M.Sc. PROGRAMME IN NUTRITION & DIETETICS

(Effective from Session 2025-26)

(Batch: 2025-2027)

SAMBALPUR UNIVERSITY

JYOTI-VIHAR, BURLA, SAMBALPUR, ODISHA-768019

SAMBALPUR UNIVERSITY

SEMESTER-WISE COURSE STRUCTURE FOR THE TWO YEARS P.G PROGRAMME IN UNIVERSITY P.G DEPARTMENT AND COLLEGES UNDER SAMBALPUR UNIVERSITY

TO BE EFFECTIVE FROM 2025-2026
BATCH: 2025-27
(Ref: letter No: 4873/Acd.-I Dated 21.08.2023)

For (Science/ Humanities/Social Sciences/ Commerce)				
Semester	**Core Course Credit**	**Additional Course**	**Additional Course Credit**	**Total Credit**
First	20	**AECC I**: Environmental Studies and Disaster management	2	22
Second	20	Inter Dept. Course (IDC) or open elective	3	23
Third	20	**AECC II**: Entrepreneurship Development	2	22
Fourth (including project of 4 credit)	20	MOOCs one paper	3	23
TOTAL	**80**		**10**	**90**
	Total credit for 2 years course = 90 Credits			
	Furthermore, following non - credit course will be taken by the students			
1. Yuva Sanskar		2. N.C.C/N.S. S/Sports/Performing Arts/Yoga (Of which one has to be opted)		

POST GRADUATE COURSE AT A GLANCE for Session 2025- 27						
Subject:		***M.Sc. Nutrition & Dietetics***	*Branch:*			
Paper Code/Number		**Paper Title**	**Type of Paper**	**Credit Hour**	**Mark Distribution**	**Maximum Marks**
FirstSemester-December,2025	ND.411	Human Anatomy & Physiology	Theory	4	80+20	100
	ND.412	Food Biochemistry & Metabolic Disorder	Theory	4	80+20	100
	ND.413	Drug Nutrient Interaction	Theory	4	80+20	100
	ND.414	Basic Concept of Nutrition	Theory	4	80+20	100
	ND.415	Practical-I	Practical	2	100	100
	ND.416	Practical-II	Practical	2	100	100
		Environmental Studies and Disaster	Theory	2	60+40	100
SecondSemester-April,2026	ND.421	Fundamentals of Food and Nutrition	Theory	4	80+20	100
	ND.422	Clinical Nutrition & Diet Therapy	Theory	4	80+20	100
	ND.423	Food Safety & Quality Control	Theory	4	80+20	100
	ND.424	Food Allergy & Intolerance	Theory	4	80+20	100
	ND.425	Practical-III	Practical	2	100	100
	ND.426	Practical-IV	Practical	2	100	100
		Interdisciplinary Course	IDC-Theory	3	60+40	100
ThirdSemester-December,2026	ND.511	Critical Care & Nutrition	Theory	4	80+20	100
	ND.512	Research Methodology and Biostatistics	Theory	4	80+20	100
	ND.513	Nutrition Education & Diet Counselling	Theory	4	80+20	100
	ND.514	Sports Nutrition	Theory	4	80+20	100
	ND.515	Nutritional Survey	Practical	2	100	100
	ND.516	Community Meal Planning	Practical	2	100	100
		Entrepreneurship Development	Theory	2	60+40	100
FourthSemester-April,2027	ND.521	Diet Planning for Critical Cases	Theory	4	80+20	100
	ND.522	Elective Paper (any one)	Theory	4	80+20	100
	ND.523	Hospital Internship and Patient Care	Practical	4	100	100
	ND.524	Project/Dissertation	Practical	4	100	100
	ND. 525	Elementary Nutrition Project	Practical	2	100	100
	ND. 526	Project Viva-Voce	Practical	2	100	100
		MOOC/Alternative Course	Theory	3	100	100

DETAILED COURSES OF STUDIES

VISION:

Sambalpur University is committed to creating and sustaining a transformative educational environment for its students, staff and faculties in the fields of Liberal Arts, Sciences and Professional Studies so that they become globally competitive through competency in respective domain knowledge, research, innovation and entrepreneurship skills with heightened sense of meaningful community engagements and personal developments.

MISSION:

P.G Department of Food Science Technology & Nutrition of Sambalpur University, Burla strives to impart quality education to the students with enhancement of their skills to make them globally competitive through:

M1	Educate society for generations by providing transformative education with deep disciplinary knowledge and concern for the environment.
M2	Develop problem solving, leadership and communication skill in student participants to serve the organization of today and tomorrow.
M3	Aim for the holistic development of the students by giving them value-based ethical education with concern for society.
M4	Foster entrepreneurial skills and mindset in the students by giving life-long learning to make them responsible citizens.

PROGRAM SPECIFIC OUTCOME (PSO):

PSOs: At the end of the PG Nutrition & Dietetics program, the student will be able to:

PSO1	To develop analytical skills in food industry and apply knowledge in the field of community nutrition.
PSO2	To solve complex problems and acquire analytical skills using latest techniques and tools to find out the solution for food, environmental safety
PSO3	To extend the knowledge on various food processing technologies by further research
PSO4	To design project in formulation, standardization of new products and clinical supplementation for starting Small Scale Industries (SSI) or Medium Scale Industries (MSI)

PROGRAM OUTCOMES (POs):

PO-1	Critical Thinking: Take informed actions after identifying the assumptions that frame our thinking and actions
PO-2	Effective Communication: Will be able to speak, read, write and listen clearly in person and through electronic media in English and in one Indian Language
PO-3	Social Interaction (Interpersonal Relation): Elicit views of others, mediate disagreements and prepared to work in team
PO-4	Entrepreneurship Capability: Demonstrate qualities to be prepared to become an entrepreneurship
PO-5	Ethics: Recognize different value systems including your own, understand the moral dimensions and accept responsibility for them
PO-6	Environment and Sustainability: Understand the issues of environmental contexts and sustainable development
PO-7	Life-Long Learning: Acquire the ability to engage in independent and life-long learning in the context of socio-technological changes

FIRST SEMESTER

Course Code: ND- 411 (4CH)	Course Name: HUMAN ANATOMY & PHYSIOLOGY
Pre-requisite: None	Co-requisite: ND-412

Programme Education Objectives

PEO1 Understand the nature and basic concepts of **Human Anatomy & Physiology** relating to the **M.Sc. in Nutrition**

PEO2 Analyse the relationships among different concepts

PEO3 Perform procedures as laid down in the areas of study

PEO4 Apply the Basic Concepts learned to execute them

UNIT	TOPIC	NO. OF LECTURES
1	Cells Structure and Its Basic- Labels of cellular organization and functions. Brief review of Cell membrane, and Intercellular communication.	3
	Muscular Skeletal System- Structure and function of bone, cartilage, connective tissue.	2
	Sense Organs- Eyes, Nose, Ears, Mouth, Skin (Structure and Functions)	3
2	Digestive System: anatomy of gastrointestinal tract and accessory organs. Digestion& absorption of foods, regulation of appetite Role of liver, pancreas, gall Bladder	6
	Respiratory system: anatomy, physiology and mechanism of respiration. Cardiorespiratory response to exercise and physiological effects of training.	5
3	Circulatory system: blood, composition of blood cells, development & function of blood cells, blood clotting, blood grouping and haemoglobin, Heart: anatomy, cardiac cycle, blood pressure and factors affecting blood pressure.	6
	Excretory system: anatomy and function of kidney, formation, composition and excretion of urine. Role of kidney in water, electrolytes & acid base balance, pH of blood, diuretics, homeostasis, buffers. Electrolyte water balance- Osmolarity effect of hypertonic, hypotonic.	6
4	Endocrine glands: structure & function, mode of action of hormones.	2
	Reproductive system: Structure& function of male & female reproductive organs. Physiological changes in pregnancy. Lactation, Post parturition changes.	3
	Anatomy and Physiology of CNS and Brain, Hypothalamus and its role in various body function (Obesity, Sleep, Memory)	2
	Total Lectures	**40**

Course Outcomes

CO-1 Remember and understand the basic concepts/Principles of **Human Anatomy & Physiology**

CO-2 Analyse the Various Concepts to understand them through case studies

CO-3 Apply the knowledge in understanding practical problems

CO-4 Execute/create the Project or field assignment as per the knowledge gained in the course

TEXT BOOK:

1. Ganong, W. F. (1985): Review of Medical Physiology, 12th Edition, Lange Medical Publication.
2. Moran Campell E.J., Dickinson, C.J., Slater, J.D., Edwards, C.R.W. and Sikora, K. (1984): Clinical Physiology, 5th Edition, ELBS, Blackwell Scientific Publications.
3. Guyton, A.C,(1985): Function of the Human body, 4th Edition, W.B. Sanders Company, Philadephia.

4. Guyton, A.C, and Hall, J. B. (1996): Text Book of Medical Physiology, 9th Edition, W.B. Sanders company, Prime Books (Pvt.) Ltd., Bangalore.
5. Wilson, K.J.W. and Waugh, A. (1996): Ross and Wilson Anatomy and Physiology in Health and Illness, 8th Edition, Churchill Livingstone.
6. McArdle, W.D., Katch, F.I. and Katch, V.L. (1996): Exercise Physiology. Energy, Nutrition and Human performance, 4th Edition, Williams and wilkins, Baltimore.
7. Jain, A.K., Textbook of physiology. Vol I and Il. Avichal publishing co.,

Course Code: ND- 412 (4CH)	**Course Name: FOOD BIOCHEMISTRY AND METABOLIC DISORDER**
Pre-requisite: None	**Co-requisite: ND-413**

Programme Education Objectives

PEO1	Understand the nature and basic concepts of **Food and Nutrition** Relating to the **M.Sc. in Nutrition and Dietetics**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

UNIT	TOPICS	NO. OF LECTURES
1	Metabolic pathways: Carbohydrates- Aerobic and anaerobic degradation, glycogenesis, glycogenolysis, gluconeogenesis HMP shunt pathway. Hormonal regulations of blood glucose, brief about metabolic disorders with reference to CHO. Glycogen storage disease, Essential Pentosuria, Glalctosemia, Fructosuria and their MNT.	**7**
2	Bioenergetics- Principles of bioenergetics, free energy – endergonic and exergonic process, role of high energy compounds in energy storage, formation of ATP-Biological oxidation and electron transport chain- Reduction potentials, anatomical site and components of oxidative phosphorylation, enzymes involved membrane location of electron transport, chemiosmotic theory, inhibitors of respiratory chain.	**5**
	Lipids- Metabolism of triacylglycerol, oxidation of fatty acids, cholesterol. Regulation of lipid metabolism and ketone bodies. Oxidative stress and antioxidants – Free radicals	**5**
	– definition, formation in biological systems, defense against free radicals. Role of free radicals and antioxidants in health and disease. Determination of free radicals, lipid peroxides, and antioxidants and brief about metabolic disorders of lipid metabolism. Gaucher's disease, Niemann pick disease, Fabry's disease, Tay-Sachs disease and their MNT.	
3	Protein: Protein degradation, fate of nitrogen (urea cycle), metabolism of aromatic, sulfur-containing, BCAA, and other amino acid pools. Glutamine and alanine cycle, protein biosynthesis. Nucleic acid metabolism of nucleic acid components, biosynthesis of nucleotides, brief about metabolic disorders of protein metabolism. Phenylketonuria, Alkaptonuria, Albinism, Cystinuria, Hypertyrosinemia, Homocystinuria ana their MNT.	**5**
	Regulation of metabolism: Interrelationship of carbohydrate protein and lipid metabolic, Role of Vitamins and Minerals in metabolism, metabolic adaptation during starvation, exercise, stress, and diabetes mellitus. Significances of enzymes in food metabolism classification, chemical nature-Enzyme inhibition, enzyme pattern in disease pattern.	**5**
4	Hormones: Classification- synthesis – regulatory functions and mechanism of hormone action – Prostaglandin structure, biosynthesis, metabolism and biological action and their role in pathology. Brief about metabolic disorders of hormones and enzyme. Down's syndrome, Turner's syndrome, Klinefelter's syndrome and their MNT.	**4**
	Metabolic disorders: Etiology, Clinical manifestation, MNT- Down's Syndrome, Turner's Syndrome, Klinefelter Syndrome, Maple Syrup Syndrome, CHO Counting,	**9**

	Inborn errors of protein and purine, PKU, MSUD, Tyrosinosis, Homocystinuria, Fructosuria, Organic Aciduria.	
	TOTAL LECTURES =	**40**

Course Outcomes

CO-1	Remember and understand the basic concepts/Principles of Biochemistry **of Foods**
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

TEXT BOOK:

1. Murray, R.K., Graner, D.K., Mayes, P.A. and Rodwell, V.W. (2000): 25 th Ed. Harpers Biochemistry Macmillan Worth Publishers.
2. Nelson, D.L., and Cox, M.M. (2000): 3[1d] Ed. Lehninger's Principles of Biochemistry, Macmillan Worth Publishers.
3. Conn, E.E., Stumpf, P.K., Bruening, G. and Doi, R.H. (2001): 5 th Ed. Outlines of Biochemistry, Heinemann Medical Books Ltd.
4. Raghuramulu, N. , Madhavan Nair and K. Kalyanasundaram, S. (2003). A Manual of Laboratory Techniques, NIN, ICMR.
5. BergJM, Tymoczko JL and Stryer L. (2002) Biochemistry 5th ed. W.H. Freeman.
6. Devlin TM. (2002) Text Book of biochemistry with Clinical Correlations 5 th ed. John Wiley and Sons.
7. Horton RH, Moran LA, Ochs RS, Rawn JD and Scrimgeour.(2002) Principles of Biochemistry 3rd ed. Prentice Hall.
8. Murray RK, Granner DK, Kayes PA and Rodwell VW. (2003) Harper's Illustrated Biochemistry. 26th ed. McGraw-Hill. Asia.
9. Voet D and Voet JG. (2004) Biochemistry. 3rd ed. John Wiley and Sons.

	10. **REFERENCE BOOKS:**
1	Swaminathan M. 1974. Essentials of Foods and Nutrition. Vol. II. Ganesh& Co.
2	J.L. JAIN, Fundamentals of Biochemistry. S. Chand publication
3	Satyanarayan and Chakrapani, Biochemistry, 5th edition., Elsevier, 2013

REFERENCE BOOKS:	
1	Modern Industrial Microbiology & Biotechnology by N. Okafor. 1st edition. CRC Press, USA. 2007.
2	Industrial Microbiology Samuel C Presscott

Course Code: ND- 413 (4CH)	**Course Name: DRUG NUTRIENT INTERACTION**
Pre-requisite: None	**Co-requisite: ND-411**

Programme Education Objectives

PEO1	Understand the nature and basic concepts of Drug **Nutrient Interaction** Relating to the **M.Sc. in Nutrition and Dietetics**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

UNIT	TOPICS	NO. OF LECTURES
1	Drugs and pharmaceutical compounds- natural and synthetic, use of excipients, characteristics of rugs action: Pharmaco-dynamics, pharmacokinetics, route, and form of excretion. Drug abuse and drug resistance, Drug and Nutrition- basic concept, Clinical significance and risk factor, rection of drugs in the body- Ingestion, Digestion Absorption, Metabolism.	**7**

	Effect of nutrition on drugs, Drug effects on nutritional status.	**3**
2	Food and drug interaction in different disease conditions: allergies, asthma, arthritis, CVD, GERD, ulcers, hypothyroidism, psychiatric disorders, food allergens, Guidelines to lower the risk of food and drug interaction, safe use of drugs. Nutrient effects on drug therapy- effects of dietary composition, interactions between medication and milk, iron, fruit juices, antacids. Drug response, adverse drug reactions, drug interactions and pharmacogenetics.	**10**
3	Drug Nutrient interaction in specific condition- Drug nutrition interaction in patients with cancer, transplantation, immune function, chronic infection, receiving enteral nutrition, antimicrobial nutrient interaction.	**10**
4	Guideline to lower the risk of food and drug interaction. Drug doses and efficacy, Safe use of drug.	**4**
	Drug Nutrient Interaction by life stage – Infancy and childhood, Pregnancy and lactation, elderly.	**6**
	TOTAL LECTURES =	**40**

Course Outcomes

CO-1	Remember and understand the basic concepts/Principles of **Drug Nutrient Interaction**
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

TEXT BOOK:

1. McCabe, B.J., Frankel, E.H., Wolfe, J.J., eds. Handbook of Food — Drug Interactions. CRC press. Boca Raton, FL2003.
2. Akamine, D, Filho M.K., &Peres, C.M. " Drug — nutrient interactions in elderly people." Current Opinion in Clinical Nutrition and Metabolic care, 10:304-310, 2007.
3. Genser, D. "Food and drug interaction: Consequences for the nutrition /health status." Annals ofNutrition & Metabolism. 52(suppl 1):29-32, 2008.
4. McCabe, B.J. Prevention of food — drug interactions with special emphasis on older adults. Current Opinion in Clinical Nutrition and Metabolic care, 7:2-26, 2004.

REFERENCE BOOKS:	
1	Swaminathan M. 1974. Essentials of Foods and Nutrition. Vol. II. Ganesh& Co.
2	Principles of Nutrition – Fisher and Fuqua, Wiley eastern Private Limited, New Delhi.
3	Nutrient Requirements and Recommended Dietary Allowances for Indians – Indian Council of Medical Research, National Institute of Nutrition, Hyderabad.
4	ABC of Nutrition (4th edition), Stewart Truswell, BMJ Publishing Group, 2003

Course Code: ND-414 (4CH)	**Course Name: BASIC CONCEPT OF NUTRITION**
Pre-requisite: None	**Co-requisite: ND-412**

Programme Education Objectives

PEO1	Understand the nature and basic concepts of **Food and Nutrition** Relating to the **M.Sc. in Nutrition and Dietetics**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

UNIT	TOPICS	NO. OF LECTURES
1	Definition- Food, Nutrition, Health and its determinants, nutrients, nutritional status, malnutrition, undernutrition, overnutrition, optimum nutrition, diet, diet therapy, therapeutic nutrition, kilocalorie, joule, diet diversity, body, daily values, nutrient density.	2
	Food Groups- Classification of Carbohydrates, Fats, Lipids, Protein, Vitamins: (A, B complex, C, D, E & K) – functions, types, metabolism, sources Major and minor mineral elements with their role in body- Ca, P, Mg, Fe, I, u, Zn, F, Chr, and Se. Importance of Roughages in the diet. Water & electrolytes balance.	10
2	Food Preparation: Selection of foods, preparation methods of food blanching, retrogradation, roux, principles of cooking, methods of cooking, advantages and disadvantages, Effect of cooking on nutritive value, methods of enhancing nutritive value, effect of cooking on nutritive value.	3
	Food as a source of nutrients: classification of nutrients; functions, recommended dietary allowances (RDA), Food pyramid, Balance diet, My plate, Mindful eating (Definition, methods, advantages, disadvantages)	3
	Meal planning: Definition, Principles of planning diets, points to be considered in planning a diet, steps involved (using food composition tables and food exchange list) Factors affecting food choice, Menu planning, exchange list, and factors for planning a balance diet.	4
3	Nutritional needs: Nutrition during infancy, pre-school children, school-going children, adolescents, adults, pregnancy and lactation, and old age, athletes/sports persons- physiological changes, nutritional requirements, food requirements as per RDA.	10
4	Nutritional Assessment: Assessment of nutritional status by direct & indirect methods, Anthropometric assessment, clinical examination, bio-physical or radiological measurement, functional assessment,	5
	National and international nutrition policies.	3
	TOTAL LECTURES =	**40**

Course Outcomes

CO-1	Remember and understand the basic concepts/Principles of **Food and Nutrition**
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

TEXT BOOK:

1. Mudambi S R and Rajagopal M V, (2008), Fundamentals of Foods, nutrition & Diet therapy by new age international publishers, New Delhi
2. Srilakshmi B, (2002), nutrition science. New Age International publishers. New Delhi.
3. Shubhangaini A Joshi,(2010), Nutrition and Dietetics, with Indian case studies, Tata McGraw-Hill, New Delhi

4. Bamji, M.S, Reddy, V. (1998), Text Book of Human Nutrition, Oxford & IBH Publishing Co, New Delhi.
5. Gibney M.J, Elia M Ljingquist. O (2005), Clinical Nutrition, Backwell Science Publishing Co.
6. Robinson C.H and Winely E.S, (1984). Basic Nutrition and Diet Therapy, Macmillian Pub. Co. New York.
7. Swaminathan, M. (2002) Food and Nutrition, Volume I, The Bangalore Printing and Publishing Company Ltd.
8. Guthrie, H.A &Picciano, M.F (1995), Morby Publishing Co, New York. Srilakshmi, B. (2005). Dietetics, New Age International Publishers, New Delhi.
9. Sakharka B M, Principles of Hospital Administration and Planning, 2009, 2nd Edition, Jaypee Brothers Medical Publishers (p) Ltd.
10. Sherry Glied and Peter Smith, The Oxford Handbook of Health Economics,201 I ll . Jan Abel Olsen, Principles in Health Economics and Policy, 2009, Oxford University Press.
12. Mohinder Chand, Managing Hospitality Operations, 2009, 1st Edition, Anmol Publications Pvt. Ltd. New Delhi.
13. Goel S.L, Health Care System and Hospital Administration, 2009, Vol.7, Deep and Deep Publications Pvt. Ltd.
14. Kalkar S.A, Hospital Information Systems, 2010, Published by AsokeK.Ghosh, PHI Learning Pvt. Ltd
.

REFERENCE BOOKS:	
1	Handbook of Seed Science and Technology, Basra A.,CRC Press, 2006
2	Handbook of Fruit and Vegetable Processing Sinha and Hui, John Wiley and Sons, 2010
3	Handbook of Meat, Poultry and Seafood Quality, Kerth Wiley Backwell, 2012
4	Technology of Milk Processing, Khan QA and Padmanabhan, ICAR, New Delhi
5	Food Science- N.Potter & J.H.Hotchkiss- CBS Publishers & Distributors, New Delhi.

Course No: ND. 415 Practical-I (2CH)

Programme Education Objectives

PEO1	Understand the nature and basic concepts of **Practical –I** Relating to the **M.Sc. in Nutrition and Dietetics**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

Course Outcomes

CO-1	Remember and understand the basic concepts/Principles of **Practical -I**
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

Course No: ND. 416 Practical-II (2CH)

Programme Education Objectives

PEO1	Understand the nature and basic concepts of **Practical –II** Relating to the **M.Sc. in Nutrition and Dietetics**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

Course Outcomes

CO-1	Remember and understand the basic concepts/Principles of **Practical -I**
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

Course :	**EVS and Disaster Management**	**(2CH)**

Programme Education Objectives

PEO1	Understand the nature and basic concepts of **EVS and Disaster Management** Relating to the **M.Sc. in Nutrition and Dietetics**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

Course Outcomes

CO-1	Remember and understand the basic concepts/Principles of **EVS and Disaster Management**
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge to understand practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

SECOND SEMESTER

Course Code: ND- 421 (4CH)	Course Name: FUNDAMENTALS OF FOOD NUTRITION
Pre-requisite: ND-414	Co-requisite: ND-422

Programme Education Objectives

PEO1	Understand the nature and basic concepts of the **Fundamentals of Food Nutrition**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study

UNIT	TOPICS	NO. OF LECTURES
1	Concept of energy: Definition, Units of energy, components of energy requirements, REE, BEE, TEE, EER, RMR, PAL, BMR (Harris Benedict), Energy requirement during work, SDA, Metabolic equivalents, NEAT, RQ, DLW, Techniques Heart Rate Monitoring method	**5**
	Nutritional screening and assessment. Nutritional care plan, implementation of nutritional care. MUST, SGA, SOAP. Nutritional support systems and other life-saving measures for the critically ill. Role of immune enhances, conditionally essential nutrients, immune suppressants, and special diets in critical care.	**5**
	Body Composition – Methods of calculation, Determination of body composition, physical and chemical, Body fat percentage- distribution of fat, attaining ideal body composition, fat loss, gaining lean body weight, low body fat percentage, body fat percentage, and hormonal changes.	**6**
2	Detailed explanation of varieties of diet (Normal, Semi-solid, Fluid, Special Diet), EN and PN (Description, Limitation, Formulation, Complication)	**10**
	Pre- and post-operative diet	**2**
3	Eating Disorders – Brief evaluation of Anorexia Nervosa, Bulimia Nervosa, Binge Eating, Specified Feeding and Eating Disorders, Pica, Rumination disorder.	**5**
	Nutritional Support Service	**3**
4	Hospital food service: Hospitality in hospital care management of dietary department, purchasing, storage, and quantity of food production, patient compliance, food production, serving to patient tray and trolley service, plate waste management, washing, and garbage disposal.	**4**
	Total Lecturer	**40**

Course Outcome

CO-1	Remember and understand the basic concepts/Principles Nutrition through life cycle
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

TEXT BOOK:

1. Srilakshmi, B. 2005. Food Science, New Age International (P) Ltd., Publishers, New Delh
2. Potter, N. and Hotch Kiss, J.H. (1996): Food Science, FiNDh edition, CBS Publishers and Distributors, New Delhi
3. Julians, B.O. (1985). Rice Chemistry and Technology, 2nd edition, American Association Chemists, St. Paul Mimesota, USA.
4. Charley, H. (1982). Food Science, 2nd edition, John Wiley & Sons, New York.

5. Srilakshmi (2008). Nutrition Science. New Age International Pvt. Ltd, New Delhi.
6. Mahan L K and Escott — Stump S (2000). Krause's Food Nutrition and Diet Therapy 10th Ed WB Saunders Ltd
7. Shills, M.E., Olson, J. , Shike, M. and Roos, C. (1998): Modern Nutrition in Health and Disease. 9th Edition . Williams and Williams. A. Beverly Co. London.
8. SreeDevi.V. (1997). Nutrition Education. Discovery Publishing House, New Delhi.
9. Bamji, M.S., Rao, P.N. and Reddy, V. (1996). Textbook of Human Nutrition, Oxford & IBH Publishing Co. Pvt. Ltd.
10. Gopalan, C. (1995). Recent Trends in Nutrition, Oxford University Press, London.

TEXT BOOKS:	
1	Dietetics – B.Srilakshmi; New age International (P) Limited, New Delhi.
2	Nutrition Science – B.Srilakshmi; New age International (P) Limited, New Delhi.
3	Human Nutrition and Dietetics – Davidson, Passmore, East wood, English Language Book Society (ELBS).
4	Text Book of Human Nutrition – Mahtab. S. Bamji; N.Pralhadrao&Vinodini Reddy, Oxford & IBH Publishing Co. Pvt.Ltd

Course Code: ND-422 (4CH)		**Course Name: CLINICAL NUTRITION AND DIET THERAPY**
Pre-requisite: ND-412		**Co-requisite: None**

Programme Education Objectives

PEO1	Understand the nature and basic concepts of Clinical **Nutrition and Diet Therapy**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

UNIT	TOPICS	NO. OF LECTURES
1	Disease Condition (Acute) – Nutritional management of fever, infection, TB and Typhoid.	4
	Neurological Disorder Management- MNT of Stroke, Coma, Burn	6
	Nutritional Management of Gout, Rheumatoid Arthritis, Osteoporosis.	
2	Nutritional management in GI track – Pathophysiology and MNT of common GI disorders (Peptic Ulcer, IBD, IBS, GERD, Malabsorption syndromes, celiac diseases, dumping syndrome, constipation, ulcerative colitis.	5
	Hepatic and Pancreatic Diseases – Pathophysiology and MNT of Hepatic encephalopathy, Wilson diseases, Liver Cirrhosis, Cholelithiasis pancreatitis, Zollinger Ellison Syndrome.	5
3	Respiratory Disease: Pathophysiology and MNT of respiratory disorders – COPD, Asthma, Pulmonary Fibrosis.	4
	Cardiovascular disease – Dyslipidemias, CHD, IHD, Hypertension, Cardiac Failure, Atherosclerosis, Hyperlipidemia, RHD	6
4	Renal Disorder - Pathophysiology and MNT of Acute and Chronic Nephritis, CKD, Nephrotic Syndrome, Acute and Chronic Renal Failure, ESRD	4
	Nervous Disorder: Epilepsy, Hyperkinetic behavior syndrome.	6
	TOTAL LECTURES =	**40**

Course Outcomes

CO-1	Remember and understand the basic concepts/Principles of **Nutrition and Diet Therapy**
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

TEXT BOOK:

1. Modern Nutrition in Health and Disease 10th edition by Maurice E. Shils
2. Alfred H.Katz, Prevention and health, the Haworth, Press, New York 1999.
3. Nutritional biochemistry of vitamins David a bendor.
4. Achayya, K.T.:(1998) A Historical Dictionary of Indian Foods, Oxford Publishing co.
5. Mahindru, S.N. (2002). Food Additives Characteristics, Detection and Estimation, Tata McGraw-Hill Publishing Co. Ltd. New Delhi.
6. Research Methodology By C.R Kothari
7. International Life Sciences Institute Present Knowledge in Nutrition — latest edition.
8. Krause's food and nutrition care process, 14th edition
9. Mahan,LK&Escott-Stump,(2000),Krause's food nutrition and diet therapy, 12th edition
10. Sareen nutrition in human metabolism,4thedition, USA
11. IAPEN, BAPEN websites

REFERENCE BOOKS:	
1	Ross & Wilson Anatomy & Physiology in Health & illness-KJW.Wilson&JS.Ross 1987, Churhill Livingstone
2	Text book of Physiology-volI & II-AK.Jain, Avichal Publishing Co. New Delhi.
3	Review of Medical Physiology-WF. Ganong, Lange medical Publication

Course Code: ND-423 (4CH)	Course Name: FOOD SAFETY AND QUALITY CONTROL
Pre-requisite: None	Co-requisite: None

Programme Education Objectives

PEO1	Understand the nature and basic concepts of **Food Safety & Quality Control** Relating to the **M.Sc. in Nutrition & Dietetics& Nutrition**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

UNIT	TOPICS	NO. OF LECTURES
1	Concept of quality: quality attributes: physical, chemical, nutritional, and microbial evaluation.	2
	Objective evaluation: Tests used for objective evaluation, application, and limit, Instruments used for quality assessment-color & gloss, size & shape, defects, texture, Viscosity & consistency	5
	Sensory evaluation: Sensory characteristics of food, sensory requirements, Types of sensory evaluation.	2
2	Food adulteration and food toxins: common adulterants in food (milk and milk products, edible oils, cereals & pulses, prepared foods, spices, beverages); simple screening, control of food adulteration	2
	Food Toxins: Terms in toxicology; Safety evaluation using traditional and modern approaches;	2
	Natural anti-nutritional factors, toxic phytochemicals, microbial toxins, toxins from fungi,	2
	Contaminations during handling and processing (PAHs), contaminants from industrial wastes, pesticide residues	2
	Toxicity of heavy metals and chemicals in food and their permissible limits,	2
	Food allergens.	1
3	Quality assurance, Quality Control, Total Quality Management;	1
	GMP, GHP;	2
	GLP, GAP;	1
	Sanitary and hygienic practices;	1
	physical, chemical, and biological hazards in foods,	1
	HACCP- Principles of HACCP, application of HACCP system, implementation steps for HACCP system;	2
	HACCP systems for food safety,	1
	Quality manuals, documentation, and audits.	1
4	Food laws and regulations: Mandatory and voluntary food laws,	1
	International quality systems and standards like ISO (9000 & 22000) series,	3

	Codex, BRC;	
	Indian Food Acts- Food Safety and Standards Act, 2006, FSNS Regulations: Regulations on Licensing and Registration, Regulations on Contaminants, toxins and residues, Food product standards, food additives, Laboratory and sampling analysis; Packaging and labelling; Prohibition and Restriction on sales.	**3**
	Various food acts- Environment (Protection) Act, 1986, Standards of Weights and Measures Act, 1976, Essential Commodities Act, 1955, The Export (Quality Control and Inspection) Act, 1963, The Insecticides Act, 1968, Consumer Protection Act, 1986. Introduction to various food laws (Voluntary) -Agmark Standards (AGMARK), BIS Standards and Specifications.	**3**
	TOTAL LECTURES=	**40**

Course

Outcome

CO-1	Remember and understand the basic concepts/Principles of **Food Safety & Quality Control**
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

TEXT BOOKS:	
1	Nutrition and Dietetics – Subhangini A.Joshi – Tata McGraw-Hill Publishing Company Limited, New Delhi
2	Dietetics – B.Srilakshmi – New age international (P) limited New Delhi.
3	Clinical Dietetics and Nutrition – F.A. Antia, Oxford University Press, London.
4	Text Book of Human Nutrition- Mahtab S. Bamji, N.Rao & V. Reddy, Oxford & IBH Publishing Co. Pvt Ltd.

REFERENCE BOOKS:	
1	Normal and Therapeutic nutrition- C.H. Robinson & M.R Lawler – Macmillen Publishing Co. New York.
2	Essentials of Food and nutrition – M.Swaminathan, Vol I & II, The Bangalore Printing & Publishing Co. Ltd (BAPPCO)
3	Food, Nutrition & Diet Therapy-L.K.Mahan & Escott.Stump- W.B. Saunders Ltd
4	Nutrition& Diet Therapy- S.R.Williams-Times mirror Mosby college Publishing. Co.
5	Human Nutrition & Dietetics- J.S.Garrow ,W.P.T.James, A. Ralph –Churhill Livingstone.

Course Code: ND- 424 (4CH)	**Course Name: FOOD ALLERGY AND INTOLERANCE**
Pre-requisite: None	**Co-requisite: ND-422**

Programme Education Objectives

PEO1	Understand the nature and basic concepts of **Food Allergy and Intolerance** Relating to the **M.Sc. in Nutrition & Dietetics& Nutrition**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

UNIT	TOPIC	NO. OF LECTURES
1	Meaning of allergy, atopy, hypersensitivity, intolerance. Food allergy meaning, type of allergic reaction, characteristics of allergic reaction, Difference between food allergy and intolerance.	8
2	Effects of food allergy on the skin, mucous membrane, respiratory tract and digestive system. Food allergy in different age group (infancy, adolescence, young, geriatric)	8
	Common food allergens (fish, shellfish, milk, peanut, sesame seed, soy, MSG, gluten) Diagnosis process, medical management, nutritional management, diagnostic test	8
3	Food borne diseases: Bacterial food borne diseases (Staphylococcal intoxication, Botulism, Salmonello Shigellosis, Enteropathogenic Escherichia Coli Diarrhoea, Clostridium Perfringens gastroenteritis, Bacillus cereus Gastroenteritis). Food Borne Viral Pathogens (Norwalk virus, Norovirus, Reovirus, Rotavirus, Astrovirus, Adenovirus, Parvovirus, Hepatitis A Virus). Food Borne Animal Parasites Protozoa – Giardiasis, Amebiasis, Toxoplasmosis, Sarcocystosis, Cryptosporidiosis. Cysticercosis/Taeniasis. Roundworm – Trichinosis, Anisakiasis. Mycotoxins: types, health issues caused by mycotoxins like Aflatoxicosis, Deoxynivalenol Mycotoxicosis, Ergotism	10
4	Microbial Food hygiene and sanitation: Contamination during handling, processing and its control	4
	Fad Diet: Atkins diet, South beach diet, Vegan diet, Ketogenic diet, Plleo diet, The Zone diet, The Dukan Diet, The 5:2 diet.	2
	TOTAL LECTURER	**40**

Course Outcomes

CO-1	Remember and understand the basic concepts/Principles of **Food Allergy and Intolerance**
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

TEXT BOOK:

1. Shills M E, Olson J A, Shike M and Ross A C (Ed) 1999: Modern Nutrition in Health and Diseases 9th Edition, Williams and Wilkins.
2. Mahan L K and Escott — Stump S (20); Krause's Food Nutrition and Diet Therapy 10th Ed W B Saunders Ltd.
3. Escott — Stump, S (1998): Nutrition and diagnosis related care 4th Edition, Williams and Wikins.
4. Garrow J S, James W P T and Ralph A (2000) Human Nutrition and Dietetics, 10th Edition, Churchill Livingstone.
5. Shils M E, Olson J A, Shike M and Ross A C (Ed) 1999: Modern Nutrition in Health and Diseases 9th Edition, Williams and Wilkins.
6. Mahan L K and Escott — Stump S (2000); Krause's Food Nutrition and Diet Therapy 10th Ed W B Saunders Ltd
7. Escott — Stump, S (1998): Nutrition and diagnosis related care 4th Edition, Williams and Wikins
8. Garrow J S, James W P T and Ralph A (2000) Human Nutrition and Dietetics, 10th Edition, Churchill Livingstone

REFERENCE BOOKS:

1	Modern Industrial Microbiology & Biotechnology by N. Okafor. 1st edition. CRC Press, USA. 2007.
2	Industrial Microbiology Samuel C Prescott

Course NO. ND- 425 (2CH) **Course Name: Practical -III**

Programme Education Objectives

PEO1	Understand the nature and basic concepts of **Practical-III,** relating to the **M.Sc. in Nutrition & Dietetics**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

Course Outcome

CO-1	Remember and understand the basic concepts/Principles of **Practical -II**
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

Course NO. ND- 425 (2CH) **Course Name: Practical -IV**

Programme Education Objectives

PEO1	Understand the nature and basic concepts of **Practical-III,** relating to the **M.Sc. in Nutrition & Dietetics**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

Course Outcome

CO-1	Remember and understand the basic concepts/Principles of **Practical -II**
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

Course: **Course Name: INTER DISCIPLINARY COURSE (2CH)**

Programme Education Objectives

PEO1	Understand the nature and basic concepts of **Inter Disciplinary Course** Relating to the **M.Sc. in Nutrition & Dietetics& Nutrition**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

Course Outcomes

CO-1	Remember and understand the basic concepts/Principles of **Inter Disciplinary Course**
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge to understand practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

THIRD SEMESTER

Course Code: ND 511 (4CH)	Course Name: CRITICAL CARE AND NUTRITION
Pre-requisite: ND-424	Co-requisite: None

Programme Education Objectives

PEO1	Understand the nature and basic concepts of **Critical Care and Nutrition**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

UNIT	TOPIC	NO. OF LECTURES
1	Assessment of patient needs based on interpretation of patient data- Clinical, biochemical, biophysical, and personal. Definition and history of dietetics, Dietetics in modern health care management, Code of ethics. Role of a dietitian – functions and classification of a dietitian. Team approach to inpatient care.	**9**
	Critical Care in Malnutrition	**3**
2	Nutritional management in coronary heart disease: Pathogenesis, role of nutrients in prevention and management – Nutritional and metabolic implicates of dyslipidaemias. CHD Prevalence, Etiology and risk factors, Diagnostic test, Nutrition management, common disorders of CHD and Nutrition management, Dyslipidaemias, Atherosclerosis, cardiac failure, Hypertension, IHD, CCF, Rheumatic heart disease.	**6**
	Nutrition Management of Renal Disease: Etiology and pathogenesis: change in function with progression of diseases, metabolic and nutritional implications. Clinical and metabolic manifestations, diagnostic tests, Types: Acute and chronic nephritis, Nephrotic syndrome, Renal Failure: Acute and chronic, ESRD. Nutritional management in	**6**
	Cancer: pathogenesis and progression of cancer. Role of Nutrients and food additives in cancer therapies and their nutritional implications. Types of symptoms, Diagnosis, Cancer therapies: Nutritional implications, Dietary management.	5
3	Nutritional supplements in critical care patients, organ transplantation, brain injury, Trauma, Sepsis, and pancreatitis	5
4	Nutritional support in specific conditions like liver, major surgery, cancer, abdominal injury, and renal surgery.	5
	Ethical consideration of critical care.	1
	TOTAL LECTURES	40

Course Outcomes

CO-1	Remember and understand the critical/ emergency and role of diet during an emergency
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge to understand practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

TEXT BOOK:

1. Mahan. L.K. and Escott-Stump, S. (2000): Krause's Food Nutrition and Diet-Therapy, I (Y^{h} Edition, W-13 Saunders Ltd,
2. Shills. M.E.. Olson, JA. Shike, M and Ross, A-c. (2002): Modern Nutrition in Health and Disease, 9th Edition, A. vaiiiams and Willdns..
3. Sareen, S, James, J (2005). Advanced Nutrition in Human Metabolism, 4th Edition, Thomson Wordsworth Publication, USA.
4. Chandra, R.R. (eds) (2002): Nutrition and Immunology, ARTS Biomedical. St-JOhn' s Newfoundland.

REFERENCE:

1	Swaminathan S.: Advanced Textbook On Food & Nutrition Vol. 1 & N (2nd Ed. Revised _ Enlarged) Bapp Co. 1985.
2	Mahan L.K., Sylvia Escott-Stump (2000): Krause‟s Food Nutrition and Diet Therapy 10th Edition, W.B. Saunders Company London.
3	B. Srilakshmi, (2007): Dietetics, published by K.K. Gupta For New age International Pvt. Ltd. New Delhi.

Course Code: ND- 512 (4CH)	**Course Name: RESEARCH METHODOLOGY AND BIOSTATISTICS**
Pre-requisite: None	**Co-requisite: None**

Programme Education Objectives

PEO1	Understand the nature and basic concepts of **Research Methodology and Biostatistics** Relating to the **M.Sc. in Nutrition & Dietetics**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

UNIT	TOPICS	NO. OF LECTURES
1	Research Methodology: Meaning, aim & objective of research, significance of research, Research types, Research methods vs methodology, Different types of research design. Different Steps in Writing Report, Technique of Interpretation, Precaution in interpretation, Significance of Report Writing, Layout of the Research Report.	**3**
	Fundamentals of statistics: Research process, Population, Variables, Primary and secondary data, Collection of data, Classification and tabulation of data, Need and usefulness of Diagrams & Graphs, Different types of diagrams and graphs (Bar charts, Histograms, Frequency polygons, one way scatter plots, Box plots, two-way scatter plots, line graphs)	**2**
	Frequency distribution: Discrete and continuous frequency distribution, population & sample, Sample Size and its Determination	**2**

	Sampling Designs: Census and Sample Survey, Implications of a Sample Design, Steps in Sampling Design, Criteria of Selecting a Sampling Procedure, Characteristics of a Good Sample Design, Different Types of Sample Designs, sampling errors.	**2**
2	Measure of dispersion: Range, Mean deviation & Standard deviation	**4**
	Descriptive statistics: Measure of central tendency: (Arithmetic mean, harmonic mean, geometric mean, median, mode), relation between mean, median and mode	
	Skewness and Kurtosis,	**2**
	Probability.	**2**
	Testing of Hypotheses: Definition, Basic Concepts, Procedure for Hypothesis Testing, Measuring the Power of a Hypothesis Test, Normal distribution, data transformation, Null and Alternative Hypothesis, level of significance.	**2**
3	Chi-square Test: Chi-square as a Non-parametric Test, Conditions for the Application Chi-square test, Steps Involved in Applying the Chi-square Test	**3**
	Student's distribution and its application, F-test and its application,	**2**
	Analysis of Variance and Covariance: Analysis of Variance (ANOVA): Concept and technique of One-way ANOVA, Concept of Two-way ANOVA & Analysis of Co-Co-Variance (ANOCOVA)	**2**
	Measures of Relationship: Need and meaning, Correlation, and Simple Regression Analysis, Types of correlation: simple, partial and multiple correlation, Method of study & testing the significance of correlation coefficient.	**4**
4	Regression analysis: regression equations and regression lines, Properties of regression lines, regression coefficient, testing the significance of regression coefficient.	**4**
	Concept of cluster Analysis and Principal component Analysis.	**4**
	Computer Application: Use of Computer in data analysis and research, Use of SoNDware and Statistical package. Introduction to SPSS. Importing data from excel, access, entering data, labeling a variable, coding and recoding a categorical and continuous variable. Converting data from string to numeric variables, sorting & filtering, merging, appending data sets.	**2**
	TOTAL LECTURES =	**40**

Course Outcomes

CO-1	Remember and understand the basic concepts/Principles of **Research Methodology and Biostatistics**
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge to understand practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

TEXT BOOKS:	
1	Zar, Jerrold H.(1998). Biostatistical Analysis, Pretice Hal, NJ
2	Statistics for Management, Levin and Rubin, Owls Books, Toledo, USA
3	Business Mathematics and Statistics, N.K.Nag & S.K.Nag, Kalyani publishers.
4	Handbook on Data Envelopment Analysis, Cooper, Seiford, Lawrence & Zhu, Springer

REFERENCE BOOKS:	
1	Statistical Methods – S.P.Gupta, Sultan Chand & Sons Publisher- New Delhi
2	Research Methodology, Methods and Techniques – C.R. Kothari Wiley Eastern Limited – New Delhi

Course Code: ND 513 (4CH)	Course Name: NUTRITION EDUCATION AND DIET COUNCELLING
Pre-requisite: ND-422	Co-requisite: None

Programme Outcome

PEO1	Understand the nature and basic concepts of **Nutrition Education and Diet Counselling**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

UNIT	TOPIC	NO. OF LECTURES
1	Introduction to diet therapy a) Nutrition support service b) Malnutrition in hospitalized patients c) pre- and post-operative diets d) Immune nutrition	8
2	Diet for PCOS, a) Prevalence, b) clinical effects, c) Risk factor d) Dietary management	8
	Diet in Diabetes Mellitus a) Prevalence, types, Etiology, and symptoms b) Diagnosis, treatment, and complications c) Dietary management	6
3	Diet in Cancer a) Risk factors and Symptoms b) Nutritional problems of cancer therapy c) Nutritional requirements and Dietary management d) Role of food in the prevention of cancer e) Physical activity and cancer	6
4	Diet for HIV/ AIDS a) Definition b) Signs & Symptoms c) Pathophysiology d) Mode of transmission e) Relation between malnutrition & HIV.	6
	Diet for Obesity, Underweight a) Definition b) Signs & Symptoms c) Pathophysiology d) Mode e) Relation between malnutrition	6
	TOTAL LECTURES	**40**

Course Outcomes

CO-1	Remember and understand the critical/ emergency and role of diet therapy during emergency
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

TEXT BOOK:

1. Counselling Skills for Dietitians Second Edition Judy Gable M SC (Nutrition), BACP Accredited Counsellor
2. British Dietetic Association (2003) ne Work of Registered Dietitians. British Dietetic Association, Birmingham. Krause, Food, Nutrition & Diet therapy.
3. Martin E. A: Nutrition education in Action, A guide for teacher, Holt, Rinhart and Winston Inc. 1963.
4. Bhatia. KK, Principles of guidance and counselling, Kalyani publishers, Ludhiana.2002.
5. Nelson- Jones, Richard, Practical counselling and helping skills, Better Yourself Books, Bombay, 1994.
6. Escott — Stump, S. (1998): Nutrition and Diagnosis Related care, 4th Edition, Williams and Wilkins.
7. Prashantham B.J., Indian case studies in therapeutic counselling, Christian Counselling centre, Vellore. 1978.
8. Narayan Rao.S., Counselling, Tata MC Graw Hill Publishing company Ltd, New York 1981.

Course Code: ND-514(4CH)		Course Name: SPORTS NUTRITION
Pre-requisite: ND-411		Co-requisite: None

Programme Education Objective

PEO1	Understand the nature and basic concepts of **Sports Nutrition** Relating to the **M.Sc. in Nutrition and Dietetics**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

UNIT	TOPICS	NO. OF LECTURES
1	Introduction to fitness-body composition, changes through the lifecycle, definition, component of physical fitness- health and skin related, type of exercises, athlete fitness. Holistic approach to management to health and fitness- diet, exercise, yoga and meditation. Effect of specific nutrients on work performance and physical fitness. Nutrition, exercise, physical fitness, and health- their inter Fluid and electrolyte balance- Water compartment in human body, fluid regulation & water intake in different conditions, effect of dehydration	**10**
2	Approaches to the management of fitness and health. Physiological changes during physical activity in cardiovascular system, respiratory system, muscular system and haemopoietic system. Fuel and other nutrients support physical activity (metabolic pathways). Mobilization of fuel stores during exercise. Importance of carbohydrate loads, shiNDs in carbohydrate and fat metabolism. Fatigue during exercise and its management.	**10**
3	Sport Nutrition: Introduction, Evaluation, and growth of sports nutrition as a discipline Anthropometric and physiological measurement. Various techniques for measuring body composition. Work capacity Nutrition in sports – Sports specific requirements diet manipulation pregame and post-game means, Use of different mutagenic aids and commercial supplements. Sports drinks, Diets for persons with high energy requirements stress, fracture and injury, pre- and post-natal fitness, diabetes, hypertension, CVD, Osteoporosis, osteoarthritis, sports anaemia, female athlete triad.	**10**
4	Anti-doping regulations and harmful effects of use of steroids & other banned substances Dietary Supplements: Regulations and Classification − Definition and regulations OF Dietary Supplements (country-specific) and Nutritional Supplements Composition, Benefits and 33 Applications of Nutritional Supplements, ergogenic aids, Macronutrient Supplements: − Pure proteins (e.g. Whey, Casein, Egg albumin, Soy protein, Pea protein & other vegan proteins/protein blends), Protein bars, Weight gainers; Amino acid supplements- , Glutamine, Arginine −Carbohydrate supplements & EFAs, Glycerol − Meal replacement powders, Ready To Drink protein shakes (RTDs) − Sports drinks.	**5**
5	Applications of food psychology for health maintenance and fitness − Strategies to change dietary behaviour − Optimism and intention − Strategic atomization − Using stages of change model to change dietary behaviour − Behaviour modification strategies to influence food and nutrition choices − Theory of planned behaviour and healthy eating.	**5**
	TOTAL LECTURES =	**40**

TEXT BOOK:

Mahan, L.K. &Ecott-Stump, S. (2000): Krause's Food, Nutrition and Diet Therapy, 10th Edition, W B. Saunders Ltd.

2. Sizer, F & Whitney, E. (2000): Nutrition — Concepts and Controversies, 8th Edition, Wadsworth Thomson Learning.
3. Whitney, E.N. &RoIfes, S.R. (2003): Understanding Nutrition, 8th Edition, WestWadsworth, An International Thomson Publishing Co.
4. Ira Wolinsky (Ed) (2003): Nutrition in Exercise and Sports, 3rd Edition, CRC Press
5. Parizkova, J. Nutrition, physical activity and health in early life, Ed. Wolinsky, I. CRC Press.

Course Code: ND-515 (4CH)		**Course Name: NUTRITIONAL SURVEY**
Pre-requisite: None		**Co-requisite: ND-513**

Programme Education Objectives

PEO1	Understand the nature and basic concepts of **Nutritional Survey** Relating to the **M.Sc. in Nutrition and Dietetics**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

Course Outcomes

CO-1	Remember and understand the basic concepts/Principles of **Nutritional Survey**
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge to understand practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

Course:	**Course Name: ENTERPRENEURSHIP DEVELOPMENT PROGRAMME (2CH)**

Programme Education Objectives

PEO1	Understand the nature and basic concepts of **Enterpreneurship Development Programme** Relating to the **M.Sc. in Nutrition & DieteticsNutrition**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

Course Outcomes

CO-1	Remember and understand the basic concepts/Principles of **Enterpreneurship Development Programme**
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

FOURTH SEMESTER

Course Code: ND 521 (4CH)	Course Name: DIET PLANNING FOR CRITICAL CASES
Pre-requisite: ND-511	Co-requisite: None

PEO1	Understand the nature and basic concepts of **Diet Planning for Critical Cases**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

Programme Outcome

UNIT	TOPIC	NO. OF LECTURES
1	Nutritional Counselling: One-on-One, Community Preventive Nutrition, Group Session, Online/Tele-Health Family Focused	10
2	Oral Nutritional supplement for – Cancer, Neurological Disorder, Renal, Pregnancy and Lactation, Geriatric Care, Critical care patient (PN & EN)	10
3	Functional foods: Antioxidant Effect, Fortified food, Pre- and Probiotics, Phytochemical rich food- Health benefits, scope, Functional ingredients	10
4	Diet planning for HIV, Anemia, Gout, PEM, Glow Diet, Detox Diet, Pregnancy, Cholelithiasis, Psychologic Nutrition, Athletes Nutrition- take case and plan , calculate meal, Prepare a new menu for respective diseases.	10
	TOTAL LECTURES	40

Course Outcomes

CO-1	Demonstrate proficiency in various nutritional counselling approaches including individual, group, community, and telehealth modalities for diverse populations
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

TEXT BOOK:

1. Counselling Skills for Dietitians Second Edition Judy Gable M SC (Nutrition), BACP Accredited Counsellor
2. British Dietetic Association (2003) ne Work of Registered Dietitians. British Dietetic Association, Birmingham. Krause, Food, Nutrition & Diet therapy.
3. Martin E. A: Nutrition education in Action, A guide for teacher, Holt, Rinhart and Winston Inc. 1963.
4. Bhatia. KK, Principles of guidance and counselling, Kalyani publishers, Ludhiana.2002.
5. Nelson- Jones, Richard, Practical counselling and helping skills, Better Yourself Books, Bombay, 1994.
6. Escott — Stump, S. (1998): Nutrition and Diagnosis-Related care, 4th Edition, Williams and Wilkins.
7. Prashantham B.J., Indian case studies in therapeutic counselling, Christian Counselling centre, Vellore. 1978.
8. Narayan Rao.S., Counselling, Tata MC Graw Hill Publishing company Ltd, New York 1981.

Course Code: ND-522 (a) (4 CH)	Course Name: FOOD PROCESSING AND PACKAGING
Pre-requisite: None	Co-requisite: None

Programme Education Objective

PEO1	To develop the skills for postharvest processing of food and use them as preservation techniques in food processing industries
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

UNIT	TOPICS	NO. OF LECTURES
1	Basic concept of food processing and preservation: Reasons for food Spoilage and Scope of food processing and preservation; principles of food processing and preservation	**2**
	Principle and preservation by low temperature: (refrigeration, freezing, and dehydro-freezing; cold storage, frozen food), changes during freezing-physical and chemical changes	**2**
	Processing and preservation by drying: factors affecting drying rate, types of dryers (kiln, tray, drum, spray, tunnel, fluidized bed drying),	**2**
	Types of drying techniques (freeze drying, vacuum drying)	**2**
	Microwave cooking-(principle, changes during microwave cooking, advantages), difference between microwave and conventional heating	**2**
2	Processing and preservation by heat: (blanching, pasteurization, sterilization, UHT processing, heating, smoking, pickling, canning)	**3**
	Concentration and evaporation- (flash evaporator, falling film evaporator, and multiple effect evaporators), changes during Concentration	**2**
	Ohmic heating	**1**
	Food processing equipment: material handling, cleaning and grading, conveyors, size reduction	**2**
	Separation Technique: filtration (MF, UF, NF, RO), agitation and mixing, frying, baking	**2**
3	Irradiation	**1**
	High-pressure processing	**2**
	pulsed electric field	**1**
	Ultrasonic processing: Properties of ultrasonics, application of ultrasonics as processing techniques	**2**
	IR heating	**1**
	Hurdle technology: concept of hurdle technology and its application	**2**
	Extrusion Technology-(principle, types of extruders).	**1**

4.	Food packaging: Packaging material, Mass transfer in packaging material	**3**
	packaging system and methods- vacuum packaging, gas flush packaging, aseptic packaging	**2**
	Modified atmosphere packaging (MAP), controlled atmosphere packaging (CAP), active packaging	**2**
	Bio-degradable packages, aseptic, and edible packages.	**2**
	Package testing, CA & M, quality changes during storage of foods	**1**
	TOTAL LECTURES =	**40**

COURSE OUTCOMES:	
Upon successful completion of the course, students should be able to:	
CO1	Create a basis knowledge of food processing and preservation methods
CO2	Demonstrate some basis knowledge of thermal processing methods for food preservation
CO3	Develop the fundamental ideas of non-thermal food preservation techniques
CO4	Implement the advancement of packaging material in food processing industries

TEXT BOOKS:	
1	Fellows PJ. 2005. *Food Processing Technology: Principle and Practice*. 4thEd. CRC.
2	Potter NN & Hotchkiss 1997. *Food Science*. 5th Ed. CBS
3	Sahay KM & Singh KK. 1994. *Unit Operation of Agricultural Processing*. Vikas Publ. House.
4	Robertson, G.L. Food Packaging: Principles and Practice (2nd ed.), Taylor & Francis 2006

REFERENCE BOOKS:	
1	Ramaswamy H &Marcotte M. 2006. *Food Processing: Principles and Applications*. Taylor & Francis
2	Wills, R.B.H., McGlasson, W.B., graham, D., Lee, T.H. and Hall, E.G. 1989.
3	Food Packaging Technology Handbook. NIIR Board, National Institute of Industrial Research, 2003
4	Robertson, G.L. Food Packaging: Principles and Practice (2nd ed.), Taylor & Francis 2006

Course Code: ND-522(b) (4CH)	**Course Name: PUBLIC HEALTH NUTRITION**
Pre-requisite: None	**Co-requisite: None**

Programme Education Objectives

PEO1	Understand the nature and basic concepts of **Public Health Nutrition,** relating to the **M.Sc. in Nutrition and Dietetics**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

UNIT	TOPICS	NO. OF LECTURES
1	Introduction to PHN, behavioral aspect of PHN, public health and food policy. Rural health- importance of interprofessional approach.Urban health and urbanization, global health.	4
	Role of nutrition support in- dietetic interns, dietitian Dietary guidelines, food choice	3
	Assessment of nutritional status of individual and community	3
2	Community nutrition- definition, characteristics of community, community health-factors affecting community health, community organization. Factors influencing community nutrition	4
	Family- characteristics, types, function food habits, food faddism	3
3	Food nutrition and security vin community	3
	Public health aspects of overnutrition, public health aspects of under-nutrition	3
	Role of new food, food fortification & enrichment, food labeling in the community	3
	Community centers- organization and function of community health center	4
4	Malnutrition and nutritional disorders- PEN, folic acid, iodine, zinc, iron and vitamins deficiency.	4
	Public health nutrition programme planning, training of workers in nutrition education programmes.	2
	Challenges in public health nutrition	2
	Professional development, needs and strategies in public health nutrition	2
	TOTAL LECTURES =	**40**

Course Outcomes

CO-1	Remember and understand the basic concepts/Principles of the **Public Health Nutrition**
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge to understand practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

TEXT BOOKS:

Olsen, A. Y. and Frackle, R.T., (2002): Nutrition in the Community. The Art of Delivering Services, 2nd Edition Times Mirror/Mosby.

2. Part, K. (2000): Part's Textbook of Preventive and Social Medicine, 18ü1 Edition, M/S. BanarasidasBhanot, Jablpur.
3. Beaton, G.H. and Bengoa, J.M. (Eds) (2000): Textbook of Human Nutrition, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
4. Bamji, M.S., Rao, P.N., Reddy, V (Eds) (2003): Textbook of Human Nutrition, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.

Course Code: ND-523 (4CH)	**Course Name: HOSPITAL INTERNSHIP AND PATIENT CARE**
Pre-requisite: None	**Co-requisite: None**

Programme Education Objectives

Students gain firsthand experience in hospital settings, where they engage with advanced diet

PEO1	Understand the nature and basic concepts of **Hospital Internship and Patient Care** Relating to the M.Sc **Nutrition and Dietetics**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

planning and practical patient care. The internship encourages application of theoretical concepts by assisting in clinical nutrition assessments, therapeutic meal planning, and collaborative work with healthcare teams. Tasks such as evaluating case studies and tailoring diet charts to individual needs are central to this immersive learning phase.

Course Outcomes

CO-1	Remember and understand the basic concepts/Principles of the **Hospital Internship and Patient Care**
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge to understand practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

Programme Education Objectives

PEO1	Understand the nature and basic concepts of the **Project/Dissertation** Relating to the**M.Sc.in Nutrition and Dietetics**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

Learners take on a focused research topic in nutrition and dietetics, exploring it through independent study and structured inquiry. Activities include formulating a research question, conducting literature reviews, designing methodology, analyzing results, and compiling findings in a formal dissertation. The experience promotes critical thinking and nurtures research acumen essential for academic and professional growth.

Course Outcomes

CO-1	Remember and understand the basic concepts/Principles of the **Project/Dissertation**
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge to understand practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

Course Code: ND-524 (2CH)	**Course Name: PROJECT/DISSERTATION**
Pre-requisite: None	**Co-requisite: None**

Programme Education Objectives

PEO1	Understand the nature and basic concepts of the **Project/Dissertation** Relating to the**M.Sc.in Nutrition and Dietetics**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

Learners take on a focused research topic in nutrition and dietetics, exploring it through independent study and structured inquiry. Activities include formulating a research question, conducting literature reviews, designing methodology, analyzing results, and compiling findings in a formal

dissertation. The experience promotes critical thinking and nurtures research acumen essential for academic and professional growth.

Course Outcomes

CO-1	Remember and understand the basic concepts/Principles of the **Project/Dissertation**
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge to understand practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

Course Code: ND-525 (2CH)	**Course Name: ELEMENTARY NUTRITION PROJECT**
Pre-requisite: None	**Co-requisite: None**

Programme Education Objectives

PEO1	Understand the nature and basic concepts of the **Elementary Nutrition Project, relating** to the M.Sc. in **Nutrition and Dietetics**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

An elementary nutrition project can be a fun and educational experience for young students. Projects can focus on identifying food groups, understanding the importance of a balanced diet, and learning about healthy eating habits. Activities can include creating food pyramids, analyzing food labels, and conducting simple experiments, such as comparing the sugar content in beverages.

Course Outcomes

CO-1	Remember and understand the basic concepts/Principle of the **Elementary Nutrition Project**
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge to understand practical problems
CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

Course Code: ND-526(2CH)	**Course Name: PROJECT VIVA-VOCE**
Pre-requisite: None	**Co-requisite: ND-523**

Programme Education Objectives

PEO1	Understand the nature and basic concepts of **Project Viva-Voce** to the **M.Sc. Nutrition and Dietetics**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

After completing their dissertation, students present and defend their work before an academic panel. This process enhances communication skills and encourages reflection on the research journey. Discussions revolve around research objectives, methods, challenges, outcomes, and relevance to the field, offering a valuable opportunity to articulate knowledge and showcase analytical depth.

Course Outcomes

CO-1	Remember and understand the basic concepts/Principles of the Project Viva-Voce
CO-2	Analyse the Various Concepts to understand them through case studies
CO-3	Apply the knowledge to understand practical problems

CO-4	Execute/create the Project or field assignment as per the knowledge gained in the course

Course Code: MOOC	**Course Name: MOOC Alternative Course (DAIRY TECHNOLOGY)**
Pre-requisite: None	**Co-requisite: None**

Programme Education Objectives

PEO1	Understand the nature and basic concepts of **MOOC** Relating to the **M.Sc. in Food Science and Technology**
PEO2	Analyse the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

Student should opt in 2nd or 3rd semester as per available from online platforms like- SWAYAM, IGNOU, CONSORTIUM FOR EDUCATIONAL COMMUNICATION, NPTEL etc. Evaluation shall be done by examination. Students should be assigned marks for the same.

Course Outcomes

CO-1	**Remember and understand the basic concepts/Principles of MOOC**
CO-2	**Analyse the Various Concepts to understand them through case studies**
CO-3	**Apply the knowledge in understanding practical problems**
CO-4	**Execute/create the Project or field assignment as per the knowledge gained in the cours**

Course: MOOC	**Course Name: MOOC Alternative Course (DAIRY TECHNOLOGY)**

Programme Education Objectives

PEO1	Understand the nature and basic concepts of **Dairy Technology** RelatingtotheM.Sc.in **Food Science and Technology**
PEO2	Analyze the relationships among different concepts
PEO3	Perform procedures as laid down in the areas of study
PEO4	Apply the Basic Concepts learned to execute them

UNIT	TOPICS	**NO. OF LECTURES**
1	Present status of milk & milk products in India and Abroad; market milk-Composition Of milk of various species, Physiochemical properties, difference evaluation, defects in dried milk powder.	**3**
	Quality evaluation and testing of milk, procurement, transportation and processing of Market milk, cleaning & sanitization of dairy equipment	**3**
	Special milks such as flavored, sterilized, recombined & reconstituted toned & double Toned.	**4**
2	Cream-Definition, classification, composition, cream separation, sampling, neutralization, sterilization, pasteurization & cooling of cream, evaluation, defects in cream	**4**
	Butter-Definition, composition, classification, methods of manufacture, theories of churning, evaluation, defects in butter	**4**
	Ice-cream-Definition, composition and standards, nutritive value, classification, methods Of manufacture, evaluation, defects in ice-cream, and technology aspects of softy manufacture.	**2**
3	Condensed milk-Definition, methods of manufacture, evaluation of condensed & Evaporated milk	**3**
	Dried milk Powder-Definition, methods of manufacture of skim & whole milk powder, instantiation	**3**
	Cheese: Definition, composition, classification, methods of manufacture, cheddar, Gouda, cottage and processed cheese, evaluation, defects in cheese.	**3**
	Pre-biotic and pro biotic milk products.	**1**
	TOTAL LECTURES=	**30**
