

VANITA VISHRAM WOMEN'S UNIVERSITY
SCHOOL OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF FOOD AND NUTRITION
MASTERS IN NUTRITION AND DIETETICS



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

**SEMESTER 1
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 2021-2022**

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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, Skill Development, and providing employment opportunities to its girl 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 girl students for holistic development and self-reliance.

VISION

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

MISSION

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

1. Introduction to the Program

The program for Master's in Nutrition and Dietetics focuses on facilitating 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 in an innovative manner and thus apply the skills in active research.

2. 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 current and future trends in the industry and help to determine food safety and entrepreneurship.
- Create awareness about the need for Nutrition in the Community emphasizing the role of Public Health Nutrition.

3. 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 behavior and competencies in handling hospital setups, counseling, 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.

4. Structure of the program

M.Sc. Nutrition And Dietetics STRUCTURE & DISTRIBUTION OF COURSES							
Courses	Theory (Credits)	Practical (Credits)	Courses	Theory (Credits)	Practical (Credits)	Total Theory & Practical Credits	Total yearly Credits
SEM1			SEM2				
FN21010	5	-	FN21070	5	-		
FN21020	5	-	FN21080	5	-		
FN21030	5	-	FN21090	5	-		
FN21040	5	-	FN23010	-	4		
FN21050	-	4	FN21100	-	4		
FN21060	-	4	FN21110		4	35+20	55
	20	8		15	12		

5. Course Structure

Masters in Nutrition and Dietetics (SEMESTERS I & II)					
Sem	Core Course	Ability Enhancement Course	Skill Enhancement Course	Discipline-Specific Elective Course	Generic Elective Course
1	FN21010 Human Physiology	-	-	-	-
	FN21020 Nutritional Biochemistry	-	-	-	
	FN21030- Macronutrient	-	-	-	
	FN21040 – Therapeutic Nutrition I	-	-	-	
	FN21050- Therapeutic Nutrition I (Pr)	-	-	-	
	FN21060- Innovations in Food Product Development (Pr)	-	-	-	
2	FN21070 - Micronutrients	-	-	-	
	FN21080 - Therapeutic Nutrition II	-	-	-	
	FN21090 – Sports Nutrition	-	-	-	
	FN23010 – GE	-	-	-	

	FN21100- Therapeutic Nutrition II (Pr)	-	-	-	
	FN21110- Food Analysis (Pr)	-	-	-	

MASTERS IN NUTRITION AND DIETETICS
SEMESTER I
CORE COURSE

FN21010 - HUMAN PHYSIOLOGY (Th)	
<p>Course Objectives This course will enable students to</p> <ol style="list-style-type: none"> 1. Advance their understanding of some of the relevant issues and topics of human physiology. 2. Understand the integrated functions of all systems and the grounding of nutritional science in Physiology. 3. Understand alterations of structure and function in various organs and systems in disease conditions. 	
<p>Course Outcome: This course will help the students to know about various systems and their functioning.</p>	
FN21010- COURSE CONTENTS (5 CREDIT)	
Sr.No	STRUCTURE
Unit 1	Cell and Tissues
	<ul style="list-style-type: none"> ● Cell- The Basic Unit of Life ● Structure of Cell ● Tissues and their classification ● Skeleton ● Muscular system- types and characteristics
Unit 2	Blood and Cardiovascular system
	<ul style="list-style-type: none"> ● Blood Composition and Blood groups ● Serum and Plasma- Tests ● Lymph ● Structure of Cardiovascular system ● Heart ● Cardiac cycle and cardiac output ● Blood Pressure ● ECG and other cardiac function tests
Unit 3	Gastrointestinal system

	<ul style="list-style-type: none"> ● Structure of Gastrointestinal Tract ● Mouth, Pharynx, Esophagus, Stomach, Small and Large Intestine ● Accessory organs of GI Tract- Liver, Gallbladder, Pancreas ● Secretions of GI System ● Gastric Function Tests, Liver Function test
Unit 4	Respiratory system
	<ul style="list-style-type: none"> ● Structure of Respiratory System ● Organs of the Respiratory system ● Mechanism of Respiration ● Interchange of gasses within lungs
Unit 5	Renal system
	<ul style="list-style-type: none"> ● Structure of Urinary System ● Kidney- structure, and functions ● Structure of nephron ● Urine formation ● Renal function tests
Unit 6	Nervous system
	<ul style="list-style-type: none"> ● Structure of Neuron ● Structure of Brain ● Synapse ● EEG
Unit 7	Reproductive system
	<ul style="list-style-type: none"> ● Structure of Male reproductive system ● Structure of Female reproductive system ● Menstrual cycle
Unit 8	Endocrine Glands
	<ul style="list-style-type: none"> ● Pituitary, Thyroid, Parathyroid, Pancreas, Adrenal glands and their hormones
REFERENCES	
<ol style="list-style-type: none"> 1. Applied Physiology- Indira Gandhi National Open University for MFN 2. Anatomy and Physiology for Nurses- Evelyn Pearce 	

3. K. Sembulingam, Prema Sembulingam, Essentials Of Medical Physiology
4. Human Anatomy and Physiology for the First year- Raje V.N.
5. West, J.B.: Best and Taylor's Physiological Basis of Medical Practice, 11th Edition.
6. Chatterjee, C.C.(2002): Human Physiology: Medical Allied Agency, Calcutta.
7. Guyton and Hall (2003): Test Book of Medical Physiology, 9th Edition, Prism Books Pvt. Ltd., W.B. Sanders Company, USA.
8. Tortora (2003) Principles of Anatomy and Physiology, John Wiley and sons.
9. Keel and Neil: Samson and Wright's Applied Physiology (12th edition), Oxford University Press. London.
10. Ross and Wilson: Anatomy and physiology in Health and Illness, 8th Edition, Church Hill Livingstone, N.Y.

Teaching Methodology

- Chalk and talk method
- Powerpoint presentations
- Videos
- Models and posters
- Quiz
- Celebration of various days based on organs and systems

**MASTERS IN NUTRITION AND DIETETICS
SEMESTER I
CORE COURSE**

FN21020- NUTRITIONAL BIOCHEMISTRY

Course Objectives

This course will enable students to

1. To lay the foundation of biological chemistry.
2. To give insights into the chemical reactions that occur in biological systems.
3. Get an insight into interrelationships between various metabolic pathways
4. Understand the integration of cellular level metabolic events to nutritional disorders and imbalances.
5. Apply the knowledge for medical nutrition management in various disease conditions

Course Outcome: This course will help to determine the knowledge about the structures of the principal components present in living beings.

**FN21020-THEORY COURSE CONTENTS
(5 CREDIT)**

Sr.No	STRUCTURE
Unit 1	Cell Membrane
	Membrane structure, composition, and Transport of metabolites across membranes
Unit 2	Enzymes
	Enzymes – Definition, Classification, Specificity of enzymes, Mechanism of Action, Enzyme kinetics, Enzyme inhibition, Factors affecting enzyme activity, Enzymes in clinical diagnosis.
Unit 3	Metabolism of Carbohydrates
	<ul style="list-style-type: none"> ● Classification of Carbohydrates ● Glycolysis- Aerobic & Anaerobic, ● Tricarboxylic acid cycle and its Significance ● Gluconeogenesis, ● Metabolism of glycogen- Glycogenesis, Glycogenolysis, Hexose monophosphate shunt

Unit 4	Biological Oxidation, Electron Transport Chain, Oxidative Phosphorylation.
Unit 5	Metabolism of Lipids
	<ul style="list-style-type: none"> ● Classification of Lipids ● Oxidation of fatty acids ● Lipogenesis- Biosynthesis of fatty acids ● Biosynthesis of cholesterol and regulation, Bile acids and their metabolism, ● Metabolism of ketone bodies, ● Metabolism of Plasma lipoproteins and their Biochemical profile
Unit 6	Metabolism of Protein
	<ul style="list-style-type: none"> ● Function and Classification of Proteins ● Binding proteins and their functions – nutritional implications, Classification of amino acids ● Amino acid metabolism ● Transamination ● Deamination ● Urea Cycle ● Metabolism of the carbon skeleton of amino acids ● Biosynthesis of non-essential amino acids ● Synthesis of specialized products from amino acids (myoglobin, hemoglobin, Creatinine, and Creatine)
Unit 7	Metabolism of Nucleic Acids
	<ul style="list-style-type: none"> ● Composition, Functions, Classification, and Structure of DNA and RNA, ● Metabolism of purine and pyrimidine nucleotides. ● Replication, transcription, translation
Unit 8	Inborn errors of metabolism
	<ul style="list-style-type: none"> ● Disorders of Carbohydrate metabolism ● Disorders of Protein metabolism ● Disorders of Lipid metabolism

REFERENCES

1. U. Satyanarayan and U. Chakrapani (2017) Biochemistry 5th Edition, Book & Allied
2. IGNOU, MFN-002- Nutritional Biochemistry
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10. A. C. Deb, 9th Edition, Fundamentals of Biochemistry, Fundamentals of Biochemistry
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15. Lanham -New et al. (2010) Nutrition & Metabolism. 2nd Edition. The Nutrition Society Textbook Series. Wiley- Blackwell

Teaching Methodology

- Powerpoint presentations
- Videos
- Chalk and talk method
- Group discussion
- Quiz

MASTERS IN NUTRITION AND DIETETICS
SEMESTER I
CORE COURSE

FN21030- MACRONUTRIENTS	
Course Objectives	
This course will enable students to	
<ol style="list-style-type: none"> 1. To understand the fundamentals of the science of nutrition. 2. To understand the underlying biological, chemical, & regulatory mechanism. 3. To understand contemporary issues in the context of current scientific knowledge. 4. To understand the interrelationship between Nutrients. 5. To understand the latest developments in Human Nutrition. 	
Course Outcome: This course will help to get in-depth knowledge about various macronutrients, their functions, sources, deficiency, and the effect of excess.	
FN21030-THEORY COURSE CONTENT (5 CREDIT)	
Sr.No	STRUCTURE
Unit 1	Body Composition and RDA
	<ul style="list-style-type: none"> ● Significance of body composition and changes through the life cycle. ● Human Nutritional Requirements, methods determining human nutrient needs.
Unit 2	Energy
	<ul style="list-style-type: none"> ● Components of energy requirements: BMR, RMR, thermic effect of feeding, physical activity. ● Factors affecting energy requirements, methods of measuring energy expenditure. ● Regulation of energy metabolism and body weight
Unit 3	Carbohydrates and Dietary Fiber
	<ul style="list-style-type: none"> ● Introduction of Carbohydrates, Functions, RDA, Sources, and deficiency ● Dietary fiber Types, sources, role, and mechanism of action. ● Resistant starch
Unit 4	Proteins
	<ul style="list-style-type: none"> ● Introduction of Protein, Functions, RDA, Sources, and deficiency ● Amino acid and its physiological significance. ● Protein Quality and supplementary protein
Unit 5	Fats
	<ul style="list-style-type: none"> ● Introduction of Fats, Functions, RDA, Sources, and deficiency ● Nutritional significance of fatty acids – SFA, MUFA, PUFA ● Role of n-3 and n-6 fatty acids and Prostaglandins. ● Trans Fatty Acids ● Visible and invisible fats in diets.
Unit 6	Water

	<ul style="list-style-type: none"> ● Sources, functions, distribution of body water. ● Mechanism of loss, regulation of water balance, disturbances in water balance, dehydration, water intoxication.
Unit 7	Interrelationship
	<ul style="list-style-type: none"> ● Interrelation between carbohydrate, fat, and protein in energy metabolism. ● Starvation

REFERENCES

1. Mahan, L.K. and Escott-Stump, S. (2000): Krause's Food Nutrition and Diet Therapy, 10th Edition, W.B. Saunders Ltd.
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8. Helen Guthrie: Introductory Nutrition, Times Mirror Publishing
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10. Mantab S. Bamji, N. Prahlad Rao, Vinodini Reddy Textbook of Human Nutrition

Teaching Methodology-

- Chalk and talk method
- Powerpoint presentations
- Videos
- Posters
- Quiz and Debates

**MASTERS IN NUTRITION AND DIETETICS
SEMESTER I
CORE COURSE**

FN21040- THERAPEUTIC NUTRITION I	
Course Objectives This course will enable students to	
<ol style="list-style-type: none"> 1. Understand the basic principles of diet therapy 2. Understand the etiology, Physiologic and Metabolic Anomalies of acute and chronic diseases and patient needs. 3. Know the effect of the various diseases on nutritional status and nutritional and dietary requirements. 4. Be able to recommend and provide appropriate nutritional care for the prevention and treatment of various diseases. 	
Course Outcome: This course will help the students to understand various diseases, their etiology, RDA, symptoms, and dietary principles of various diseases.	
FN21040-THEORY COURSE CONTENTS	
S.No	STRUCTURE
Unit 1	Nutrition Care Process
	<ul style="list-style-type: none"> ● Nutritional screening Assessment of the nutritional status of hospitalized and outdoor patients.
Unit 2	Standard Hospital Diets
	<ul style="list-style-type: none"> ● Nutritional Intervention – Diet Modifications ● Modification of normal diet as a basis for therapeutic diets
Unit 3	Weight Management
	<ul style="list-style-type: none"> ● Obesity- <ul style="list-style-type: none"> ○ Etiology, types, dietary principles, and management, ○ Behavior modification ○ Non-dietary management- Pharmacological, Surgical, Physical activity, and exercise ● Underweight <ul style="list-style-type: none"> ○ Etiology, dietary principles, and management ● Eating disorders – Anorexia Nervosa and Bulimia and FAD Diets
Unit 4	Diabetes Mellitus

	<ul style="list-style-type: none"> ● Classification ● Pathophysiology ● Diagnosis, ● Nutritional Management ● Acute complications- Hypoglycemia, Ketoacidosis, Somogyi effect. Dawn phenomenon ● Chronic complication- Macrovascular and Microvascular ● Artificial sweeteners/sugar substitutes ● Blood glucose-lowering agents. <ul style="list-style-type: none"> ○ Insulin ● Oral hypoglycemic agents
Unit 5	Cardiovascular Disorders
	<ul style="list-style-type: none"> ● Hypertension- <ul style="list-style-type: none"> ○ Definition, Classification, pathophysiology, nutritional management, and Prevention ● Atherosclerosis <ul style="list-style-type: none"> ○ Pathophysiology, Risk Factors, and dietary management ● Hyperlipidemia <ul style="list-style-type: none"> ○ Prevention of coronary heart disease
Unit 6	Musculoskeletal Disorders
	<ul style="list-style-type: none"> ● Sarcopenia ● Gout ● Rheumatoid Arthritis ● Osteoarthritis
Unit 7	Disorders of Hormonal Imbalance
	<ul style="list-style-type: none"> ● Functions of the gland, hormones, imbalance of hormones, clinical diagnosis, symptoms, and dietary care
REFERENCES	
<ol style="list-style-type: none"> 1. Mahan, L.K. and Escott-Stump, S. (2000): Krause's Food Nutrition and Diet Therapy, 10th Edition, W.B. Saunders Ltd. 2. Shils, M.E., Olson, J.A., Shike, M. and Ross, A.C. (1999): Modern Nutrition in Health and Disease, 9th Edition, Williams and Wilkins. 3. Escott-Stump, S. (1998): Nutrition and Diagnosis-Related Care, 4th Edition, Williams and Wilkins. 4. Garrow, J.S., James, W.P.T. and Ralph, A. (2000): Human Nutrition and Dietetics, 10th Edition, Churchill Livingstone. 5. Williams, S.R. (1993): Nutrition and Diet Therapy, 7th Edition, Times Mirror/Mosby College Publishing. 6. Davis, J. and Sherer, K. (1994): Applied Nutrition and Diet Therapy for Nurses, 2nd Edition, W.B. Saunders Co. 7. Walker, W.A., and Watkins, J.B. (Ed) (1985): Nutrition in Pediatrics, Boston, Little, Brown & Co. 	

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Teaching Methodology

- Powerpoint presentations
- Videos
- Chalk and talk method
- Guest Lectures
- Group discussions
- Quiz and Debate

MASTERS IN NUTRITION AND DIETETICS
SEMESTER I
CORE COURSE

FN21050- THERAPEUTIC NUTRITION I (Practical)	
Course Objectives This course will enable students to:	
<ol style="list-style-type: none"> 1. To train students to do market surveys of foods available. 2. To standardize various recipes and know various portion sizes. 3. To understand the basic principles of Diet planning. 4. To plan various diets according to the requirements and disease conditions. 	
Course Outcome: This course will help to determine the knowledge about the methods of dietary management in various degenerative diseases that can be prevented.	
FN21050- PRACTICAL COURSE CONTENTS (4 CREDIT)	
Sr. No.	STRUCTURE
Unit 1	Standardization of portion sizes for different food preparations. Assessment of Nutritional status
Unit 2	Exchange list as a tool for planning diets
Unit 3	RDA
Unit 4	Process of Diet planning
Unit 5	A market survey of food items with Cost
Unit 6	Preparation of Hospitals diets <ol style="list-style-type: none"> 1. Different types of liquid diets 2. Bland Diets 3. High fiber diets 4. Low Fibre Diets 5. Low Residue diets
Unit 7	Energy Modifications: <ul style="list-style-type: none"> ● Low-Calorie Diets ● High-Calorie diets
Unit 8	Diet for Diabetics: <ul style="list-style-type: none"> ● Hyperglycemic condition Hypoglycemic condition
Unit 9	Diet during Cardio-vascular Diseases: <ul style="list-style-type: none"> ● Fat modification for atherosclerosis ● Low sodium Diet in Hypertension
Unit 10	Diets for Specific metabolic disorders: Gout
Unit 11	Diet for Hormonal disorders: Hyperthyroidism, PCOS
REFERENCES	

1. Mahan, L.K. and Escott-Stump, S. (2000): Krause's Food Nutrition and Diet Therapy, 10th Edition, W.B. Saunders Ltd.
2. Shils, M.E., Olson, J.A., Shike, M. and Ross, A.C. (1999): Modern Nutrition in Health and Disease, 9th Edition, Williams and Wilkins.
3. Escott-Stump, S. (1998): Nutrition and Diagnosis-Related Care, 4th Edition, Williams and Wilkins.
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10. World Cancer Research Fund (1997). Food, Nutrition and the Prevention of Cancer- A Global perspective, Washington E.D. WCRF.

Teaching Methodology-

- Chalk and talk method
- Powerpoint presentations
- Videos
- Posters
- Quiz and Debates

**MASTERS IN NUTRITION AND DIETETICS
SEMESTER I
CORE COURSE**

FN21060- INNOVATIONS IN FOOD PRODUCT DEVELOPMENT

Course Objectives

1. This course will enable students to
2. Understand and know various aspects of food product development including food science & technology, marketing, and consumer research, finance, and communication.
3. To comprehend the role of different ingredients used in food preparation
4. Develop products that meet consumer needs, and are nutritionally and commercially viable.
5. Recognize the potential for entrepreneurship through marketing.

Course Outcome: This course will help students to develop new foods and determine their acceptance of these foods.

**FN21060- PRACTICAL COURSE CONTENTS
(4 CREDIT)**

S.No	STRUCTURE
Unit 1	Introduction
	<ul style="list-style-type: none"> ● To need for developing new product ● Steps to follow for developing new products ● Various aspects to be taken care of while developing a new product ● Selection of packaging materials ● Labeling ● Study of shelf life of the product ● Estimating cost of the product developed Marketing and sale.
Unit 2	Selection of recipes to be developed with justification.
	<ul style="list-style-type: none"> ● Standardization of recipe ● Finalizing at least two recipes. ● To get feedback from the customers- Sensory Evaluation
Unit 3	Packaging of the product
	<ul style="list-style-type: none"> ● Costing and labeling ● Packaging ● Marketing and sale
Unit 4	To study the shelf life of the product developed
Unit 5	Visit the food processing industry / Bakery

Teaching Methodology-

- Chalk and talk method
- Powerpoint presentations
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- Quiz and Debates

