Two-Year Postgraduate Programme

Masters of Nutrition and Dietetics

Faculty of Applied Sciences

Parul University

Vadodara, Gujarat, India

Faculty of Applied Sciences
Masters of Sciences Nutrition and Dietetics

1. Vision of the Department

To be a pioneering department committed to advancing nutritional knowledge, fostering innovative research, and cultivating a society empowered with the understanding and practice of balanced nutrition.

2. Mission of the Department

M1	To develop programmes for training the students in a combination of traditional subjects and the developing specializations focusing on skill development through rigorous laboratory work and environmental protection.
M2	The key aspect of the department's mission is to advance scientific knowledge in nutrition and dietetics through research and innovation. Faculty and students engage in cutting-edge research projects that contribute to the understanding of nutrition-related issues, such as chronic disease prevention, nutritional epidemiology, food science, and public health nutrition.
M3	The department fosters interdisciplinary collaboration to leverage diverse expertise and perspectives in tackling issues such as malnutrition, obesity, food insecurity, and sustainable food systems.
M4	The department is committed to fostering the professional development of its faculty, staff, and students.

3. Program Educational Objectives

The statements below indicate the career and professional achievements that the M.Sc. Nutrition and Dietetics curriculum enables graduates to attain.

PEO 1	To develop advanced knowledge and expertise in clinical nutrition, applying evidence-based practices to assess, diagnose, and develop nutritional interventions for individuals with complex health conditions.
PEO 2	To develop and implement health promotion and disease prevention initiatives, emphasizing the importance of nutrition in primary and secondary prevention strategies within community and public health settings.
PEO 3	To engage in scholarly activities, conducting research and contributing to the advancement of clinical nutrition knowledge. They will apply research findings to develop innovative strategies for managing nutrition-related health issues.

4. Program Learning Outcomes

Program Learning outcomes are statements conveying the intent of a program of study.

PLO 1	**Disciplinary Knowledge**	Execute strong theoretical and practical understanding generated from the specific programme in the area of work.

PLO 2	**Critical Thinking and Problem Solving**	Identify the problem by observing the situation closely, take actions and analytical skills to design the solutions.
PLO 3	**Social Competence**	Exhibit thoughts and ideas effectively, build effective interactive and presenting skills to meet global competencies.
PLO 4	**Research-related Skills and Scientific Temper**	Infer scientific literature, build sense of enquiry and identify and consult relevant sources to find answers.
PLO 5	**Trans-disciplinary Knowledge**	Create new conceptual, theoretical and specific approaches to address a common problem.
PLO 6	**Personal and Professional Competence**	Execute interpersonal relationships, self-motivation and adaptability skills and commit to professional ethics.
PLO 7	**Effective Citizenship and Ethics**	Demonstrate empathetic social to professional ethics and responsibility.
PLO 8	**Environment and Sustainability**	Understand the impact of the scientific solutions in societal and environmental contexts.
PLO 9	**Self-directed and Life-long learning**	Acquire the ability to engage in independent and life-long learning in broadest context of socio-technological changes.

5. Program Specific Learning Outcomes

PSO 1	**Medical Nutrition Therapy**	Applying medical nutrition therapy principles to manage and prevent nutrition-related diseases, collaborating with healthcare teams to integrate nutrition into patient care.
PSO 2	**Public Health Framework**	Apply the core principles of public health to nutrition practice, understanding population health, epidemiology, health promotion, and disease prevention.

6. Credit Framework

Semester wise Credit distribution of the programme	
Semester-1	20
Semester-2	20
Semester-3	20
Semester-4	20
Total Credits:	**80**

Category wise Credit distribution of the programme	
Category	**Credit**
Major Core	60
Minor Stream	00
Multidisciplinary	00
Research	20
Total Credits:	**80**

7. Program Curriculum

Semester 1						
Sr. No.	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
1	11209116	Advanced Physiology	3	3	0	0
2	11209118	Research Methods and Biostatistics – 1	3	3	0	0
3	11209119	Advanced Nutrition Biochemistry	3	3	0	0
4	11209120	Lab- Advanced Nutrition Biochemistry	2	0	3	0
5	11209121	Nutrition Epidemiology and Anthropology	3	3	0	0
6	11209122	Lab- Nutrition Epidemiology and Anthropology	2	0	3	0
7	11209123	Advance Human Nutrition	4	4	0	0
		Total	**20**	**16**	**06**	**0**
Semester 2						
Sr. No.	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
8	11209161	Advanced Food Science and Preservation	4	4	0	0
9	11209162	Nutrition Health Communication	2	2	0	0

10	11209163	Lab - Nutrition Health Communication	2	0	3	0
11	11209164	Scientific writing	3	3	0	1
12	11209165	Research Methods and Biostatistics	2	2	0	1
13	11209166	Dissertation – I	4	0	0	12
14	11209169	NCD's and their management	3	3	0	0
		Total	**20**	**14**	**3**	**14**
Semester 3						
Sr. No.	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
15	11209204	Nutrition Program management	3	3	0	0
16	11209209	Advanced Therapeutic Nutrition	4	4	0	0
17	11209210	Lab- Advanced Therapeutic Nutrition	2	0	3	0
18	11209211	Lab- Nutrition Programme Management	2	0	3	0
19	11209212	Convergence in Nutrition Programmes	3	3	0	0
20	11209213	Dissertation – 2	6	0	0	15
		Total	**20**	**10**	**06**	**15**
Semester 4						
Sr. No.	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
21	11209251	Internship	6	0	6	0
22	11209252	Nutrition Mainstreaming and advocacy	2	2	0	0
23	11209253	Nutrition and Gender in the Lifecycle	2	2	0	0
24	11209259	Dissertation-3	10	0	0	10
		Total	**20**	**04**	**06**	**0**

8. Detailed Syllabus

Semester 1
(1)

a. Course Name: Advanced Physiology
b. Course Code: 11209116
c. Prerequisite: Strong foundation in basic biology, chemistry, and anatomy.
d. Rationale: Basis for innovative treatments, personalized medicine, and contributes to public health strategies, ultimately enhancing overall well-being.
e. Course Learning Objective:

CLOBJ 1	Learning regarding various transport mechanisms
CLOBJ 2	Understanding about key concepts in equilibrium
CLOBJ 3	Learning about body systems - like digestive, respiratory, circulatory and reproductive system

f. Course Learning Outcomes:

CLO 1	Acquiring knowledge regarding diverse transport mechanisms, gaining an understanding of the fundamental principles underlying the movement of substances in biological systems.
CLO 2	Analysing key concepts in equilibrium, demonstrating their ability to interpret and grasp the intricate balance within various systems and phenomena.
CLO 3	At application level, students will employ critical thinking skills to explore and implement their knowledge of body systems.

g. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
3	**-**	**-**	**3**	**20**	**20**	**-**	**60**	**-**	**100**

L- Lectures; **T**- Tutorial; **P-** Practical; **C**- Credit; **MSE-** Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content:

Sr.No	Topic	Weightage	Teaching Hours
1	**1.1 Physiological principles** a) Transport mechanisms in brief. b) Plasma volume, Total blood volume, Red cell volume. **1.2 Equilibrium** a) Moles, Milli moles, Equivalence. b) Osmoles, ph, buffer, temperature. c) Importance of Fluid systems-ECF, ICF, Electrochemical gradient, Ionic gradient, Solvent drag, Gibbs-Donnan equilibrium. d) Acid-Base balance, Handerson-Hasselbach equation. **1.3 Digestive system** a) Related organs, structure and function (brief) b) Motor-neural effects-Secretory, digestive and absorptive function. c) Role of liver, gallbladder, pancreas and their dysfunctions. d) Hormones of GIT & regulation of gastric secretions. e) Regulation of Nutrient intake and food selection. f) Meal related gastric secretion-– Cephalic, Gastric, Inhibitory g) Gastric emptying and regulation. **1.4 Circulatory system-Blood formation** a) RBC, WBC, Blood clotting and homeostasis, functions of plasma proteins, b) Erythropoiesis- Role of various hormones in controlling Erythropoiesis. c) Pathophysiology-Anemias, Iron deficiency anemia-etiology and classification. d) Corpuscular defects and congenital defects, regulation of iron absorption – with reference to mucosa and enterocytes. e) Castle's experiment- Pernicious anemia, causative factors, extrinsic, intrinsic factors f) Folic acid and B12 deficiency methylation, megaloblastic anemia, clinical features, prevention of B12 deficiency. g) Pathophysiology of Jaundice. h) Granulopoiesis-role of WBCs in Anemia control, regulation of granulopoiesis i) Regulation of neutrophils and various factors – Role of interleukins. Tumor necrosis factor, GMCSF, MCSF, Inhibitory factors, chalones	29	13

2	**Neuro -Endocrine System** 1.1 Humoral responses of Hormones 1.2 Neuronal development-role of vit.B12. 1.3 Role of hormones- regulation of neurohormonal secretion. 1.4 The neuroendocrine axis-role of releasing factors and feedback responses. 1.5 Emphasis on the physiology of metabolic hormone-thyroid, insulin. (Or any 2 examples) 1.6 Role of ADH, Aldosterone	22	10
3	**Excretory and musculo-skeletal systems** **3.1 Excretory system** a) Nephron-structure, functions. b) Role of the kidney in maintaining pH of blood, GFR, Countercurrent balance, controlling blood pressure c) Water, electrolyte and acid-base balance, diuretics d) Respiratory acidosis, alkalosis. **3.2 Musculo-Skeletal system** a) Structure and function of muscle proteins, bone, cartilage, and connective tissue. b) Pathophysiology of the system – eg : muscular dystrophy, osteoporosis, rickets. c) Crystal poisoning and drug-induced osteomalacia.	22	10
4	**Immunology and Nutrition** 4.1 Cell-mediated and humoral immunity – the impact of malnourishment. 4.2 Innate immunity - Activation of WBC and production of Antibodies. T cells, B cells. Role of the thymus. 4.3 Malnutrition -infection cycle 4.4 Role of vitamins in immunity -Vitamins A, C, E 4.5 role of minerals in immunity - eg zinc, iron 4.6 PEM- Protein-energy malnutrition and its impact on immunity 4.7 Acquired immunity-related disease- AIDS, HIV etc	13	6
5	**Reproductive system** 5.1 Spermatogenesis, Oogenesis, Menstrual cycle, Embryo formation. 5.2 Physiological changes in pregnancy; Placental transfer of nutrients 5.3 Physiological changes in lactation; nutrition during lactation. 5.4 Embryo development-Cellular development of specific organs and tissues. 5.5 Congenital malformations-genetic defects. 5.6 Intrauterine deficiencies; Low birth weight, placental dysfunction; Infant and perinatal mortality.	13	6
	Total	**100%**	**45**

i. Text Book and Reference Book:

1. A.P.Krishna- Textbook of MEDICAL PHYSIOLOGY.
2. Guyton, A.C Hall, J.E (1996) Textbook of Medical Physiology, 9th Ed. Prism Books (Pvt.)Ltd. Bangalore.

3. Wilson (1989)Anatomy and Physiology for nurses, London, Edwars Arnold.
4. Gerard J. Tortora,BryanDerrickson (2015 India Edition) ANATOMY & PHYSIOLOGY

Semester 1
(2)

a. **Course Name:** Research Methods and Biostatistics – 1
b. **Course Code:** 11209118
c. **Prerequisite:** Solid foundation in basic statistics, mathematics, and a grasp of biology concepts.
d. **Rationale:** Provide the tools to design studies, collect data, and analyze results in fields like biology and medicine
e. **Course Learning Objective:**

CLOBJ 1	Learning of steps in Research Process
CLOBJ 2	Understanding of about various terms in research like variables, hypothesis, validity and reliability
CLOBJ 3	Learning about Qualitative and Quantitative Research

f. **Course Learning Outcomes:**

CLO 1	Understanding the sequential Steps in the Research Process, fostering their ability to comprehend and apply fundamental procedures within the realm of research methodology at the cognitive level of comprehension and application.
CLO 2	Analyzing and evaluating the intricacies of research terminology, enhancing their cognitive abilities at the levels of analysis and evaluation
CLO 3	Demonstrating the capacity to synthesize and create new insights, operating at the highest cognitive levels of synthesis and evaluation as they discern between qualitative and quantitative approaches in research.
CLO 4	Demonstrate Qualitative and Quantitative Research method

g. **Teaching & Examination Scheme:**

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
3	**-**	**-**	**3**	**20**	**20**	**-**	**60**	**-**	**100**

L- Lectures; **T**- Tutorial; **P-** Practical; **C**- Credit; **MSE-** Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	**Steps in Research Process-1** 1.1 Selection of research topics – need, relevance, feasibility 1.2 Problem analysis, problem definition, stating hypothesis and formulating objectives, 1.3 Variables, Dependent - Independent - Confounding 1.4 Indicators- relevant and measurable. 1.5 Literature search – referencing, abstracting, compiling, computer searches, bibliography 1.6 Internal & External Validity 1.7 Threats to validity 1.8 Sampling methods 1.9 Sample size calculations.	**24**	**11**
2	**Steps in Research Process-2** 2.1 Research Designs (RD) 2.2 Non Interventional RD a. Descriptive, ecological, cross-sectional, case-control, Cohort, Nested case control. 2.3 Interventional/ Experimental RD a. True Experimental Designs (TE) b. Quasi Experimental designs (QE) c. Examples of QE & TE 2.4 Data Collection a. Qualitative data(QL) and Quantitative data (QN) – Meaning and Differences b. Primary and Secondary Data – Meaning and Differences c. Methods of Collecting Primary and Secondary data	**51**	**23**
3	**QN & QL Methods & Tools** 3.1 QN Methods a. Nutrition status assessment (NSA) b. Structured surveys 3.2 Qualitative and participatory research methods a. FGDs b. Interviews – Key Informant, In-depth, Narratives c. Observation d. Social mapping/ Community Mapping e. Free listing and pile sorting f. Ranking Methods g. Participatory rapid assessment 3.3 Integrating qualitative and quantitative methods 3.4 Data management and data analysis	**24**	**11**
	Total	100%	45

- **Textbook and Reference Book:**

1. Research Methodology by C.R. Kothari by New Age International Publishers
2. Beaglehoe R, Bonita R and T Kjellstrom. Basic Epidemiology. World Health Organization
3. Designing and Conducting Health Systems Research Projects. Volume-1 Proposal Development and Fieldwork. By Corlien M. Varkevisser Indra Pathmanathan Ann Brownlee KIT Publishers, Amsterdam
4. Designing and Conducting Health Systems Research Projects. Volume-2 Data analysis and Report Writing By Corlien M. Varkevisser Indra Pathmanathan Ann Brownlee KIT Publishers, Amsterdam

Semester 1
(3)

a. **Course Name:** Advanced Nutrition Biochemistry
b. **Course Code:** 11209119
c. **Prerequisite:** Strong foundation in basic biochemistry, organic chemistry, and nutrition fundamentals
d. **Rationale:** Development of personalized nutrition strategies based on individual biochemical profiles.
e. **Course Learning Objective:**

CLOBJ 1	Understanding of metabolic interrelationships
CLOBJ 2	Analysis of metabolic derangements
CLOBJ 3	Comprehension of nucleotide metabolism
CLOBJ 4	Understanding of hormone mechanisms and regulation

f. **Course Learning Outcomes:**

CLO 1	Demonstrate comprehension of metabolic interrelationships, applying their understanding to identify connections and interactions within biochemical pathways, operating at the cognitive level of understanding and application.
CLO 2	Analyzing metabolic derangements, students will utilize critical thinking skills to evaluate disruptions in metabolic processes, engaging in the cognitive processes of analysis and evaluation to assess deviations from normal metabolic functioning.
CLO 3	Understanding and applying biochemical principles, fostering a deeper comprehension of nucleotide synthesis and degradation at the cognitive levels of comprehension and application.
CLO 4	Synthesizing the knowledge to interpret the intricate interplay between hormones and physiological processes, reflecting the cognitive levels of understanding, analysis, and synthesis.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	-	-	3	20	20	-	60	-	100

L- Lectures; **T**- Tutorial; **P-** Practical; **C**- Credit; **MSE-** Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	**Intermediary Metabolism** 1.1 Carbohydrate Metabolism 1.2 Amino acid Metabolism 1.3 Lipid Metabolism 1.4 Intermediary level and subcellular level 1.5 Inter-relationship between metabolism of Carbohydrate, Protein and Fat 1.6 Metabolic derangements due to macronutrient metabolism	**22**	**10**
2	**Metabolism of Purine and Pyrimidine, Nucleotides and Nucleic acid** 2.1 Biosynthesis of purines and pyrimidine 2.2 Salvage reaction 2.3 Catabolism of Purines and pyrimidine 2.4 Formation of Uric acid 2.5 Nucleotides metabolism and cellular role of nucleotides 2.6 Metabolism of DNA and RNAs 2.7 DNA replication, termination mutation and repair and recombination concepts	**22**	**10**
3	**Protein Biosynthesis** 3.1 Gene expression 3.2 Transcription 3.3 Translation 3.4 Post-translational modification 3.5 Inhibitors of protein biosynthesis 3.6 Gene expression in mitochondria	**22**	**10**
4	**Molecular Endocrinology** 4.1 Classification of hormones 4.2 Mechanism of Hormone Action 4.3 Hormones and neurotransmitters 4.4 Assays of Hormones	**33**	**15**

	4.5 Signal generation, signal transduction, cAMP, cGMP, Protein kinase cascade system 4.6 Regulation of hormonal action		
	Total	**100%**	**45**

- **Textbook and Reference Book:**

1. Fundamentals of Biochemistry by A.C. Deb – New Central Book Agency
2. Biochemistry by U Satyanarayan - Elsevier India
3. Harpers Biochemistry by Murray RK (Latest edition)

Semester 1
(4)

a. Course Name: Nutrition Epidemiology and Anthropology
b. Course Code: 11209121
c. Prerequisite: Foundation in basic epidemiology, nutrition fundamentals, anthropological concepts, research methods, and statistical skills.
d. Rationale: Uncovering patterns of nutrition-related diseases in populations for effective public health interventions.
e. Course Learning Objective:

CLOBJ 1	Comprehension of the epidemiological concepts.
CLOBJ 2	Analysis of epidemiological studies and methods
CLOBJ 3	Evaluation of Nutritional Health Research
CLOBJ 4	Application of Anthropological Research Tools

f. Course Learning Outcomes:

CLO 1	Demonstrate comprehension of epidemiological concepts, utilizing cognitive skills to understand the fundamental principles and frameworks underlying the study of disease distribution and determinants, operating at the cognitive level of understanding.
CLO 2	Analyzing epidemiological studies and methods, students will engage in critical thinking processes, employing analytical skills to assess the design, implementation, and findings of research studies, reflecting the cognitive levels of analysis and evaluation.
CLO 3	Evaluating Nutritional Health Research, students will apply their knowledge and comprehension to assess the validity, reliability, and significance of nutritional studies, operating at the cognitive levels of evaluation and synthesis.
CLO 4	Applying Anthropological Research Tools, students will demonstrate their ability to utilize anthropological methodologies and techniques, engaging in practical application and problem-solving tasks that involve the synthesis and application of

	anthropological concepts and tools at the cognitive levels of application and synthesis.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	-	-	3	20	20	-	60	-	100

L- Lectures; **T**- Tutorial; **P-** Practical; **C**- Credit; **MSE-** Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	**Application of Epidemiology and nutrition epidemiology** 1.1 Overview of key terminologies used in epidemiology and vital events (birth and death rates). 1.2 Applications of Epidemiology and Nutritional Epidemiology to understand disease and nutritional disorders and their management/treatment- examples 1.3 .Limitations of epidemiological research studies	11	5
2	**Types of Epidemiological Studies and Overview of Quantitative Epidemiological research methods and tools** 2.1.Experimental studies (Randomized Control Trials & Quasi experimental trials) 2.2. Non Experimental (Descriptive, Analytical Cohort, case control & cross-sectional) 2.3.Nutrition Status Assessment tools 2.4 Structured surveys and others eg. Weight and Height , Diet survey etc.	22	10
3	**Epidemiology research studies in Nutrition** 3.1. Studies/Literature/ Good Studies (design, tools and methods, result highlights) in relation to- a. Overweight and Obesity b. Micronutrient deficiency disorders i. Vitamin A and Iron deficiency ii. Iodine and Zinc deficiency c. Nutrition Health Program Evaluation	22	10
4	**Introduction to Anthropology** 4.1. Definition and applications of Anthropology and Nutritional Anthropology	22	10

	4.2.Ethnography and Ethno-physiology- Cultural perceptions of body physiology at different stages of the life cycle: developing countries and India.- Examples of studies 4.3. Emic view , etic view and application for culturally sensitive and acceptable nutritional Interventions. 4.4 Participatory qualitative approaches and their usefulness for nutrition interventions		
5	**Research Tools in Anthropology for Formulation of Research and Program Design** 5.1. Focus Group Discussion 5.2. Various Types of interviews. 5.3. Observation methods 5.4. Participatory Research methods. 5.5. Triangulation of methods. 5.6. Steps for ensuring effective planning and use of these methods. 5.7. Examples of studies using QR/PR methods (NHC, Formative research, Process evaluation)	22	10
	Total	**100%**	**45**

i. Textbook and Reference Book:

1. Measuring and Interpreting Malnutrition and Mortality (2005) : A Manual by CDC & WFP
2. R. Bonita , Basics of Epidemiology, 2nd edition , WHO, Geneva
3. Kanani S , Nutritional Epidemiology and Intersectoral linkages.Dept of Foods and Nutrition, MS University, Vadodara
4. Kanani S. Advances in Nutrition Anthropology, Dept of Foods and Nutrition, MS University, Vadodara
5. Lillian Langseth, Nutritional Anthropology and applications
6. Scrimshaw NS and Gleason RG. Rapid Assessment Procedures: Qualitative Methodologies for Planning and Evaluation of Health-Related Programmes. Ed. International Nutrition Foundation For Developing Countries (INFDC), 1992.
7. Scientific reports - Integration of QL and QN research for program design implementation and evaluation for nutrition health promotion : Examples from India by Shubhada Kanani , Dept of Foods and Nutrition, MS University, Vadodara 2008
8. https://www.suposhan.in/ - SuPoshan

Semester 1
(5)

a. **Course Name: Advance Human Nutrition**
b. **Course Code:** 11209123
c. **Prerequisite:** Strong foundation in basic nutrition, biochemistry, physiology, chemistry, biology, statistics, research methods, and anatomy.
d. **Rationale:** Offering in-depth insights into complex nutritional concepts and their applications.

e. Course Learning Objective:

CLOBJ 1	Understand the classification, digestion, absorption, and utilization of carbohydrates, lipids, proteins, and vitamins in human metabolism.
CLOBJ 2	Analyze the role of different macronutrients (carbohydrates, lipids, proteins) and vitamins in health maintenance, including their influence on disorders related to metabolism.
CLOBJ 3	Evaluate human requirements for carbohydrates, lipids, proteins, and vitamins, including the methodologies used for assessing nutritional status and deficiencies.
CLOBJ 4	Apply the acquired knowledge to assess and recommend heart-friendly diets, understand the implications of protein deficiency/excess, and identify toxicities/deficiencies of vitamins in dietary intake.

f. Course Learning Outcomes:

CLO 1	Understanding the classification, digestion, absorption, and utilization of carbohydrates, lipids, proteins, and vitamins in human metabolism.
CLO 2	Analyzing the role of different macronutrients (carbohydrates, lipids, proteins) and vitamins in health maintenance and metabolic disorders.
CLO 3	Evaluating human requirements for carbohydrates, lipids, proteins, and vitamins, including methodologies for assessing nutritional status and deficiencies.

g. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
4	**-**	**-**	**4**	**20**	**20**	**-**	**60**	**-**	**100**

L- Lectures; **T**- Tutorial; **P-** Practical; **C**- Credit; **MSE-** Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content:

Sr. No.	**Content**	**Weightage**	**Teaching Hours**
1	**Carbohydrates** 1.1 Classification , digestion, absorption and utilization : An overview	25	15

	1.2 Simple and Complex carbohydrates, Non-starch polysaccharides and fibre constituents and their role in Nutrition and health maintenance. 1.3 Established and emerging evidence of fibre; daily requirements of fibre 1.4 Newer functional role of carbohydrates in human nutrition 1.5 Disorders related to carbohydrate metabolism 1.6 Polyols, Glycemic Index , Glycemic load and Satiety index: Clinical implications		
2	**Lipids** 2.1 Classification, digestion, absorption, transport – An overview 2.2 Functions of essential fatty acids, and Long chain PUFA and trans fats in human metabolism 2.3 Role of n3 and n6 fatty acids in health and disease 2.4 Hyperlipidemia and atherosclerosis - implications for heart health 2.5 Phytochemicals & Plant sterols in human nutrition 2.6 Diet and heart hypothesis: Effect of quality and quantity of fat on lipid status 2.7 Visible and invisible fats in diets 2.8 Human requirements of essential fatty acids; total fats 2.9 Assessment of Lipid status 2.10 Recommendations for heart friendly diets	25	15
3	**Proteins** 3.1 Classification, digestion, absorption and transport – an overview 3.2 Non protein compounds and their biological functions 3.3 Metabolism of proteins – Role of liver and muscles 3.4 The concept of nitrogen balance, obligatory nitrogen losses and their relevance to protein requirements 3.5 Human requirements for proteins 3.6 Current methodology for determining protein requirements and essential amino acid requirements 3.7 Protein deficiency and protein excess - implications for health in childhood and adulthood 3.7 The concept of quality of protein and method for measuring it. 3.8 Disorders of protein metabolism; role of kidney; secondary complications in diabetes	25	15
4	**Fat & Water Soluble Vitamins** 4.1 Absorption, transport and metabolism - an overview 4.2 Bioavailability : Modulators 4.3 Biochemical functions 4.4 Assessment of vitamin status 4.5 Interaction with other nutrients 4.6 Toxicity and deficiency 4.6 RDA for vitamins and ensuring adequacy from diets	25	15
	Total	**100%**	**60**

i. Textbook and Reference Book:

1. Shils ME, Olson JA, Shike M, Ross AC, Caballero B and Cousins RJ (2006). Modern Nutrition in Health and Disease (10thed.). Lippincott, Williams and Wilkins publications.
2. Zeigler EE and Filer Jr LJ (1996). Present Knowledge in Nutrition (7thed.). ILSI Press, Washington DC 3. Human energy requirement (2004). Report of a joint FAO/WHO/UNU Expert consultation, Rome, 17-24 October 2001. FAO, Food & Nutrition technical Report series

Semester 1
(6)

a. Course Name: Lab- Advanced Nutrition Biochemistry

b. Course Code: 11209120

c. Prerequisite: Background in basic biochemistry and laboratory techniques.

d. Rationale: Enhances understanding by providing hands-on experience in advanced nutrition biochemistry techniques, reinforcing theoretical knowledge with practical skills.

e. Course Learning Objective:

CLOBJ 1	Understanding the classification, digestion, absorption, and utilization of carbohydrates, lipids, proteins, and vitamins in human metabolism.
CLOBJ 2	Analysing the role of different macronutrients (carbohydrates, lipids, proteins) and vitamins in health maintenance and metabolic disorders.
CLOBJ 3	Evaluating human requirements for carbohydrates, lipids, proteins, and vitamins, including methodologies for assessing nutritional status and deficiencies.

f. Course Learning Outcomes:

CLO 1	Demonstrate comprehension of the classification, digestion, absorption, and utilization of carbohydrates, lipids, proteins, and vitamins in human metabolism.
CLO 2	Analysing the role of different macronutrients (carbohydrates, lipids, proteins) and vitamins in health maintenance and metabolic disorders.
CLO 3	Evaluating human requirements for carbohydrates, lipids, proteins, and vitamins, including methodologies for assessing nutritional status and deficiencies.
CLO 4	Applying their understanding, students will integrate knowledge to assess and recommend dietary choices that promote heart health, mitigate protein imbalances, and identify potential vitamin toxicities/deficiencies.

g. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
-	**-**	**3**	**2**	**-**	**-**	**40**	**-**	**60**	**100**

L- Lectures; **T**- Tutorial; **P-** Practical; **C**- Credit; **MSE-** Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content: List of Experiments

Sr. No.	Content	Weightage	Teaching Hours
1	**Spectrophotometry** Estimation of Proteins Estimation of Phosphorus Estimation of Iron. Estimation of Cholesterol. Determination of blood glucose – oxidase method.	50	5
2	**Estimation of Vitamin-C** Chromatographic Techniques Separation of amino acids, sugars and lipids.	25	5
3	**Blood Analysis** Haemoglobin Total count ,Differential count Blood group – ABO and Rh	25	10
	Total	**100%**	**30**

Semester 1
(7)

a. Course Name: Lab- Nutrition Epidemiology and Anthropology
b. Course Code: 11209122
c. Prerequisite: Foundational knowledge in epidemiology, nutrition, and anthropological research methods.
d. Rationale: Reinforces theoretical concepts, allowing practical application of epidemiological and anthropological methods to investigate nutrition patterns and health outcomes in populations.
e. Course Learning Objective:

CLOBJ 1	Development of comprehensive research and presentation skills involving literature review, analysis, and effective communication of Nutritional Epidemiological studies' findings in group settings, covering topics like PEM, Anemia, Vit A deficiency, IDD, and program evaluations.
CLOBJ 2	Development expertise in analyzing NFHS 4 data on health conditions' prevalence, mastering epidemiological data communication through slide presentations
CLOBJ 3	Proficiency will be gained in qualitative research methods for program assessments and effectively presenting data collected from specific target populations in Anthropological studies.

f. Course Learning Outcomes:

CLO 1	Analysing and synthesizing research and presentation skills, students will engage in higher-order cognitive processes.
CLO 2	Apply and evaluate the knowledge, as they analyze NFHS 4 data on health conditions' prevalence, operating at the cognitive levels of application and evaluation.
CLO 3	Gaining proficiency in qualitative research methods for program assessments involves students utilizing higher-order cognitive skills such as synthesis and analysis.

g. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
-	**-**	**3**	**2**	**-**	**-**	**40**	**-**	**60**	**100**

L- Lectures; **T**- Tutorial; **P-** Practical; **C**- Credit; **MSE-** Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content: List of Experiments:

Sr. No.	**Content**	**Weightage**	**Teaching Hours**
1	Class project in small groups - each group will Study - objectives, methods, tools , results and conclusion of various Nutritional Epidemiological studies and present in class Topics will be related to - PEM , Anemia , Vit A deficiency, IDD, program evaluation and others.	**25**	**5**
2	Slide presentation and interpretation - NFHS 4 Data (Prevalence)	**25**	**5**
3	Class project in small groups - each group to study, review and present an Anthropological study using QL or PR data eg - NHE; process evaluation of programs	**25**	**5**
4	Field work - select any topic related to a program assessment and a. Prepare 2 data collection tools- i) using QN and ii) QL methods (eg. structured interview; FGD Question guide) - draft and revised after corrections b. Use the tool with either mothers of children or adolescent girls (depending on the program being assessed) and collect data c. Interpret data; write report and discuss in class	**25**	**5**

	Total	**100%**	**30**

Semester 2
(1)

a. **Course Name:** Advanced Food Science & Preservation
b. **Course Code:** 11209161
c. **Prerequisite:** Strong understanding of food chemistry, microbiology, and food safety principles.
d. **Rationale:** Advanced Food Science & Preservation equips individuals with specialized knowledge and techniques to enhance food quality, safety, and shelf life, meeting consumer demands and reducing food waste.
e. **Course Learning Objective:**

CLOBJ 1	Learning the composition of various foods and concept of Rheology
CLOBJ 2	Understanding will be developed for changes occurring in various foods as a result of processing and cooking
CLOBJ 3	Learning of application food science to improve nutritional quality and acceptability of food preparations.

f. **Course Learning Outcomes:**

CLO 1	Classify composition of various foods and concept of Rheology
CLO 2	Evaluate changes occurring in various foods as a result of processing and cooking
CLO 3	Apply the knowledge of food science to improve nutritional quality and acceptability of food preparations

g. **Teaching & Examination Scheme:**

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
4	**-**	**-**	**4**	**20**	**20**	**-**	**60**	**-**	**100**

L- Lectures; **T**- Tutorial; **P-** Practical; **C**- Credit; **MSE-** Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	**Constituents of Foods, Additives and Rheology** 1.1 Water : Physical properties of water and ice, chemical nature and structure of the water molecule. Free and bound water. Water activity and food spoilage. 1.2 Starch : Structure, characteristics of food starches, gelatinization, effect of different conditions and ingredients on gelatinization. Non starch polysaccharides : Cellulose, hemi-cellulose, pectins, gums and animal polysaccharides. 1.3 Food Enzymology: Endogenous enzyme activity, Methods controlling them, enzymes in food industry 1.4 Food Rheology	25	15
2	**Cereal and Cereal Products** 2.1 Cereal grains : Structure, composition**,** classification and grading 2.2 Cereal products : Malting, popping and puffing of cereal grains and millets 2.3 Flour and flour quality : Flour constituents, role in bakery 2.4 Batters and dough	25	15
3	**Pulses, Legumes, Nuts and Oilseeds, Fats and Oils** 3.1 Pulses and Legumes : Structure, composition, selection, grading, processing, germination, fermentation, cooking quality and toxic constituents. 3.2 Nuts and Oilseeds : Composition, selection, grading, oil extraction, protein concentrates and isolates. 3.3 Fats and Oils : Sources, composition, effect of composition on fat, classification, physical and chemical properties, rancidity changes, antioxidants and synergists**,** changes during frying, recent advances	25	15
4	**Milk and Milk Products, Fruits and Vegetables and beverages** 4.1 Milk and its Products Composition, physical and functional properties. Denaturation, effects of processing and storage. Dairy products. 4.2 Fruits and Vegetables Gross composition, classification, structural features. Enzymes in fruits and vegetables, browning reactions. Pigments : Structure, constituents, effect of cooking, acid, alkali, etc. on pigments. Texture of fruits and vegetables during ripening. Vegetable products as spices. 4.3 Beverages Composition, processing, phenolic compounds and factors affecting a. Tea and coffee b. Alcoholic beverages.	25	15
	Total	**100%**	**60**

i. Textbook and Reference Book:

1. Charley H (1982). Food Science (2nded.). John Wiley & Sons, New York.

2. Potter N and Hotchkiss JH (1996). Food Science (5thed.). CBS Publication & Distributors, New Delhi.
3. Pomeranz Y (1991). Functional properties of food components (2nded.). Academic Press, New York.
4. Park Pauline G and Palmer H (1972). Food theory and applications. John Wiley & Sons, New York

Semester 2
(2)

a. Course Name: Nutrition Health Communication

b. Course Code: 11209162

c. Prerequisite:. Proficiency in nutrition science, communication theory, and public health principles.

d. Rationale: Nutrition Health Communication facilitates effective dissemination of evidence-based dietary information, empowering individuals to make informed choices, and promoting positive health behaviours for improved overall well-being.

e. Course Learning Objective:

CLOBJ 1	Learning various theories and models which are used for Nutrition Health Communication programs
CLOBJ 2	Gaining knowledge regarding recent advances in communication theories and practices relevant to Nutrition Health Communication (NHC)
CLOBJ 3	Learning the important NHC/IEC programmes worldwide, their strengths and weaknesses
CLOBJ 4	Learning to plan and implement effective NHC/IEC interventions for improvement of health and nutrition

f. Course Learning Outcomes:

CLO 1	Summarise various theories and models which are used for Nutrition Health Communication programs
CLO 2	Construct recent advances in communication theories and practices relevant to Nutrition Health Communication (NHC)
CLO 3	Explain important NHC/IEC programmes worldwide, their strengths and weaknesses
CLO 4	Develop skills to plan and implement effective NHC/IEC interventions for improvement of health and nutrition.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	-	2	20	20	-	60	-	100

L- Lectures; **T**- Tutorial; **P-** Practical; **C**- Credit; **MSE-** Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	**Nutrition- Health Communication and theories** 1.1 Key concepts of Health and Nutrition Communication. 1.2 Behavior Change Theories - a) Health belief model b) Theory of planned behaviour c) Social cognitive theory d) Trans theoretical model e) HAPA model f) Social and behavior change communication (SBCC) g) Diffusion of innovation and other theories 1.3 Application of theory to NHC programs – The steps; with examples 1.4 Need to focus on facilitators and barriers of change 1.4. Concept of Social Marketing and its role for NHC	33	10
2	**Components and Processes of NHC - a focus on Behaviour Change** 2.1 .Components, Processes and steps a. Planning NHC, Formative research, TIPS b. Setting objectives- cognitive and behavioural; SMART objectives c. Operational Plan - who, what, where, when d. Implementation of NHC - stand alone and integrated with other programs e. Supervision and monitoring of field level implementation and community outreach f. Process and Impact Evaluation : Why and How g. Social mobilization, Empowerment of community and partnership	17	5
3	**Various Media applied in NHC**	17	5

	3.1 Various types of Media- a. Interpersonal communication (IPC) b. Mass Media c. Folk Media 3.2. Digital and Electronic media; M- Health 3.3. Other media and its use in NHC programs		
4	**Successful NHC Projects , Government programs and Best Practices** 4.1. Global Examples 4.2. Positive Deviance studies - National 4.3. Overview of Best Practices in NHC 4.4. Challenges for NHC implementation and overcoming them	33	10
	Total	**100%**	**30**

h. Textbook and Reference Book:

1. Theory at a Glance, National Cancer Institute, National Institute of Health (NIH), USA, 2005
2. Population Reports. Communication for Better Health. Info Project : Centre for Communication Programs. John Hopkins Bloomberg School of Public Health, 2008.
3. Hubley J. Communicating Health: An Action guide to Health Education and Health Promotion. The Macmillan Press Ltd., London and Basingstoke, 1983.
4. Nutrition-Health Education and Communication For Improving Women And Child Nutrition By Dr.Shubhada Kanani In: Public Health Nutrition in Developing Countries – Part 2.Ed. By Sheila C. Vir.Woodhead Publishing India Pvt .Ltd. New Delhi, 2011; Ch. 39; Pg.1085-1104
5. Glanz K, Lewis FM, Rimer BK (1996). Health seeking behaviour and Health Education : Theory, research and practice. 2nd edition, Jossey-Bass, San Francisco.
6. Eder JP, Geller ES, Hovell MF, Mayer (eds) (!994). Motivating health Behaviour, Delmar, Albany, New York
7. Melkote SR (1991). Communication for development in the third world. Theory and Practice. Sage Publications, New Delhi
8. Academy of educational development (1996) Nutrition Communication Project final report.AED,Washington DC
9. Management Information System (MIS) of Indian Government's Flagship Programmes: Are they an adequate monitoring tool? IJMR Occasional Paper No. 5/2012
10. Alive and Thrive project reports; Bangladesh Nutrition Integrated program.

Semester 2
(3)

a. Course Name: Lab - Nutrition Health Communication

b. Course Code: 11209163

c. Prerequisite: Understanding of nutrition science, communication theory, and behaviour change strategies.

d. Rationale: Nutrition Health Communication labs provide hands-on experience in designing effective messaging, fostering behaviour change, and promoting health literacy to improve dietary behaviours and overall health outcomes in diverse populations.

e. Course Learning Objective:

CLOBJ 1	Learning the SMART goal for nutrition program
CLOBJ 2	Understanding to prepare informative education communication
CLOBJ 3	Gaining knowledge on Smartphones and technology are used by AWWs at AWC using an observation checklist

f. Course Learning Outcomes:

CLO 1	Develop SMART goal for nutrition program
CLO 2	Prepare information education communication
CLO 3	Critique of Smartphones used by AWWs at AWC using an observation checklist

g. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
-	**-**	**3**	**2**	**-**	**-**	**40**	**-**	**60**	**100**

L- Lectures; **T**- Tutorial; **P-** Practical; **C**- Credit; **MSE-** Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE-** End Semester Examination

h. List of Experiments:

Sr. No.	**Content**	**Weightage**	**Teaching Hours**
1	Small group project-each group selects a topic for behavior change and carries out the following:	**33**	**10**
2	Planning for the NHC program- a) How to do formative research- steps b) How to conduct TIPS - steps c) Setting objectives for NHC- list of cognitive and behavioral objectives in SMART format	**17**	**5**
3	Preparation and Pre-testing of NHC material a) Preparing any one: Flashcards or flip book b) Preparing a Slideshow	**17**	**5**

	c) Preparing a poster (pretest draft of above in Parul sewashram OPD with few mothers or adolescents- depending on topic; then revise the visual) 2.2 Critique of Smartphones used by AWWs at AWC (using an observation checklist) followed by class discussion		
4	Class project - Using the prepared visual material in a small group session in community (either ICDS, or health center or primary school; depending on topic) a) conducting session in community; supervisor grades the session; and getting feedback b) Preparing a report c) discussion in class about their experience in field	**33**	**10**
	Total	**100%**	**30**

Semester 2
(4)

a. **Course Name: Scientific Writing**
b. **Course Code:** 11209164
c. **Prerequisite:** Proficiency in research methodology, critical thinking, and effective communication skills.
d. **Rationale:** Scientific writing enables clear dissemination of research findings, fosters academic discourse, and contributes to the advancement of knowledge in various fields.
e. **Course Learning Objective:**

CLOBJ 1	Understanding how to write scientifically for their dissertation and future research work
CLOBJ 2	Learning skills to write a report on a scientific article
CLOBJ 3	Find plagiarism and grammatical mistakes in article

f. **Course Learning Outcomes:**

CLO 1	Adapt practice about how to write scientifically for their dissertation and future research work.
CLO 2	Create a report on a scientific article
CLO 3	Find plagiarism and grammatical mistakes in article

g. **Teaching & Examination Scheme:**

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
3	**-**	**-**	**3**	**20**	**20**	**-**	**60**	**-**	**100**

L- Lectures; **T**- Tutorial; **P-** Practical; **C**- Credit; **MSE-** Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	**Introduction to Scientific Writing** 1.1 Why writing well is critical for career success 1.2 Types of scientific written work 1.3 Making your work suitable for different audiences- reader focused 1.4 Begin with making an outline – features of a good outline	20	9
2	**Features of a well written report, paper or book (with eg.)** 2.1 Content organization 2.2 Logical and smooth flow of matter 2.3 Complete and factually correct 2.4 Clear and concise 2.5 Correct grammar and appropriate use of language 2.6 Interesting and creative (where possible) 2.7 No plagiarism – all cited work properly referenced 2.8 Examples from literature	25	11
3	**Grammar and English language use- avoiding errors** 3.1 Sentence construction 3.2 Paragraph construction 3.3 Use of parts of speech and the articles 'a', 'an' and 'the' 3.4 Avoiding spelling errors 3.5 Building vocabulary; use of correct words 3.6 Formatting tips	25	11
4	**Typical structure of research report or journal paper** 4.1 Abstract or summary 4.2 Introduction and Review of literature 4.3 Methodology-objectives, sampling, study design, data collection tools, analytical tools 4.3 Results and presentation –text, tables, graphs, flow charts, photos and others 4.4 Discussion; comparing with other research, interpretation 4.5 Conclusion, limitation of this study; Recommendations 4.6 References, online references 4.7 Assignment for Practice- prepare outline of research report on any topic of your choice	30	14
	Total	**100%**	**45**

i. Textbook and Reference Book:

1. Scientific writing resource material. Workshop on scientific writing, Parul university; 2018
2. Kanani Shubhada. Guidelines for writing thesis. 2011

3. Editorial. Writing a research article -advice for beginners-. International journal for quality in healthcare.16(3): 191-192; 2004

Semester 2
(5)

a. **Course Name:** Research Methods and Biostatistics - 2
b. **Course Code:** 11209165
c. **Prerequisite:** Strong foundation in scientific inquiry, data analysis, and basic statistical concepts.
d. **Rationale:** Proficiency in research methods and biostatistics enables rigorous study design, data interpretation, and evidence-based decision-making in biomedical and public health research.
e. **Course Learning Objective:**

CLOBJ 1	Learning the significance of Biostatistics in the field of Nutrition and Dietetics (NUDS)
CLOBJ 2	Application different biostatistical methods that can be applied to better interpret different types of data available in the field of NUDS will be understood
CLOBJ 3	Learning to present data in various ways
CLOBJ 4	Understanding the uses computers and softwares to analyse the data

f. **Course Learning Outcomes:**

CLO 1	Explain the significance of Biostatistics in the field of Nutrition and Dietetics (NUDS)
CLO 2	Apply different biostatistical methods that can be applied to better interpret different types of data available in the field of NUDS
CLO 3	Develop skills to present data in various ways
CLO 4	Identify various methods using computers and softwares to analyse the data

g. **Teaching & Examination Scheme:**

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
2	**-**	**-**	**2**	**20**	**20**	**-**	**60**	**-**	**100**

L- Lectures; **T**- Tutorial; **P-** Practical; **C**- Credit; **MSE-** Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	**Biostatistics and its Application in NUDS** 1.1 Introduction of concepts and definitions in Biostatistics 1.2 Characteristics of Data a. Central Tendency - Measures of central tendency: Mean, Median, and Mode b. Dispersion, Measures of dispersion: Range, Variance, Standard deviation, quartiles, deciles, percentiles c. Measures of Skewness and Kurtosis	**33**	**10**
2	**Distribution curves and common statistical tests** 2.1 Binomial distribution, Poisson distribution, Normal distribution, their applications in data analysis. 2.2 Chi square tests (□2) 2.3 t – tests for independent sampling 2.4 t – tests for paired samples 2.5 Analysis of variance ANOVA; The F test 2.6 Karl Pearson's Coefficient 2.7 Spearman's Rank Coefficient 2.8 Regression analysis 2.9 Z score and application in nutrition assessment 2.10 Types of Parametric & Non – Parametric Testing of Hypothesis 2.11 Confidence interval and Level of significance 2.12 Potential errors and bias in Research - Random error, systematic error, selection bias, measurement bias	**17**	**5**
3	**Presentation of Data** 3.1 Classification of quantitative data 3.2 Raw data 3.3 Discrete frequency distribution 3.4 Continuous frequency distribution 3.5 Cumulative frequency distribution 3.6 Compilation and Tabulation of Raw Data 3.7 Tabulation: Essential Parts of a Table 3.8 Diagrammatic Presentation: Line diagram, Bar diagram, Simple divided bar diagram, Percentage sub-divided bar diagram, Multiple Bar Diagram Pie diagram 3.9 Graphical Presentation: Histogram, Frequency curve, ogive and stem and leaf display	**17**	**5**
4	**Computer programmes for data management and analysis** 4.1 Use of excel in statistics 4.2 SPSS, SAS and other programmes 4.3 Epicollect software and other recent software 4.4 Qualitative data analysis	**33**	**10**

	a. ATLAS Ti b. N-VIVO		
	Total	**100%**	**30**

j. Textbook and Reference Book:

1. Introduction to Statistical Reasoning by Gary Smith WCB/McGraw-Hill
2. Biostatistics : A foundation for analysis in the health sciences by Daniel W.W and N.Y.John Wiley
3. Research Methodology by C.R. Kothari New Age International Publishers
4. Research Methods and Measurements In Behavioural and Social Sciences by G.L. Bhatnagar **.**

Semester 2
(6)

a. Course Name: NCD's and Their Management

b. Course Code: 11209169

c. Prerequisite: Understanding of epidemiology, pathophysiology, and public health principles.

d. Rationale: Effective management of Non-Communicable Diseases (NCDs) requires comprehensive knowledge of prevention strategies, treatment modalities, and health promotion efforts to mitigate their impact on individuals and communities.

e. Course Learning Objective:

CLOBJ 1	Learning role of nutrition in onset, prevention and treatment of various non-communicable- diseases.
CLOBJ 2	Importance of diet and healthy lifestyle to prevent chronic disease will be learned
CLOBJ 3	Learning about the role of nutrition in HIV/AIDS condition
CLOBJ 4	Learning the role of nutrition in arthritis

f. Course Learning Outcomes:

CLO 1	Demonstrate the role of nutrition in onset, prevention and treatment of various non-communicable- diseases.
CLO 2	Summarize Importance of diet and healthy lifestyle to prevent chronic disease
CLO 3	Build knowledge about the role of nutrition in HIV/AIDS condition
CLO 4	Explain the role of nutrition in arthritis

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	-	-	3	20	20	-	60	-	100

L- Lectures; **T**- Tutorial; **P-** Practical; **C**- Credit; **MSE-** Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	**Importance of diet and healthy lifestyle to prevent chronic disease** 1.1 Dietary macronutrients and chronic disease 1.2 Dietary micronutrients and chronic disease 1.3 Role of functional foods, antioxidants to prevent disease and maintain health 1.4 Importance of exercise and active lifestyle; fitness 1.5 Importance and steps for weight control; reducing and maintaining normal weight 1.6 Impact of stress on healthy living and onset of disease	7	3
2	**Coronary heart disease** 2.1 Hyperlipidaemia and hypertension 2.2 Role of diet in the management of various types of hyperlipidaemias and hypertension 2.3 Diet after by-pass surgery and heart attacks 2.4 treatment aiding diet therapy like exercise, lifestyle changes 2.3 Atherosclerotic / Ischaemic heart disease- types and risk factors 2.4 Stress and hypertension, heart disease; stress management 2.6 Prevention strategies: Control of risk factors from a young age; lifestyle changes.	22	10
3	**Cancer** 3.1 Pathophysiology 3.2 Risk factors 3.3 Medical Diagnosis and Stages of Cancer 3.4 Cancer Therapy 3.5 Nutritional Requirement 3.6 Medical Nutrition Therapy; importance of nutrition 3.6 Counselling and family support	22	10
4	**HIV and AIDS** 4.1 Epidemiology and Trends	27	12

	4.2 Pathophysiology and Classification 4.3 Medical Nutrition Therapy 4.4 Complementary and Integrative Therapies		
5	**Nutrition in arthritis** 5.1 Types of arthritis, Rheumatoid arthritis, osteoarthritis, gout 5.2 Pathophysiology and Inflammation 5.3 Medical diagnosis and treatment 5.4 Dietary guidelines 5.5 lifestyle changes 5.6 Weight control and arthritis	22	10
	Total	**100%**	**45**

i. Textbook and Reference Book:

1. Manual of – Dietary Guidelines for Indians, National Institute of Nutrition, ICMR 2011
2. Indian Food Composition Tables
3. Indian council of Medical Research (ICMR), Report of the expert group of ICMR 2010, NIN.
4. William's Basic Nutrition & Diet Therapy, by Staci Nix 13th Edition, Publisher - MOSBY Elsevier

Semester – 3
(1)

a. **Course Name:** Nutrition Programme Management
b. **Course Code:** 11209204
c. **Prerequisite:** Expertise in nutrition science, public health, and project management methodologies.
d. **Rationale:** Skilful management of nutrition programs facilitates the efficient implementation of interventions, ensures resource optimization, and maximizes impact on improving population health outcomes.

e. **Course Learning Objective:**

CLOBJ 1	Concepts of management will be learned in nutrition programs and application of management principles in practice.
CLOBJ 2	Understanding the planning, implementing, monitoring and evaluation of nutrition programs.
CLOBJ 3	Knowledge will be gained on better management of nutrition-health programs to enhance the cost effectiveness and impact on beneficiaries.

f. **Course Learning Outcomes:**

CLO 1	Classify the importance of various concepts of management in nutrition programs and application of management principles in practice.

CLO 2	Demonstrate basic skills for planning, implementing, monitoring and evaluation of nutrition programs.
CLO 3	Evaluate the changes required towards better management of nutrition-health programs to enhance the cost effectiveness and impact on beneficiaries.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	-	-	3	20	20	-	60	-	100

L- Lectures; **T**- Tutorial; **P-** Practical; **C**- Credit; **MSE-** Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	**Concepts of nutrition program management and the Planning process** 1.1 Definition of term "management" 1.2 Three components of management- PIE (planning implementation evaluation)	7	3
2	**Program planning** 2.1 Concept and steps for effective planning 2.2 Planning for implementation and evaluation 2.3 Community participation in planning and management of program 2.4 Examples of good planning- national programs	22	10
3	**Implementation, Monitoring and Evaluation for Nutrition/ Health Programs** 3.1 Various components of implementation- Human resources, material resources, monitoring resources 3.2 Who will do what, where and when and how? 3.3 Execution of activities- training and capacity building of the team. 3.4 Allocation of time and various resources 3.5 Operational planning-micro planning 3.6 Arranging workspace, improving workflow, managing paperwork. 3.7 Review of evaluation studies related to actual management of programs	22	10

4	**Supervision and monitoring of program** 4.1 Types of supervision 4.2 What is effective supervision. 4.3 Monitoring tools 4.4 Examples of supervision-monitoring tools in programs	27	12
5	**Process and impact evaluation** 5.1 Concept and measurements 5.2 Tool for process evaluation 5.3 Tool for impact evaluation 5.4 Integrating process and impact evaluation. 5.5 Using evaluation data to strengthen programs. 5.6 Review of evaluation reports of few national programs	11	5
6	**Community participation and program sustainability** 6.1 Concept of program sustainability 6.2 Levels of community participation- from passive to very active and partnerships 6.3 Advantage and challenges of community participation 6.4 Guidelines and methods for promoting participation. 6.5 Best practices in community participation - examples from literature	11	5
	Total	**100%**	**45**

i. Textbook and Reference Book:

1. Capoor I, Gade J, and the CHETNA team. Enabling Community Participation in Nutrition Initiatives for Better Health: CHETNA's Experiences. Paper Presented at the Conference on Community Based Approaches to Improving Nutrition and Food Security at CARE, New Delhi, India,2000.
2. Kanani S. Nutirition and the Reproductive and Child Health (RCH) Programme: Linkages, Importance and Future Directions. A discussion paper, Department of Foods and Nutrition, 1998.
3. Kapil U. Integrated Child Development Services (ICDS) Scheme: A Program for Holistic Development of Children in India. Department of Nutrition, All India Institute of Medical Sciences, New Delhi, India. Indian Journal of Pediatrics, Volume:69, 2002.
4. ICDS Scheme to the Growth Development in Preschoolers: A Systematic Review of Literature Jemy Elizabeth Joseph Medical Science Department, JJT University, Vidyanagari, Jhunjhunu, Rajasthan-333001, India 2014.

Semester – 3
(2)

a. **Course Name:** Advanced Therapeutic Nutrition
b. **Course Code:** 11209209
c. **Prerequisite:** In-depth knowledge of biochemistry, physiology, and clinical nutrition assessment.
d. **Rationale:** Advanced Therapeutic Nutrition equips practitioners with specialized skills to design and implement tailored dietary interventions, promoting optimal health outcomes in individuals with complex medical conditions.
e. **Course Learning Objective:**

CLOBJ 1	Knowledge will be gained in the field of therapeutic nutrition
CLOBJ 2	Learning the classification, pathogenesis, diagnosis, aetiology, symptoms and dietetic management of various diseases
CLOBJ 3	Understanding and implementation of knowledge to plan diets for liver disorders, gastrointestinal disorders, infections, and fever

f. Course Learning Outcomes:

CLO 1	Develop advanced knowledge in the field of therapeutic nutrition
CLO 2	Explain classification, pathogenesis, diagnosis, aetiology, symptoms, and dietetic management of various diseases
CLO 3	Plan a diet for liver disorders, gastrointestinal disorders, infections, and fever

g. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
4	**-**	**-**	**4**	**20**	**20**	**-**	**60**	**-**	**100**

L- Lectures; **T**- Tutorial; **P-** Practical; **C**- Credit; **MSE-** Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content:

Sr. No.	**Content**	**Weightage**	**Teaching Hours**
1	**Introduction to Therapeutic Nutrition and Diets** 1.1 Applications of Therapeutic Nutrition 1.2 Enteral and Parenteral Nutrition 1.3 Nutrition care in immune deficiency diseases a. Care during HIV AIDS b. Care during Cancers 1.4 Routine Hospital Diets 1.5 Pre and Post Operative Diets 1.6 Diet prescription and nutritional care process – Essential components of diet prescription and steps involved in the nutrition care process.	25	15

	1.7 Diet counselling a. Definition b. Responsibilities of a counsellor c. Tips for successful counselling d. Components of counselling process e. Formulation of a pro-formal		
2	**Liver and Renal Disease** 2.1 Classification, aetiology, clinical features, diagnostic tests, prevention, and treatment 2.2 Liver disorders 2.3 Role of diet in liver health a. Viral hepatitis types A and B, C and E b. Cirrhosis of liver c. Fatty Liver d. Hepatic coma e. Infective Hepatitis f. Cholelithiasis g. Hepatic Encephalopathy 2.4 Renal disease a. Glomerulonephritis b. Nephrotic syndrome c. Acute and chronic renal failure d. Dialysis or Renal Transplant e. Urolithiasis f. Dietary Management of Renal Disorders and Complications 2.5 Pancreatitis 2.6 Gout	25	15
3	**Gastrointestinal Diseases** 3.1 Aetiology and pathogenesis 3.2 Clinical picture and diagnostic tests 3.3 Treatment and preventive aspects a. Peptic ulcer b. Flatulence and Constipation c. Ulcerative colitis d. Diarrhoea, dysenteries e. Malabsorption syndrome f. Irritable Bowel Disease g. Crohn's Disease	25	15
4	**Diet in Infections and Fever** 4.1 Causes 4.2 Types 4.3 Host Defence Mechanism 4.4 General Dietary Considerations 4.5 Typhoid 4.6 Influenza	25	15

	4.7 Malaria 4.8 TB		
	Total	**100%**	**60**

i. Textbook and Reference Book:

1. Dietetics by B. Srilakshmi – New Age International Publishers (Latest Edition)
2. Clinical Dietetics and Nutrition by F.P. Antia and Philip Abraham
3. Food, Nutrition and Diet Therapy by Krause and Mahan – WB Saunders Company.

Semester – 3
(3)

a. **Course Name:** Lab - Advanced Therapeutic Nutrition
b. **Course Code:** 11209210
c. **Prerequisite:** Strong foundation in nutrition science, clinical practice, and research methodology.
d. **Rationale:** Advanced Therapeutic Nutrition labs offer hands-on training in specialized dietary interventions, preparing professionals to address complex health conditions and optimize patient care through evidence-based practices.
e. **Course Learning Objective:**

CLOBJ 1	Learning to plan therapeutic diets for different diseases
CLOBJ 2	Learning the different forms of diseases condition
CLOBJ 3	Learning different protocols for management of different diseases

f. **Course Learning Outcomes:**

CLO 1	Plan a therapeutic diet for different diseases
CLO 2	Identify different forms of diseases condition
CLO 3	Explain the protocol for the management of different diseases

g. **Teaching & Examination Scheme:**

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
-	**-**	**3**	**2**	**20**	**20**	**-**	**60**	**-**	**100**

L- Lectures; **T**- Tutorial; **P-** Practical; **C**- Credit; **MSE-** Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE-** End Semester Examination

h. **List of Experiments:**

Sr. No.	Content	Weightage	Teaching Hours
	Planning therapeutic diet for the following conditions 1.1 Acute nephritis 1.2 Acute nephrosis 1.3 Chronic renal failure 1.4 Chronic renal failure patient with dialysis 1.5 Nephrolithiasis 1.6 Mild, Moderate and Severe Jaundice 1.7 Cirrhosis of Liver with ascites 1.8 Gout 1.9 Peptic ulcer 1.10 Flatulence and Constipation 1.11 Ulcerative colitis 1.12 Diarrhoea, dysenteries 1.13 Malabsorption Syndrome 1.14 Irritable Bowel Disease 1.15 Crohn's Disease	100 %	30

Semester – 3
(4)

a. **Course Name: Lab - Nutrition Programme Management**
b. **Course Code:** 11209211
c. **Prerequisite:** Proficiency in nutrition science, program management, and data analysis.
d. **Rationale:** Effective management of nutrition programs ensures optimal delivery of services, resource allocation, and attainment of desired health outcomes for targeted populations.
e. **Course Learning Objective:**

CLOBJ 1	Knowledge will be gained for preparing observation checklist for field level management of various nutrition programs
CLOBJ 2	Various IEC material used in community for counselling will be learned
CLOBJ 3	Effect of different nutritional programs will be understood and identification of gaps will be learned

f. **Course Learning Outcomes:**

CLO 1	Plan a observation checklist for field level management of various nutrition programs
CLO 2	Discuss various IEC material used in community for counselling
CLO 3	Evaluate the effect of different nutritional programs and identify the gaps

g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
-	-	3	2	-	-	40	-	60	100

L- Lectures; **T**- Tutorial; **P-** Practical; **C**- Credit; **MSE-** Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE-** End Semester Examination

h. List of Experiments:

Sr. No.	Content	Weightage	Teaching Hours
1	1.Class project: review various operational plans of nutrition programs like control of NCD, Poshan abhiyan, Atal bal mission, RMNCH+A, SAM and MAM management and others	**17**	**5**
2	2. Field visit to observe field level management of various nutrition programs a. School based anaemia control program (implementation and supervision) b. Food supplement in ICDS c. Mangal divas d. Jan andolan program e. NRC/CMTC	**17**	**5**
3	1. Implementation of training and capacity building ○ Class project: review of training modules of various programs under ICDS and health department-(ILA approach) ○ Visit to middle level training centre in Gandhinagar ○ Visit to regional training centre under health department ○ Visit to anganwadi training centre	**33**	**10**
	2. Management of IEC programs under ICDS and health ○ Class project: review of available IEC materials and class presentation ○ Case study: implementation of special IEC programs under health and ICDS. e.g.: Anaemia and IEC, IEC under poshan abhiyan, IEC for ANC PNC, IEC for adolescent health and nutrition	**33**	**10**
	Total	**100%**	**30**

Semester – 3
(5)

a. **Course Name:** Convergence in Nutrition Programs for Food-Nutrition Security
b. **Course Code:** 11209212
c. **Prerequisite:** Comprehensive understanding of food systems, nutrition science, and socio-economic factors.
d. **Rationale:** Integration of diverse nutrition programs fosters synergy, enhances efficiency, and ensures holistic approaches to address food insecurity and malnutrition.
e. **Course Learning Objective:**

CLOBJ 1	Parameters related to HDI (human development index); hunger index will be learned
CLOBJ 2	Knowledge will be gained on factors affecting food and nutrition security
CLOBJ 3	Interventions to improve food and nutrition security will be understood
CLOBJ 4	Learning regarding inter-sectoral approaches in achieving food and nutrition security

f. **Course Learning Outcomes:**

CLO 1	Identify various parameters related to HDI (human development index); hunger index
CLO 2	Elaborate various factors affecting food and nutrition security
CLO 3	Classify various interventions to improve food and nutrition security
CLO 4	Describe the importance of inter-sectoral approaches in achieving food and nutrition Security

g. **Teaching & Examination Scheme:**

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
3	**-**	**-**	**3**	**20**	**20**	**-**	**60**	**-**	**100**

L- Lectures; **T**- Tutorial; **P-** Practical; **C**- Credit; **MSE-** Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE-** End Semester Examination

h. **Course Content:**

Sr. No.	**Content**	**Weightage**	**Teaching Hours**

1	**Food and Nutrition Security** 1.1 Food Security 1.2 Nutrition Security 1.3 Hidden Hunger 1.4 Status of Food Insecurity – Global, National, State 1.5 Impact Of climate change on food and nutrition security	20	9
2	**Interventions to Improve Food and Nutrition Security** 2.1 Steps taken by GoI such as Green Revolution, White Revolution, GMOs and biofortified crops 2.2 Food Corporation of India - purpose and functioning 2.3 Public Distribution System – Strength and Weaknesses 2.4 Role of World Food Programme in ensuring Food and Nutrition Security	25	11
3	**Convergence** 3.1 Role of various sectors in achieving Food and Nutrition Security 3.2 Nutrition consideration in sectoral programmes – Health, Nutrition, Education, WASH, Sanitation 3.3 Role of agriculture in Food and Nutrition Security 3.4 Need for convergence and partnerships to maximize coverage and optimize benefits 3.5 Best Practices of Inter-sectoral convergence for achieving Food and Nutrition Security	30	14
4	**Human Development, Poverty and Hunger** 4.1 Definition of HDI and its Components and Indicators 4.2 Comparison of Global HDI with national and state HDI 4.3 Poverty and Hunger – Definition Global vs Indian 4.4 Inter- relationship between poverty and Hunger 4.5 Global Hunger Index – Component Calculations; data for India 4.6 Programmes for Reducing Hunger and Poverty – NREGA, NFWP, AAY and newer programmes and Schemes	25	11
	Total	**100%**	**45**

i. Textbook and Reference Book:

1. Human Development Index Report (Latest)
2. Global Hunger Index Report (Latest)
3. Food Agriculture Organization. Publications
4. National Food Security Act

Semester – 4
(1)

a. **Course Name:** Nutrition Mainstreaming and Advocacy
b. **Course Code:** 11209252
c. **Prerequisite:** Understanding of nutritional science and public health principles.
d. **Rationale:** Empowering individuals and communities to make informed dietary choices and advocate for improved nutrition outcomes.
e. **Course Learning Objective:**

CLOBJ 1	Knowledge gaining of concepts and practices of mainstreaming and advocacy for nutrition
CLOBJ 2	Learning regarding the evidence based nutrition advocacy
CLOBJ 3	Learning the international and national goals and targets related to public health nutrition

f. **Course Learning Outcomes:**

CLO 1	Define concepts and practices of mainstreaming and advocacy for nutrition
CLO 2	Apply evidence based nutrition advocacy
CLO 3	Interpret international and national goals and targets related to public health nutrition

g. **Teaching & Examination Scheme:**

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
2	**-**	**-**	**2**	**20**	**20**	**-**	**60**	**-**	**100**

L- Lectures; **T**- Tutorial; **P-** Practical; **C**- Credit; **MSE-** Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE-** End Semester Examination

h. **Course Content:**

Sr. No.	**Content**	**Weightage**	**Teaching Hours**
1	**Concept of Mainstreaming nutrition** 1.1 Concept of Mainstreaming nutrition in all sector programs for Maternal, Child and Adolescents and national health and development programs 1.2 Steps of Mainstreaming Nutrition	**40**	**12**

	1.3 Using Best Practices for Mainstreaming Programmes at scale 1.4 Case Studies - Examples of Recent National and International Mainstreaming Nutrition		
2	**Concept and Application of Evidence based nutrition advocacy** 2.1 Concepts and practices in nutrition advocacy– steps for success 2.2 Need for Nutrition Advocacy- some examples from successful nutrition advocacy programs 2.3 Steps in Nutrition Advocacy at Policy and Programme level 2.4 Examples of Nutrition advocacy by Print, Electronic, Social and Mass Media - Factsheets, Policy Briefs, Reports 2.5 National Policies influenced by Nutrition Advocacy 2.6 Critique of recent successful Examples of Nutrition advocacy 2.7 Eat right India Movement 2.8 Fit India Movement 2.9 Other New Initiatives for Nutrition Advocacy	**40**	**12**
3	**Mainstreaming and Nutrition Advocacy at National and International Level** 3.1 Role of FAO, WHO, NGO's & United Nations in Global /National advocacy & program implementation support to Government 3.2 Role of Academic Institutes in Mainstreaming and Nutrition Advocacy 3.3 National policies – nutrition, health, education, agriculture and their linkages 3.4 Operationalizing national/state policies and targets – steps for advocacy and mainstreaming of nutrition at field levels in various programs	**20**	**6**
	Total	**100%**	**30**

i. Textbook and Reference Book:

1. Global Nutrition Report (Latest)
2. National Nutrition Policy (Latest)
3. State Nutrition Policy (Latest)
4. Comprehensive National Nutrition Survey
5. Health Atlas Report

Semester – 4
(2)

a. **Course Name:** Nutrition and Gender in the Life Cycle
b. **Course Code:** 11209253
c. **Prerequisite:** Familiarity with gender dynamics and life cycle stages.
d. **Rationale:** Addressing the intersectionality of nutrition and gender throughout various stages of life to promote equitable health outcomes and social justice.
e. **Course Learning Objective:**

CLOBJ 1	Concept of 'Gender', Gender sensitivity and Nutrition will be understood
CLOBJ 2	Knowledge on the importance of nutrition throughout the lifecycle will be gained
CLOBJ 3	Knowledge will be gained on gender sensitivity in nutrition health program
CLOBJ 4	Nutrition health programs from a gender perspective will be learned

f. **Course Learning Outcomes:**

CLO 1	Summarize the concept of 'Gender', Gender sensitivity and Nutrition
CLO 2	Assess the importance of nutrition throughout the lifecycle.
CLO 3	Utilize the features of a gender sensitive nutrition health program.
CLO 4	Criticize current nutrition health programs from a gender perspective

g. **Teaching & Examination Scheme:**

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
2	**-**	**-**	**2**	**20**	**20**	**-**	**60**	**-**	**100**

L- Lectures; **T**- Tutorial; **P-** Practical; **C**- Credit; **MSE-** Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE-** End Semester Examination

h. **Course Content:**

Sr. No.	**Content**	**Weightage**	**Teaching Hours**
1	**Nutrition & Gender** 1.1. Concepts, Definitions of gender, and its relationship to nutrition and health.	10	3

	1.2. Poverty and socio–cultural vulnerabilities : their contribution to under-nutrition throughout the life cycle. 1.3. Intergenerational cycle of malnutrition and role of gender		
2	**Socio-cultural factors/vulnerabilities during reproductive period its impact on nutritional status** 2.1. Importance of nutrition during pregnancy, lactation, reproductive period (non-pregnant/non-lactating) 2. 2. Importance of Antenatal care during pregnancy and consequences of neglect of pregnant/lactating women on women, on newborn. 2.3. Socio-cultural vulnerabilities affecting nutritional status of Pregnant/lactating women and women during reproductive period: Multiple roles, frequent cycling of pregnancy & lactation, pregnancy wastage, depletion of maternal stores, poor family support. 2.4. Gender related factors affecting nutritional status of lactating women and its consequences on the child and mother: Constraints in Breastfeeding, quantity and quality of breast milk. 2.5. Elimination of female fetus before birth, infanticide, Consequences of sex selection on demographic profile.	20	6
3	**Socio-cultural factors/ vulnerabilities in early childhood and gender** 3.1. Importance of healthy feeding, caring practices and health seeking behaviours for good nutritional status of infants and young children. 3.2. Gender related factors affecting nutritional status of boys and girls and importance of focusing on the girl child. 3.3. Consequences of neglect of a girl child on morbidity, mortality and her growth - development 3.4 Long term consequences on nutrition of child and family due to neglect of girl child education	13	4
4	**Socio-cultural factors/ vulnerabilities during school-age and adolescence and its impact on nutritional status** 4.1.Importance of nutrition during school-age and adolescence 4.2. Socio-cultural vulnerabilities/ factors and gender: Impact on boys and girls in school-age and adolescence morbidity, mortality, educational & nutritional status during adolescence. 4.3. Early marriage and reproductive role & its consequences.	20	6
5	**Nutrition during Middle age, Geriatric Age** 5.1. Importance of nutrition during Middle age and Geriatric period. 5.2. Cumulative effects of socio-cultural vulnerabilities throughout early life and its effect on health and nutritional status during geriatric period.	20	6

	5.3. Nutritional status of Geriatric age group with focus on women and its consequences.		
6	**Critique of nutrition health policies from Gender & Nutrition perspective and experiences - globally and in India** 6.1. Critique of existing nutrition health policies and programs with respect to different stages of lifecycle. 6.2. Experiences of the developed and developing countries in implementing nutrition health policies and programs in the lifecycle from a nutrition and gender perspective 6.3. Critique of the programs and policies supporting girls and women throughout the lifecycle : scenario in India and other countries. 6.4.Towards a population and gender sensitive nutrition health policies and practice - Concepts & components of a gender/population sensitive policy & best practices in nutrition & public health 6.5. Examples of national & state level nutrition policies: The life cycle & gender component	17	5
	Total	**100%**	**30**

i. Textbook and Reference Book:

1. Gopalan C and Suminder Kaur (1989) Women and Nutrition in India, Nutrition Foundation of India, special publications series No 5, New Delhi, India.
2. Merchant K and K Kurz (1993) Women's Nutrition through the life cycle in The Health of Women : A Global Perspective, editors Marge Koblinsky et al, NCIH, USA
3. UNICEF (1994) Women & Gender in Countries in Transition, Regional Office for Central, Eastern, Europe, Commonwealth of Independent states & Baltic states. Women and Nutrition – Papers from ACC / SCN Sessions. ACC / SCN, Symposium Report, Nutrition Policy Discussion Paper No. 6, Oct. 1990.
4. Gender and Nutrition . A project b International center for research on women (ICRW), 2007.