

**VANITA VISHRAM WOMEN'S UNIVERSITY  
SCHOOL OF SCIENCE AND TECHNOLOGY  
FACULTY OF SCIENCE  
DEPARTMENT OF FOOD AND NUTRITION**

**MASTERS IN NUTRITION AND DIETETICS**



**VANITA VISHRAM  
WOMEN'S UNIVERSITY**  
SURAT

**Under Learning Outcomes-based Curriculum Framework (LOCF)  
for Post Graduate (PG) Education**

**SEMESTER IV  
Core Courses (CC)**

*Syllabus applicable to the students seeking admission in the following  
program*

**MASTERS IN NUTRITION AND DIETETICS under LOCF w.e.f.  
the Academic Year 2024-2025**

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## **1. PREAMBLE – VVWU**

Vanita Vishram Women’s University (VVWU) is the first-ever Women’s University of Gujarat approved by the Government of Gujarat under the provisions of the Gujarat Private Universities Act, 2009. It is a University committed to achieving Women’s Empowerment through Quality Education and skill Development, and by providing employment opportunities to its female students through its model curriculum, integration of technology in pedagogy and best-in-class infrastructure. The focus is on prioritizing practical components and experiential learning supported through academia-industry linkages, functional MoUs, skill development training, internships etc. It aims at providing opportunities to the female students for holistic development and self-reliance.

### **VISION**

Empowerment of women through quality education and skill development, to make them strong pillars of stability in society.

### **MISSION**

To provide Education & Professional Training to all women for their all-round development, to enable them to become economically independent and socially empowered citizens.

## **2. INTRODUCTION OF THE PROGRAM**

The Masters in Nutrition and Dietetics focuses on helping students to understand the concepts of Diet and Nutrition to further contribute as nutritionists. They need to apply knowledge drawn from relevant sciences to promote an understanding of the effects of nutrition on growth, development, and well-being. It is further strengthened with project work and internships in the food industry, hospitals & public nutrition area. A component of Research is the feature that makes the student think innovatively and thus apply the skills in active research.

## **3. PROGRAM SPECIFIC OBJECTIVES (PSOs)**

- Introduce the students to the advanced aspects of Nutrition Science and Dietetics.
- Make them understand the role of a Nutritionist or a dietitian in preventive and therapeutic aspects of Health care management.
- Develop skills wherein they understand the role of various foods, and nutrients they provide and imply innovative methods in food product development.
- Create awareness among them about the industry's current and future trends and help determine food safety and entrepreneurship.
- Create awareness about the need for Nutrition in the Community emphasizing the role of Public Health Nutrition.

## **4. PROGRAMME SPECIFIC OUTCOMES (PSOs)**

- Students will be equipped with the advanced skills and knowledge that are essential for functioning in the field of Nutrition and Dietetics.
- They will develop professional behaviour and competencies in handling hospital setups, counselling, and food handling.
- They will also develop a scientific outlook towards the research in this field and do active research.
- Students will be able to guide and counsel the people in the community, thereby helping in the prevention of nutrient deficiencies.
- They will develop competencies that will enable them to focus on various startups, and government or non-government organizations.

## 5. CREDIT STRUCTURE OF THE PROGRAM

Masters in Nutrition and Dietetics - Structure & Distribution of Courses													
Courses	Theory (Credits)	Practical (Credits)	Courses	Theory (Credits)	Practical (Credits)	Courses	Theory (Credits)	Practical (Credits)	Courses	Theory (Credits)	Practical (Credits)	Total Theory & Practical Credits	Total yearly Credits
SEM I			SEM 2			SEM III			SEM IV				
FN21210 Human Physiology	4	-	FN21270 Micronutrients	4	-	FN21330- Research Methodology and Biostatistics	4	-	FN21380- Public Health Nutrition	4	-	<b>56 + 40</b>	<b>96</b>
FN21220 Nutritional Biochemistry	4	-	FN21280 Food Safety and Toxicology	4	-	FN21340- Family Meal Management	4	-	FN24050- Nutrigenomics FN24060- Enteral and Parenteral Nutrition	4	-		
FN21230 Therapeutic Nutrition I	4	-	FN21290 Sports Nutrition	4	-	FN21350- Food Microbiology	4	-	FN21390- Recent Advances	-	4		
FN21240 Macronutrients	4	-	FN21300 Therapeutic Nutrition II	4		FN24010- Alternate Therapies/ FN24020- Pathology and Pharmacology	4	-	FN21400- Dissertation	-	12		
FN21250 Therapeutic Nutrition I (Pr)	-	4	FN21310 Therapeutic Nutrition II (Pr)	-	4	FN21360- Food Analysis	-	4					
FN21260 Innovations in Food Product Development (Pr)	-	4	FN21320 Dietetic Techniques and Internship (Pr)	-	4	FN21370- Project Work	-	4					
	<b>16</b>	<b>08</b>		<b>16</b>	<b>08</b>		<b>16</b>	<b>08</b>		<b>08</b>	<b>16</b>		

## 6. COURSE STRUCTURE

Semester	Course Category	Course Code	Subject Name	Credit	Total Credit
I	CC	FN21210	Human Physiology (Th)	4	24
	CC	FN21220	Nutritional Biochemistry (Th)	4	
	CC	FN21230	Therapeutic Nutrition I (Th)	4	
	CC	FN21240	Macronutrients (Th)	4	
	CC	FN21250	Therapeutic Nutrition I (Pr)	4	
	CC	FN21260	Innovations in Food Product Development (Pr)	4	
II	CC	FN21270	Micronutrients (Th)	4	24
	CC	FN21280	Food Safety and Toxicology (Th)	4	
	CC	FN21290	Sports Nutrition (Th)	4	
	CC	FN21300	Therapeutic Nutrition II (Th)	4	
	CC	FN21310	Therapeutic Nutrition II (Pr)	4	
	CC	FN21320	Dietetic Techniques and Internship (Pr)	4	
III	CC	FN21330	Research Methodology and Biostatistics (Th)	4	24
	CC	FN21340	Family Meal Management (Th)	4	
	CC	FN21350	Food Microbiology (Th)	4	
	DSE 1	FN24010	Alternate Therapies (Th)	4	
		FN24020	Pathology and Pharmacology (Th)		
	CC	FN21360	Food Analysis (Pr)	4	
	CC	FN21370	Project Work (Pr)	4	
IV	CC	FN21380	Public Health Nutrition (Th)	4	24
	DSE 2	FN24050	Nutrigenomics (Th)	4	
		FN24060	Enteral and parenteral Nutrition (Th)		
	CC	FN21390	Recent Advances in Nutrition (Pr)	4	
	CC	FN21400	Dissertation (Pr)	12	

**MASTER IN NUTRITION AND DIETETICS  
SEMESTER IV  
CORE COURSE**

<b>FN21380- PUBLIC HEALTH NUTRITION</b>	
<b>Course Objectives</b> The course will enable the student to learn	
<ol style="list-style-type: none"> <li>1. To recognize the importance of malnutrition as an obstacle for community development.</li> <li>2. To understand various methods of assessment of nutritional status in the community.</li> <li>3. To be familiar with strategies and programs for improving nutrition and health of vulnerable groups in the community.</li> </ol>	
<b>Course Outcome:</b> This course will help to get in depth knowledge about various public health agencies, strategies to improve public health status.	
<b>FN21380- PUBLIC HEALTH NUTRITION THEORY COURSE CONTENTS (4 CREDIT)</b>	
S.No.	STRUCTURE
<b>Unit 1</b>	<b>Concept of Public Nutrition</b> <ul style="list-style-type: none"> <li>● Relationship between health and nutrition, role of public nutritionists in the health care delivery.</li> <li>● Determinants of Health Status</li> <li>● Indicators of Health (Vital statistics: Mortality and morbidity rates; Life expectancy)</li> <li>● National Health Care Delivery System</li> <li>● Primary Health Care of the Community</li> </ul>
<b>Unit 2</b>	<b>Assessment of Nutritional status</b> <ul style="list-style-type: none"> <li>● Anthropometry</li> <li>● Dietary survey</li> <li>● Clinical Evaluation</li> <li>● Biochemical Methods</li> </ul>
<b>Unit 3</b>	<b>Nutritional Monitoring and Surveillance</b> <ul style="list-style-type: none"> <li>● Objectives and components of Nutrition Monitoring</li> <li>● Nutrition Monitoring Programs in India (NNMB, NSSO, NFHS, DLHS, FNB)</li> <li>● Nutrition Surveillance system, objectives, uses and its indicators</li> </ul>
<b>Unit 4</b>	<b>Nutrition Intervention Programmes:</b> Objectives and its operation <ul style="list-style-type: none"> <li>● Integrated Child Development Services</li> <li>● Anaemia Prophylaxis and Vitamin A Prophylaxis Programme</li> </ul> <b>Supplementary Feeding Programs</b> <ul style="list-style-type: none"> <li>● Mid Day Meal Programme</li> <li>● Other current Programs</li> <li>● Field observations of some current programmes and agencies- ICDS, Anganwadi, Milk Dairy, Food Corporation etc.</li> </ul>
<b>Unit 5</b>	<b>Food and Nutrition Security</b>

	<ul style="list-style-type: none"> <li>● Determinants of Food Security</li> <li>● Food Security Programs in India (PDS, TPDS, AAY, Annapurna Scheme, NFFWP)</li> <li>● Role of Agriculture in Nutrition</li> </ul> <p><b>National and International organizations concerned with food and nutrition:</b></p> <ul style="list-style-type: none"> <li>● International organizations- FAO, WHO, UNICEF, World Bank etc.</li> <li>● National organizations- ICMR, ICAR, CSWB, SSWB.</li> </ul>
<p><b>REFERENCES</b></p> <ol style="list-style-type: none"> <li>1. Park &amp; Park: Textbook of preventive and Social Medicine, Banarsidas, Bhanot Publication 1995.</li> <li>2. Gopaldas, T. and Seshadri S (Eds) Nutritional Monitoring and Assessment, Delhi; Oxford University Press.</li> <li>3. FAO, Annual on food and Nutrition Policy, 1970.</li> <li>4. Sabarweal, B. Public Health and Nutritional care. Commonwealth publishers . New Delhi 1999.</li> <li>5. Gibney M.J, Magarets B.M, Kearney J.M and Lenore Arab 2004. Public Health</li> <li>6. Nutrition, Blackwell Publishing Co., U.K.</li> <li>7. SCN News, UN ACC/SCN subcommittee on Nutrition.</li> <li>8. National Plan of Action on Nutrition 1995. Food &amp; Nutrition Board, Dept. of WCD, GOI.</li> <li>9. National Nutrition Policy 1993 : Dept. of WCD, GOI</li> </ol>	
<p><b>TEACHING METHODOLOGY</b></p> <ul style="list-style-type: none"> <li>● PowerPoint presentations</li> <li>● Videos</li> <li>● Chalk and talk method</li> <li>● Guest Lectures</li> <li>● Group discussions</li> <li>● Quiz and Debate</li> </ul>	



**MASTER IN NUTRITION AND DIETETICS  
SEMESTER IV  
DEPARTMENT ELECTIVE**

<b>FN24050 NUTRIGENOMICS</b>	
<b>Course Objectives:</b>	
<ol style="list-style-type: none"> <li>1. To learn the importance of nutrition and its effects on gene expression.</li> <li>2. To learn nutrient and gene interactions and their relation with disease prevention and intervention.</li> <li>3. To know how diet and underlying genetics interact to increase disease susceptibility.</li> </ol>	
<b>Course Outcomes:</b> At the end of the course, Students will gain knowledge to apply Nutrigenomics and to design nutritional strategies for the prevention of chronic diseases such as cardiovascular disease, obesity, type-2 diabetes and cancer.	
<b>FN24050 NUTRIGENOMICS THEORY COURSE CONTENT(4 CREDIT)</b>	
<b>Sr. No</b>	<b>STRUCTURE</b>
<b>Unit 1</b>	<b>Basics of Genetics and terminologies:</b> <b>Molecular Biology: Structure and Functions</b> Chromosomes, Nucleic Acids (DNA, RNA), Genes, Nucleotides, Chemical structure of DNA and base composition, biologically important nucleotides, Watson Crick Model, Central Dogma of Molecular biology
<b>Unit 2</b>	<b>DNA Replication and Repair:</b> Unit of replication, enzymes involved, DNA damage and repair mechanisms.
<b>Unit 3</b>	<b>RNA synthesis and processing:</b> Structure and functions of different types of RNA, RNA transport, Transcription factors, RNA processing, editing and splicing.
<b>Unit 4</b>	<b>Introduction to Gene-diet interactions: Nutrigenomics:</b> Introduction to nutritional genetics and genomics Transporter gene polymorphisms -interaction with effects of micronutrients in humans. The intestinal microbiota - role in nutrigenomics Nutrigenomics approaches to unraveling physiological effects of complex foods.
<b>Unit 5</b>	<b>Technologies in Nutrigenomics:</b> <b>Genomics techniques:</b> Different sequencing approaches, Microarray, Mass array, SNP genotyping, PCR and RT-PCR techniques. <b>Proteomics techniques:</b> 1-D, 2-D gel electrophoresis, DIGE, novel peptide identification, peptide sequencing methods. <b>Metabolomics techniques:</b> Chromatography and mass spectrometry techniques, Discovery and validation of biomarkers for important diseases and disorders <b>Computational approaches:</b> Introduction to different types of public domain databases, data mining strategies, primer designing.
<b>Unit 6</b>	<b>Modifying disease risk through nutrigenomics:</b> Modulating the risk of following diseases through Nutrigenomics: • Cardiovascular disease • Diabetes • Inflammatory bowel diseases • Obesity • Cancer • Malnutrition

**REFERENCES**

1. Lynette R. Ferguson 2013 *Nutrigenomics and Nutrigenetics in Functional Foods and Personalized Nutrition*, CRC Press; 1st edition
2. *Journal Nutrients* 2012, *Molecular Nutrition Research—The Modern Way of Performing Nutritional Science*, 4, 1898-1944;
3. *Journal Nutrients* 2013, *Nutrigenetics and Metabolic Disease: Current Status and Implications for Personalized Nutrition*, 5, 32-57;
4. *Journal Nutrigenetics Nutrigenomics* 2011;4:69–89; *Nutrigenetics and Nutrigenomics: Viewpoints on the Current Status and Applications in Nutrition Research and Practice*.
5. *J Am Diet Assoc.* 2006;106:569-576; *Nutrigenomics: From Molecular Nutrition to Prevention of Disease*.
6. Carlberg, Ulven, Molnár - *Nutrigenomics* - ed. Springer 2016
7. Kohlmeier - *Nutrigenetics* - ed. Elsevier 2012
8. *The Journal of Nutrition*; Nutritional “Omics” Technologies for Elucidating the Role(s) of Bioactive Food Components in Colon Cancer Prevention.
9. *Nutrition* 25 (2009) 1085–1093; *Proteomics at the centre of nutrigenomics: Comprehensive molecular understanding of dietary health effects*.

**Teaching Methodology**

- Internship
- PowerPoint presentations
- Videos
- Models and posters

**MASTER IN NUTRITION AND DIETETICS  
SEMESTER IV  
DEPARTMENT ELECTIVE**

<b>FN24060 ENTERAL AND PARENTERAL NUTRITION</b>	
<b>Course Objectives</b>	
<ol style="list-style-type: none"> <li>1. To recognize the metabolic and physiological effects of foods on the body's healing and immune systems and reduction of inflammation.</li> <li>2. To consider how to supply appropriate, bioavailable nutrients.</li> <li>3. To recognize the assessment of the nutritional status of patients with an illness, diet-related condition, or injury, in order to benefit the patient's own health and reduce health-care costs.</li> <li>4. To recognize the health effects of setting goals for the patient's treatment and developing a specialized nutrition prescription that includes patient education and self-management training.</li> </ol>	
<b>Course Outcomes</b>	
<ol style="list-style-type: none"> <li>1. Identify alternative feeding routes and feeding methods.</li> <li>2. Recommend Enteral Formulas leading to better health outcomes and improved quality of life.</li> <li>3. Identify nutritional support, enteral nutrition, parenteral nutrition, indications for uses &amp; contraindication.</li> <li>4. Identify the advantages of enteral feeding over parenteral feeding.</li> <li>5. Reduce &amp; managing complications of nutritional support, enteral nutrition &amp; parenteral nutrition.</li> </ol>	
<b>FN24060 ENTERAL AND PARENTERAL NUTRITION THEORY COURSE CONTENT (4 CREDIT)</b>	
<b>S.No</b>	<b>STRUCTURE</b>
<b>Unit 1</b>	Nutritional Management in critical care <ul style="list-style-type: none"> <li>● Nutritional screening and nutritional Status assessment of critically ill patients</li> <li>● Nutritional requirement according to the critical condition</li> <li>● Nutritional support systems: Enteral and parenteral</li> </ul>
<b>Unit 2</b>	Enteral Nutrition <ul style="list-style-type: none"> <li>● Site and Size of the tube</li> <li>● Feed-types</li> <li>● Complications</li> <li>● Feeding routes and feeding methods and nutritional support</li> <li>● Role of enteral formulas leading to better health outcomes</li> </ul>
<b>Unit 3</b>	Parenteral Nutrition <ul style="list-style-type: none"> <li>● Type</li> <li>● Composition</li> <li>● Complications</li> <li>● Feeding routes &amp; feeding methods and nutritional support</li> </ul>
<b>Unit 4</b>	Comparative analysis of various types of feeding methods, their advantages and

disadvantages.  
Case studies of various cases with respect to enteral and parenteral Nutritional Support.

**REFERENCES**

1. Mahan, L.K. and Escott-Stump, S. (2000): Krause's Food Nutrition and Diet Therapy, 10<sup>th</sup> Edition, W.B. Saunders Ltd.
2. Garrow, J.S., James, W.P.T. and Ralph, A. (2000): Human Nutrition and Dietetics, 10<sup>th</sup> Edition, Churchill Livingstone
3. Helen Guthrie: Introductory Nutrition, Times Mirror Publishing
4. M. Swaminathan. Advanced Text book on Food and Nutrition Vol.-I & Vol. – II.
5. Mantab S. Bamji, N. Prahlad Rao, Vinodini Reddy Textbook of Human Nutrition.
6. Annalynn Skipper (2011). Dietitian's Handbook of Enteral and Parenteral Nutrition. Jones & Bartlett Publishers.

**Teaching Methodology**

- Internship
- PowerPoint presentations
- Videos
- Models and posters

**MASTER IN NUTRITION AND DIETETICS  
SEMESTER IV  
CORE COURSE**

<b>FN21390- RECENT ADVANCES IN NUTRITION</b>	
<b>Course Objectives:</b> This course will enable the students to:	
<ol style="list-style-type: none"> <li>1. Assessment of Nutritional status and Identification of nutritional problems among vulnerable groups.</li> <li>2. Have thorough understanding of the deficiencies and their health effects</li> <li>3. Be familiar with applications in the Community.</li> </ol>	
<b>Course Outcome:</b> Students will learn about the use of nutritional knowledge for the benefit of the community.	
<b>FN21390- RECENT ADVANCES IN NUTRITION PRACTICAL COURSE CONTENTS (4 CREDIT)</b>	
<b>Sr.No.</b>	<b>STRUCTURE</b>
<b>Unit 1</b>	Development of tools to assess nutrition knowledge, attitudes and practices.
<b>Unit 2</b>	<ul style="list-style-type: none"> <li>● Assessment of Nutritional status and Identification of nutritional problems among vulnerable groups.</li> <li>● Development, use and evaluation of methods and aids for nutrition and health education.</li> </ul>
<b>Unit 3</b>	Planning nutritive recipes specific to nutritional problems.
<b>Unit 4</b>	Poster Presentation
<b>REFERENCES</b>	
<ol style="list-style-type: none"> <li>1. Park, J.E. and Park, K. Textbook of Preventive and social medicine. BanarsiDas Bhanot Publishers.</li> <li>2. Nutrition Education for the Public (1997): FAO Food and Nutrition Paper, 62, FAO.</li> <li>3. National Plan of Action on Nutrition (1995): Food &amp; Nutrition Board, Dept. Of WCD, Govt. of India.</li> <li>4. World Health Organization (1998) World Health Report: Life in the 21st century. Report of the Director General. WHO, Geneva, Switzerland.</li> </ol>	
<b>JOURNALS</b>	
<ul style="list-style-type: none"> <li>● American Journal of Clinical Nutrition</li> <li>● Age Aging,</li> <li>● Journal of Gerontology</li> <li>● Food and Nutrition Bulletin</li> <li>● Nutrition Reviews</li> <li>● Nutrition Update Series</li> <li>● World Review of Nutrition and Dietetics</li> </ul>	

## **TEACHING METHODOLOGY**

- PowerPoint presentations
- Videos
- Chalk and talk method
- Guest Lectures
- Webinars
- Demonstrations
- Group discussions
- Quiz
- Debates
- Field Visits
- Role plays
- Elocution
- Peer group training
- Market surveys

**MASTER IN NUTRITION AND DIETETICS  
SEMESTER IV  
CORE COURSE**

<b>FN21400 DISSERTATION</b>	
<b>Course Objectives-</b>	
This course will enable students to:	
<ol style="list-style-type: none"> <li>1. To facilitate carrying out extensive research and development projects or technical projects at place of work through problem and gap identification.</li> <li>2. Development of methodology for problem solving, interpretation of findings, presentation of results and discussion of findings in context of national and international research.</li> <li>3. The overall goal of the dissertation is for the student to display the knowledge and capability required for independent work.</li> </ol>	
<b>Course Outcome-</b> The student will be able to gain in-depth knowledge and use adequate methods in the major subject/field of study with respect to research and development.	
<b>FN21400 DISSERTATION PRACTICAL COURSE CONTENT (12 CREDIT)</b>	
<b>S.No.</b>	<b>STRUCTURE</b>
<b>Unit 1</b>	<ul style="list-style-type: none"> <li>● Defining the scope of a project and doing research, as well as different ways of communicating the results</li> </ul>
<b>Unit 2</b>	<ul style="list-style-type: none"> <li>● Defining a topic and formulating a problem statement, selecting and reviewing relevant literature, designing an empirical study as well as performing it, including data collection and analysis</li> </ul>
<b>Unit 3</b>	<ul style="list-style-type: none"> <li>● Statistical data analysis and Thesis writing</li> </ul>
<b>Unit 4</b>	<ul style="list-style-type: none"> <li>● Poster Presentation</li> <li>● Research paper Publication</li> </ul>
<b>Teaching Methodology</b>	
<ul style="list-style-type: none"> <li>● PowerPoint presentations</li> <li>● Videos</li> <li>● Models and posters</li> </ul>	