable purees and pastes (Overview) Fruit and vegetable based beverages (Overview) iv. Other products (Overview) Tea, Coffee and cocoa processing Alcoholic beverages (Beer and wine) Carbonated beverages Jaggery and Sugar production v. Emerging trends in plant food processing- Plant based milks, drinks for enhanced sports performance and other products (Overview) **Fortification of plant based foods**	
III	**A. Processing of Animal foods** i. Milk and milk products: Clarification, Pasteurization and Homogenisation of milk. Standard milk, toned milk and skimmed milk Cheese manufacture Indigenous milk products- Cream, Curd, Butter, Ghee, Buttermilk, Paneer, Rabri, Khoa, Shrikand and Lassi. Other products- Flavoured milk, Ice-cream and frozen desserts, Evaporated milk, Condensed milk, Milk powder, whey proteins, Yogurt and kefir. ii. Meat and Poultry: Abattoir operations, Post Mortem changes in meat, Tenderization of meat, Frozen meat and poultry, Bacon, Ham, Sausages, Nuggets/ Patties and other Ready to Cook (RTC) or Ready to Eat (RTE) products. Determination of egg quality Egg products- Liquid eggs, dehydrated eggs and other value added products (Lysozyme, avidin and bioactive peptides) iii. Seafood: Frozen fish, Canned fish, Dried fish, Smoked fish, Fish Flour, Fish oil, Surimi and Algal products. **B. Value added products from animal food processing waste (Overview)**	**15**
IV	**A. Food Safety and Quality Assurance** i. Food safety, Hazards and risks Meaning, definition, types of hazards: biological, physical and chemical hazards. Overview of Global Food Safety Issues ii. Food adulteration- Types, impact, methods of detection and regulations iii. Food Additives- Functional classes, role in different foods, safety assessment. iv. Food safety regulations National (FSSAI) & Global (Codex Alimentarius) Voluntary Standards in India	**15**

	AGMARK, BIS v. Food Safety and Quality management TQM, HACCP, ISO Good Hygiene Practices (GHP) and Good Manufacturing Processes (GMP) vi. Food labelling Emerging issues in Food Safety	
	Total Hours	**60**

References:

Chandrasekaran, M. Valorization of Food Processing By-Products (2012). United Kingdom: CRC Press.

Codex Alimentarius. Standards, codes of practice, guidelines, and other recommendations published by the Food and Agriculture Organization of the United Nations relating to food, food production, food labelling, and food safety available on https://www.fao.org/fao-who-codexalimentarius/en/

Food Safety and Standards Authority of India (FSSAI). Latest guidelines and standards along with amendments available on https://www.fssai.gov.in/

Hartel, R. W., Heldman, D. R. (2012). Principles of Food Processing. Switzerland: Springer US.

Mcwilliams, M. (2017). Foods experimental perspective. Pearson

Manay, S. N. and Shadaksharaswamy M. (2020). Food Facts and Principles. New Delhi: New Age International Publishers.

Pierson, M. HACCP: Principles and Applications. (2012). United States: Springer US.

Subhulakshmi G., Udipi A. Shobha and Ghugre S. Padmini (2021). Food Processing and Preservation (2nd Edition) New Age International Publishers, New Delhi.

Potter, N. N., Hotchkiss, J. H. (2012). Food Science: Fifth Edition. Netherlands: Springer US.

Smith, J. S., Hui, Y. H. (2014). Food Processing: Principles and Applications. India: Wiley.

Vaclavik, V. A. (n.d.). Essentials of Food Science. United States: Springer.

** All new journals related to Food Preservation and Food Processing

Evaluation:

2 CREDITS COURSE FOR TOTAL MARKS OF 50	
CONTINUOUS INTERNAL EVALUATION:	**MARKS**
Class test/ quiz	10
Class participation/ group discussion	10
Seminar/ Power-point Presentation on latest trends in food preservation and processing	20
Creation of flow charts on processes used by the food industry	10
Total Marks for Internal Assessment	**25**
SEMESTER-END EXAMINATION	**MARKS**
All questions are compulsory with internal choice.	
Question 1 from Unit 1	10
Question 2 from Unit 2	10
Question 3 from Unit 3	10
Question 4 from Unit 4	10
Question 5 from multiple units	10
Total Marks for Semester End Examination	**25**
TOTAL MARKS FOR THE COURSE	**50**

Syllabus
M.Sc. (Foods, Nutrition and Dietetics)
(Sem. - IV)

Course Code	Course Title	Theory/ Practical	Credits
FND04C4E1A	**Food Psychology and Nutritional Counseling**	**Theory**	**2**

Course Objectives:

To enable the student to

1. Understand the relevance and applications of food choice models and theories influencing factors of food choices and eating behavior.
2. Apply concepts of food psychology for health, disease prevention and nutrition education programmes.
3. Analyse and apply perceptions and factors influencing food choices from the point of view of the food consumer.
4. To design nutrition education programmes and nutrition counselling startegies using various principles and ethics influencing food consumption

Course Outcomes (CO)

On successful completion of the course, the student will be able to:

CO No.	Course Outcomes
CO1	To understand the research, principles and theories of food choices and eating psychology or similar studies involving human behavior applicable to food and nutrition.
CO2	To summarize various factors that influences food choices (biological, psychological and environmental)
CO3	To apply the knowledge in the area of human nutrition and eating psychology to address health related challenges that can be solved through change in eating behaviour and lifestyle.
CO4	To compare and gain an insight to different perspectives and broaden the areas of understanding food history, various food culture, food ethics and anthropology.
CO5	To plan various strategies and therapy that can be useful in implementing behavioural modification to prevent and treat diet and lifestyle related diseases.
CO6	To analyze the changing needs of a food consumer and to develop plans for food consumption that are psychologically appealing, sustainable and also environmentally safe.

Unit No.	Course Content	No. of Hours
I	**A. The psychology of food choices, eating behavior and consumer preferences** 1. Models and theories of food choice a. Social, psychological and development models of food choice b. Food choice Process model 2. Neurobiology of food intake: Biological and genetic influences on energy and nutrient intake 3. Food choices across the life span 4. Role of family and peers 5. Food history and Culture, religion 6. Food rewards 7. Mood, emotions and food choice 8. Role of stress in choosing foods	**15**

	9. Food cravings and addiction 10. Influences of Media on food choice **B. Psychology of the food and nutrition consumer** 1. Food quality and consumer expectations 2. The psychology of the food shopper 3. Factors affecting food purchase 4. Packaging and labeling based on the psychology of the consumer 5. Ethnic, religious and economic influences on food choice of the consumer 6. Consumer perception of processed foods, supplements (nutraceuticals), organic, genetically modified foods 7. Food trends and the changing consumer	
II	**A. Nutritional counselling: Process, ethics and skills** Definition and types of: Individual, family and group counseling and psychotherapy services **B. Applications of food psychology for health maintenance and disease prevention** 1. Strategies to change dietary behavior (Mindful eating, Implementations intention, REBT, stages of change model, Health coaching and others 2. Alcohol and tobacco use and abuse 3. Eating disorders and Body dysmorphia 4. Behavior modification strategies to influence food and nutrition choices in lifestyle disease conditions. **C. Applications of food psychology in counselling adult and pediatric populations** 1. Ingestive homeostasis 2. Early and conditioned food preferences 3. Development of human flavor preferences 4. Psychology of taste and taste aversion 5. Role of experience in the development of child's eating behavior. 6. Behavioral Problems and Parenting Style 7. Infant and young child feeding guidelines (W.H.O.) 8. Eating Problems in Young Children 9. Other problems that may affect eating behaviour- School avoidance, temper tantrum, sleep problems and violent behavior in children and adolescents, picky/fussy eating	**15**
	Total Hours	**30**

References:

Block, J., Scribner, R., & DeSalvo, K. (2004). Fast food, race/ethnicity, and income: a geographic analysis. American Journal of Preventive Medicine, 27(3), 211-17.

Bower, A. (2007). African-American foodways: Explorations of history and culture. Urbana, IL: University of Illinois Press.

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Caswell J. and Yaktine a..(2013).Supplemental Nutrition Assistance Program-Examining the Evidence to Define Benefit Adequacy, National Academies Press (US); Washington (DC).

Cawley, J. (Ed.). The Oxford handbook of the social science of obesity. Oxford, UK: Oxford University Press.

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Jacobson, H. (2013). Whole: Rethinking the science of nutritionism. Dallas, TX: BenBella Books. Kulick, D., & Meneley, A. (2003). Fat: The anthropology of an obsession. New York: Tarcher.

Layman B. (2012),A Psychology of Food-More Than a Matter of Tastes, Springer,Kindle Edition.

Mayer E. (2016).The Mind-Gut Connection: How the Hidden Conversation Within Our Bodies Impacts Our Mood, Our Choices, and Our Overall Health,Harper Collins Publishers.

Mendes R. and Dias E.(2011).Health Protection, Health Promotion, and Disease Prevention at the Workplace, Oxford University Press. DOI:10.1093/acprof:oso/9780195380002.003.0018

Ogden, J. (2011). *The Psychology of Eating: From Healthy to Disordered Behavior* (2nd ed.). Wiley &

Blackwell.
Rankin S.H., Stallings K.D. and London F.(2005) Patient Education in Health and Illness, Lippincott Williams & Wilkins, Philadelphia.
Rappaport, L. (2003). How we eat: Appetite, culture, and the psychology of food. Ontario, Canada: ECW Press.
Ronald, P., & Adamchak, R. W. (2008). Tomorrow's table: Organic farming, genetics, and the future of food. New York: Oxford University Press.
Rossi AA, Pietrabissa G, Castelnuovo G, Mannarini S. (2024). Cognitive restraint, uncontrolled eating, and emotional eating. The Italian version of the Three Factor Eating Questionnaire-Revised 18 (TFEQ-R-18): a three-step validation study. Eat Weight Disord. 29(1):16. doi: 10.1007/s40519-024-01642-y.
Russell, S. (2005). Hunger: An unnatural history. New York: Basic Books.
Shepherd R. and Raats M. (2010).The Psychology of Food Choice, The Centre for Agriculture and Bioscience International (CABI), Wallingford, England.
Sonnenfield, A., ed. (1999). Food: A culinary history from antiquity to the present. New York: Columbia University Press.
Veit, H. (2013). Modern food, moral food: Self-control, science, and the rise of modern American eating in the early twentieth century. Chapel Hill, NC: University of North Carolina Press.
Watson, J., & Caldwell, M. (2009). The cultural politics of food and eating. Malden, MA: Blackwell.
- www.newbooks-services.de/MediaFiles/Texts/7/9781107011007_Intro_001.pdf
- www.jblearning.com/samples/0763743828/43828_CH05_LO_5183.pdf
- www.eolss.net/sample-chapters/c04/e6- 27-01- 02.pdf
- www.emro.who.int/dsaf/EMRPUB_2012_EN_1362.pdf

Evaluation:

2 CREDITS COURSE FOR TOTAL MARKS OF 50	
CONTINUOUS INTERNAL EVALUATION	**MARKS**
Class participation, Class test/Open book test	10
Presentations using audio visual aids on any topic of application of food Psychology in health or product development	10
Group discussions/debate	05
Total Marks for Internal Assessment	**25**
Semester-end Examination	**Marks**
All questions are compulsory with internal choice.	
Question 1 from Unit 1	10
Question 2 from Unit 2	10
Question 3 from Unit 1 and unit 2	05
Total Marks for Semester End Examination	**25**
TOTAL MARKS FOR THE COURSE	**50**

Syllabus
M.Sc. (Foods, Nutrition and Dietetics)
(Sem. - IV)

Course Code	Course Title	Theory/ Practical	Credits
FND04C4E1BP	**Food Psychology and Nutritional Counselling**	**Practical**	**2**

Course Objectives:

To enable students to

1. Learn concepts and applications of food psychology through literature reviews and in depth study
2. Develop techniques and skills in nutritional counselling and communication skills and use tools and aids for better counselling
3. Interpret and plan qualitative research in area on food and eating psychology to understand human eating behaviour and food selection.

Course Outcomes (CO)

On successful completion of the course, the student will be able to:	
CO No.	**Course Outcomes**
CO1	To understand the principles and theories of counselling in the context of food, diet and nutrition.
CO2	To summarize various methods of qualitative research applicable in understanding eating behavior.
CO3	To apply the knowledge in the area of human nutrition and eating psychology to address health related challenges that can be solved through change in eating behaviour and lifestyle.
CO4	To compare and gain an insight to different perspectives and broaden the areas of understanding food history, various food culture, food ethics and anthropology.
CO5	To plan various strategies that can be useful in implementing behaviour modification with high compliance.
CO6	To interpret the use of various validated tools (e.g. questionnaire) in assessing nutrition and eating disorders.

Unit No.	Course Content	No. of Hours
I.	Food Psychology: 1. Detailed study using review of literature in the area of food psychology and eating behaviours pertaining to: • The various factors that influence food choices • Alternative Food Pathways and Eating Preferences • Food ethics, Cultural/Ethnic influence on food choices, • Identity - Divided Identities: Food and Gender/Class Differences. Food and Politics, rights and law with reference to food. 2. Planning and executing a qualitative research to study food choice behaviour 3. Mindful eating exercise and other psychotherapies in Obesity and other lifestyle disorders 4. Identifying validated questionnaires to screen and assess 'Eating Disorders' and body dysmorphia and emotional eating e.g. EAT – 26, MPEQ, Eating disorder examination EDE and assessment of eating behaviour e.g. Three factor eating questionnaire (TFEQ R-18)	15

II.	Nutritional Counselling: 1.Techniques and process of nutritional counselling 2.Motivational interviewing 4. Conducting a detailed Nutritional assessment and developing a strategy for nutritional counselling based on the nutritional care plan developed, a experiential learning through mock counselling session and a role play (Ethical principles for counselling) 5.Specific considerations in nutritional counselling for various age groups · Adult · Child (WHO's training course on infant and young child feeding counselling) · Elderly 6.Nutritional counselling for patients in the hospital and individuals belonging to different socio-economic strata (Case study)	15
	Total Hours	30

References:

Block, J., Scribner, R., & DeSalvo, K. (2004). Fast food, race/ethnicity, and income: a geographic analysis. American Journal of Preventive Medicine, 27(3), 211-17.

Bower, A. (2007). African-American foodways: Explorations of history and culture. Urbana, IL: University of Illinois Press.

Booth D.A.(1994).The Psychology of Nutrition, Taylor and Francis, UK.

Caswell J. and Yaktine a..(2013).Supplemental Nutrition Assistance Program-Examining the Evidence to Define Benefit Adequacy, National Academies Press (US); Washington (DC).

Cawley, J. (Ed.). The Oxford handbook of the social science of obesity. Oxford, UK: Oxford University Press.

Conner M and Armitage J.(2002).The social psychology of food, Open University Press, Mc –Graw Hill. Education, UK.

Counihan, C., & Van Esterik, P. (2008). Food and culture: A reader (2nd ed.). New York: Routledge. Duram, L. (2005). Good growing: Why organic farming works. Lincoln, NE: University of Nebraska Press.

Jacobson, H. (2013). Whole: Rethinking the science of nutritionism. Dallas, TX: BenBella Books. Kulick, D., & Meneley, A. (2003). Fat: The anthropology of an obsession. New York: Tarcher.

Layman B. (2012),A Psychology of Food-More Than a Matter of Tastes, Springer,Kindle Edition.

Mayer E. (2016).The Mind-Gut Connection: How the Hidden Conversation Within Our Bodies Impacts Our Mood, Our Choices, and Our Overall Health,Harper Collins Publishers.

Mendes R. and Dias E.(2011).Health Protection, Health Promotion, and Disease Prevention at the Workplace, Oxford University Press. DOI:10.1093/acprof:oso/9780195380002.003.0018

Ogden, J. (2011). *The Psychology of Eating: From Healthy to Disordered Behavior* (2nd ed.). Wiley & Blackwell.

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Ronald, P., & Adamchak, R. W. (2008). Tomorrow's table: Organic farming, genetics, and the future of food. New York: Oxford University Press.

Rossi AA, Pietrabissa G, Castelnuovo G, Mannarini S. (2024). Cognitive restraint, uncontrolled eating, and emotional eating. The Italian version of the Three Factor Eating Questionnaire-Revised 18 (TFEQ-R-18): a three-step validation study. Eat Weight Disord. 29(1):16. doi: 10.1007/s40519-024-01642-y.

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Sonnenfield, A., ed. (1999). Food: A culinary history from antiquity to the present. New York: Columbia University Press.

Veit, H. (2013). Modern food, moral food: Self-control, science, and the rise of modern American eating in the early twentieth century. Chapel Hill, NC: University of North Carolina Press.

Watson, J., & Caldwell, M. (2009). The cultural politics of food and eating. Malden, MA: Blackwell.

- www.newbooks-services.de/MediaFiles/Texts/7/9781107011007_Intro_001.pdf
- www.jblearning.com/samples/0763743828/43828_CH05_LO_5183.pdf
- www.eolss.net/sample-chapters/c04/e6- 27-01- 02.pdf
- www.emro.who.int/dsaf/EMRPUB_2012_EN_1362.pdf

Evaluation:

2 CREDITS COURSE FOR TOTAL MARKS OF 50	
CONTINUOUS INTERNAL EVALUATION:	**MARKS**
Class participation, Class test/ Review of literature (presentation on a topic)	10
Case study/ survey/Designing a qualitative research/demonstration of counselling techniques (mock session & role play)	10
Group discussion	05
Total Marks for Internal Assessment	**25**
SEMESTER-END EXAMINATION	**MARKS**
All questions are compulsory with internal choice.	
Develop a plan of nutrition counselling techniques and demonstrate strategies to use food psychology in food choice and eating behaviour	15
Viva voce	05
Journal	05
Total for Semester End Examination	**25**
TOTAL MARKS FOR THE COURSE	**50**

Syllabus
M.Sc. (Foods, Nutrition and Dietetics)
(Sem. - IV)

Course Code	Course Title	Theory/ Practical	Credits
FND04C4E2A	**Novel and emerging strategies for disease management**	**Theory**	**2**

Course Objectives:

To help students:

A.

- Understand the physiological changes post-bariatric surgery.
- Learn the nutritional requirements and dietary guidelines for bariatric patients.
- Recognize and manage potential nutritional deficiencies and complications.
- Develop skills in patient education and counseling specific to bariatric nutrition.
- Explore the role of the dietitian in a multidisciplinary team managing bariatric patients.

B.

- Understand the basic principles of genetics and genomics as they relate to nutrition.
- Explore the role of nutrients in gene expression and regulation.
- Analyze how genetic variations influence individual responses to nutrients.
- Evaluate the impact of diet on the genome and epigenome.
- Apply nutrigenomic knowledge to develop personalized nutrition strategies

Course Outcomes (CO)

On successful completion of the course, the student will be able to:	
CO No.	**Course Outcomes**
CO1	Understand the various types of bariatric surgeries and their indications and contraindications Understand and explain key concepts in nutrigenomics, including the human genome, genetic variation, nutrient-gene interactions, epigenetics, and the role of genetic polymorphisms in nutrient metabolism
CO2	Evaluate preoperative nutritional assessment tools and methods to determine the best approach for patient care Examine the influence of diet on gene expression and epigenetic marks, and evaluate the genetic predisposition to chronic diseases and the social implications of nutrigenomics research
CO3	Apply knowledge of postoperative diet progression to develop individualized nutritional plans for bariatric surgery patients. Illustrate mechanisms of nutrient-gene interactions, design personalized dietary recommendations, microbiome-targeted interventions, and nutrition strategies for sports and fitness based on genetic variations
CO4	Create comprehensive long-term nutritional management strategies that include protein, vitamin, and mineral supplementation for bariatric patients Formulate nutrigenomic approaches to healthy aging, and integrate personalized nutrition strategies into clinical and sports practice
CO5	Design intervention plans to manage common gastrointestinal symptoms and nutritional complications post-bariatric surgery and in cases to manage diseases based on nutrigenomic testing
CO6	Analyze the psychological and emotional aspects of bariatric surgery to provide effective patient counseling and support

Unit No.	Course Content	No. of Hours
I.	**Introduction to Bariatric Surgery** • Overview of obesity and its health implications. • Types of bariatric surgery (e.g., gastric bypass, sleeve gastrectomy, adjustable gastric banding). • Indications and contraindications for bariatric surgery. **Preoperative Nutritional Assessment** • Importance of nutritional assessment before surgery. • Tools and methods for nutritional assessment. • Preoperative dietary modifications and weight loss goals. **Physiology of Bariatric Surgery** • Anatomical and physiological changes post-surgery. • Impact of these changes on nutrient absorption and metabolism. **Immediate Postoperative Nutrition Care** • Phases of postoperative diet progression (clear liquids, full liquids, pureed foods, etc.). • Nutritional goals and common challenges in the immediate postoperative period. **Long-term Nutritional Management** • Long-term dietary guidelines and lifestyle changes. • Importance of protein, vitamins, and mineral supplementation. • Strategies for maintaining weight loss and preventing weight regain. **Macronutrient Needs and Challenges** • Protein requirements and sources. • Managing carbohydrate and fat intake. • Balancing macronutrients to support recovery and long-term health. **Micronutrient needs and challenges** • Common micronutrient deficiencies (e.g., iron, vitamin B12, calcium, vitamin D). • Supplementation protocols and monitoring. **Hydration and Fluid Management** • Importance of hydration post-surgery. • Fluid intake guidelines and managing dehydration risks. **Managing Gastrointestinal Symptoms** • Common gastrointestinal issues (e.g., dumping syndrome, constipation, nausea). • Nutritional strategies to manage these symptoms. **Nutritional Complications, monitoring, follow up care and long term compliance** • Identifying and addressing nutritional complications. • Laboratory tests and other monitoring tools. **Psychological Aspects of Bariatric Surgery** • Emotional and psychological challenges post-surgery. • Role of the dietitian in providing psychological support and counseling.	**15**

	Pediatric and Adolescent Bariatric Nutrition • Specific considerations for pediatric and adolescent patients. • Nutritional requirements and challenges in younger populations. **Special Populations and Bariatric Surgery** • Considerations for bariatric surgery in patients with diabetes, pregnancy, and other comorbidities. • Tailoring nutritional care to special populations. **Multidisciplinary Approach and Future Directions** • Role of the dietitian in the multidisciplinary team. Innovations and future directions in bariatric nutrition research and practice.	
II.	**Introduction to Nutrigenomics** • Definition and scope, historical background and significance • Overview of human genome and nutritional genomics • Nutrigenomics, metabolomics, proteomics, transcriptomics and personalized nutrition **Basics of Genetics and Genomics** • DNA structure and function • Gene expression and regulation • Genetic variation and polymorphisms **Nutrient-Gene Interactions and; epigenetics and nutrition** • Mechanisms of nutrient-gene interactions - examples and case studies of nutrients affecting gene expression • Epigenetic mechanisms: DNA methylation, histone modification • Influence of diet on epigenetic marks • Transgenerational epigenetic inheritance **Nutrigenomics of Macronutrients** • Carbohydrates, proteins, and fats • Genetic variations affecting metabolism of macronutrients • Personalized dietary recommendations **Nutrigenomics of Micronutrients** • Vitamins and minerals • Role of genetic polymorphisms in micronutrient metabolism • Impact on health and disease prevention **Functional Foods and Nutrigenomics** • Role in modulating gene expression • Development and application of functional foods **Gut Microbiome and Nutrigenomics** • Interaction between diet, microbiome, and host genome • Influence of probiotics and prebiotics on gene expression • Microbiome-targeted dietary interventions **Nutrigenomics and Chronic Diseases**	**15**

	• Genetic predisposition and diet in chronic diseases • Obesity, Cardiovascular disease, diabetes, cancer, autoimmune diseases and neurological issues • Nutrigenomic strategies for disease prevention and management **Nutrigenomics in fitness and sports** • Somatotype studies • Genetic variants determining sports choice and sports performance • Nutrigenomics based Nutrition interventions for sportspersons and fitness enthusiasts **Nutrigenomics and Aging** • Genetic and dietary factors in aging • Role of caloric restriction and anti-aging nutrients • Nutrigenomic approaches to healthy aging **Ethical, Legal, and Social Issues in Nutrigenomics** • Ethical considerations in nutrigenomic research • Legal and regulatory aspects • Social implications and public health perspectives **Personalized Nutrition and Precision Medicine** • Concept of personalized nutrition • Integrating nutrigenomics into clinical practice • Case studies and practical applications **Future Directions in Nutrigenomics** • Emerging trends and technologies • Potential impact on public health and clinical practice Research gaps and future opportunities	
	Total Hours	**30**

References:

Unit 1:

Bariatric Surgery: From the Non-Surgical Approach to the Post-Surgery Individual care. (2021). United Kingdom: IntechOpen.

Hakim, N. S. (2011). Bariatric Surgery. Singapore: Imperial College Press.

Management of Nutritional and Metabolic Complications of Bariatric Surgery. (2021). Germany: Springer Nature Singapore.

Minimally Invasive Bariatric and Metabolic Surgery: Principles and Technical Aspects. (2015). Germany: Springer International Publishing.

Nutrition and Bariatric Surgery. (2020). Netherlands: Elsevier Science.

Preedy, V. R., Rajendram, R., R Martin, C. (2016). Metabolism and Pathophysiology of Bariatric Surgery: Nutrition, Procedures, Outcomes and Adverse Effects. Netherlands: Elsevier Science.

Unit 2:

Carlberg, C., Ulven, S. M., Molnár, F. (2016). Nutrigenomics. Germany: Springer International Publishing.

Kohlmeier, M. (2012). Nutrigenetics: Applying the Science of Personal Nutrition. Netherlands: Elsevier Science.

Nutritional Genomics: Discovering the Path to Personalized Nutrition. (2006). Germany: Wiley.

Pemberton, A. (2022). Using Nutrigenomics Within Personalized Nutrition. United Kingdom: Jessica Kingsley Publishers.

Principles of Nutrigenetics and Nutrigenomics: Fundamentals of Individualized Nutrition. (2019). Netherlands: Elsevier Science.

Subbiah, M. T. R. (2013). Nutrigenomics: Application to the Development of Nutraceuticals and Cosmeceuticals. United States: Nova Science Publishers, Incorporated.

Evaluation:

2 CREDITS COURSE FOR TOTAL MARKS OF 50	
CONTINUOUS INTERNAL EVALUATION:	**MARKS**
Literature Review of specific topics	10
Create a resource on Bariatric Nutrition and applications of Nutrigenomics in specified aspect/ disease conditions for a health professional	10
Class discussion	5
Total Marks for Internal Assessment	**25**
SEMESTER-END EXAMINATION	**MARKS**
All questions are compulsory with internal choice.	
Question 1 from Unit 1	10
Question 2 from Unit 2	10
Question 3 from multiple units	5
TOTAL MARKS FOR SEMESTER END EXAMINATION	**25**
TOTAL MARKS FOR THE COURSE	**50**

Syllabus
M.Sc. (Foods, Nutrition and Dietetics)
(Sem. - IV)

Course Code	Course Title	Theory/ Practical	Credits
FND04C4E2BP	**Novel and emerging strategies for disease management**	**Practical**	**2**

Course Objectives:

To help students:

A.

- Understand the physiological changes post-bariatric surgery.
- Learn the nutritional requirements and dietary guidelines for bariatric patients.
- Recognize and manage potential nutritional deficiencies and complications.
- Develop skills in patient education and counseling specific to bariatric nutrition.
- Explore the role of the dietitian in a multidisciplinary team managing bariatric patients.

B.

- Understand the basic principles of genetics and genomics as they relate to nutrition.
- Explore the role of nutrients in gene expression and regulation.
- Analyze how genetic variations influence individual responses to nutrients.
- Evaluate the impact of diet on the genome and epigenome.
- Apply nutrigenomic knowledge to develop personalized nutrition strategies

Course Outcomes (CO)

On successful completion of the course, the student will be able to:

CO No.	Course Outcomes
CO1	Understand the various types of bariatric surgeries and their indications and contraindications Understand and explain key concepts in nutrigenomics, including the human genome, genetic variation, nutrient-gene interactions, epigenetics, and the role of genetic polymorphisms in nutrient metabolism
CO2	Evaluate preoperative nutritional assessment tools and methods to determine the best approach for patient care Examine the influence of diet on gene expression and epigenetic marks, and evaluate the genetic predisposition to chronic diseases and the social implications of nutrigenomics research
CO3	Apply knowledge of postoperative diet progression to develop individualized nutritional plans for bariatric surgery patients. Illustrate mechanisms of nutrient-gene interactions, design personalized dietary recommendations, microbiome-targeted interventions, and nutrition strategies for sports and fitness based on genetic variations
CO4	Create comprehensive long-term nutritional management strategies that include protein, vitamin, and mineral supplementation for bariatric patients Formulate nutrigenomic approaches to healthy aging, and integrate personalized nutrition strategies into clinical and sports practice
CO5	Design intervention plans to manage common gastrointestinal symptoms and nutritional complications post-bariatric surgery and in cases to manage diseases based on nutrigenomic testing
CO6	Analyze the psychological and emotional aspects of bariatric surgery to provide effective patient counseling and support

Unit No.	Course Content	No. of Hours

I.	**Assessment, planning and preparation of the prescribed therapeutic diets for specific cases of Bariatric surgery in the following detail:** • Planning diets using Medical Nutrition Therapy to prescribe energy, macronutrients, fiber, micronutrients and fluids • Menu Planning for oral diets or nutrition support, keeping in mind the complications of Bariatric surgery • Detailed calculation to understand the efficacy of the plan • Supplement usage • Outline recommendations in easily understood format i. Pre-operative Cases ii. Immediate post-operative cases iii. Long term post-operative cases iv. Pediatric Bariatric surgery v. Adolescent Bariatric surgery Bariatric surgery in patients with diabetes, pregnancy, and other comorbidities.	**15**
II.	**Interpretation of Nutrigenomic tests to assess risk and subsequent planning and preparation of the prescribed therapeutic diets for specific conditions in the following detail:** • Planning diets using Medical Nutrition Therapy to prescribe energy, macronutrients, fiber, micronutrients and fluids based on the nutrigenomic report • Detailed calculation to understand the efficacy of the plan • Supplements, nutraceutical prescription and functional foods usage in the prescription based on the nutrigenomic report • Giving personalized dietary and lifestyle recommendations in easily understood format i. Obesity, type Diabetes and metabolic syndrome ii. Cardiovascular Health and diseases iii. Cancers iv. Autoimmune diseases and allergies v. Sports Nutrition vi. Cognition and neurological diseases	**15**
	Total Hours	**30**

References:

Unit 1:

Bariatric Surgery: From the Non-Surgical Approach to the Post-Surgery Individual care. (2021). United Kingdom: IntechOpen.

Hakim, N. S. (2011). Bariatric Surgery. Singapore: Imperial College Press.

Management of Nutritional and Metabolic Complications of Bariatric Surgery. (2021). Germany: Springer Nature Singapore.

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Preedy, V. R., Rajendram, R., R Martin, C. (2016). Metabolism and Pathophysiology of Bariatric Surgery: Nutrition, Procedures, Outcomes and Adverse Effects. Netherlands: Elsevier Science.

Unit 2:

Carlberg, C., Ulven, S. M., Molnár, F. (2016). Nutrigenomics. Germany: Springer International Publishing.

Kohlmeier, M. (2012). Nutrigenetics: Applying the Science of Personal Nutrition. Netherlands: Elsevier Science.

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Pemberton, A. (2022). Using Nutrigenomics Within Personalized Nutrition. United Kingdom: Jessica Kingsley Publishers.
Principles of Nutrigenetics and Nutrigenomics: Fundamentals of Individualized Nutrition. (2019). Netherlands: Elsevier Science.
Subbiah, M. T. R. (2013). Nutrigenomics: Application to the Development of Nutraceuticals and Cosmeceuticals. United States: Nova Science Publishers, Incorporated.

Evaluation:

2 CREDITS COURSE FOR TOTAL MARKS OF 50	
CONTINUOUS INTERNAL EVALUATION	**MARKS**
Continuous assessment of planning and preparation for patients undergone bariatric surgery	10
Continuous assessment of interpretation of nutrigenomic tests and meal planning for specific conditions	10
Journal	5
Total Marks for Internal Assessment	**25**
SEMESTER-END EXAMINATION	**MARKS**
All questions are compulsory with internal choice.	
Construction of a case specific diet plan	20
Viva Voce examination	5
Total Marks for Semester End Examination	**25**
TOTAL MARKS FOR THE COURSE	**50**

Syllabus
M.Sc. (Foods, Nutrition and Dietetics)
(Sem. - IV)

Course Code	Course Name	Theory/ Practical	Credits	Hours
FND04C5	**Research Project**	**Practical**	**4**	**180**

Course Objectives:

1. To provide students with an opportunity to conduct independent research under supervision in Foods, Nutrition and Dietetics and allied areas.
2. To encourage students to work in conjunction with relevant food industries, institutes, Governmental and non-governmental agencies, NGOs, hospitals, clinics, schools, sports and fitness ventures, entrepreneurs, communities and other relevant agencies.
3. To assist students in developing general research skills as well as research skills specific to their specialization.
4. To encourage students to adopt best practices in research.
5. To facilitate students in completing data collection/data entry/data analysis, and writing the remaining chapters of the dissertation (Results and Discussion, Summary and conclusion and limitations and recommendations).
6. To support students in: (a) completing and submitting the dissertation for the viva voce examination, (b) integrating feedback and submitting the final copy of the dissertation, and (c) writing a research paper using the findings of their research

Course Outcomes:

On successful completion of the course, the student will be able to:	
CO No.	**Course Outcomes**
CO1	Demonstrate the ability to design and conduct independent research projects in the field of Foods, Nutrition and Dietetics and related disciplines, under the guidance of faculty mentors.
CO2	Establish effective partnerships and collaborations with relevant industries, institutes, NGOs, hospitals, schools, and other stakeholders to enrich research endeavors and enhance practical applications of research findings.
CO3	Develop and apply advanced research methodologies, techniques, and tools specific to their area of specialization, while also honing general research skills such as critical thinking, problem-solving, and data analysis.
CO4	Adhere to ethical standards and best practices in research, including the responsible conduct of research, proper citation and referencing, and maintaining integrity in data collection, analysis, and reporting.
CO5	Successfully complete key milestones in the research process, including formulating and defending a well-structured research proposal, initiating data collection procedures, and drafting the initial chapters of the dissertation (Introduction and Review of Literature; Methodology) with clarity, coherence, and scholarly rigor.

Unit No.	Course Content	No. of Hours
I	**Completing Laboratory Work/Product Development/ Data Collection** **Completing Data Entry and Preliminary Analyses** • Entering all data; checking for data entry errors; running preliminary analyses. • Analyzing Data and Reporting Results • Analyzing data; interpreting findings; reporting results in figures/tables and text using scientific protocol; writing the third chapter of the dissertation, namely, the Results, by research objectives/ questions/hypotheses; orally presenting the	

	results and integrating feedback	
II	**Discussing Findings and Write Results and Discussions** • Corroborating own findings with those in previous research and theory • Explaining findings using relevant literature and communication with experts • Discussing implications of findings for practice/ industry/family/society • Suggesting recommendations for future research; writing the fourth chapter of the dissertation, namely, the Discussion, using appropriate scientific protocol	
III	**Discussing Findings and Write Results and Discussions** • Corroborating own findings with those in previous research and theory • Explaining findings using relevant literature and communication with experts • Discussing implications of findings for practice/ industry/family/society • Suggesting recommendations for future research; writing the fourth chapter of the dissertation, namely, the Discussion, using appropriate scientific protocol	
IV	**Submission and Oral Defense; Writing of the Research Paper** • Orally defending the dissertation; integrating feedback into the final document; submitting the completed dissertation (hard copy and soft copy). • Using the dissertation to write a research paper; submitting the research paper (hard copy and soft copy)/ Present the findings at Avishkar/Indian Science Congress or any other Conference	
	Total Hours	

References:

Dissertations in the College Library

Relevant Research Literature as per selected topic from scientific journals, dissertations, theses, books, literature on the internet.

Evaluation:

4 CREDITS COURSE FOR TOTAL MARKS OF 100	
CONTINUOUS INTERNAL EVALUATION	**MARKS**
Research Guide's Evaluation for Examining the Student's expertise with regard to Research: Proactive / Initiative / Responsibility / Flexibility/ Receptivity to feedback/ Thoroughness/ Meeting deadlines / Regularity in meeting/ Ethics / Absence of Plagiarism/ Networking, collaboration/ contacting experts.	25
Research Guide's Evaluation for Examining the Quality of Chapters 1 and 2 of the M.Sc. Dissertation: Chapter 1: Literature Review; Research Purpose (Objectives/Hypotheses/Questions); Chapter 2: Tools/Measurement	25
Total Marks for Internal Assessment	**50**
SEMESTER-END EXAMINATION	**MARKS**
All questions are compulsory with internal choice.	
External Examiner's Evaluation of the Submitted Document: Relevance of research topic; Accuracy/Thoroughness of Literature Review; Clarity & Appropriateness of the Research Purpose; Accuracy & quality of methodology-related decisions; Quality & appropriateness (including ethics) of measurement/tools	25
External Examiner's Evaluation through Viva Voce, of Student's expertise with regard to Research: Clarity/Soundness/Accuracy with regard to selection of topic; Ability to clarify and contextualize Non-Indian vs Indian Literature; Clarity/Soundness/Accuracy with regard to the review of literature , research design & sampling, measurement/tools & plan of analysis, the beginning steps of the research process; student's emerging research expertise	25
Total Marks for Semester End Examination	**50**
TOTAL MARKS FOR THE COURSE	**100**

Letter Grades and Grade Points:

Semester GPA/ Programme CGPA Semester/ Programme	% of Marks	Alpha-Sign/ Letter Grade Result
9.00 - 10.00	90.0 - 100	O (Outstanding)
8.00 - < 9.00	80.0 - < 90.0	A+ (Excellent)
7.00 - < 8.00	70.0 - < 80.0	A (Very Good)
6.00 - < 7.00	60.0 - < 70.0	B+ (Good)
5.50 - < 6.00	55.0 - < 60.0	B (Above Average)
5.00 - < 5.50	50.0 - < 55.0	C (Average)
4.00 - < 5.00	40.0 - < 50.0	P (Pass)
Below 4.00	Below 40.0	F (Fail)
Ab (Absent)	-	Absent

Sign of the BOS Chairman
Name of the Chairman
BOS in

Sign of the Offg. Associate Dean
Name of the Associate Dean
Faculty of

Sign of the Offg. Associate Dean
Name of the Associate Dean
Faculty of

Sign of the Offg. Dean
Name of the Dean
Faculty of