

# Vidyasagar University

## Curriculum for B.Sc (Honours) in Nutrition [Choice Based Credit System]

### Semester-IV

Course	Course Code	Name of the Subjects	Course Type/ Nature	Teaching Scheme in hour per week			Credit	Marks
				L	T	P		
CC-8		C8T: Diet and Diseases	Core Course - 8	4	0	0	6	75
		C8P:Practical		0	0	4		
CC-9		C9T: Food Microbiology	Core Course - 9	4	0	0	6	75
		C9P:Practical		0	0	4		
CC-10		C10T: Food processing and Preservation	Core Course - 10	4	0	0	6	75
		C10P:Practical		0	0	4		
GE-4	TBD		Generic Elective-4				4/5	75
							2/1	
SEC-2		Basic Molecular Biology Or Nutrition and Fitness Or Entrepreneurship Development Or Women Health & Nutrition	Skill Enhancement Course-2	1	1	0	2	50
<b>Semester Total</b>							<b>26</b>	<b>350</b>

L=Lecture, T= Tutorial, P=Practical, CC = Core Course, GE= Generic Elective, SEC = Skill Enhancement Course, TBD = to be decided

**Generic Elective (GE)( Interdisciplinary)** from other Department: Papers are to be taken from any of the following discipline: **Chemistry/Physiology/Botany /Zoology/Computer Sc/Microbiology/Bio-Technology/ Mathematics/Statistics**

**Modalities of selection of Generic Electives (GE):** A student shall have to choose **04** Generic Elective (GE1 to GE4) strictly from **02** subjects / disciplines of choice taking exactly **02** courses from each subjects of disciplines. Such a student shall have to study the curriculum of Generic Elective (GE) of a subject or discipline specified for the relevant semester.

Core Course (CC)

**CC-8: Diet and Diseases**

**Credits 06**

**C8T: Diet and Diseases**

**Credits 04**

**Course Contents:**

1. Inborn error of metabolism – Lactose Intolerance, Galactosamia, Phenylketonuria and its dietary management.
2. Etiology, symptoms, diagnostic tests and dietary management of intestinal diseases: Diarrhea, Steatorrhoea, Diverticular disease, Inflammatory bowel disease, Ulcerative Colitis, Flatulence, Constipation, Irritable Bowel Syndrome, Haemorrhoids.
3. Etiology, symptoms, diagnostic tests and dietary management of Malabsorption syndrome, Celiac sprue, tropical sprue, Intestinal brushborder deficiencies (Acquired disaccharide intolerance), Protein losing enteropathy. RUTF.
4. Disease of the liver, Exocrine Pancreas and Biliary System. Liver function tests, application of diet therapy and nutritional care in liver disease. Dietary care and management in Viral Hepatitis, Cirrhosis of liver, Wilson's diseases. Dietary care and management in diseases of Gall Bladder and Pancreas Cholelithiasis, Cholecystitis, Cholecystectomy, Pancreatitis.
5. Anaemias: Pathogenesis and dietary management - Nutritional Anaemias, Sickle Cell Anaemias, Thalassemia, Anaemia resulting from Acute Haemorrhage.
6. Arthritis and gout: Etiology, symptoms, diagnostic tests and dietary management.

**C8P: Diet and Diseases (Practical)**

**Credits 02**

**Practical:**

1. Planning and preparation of diet for diarrhoea patient.
2. Planning and preparation of diet for Steatorrhoea patient.
3. Planning and preparation of diet for Diverticular disease patient.
4. Planning and preparation of diet for Ulcerative Colitis patient.
5. Planning and preparation of diet for Flatulence patient.
6. Planning and preparation of diet for Constipation patient.
7. Planning and preparation of diet for Irritable Bowel Syndrome patient.
8. Planning and preparation of diet for Haemorrhoids patient.
9. Planning and preparation of diet for Celiac sprue patient.

10. Planning and preparation of diet for Viral Hepatitis patient.
11. Planning and preparation of diet for Cirrhosis of liver patient.
12. Planning and preparation of diet for Cholelithiasis patient.
13. Planning and preparation of diet for Pancreatitis patient.
14. Planning and preparation of diet for Anaemia patient.
15. Planning and preparation of diet for Thalassemia patient.

## **CC-9: Food Microbiology**

**Credits 06**

### **C9T: Food Microbiology**

**Credits 04**

#### **Course Contents:**

1. Introduction to microbiology and its relevance to everyday life. General characteristics of bacteria, fungi, virus, protozoa and algae.
2. Cultivation of microorganisms: Nutritional requirements of microorganisms, types of media used, methods of isolation.
3. Growth of microorganisms: Growth curve, effect of environmental factors in growth of microorganism – pH, water activity, oxygen availability, temperature and others.
4. Primary sources of microorganisms in foods, physical and chemical methods used in destruction of micro organisms in foods - sterilisation and disinfection.
5. Food Spoilage: Contamination of micro organisms in the spoilage of different kinds of foods, such as cereal and cereal products, vegetable and fruits, fish and other sea foods, meat and meat products, eggs and poultry, milk and milk products, canned foods.
6. Assessing the microbiological quality of food: indicator organisms, microbiological standards, principles of GMP & HACCP in food processing. Safety management at household and industrial level.
7. Foodborne infections: Bacterial food infections-Salmonellosis, Shigellosis and Listeriosis. Food poisoning (Staphylococcal and Botulism) - Symptoms, mode of transmission and methods of prevention, Concept of aflatoxin intoxication.
8. Beneficial effect of microorganisms-concept of probiotics and related factors
9. Environmental microbiology: Water and water borne diseases, air and air borne diseases, soil and soil borne diseases, sewage and diseases.
10. Waste product handling: Planning for waste disposal- solid wastes and liquid wastes.
11. Fermented Foods- Dietary different fermented products, importance of fermented foods.

### **C9P: Food Microbiology (Practical)**

**Credits 02**

#### **Practical:**

1. Study of equipments in a microbiology lab.
2. Preparation of different culture media.
3. Staining of bacteria with gram staining.
4. Microbiological examination of milk (Methylene blue reduction test).

5. Preparation of traditional Indian fermented food and its quality checking e.g. testing of physical, chemical and nutritional properties.

## **CC-10: Food processing and Preservation**

**Credits 06**

## **C10T: Food processing and Preservation**

**Credits 04**

### **Course Contents:**

1. Significance, principles of different methods of food processing: thermal processing- Cooking (moist heat, dry heat, combination method of cooking), blanching, pasteurization, sterilization, canning.
2. Principles of microwave cooking and solar cooking.
3. Principle of freezing, changes occurring during freezing. Types of freezing - slow freezing, quick freezing. Food preservation by drying and dehydration, differences between sun drying and dehydration (i.e. mechanical drying), types of driers used in the food industry.
4. Preservation by Irradiation: Units of radiation, kinds of ionizing radiations used in food irradiation. Mechanism of action, concept of cold sterilization.
5. Principle and methods of making pickles, jam and jellies from different vegetables / fruits.
6. Principle and methods of preparation of food from cereals.
7. Principle and methods of preparation of meat, fish, poultry and egg products.

## **C10P: Food processing and Preservation (Practical)**

**Credits 02**

### **Practical:**

#### **A:**

1. **Milk cookery:** Experimental milk cookery. Preparation of selected common recipes.
2. **Egg cookery:** Experimental cookery on eggs-boiled eggs, poached eggs, Omelettes and custards. Preparation of selected common recipes.
3. **Vegetables Cookery:** a. Different methods of cooking vegetables – effect of shredding, dicing, acid and alkali, pressure cooking, steaming with and without lid. e.g. Potato, beetroot, carrot and greens. Recipes with Vegetables
4. **Fruits:** Prevention of browning on fruits. Preparation of selected common recipes.
5. Estimation of Sodium, Potassium, Calcium and Iron in different food staffs.
6. Estimation of vitamin C content of food by biochemical method.

#### **B:**

**Visit to a food processing industry.**

*Skill Enhancement Course (SEC)*

**SEC-2: Basic Molecular Biology**

**Credits 02**

**SEC2T: Basic Molecular Biology**

**Course Contents:**

1. Nucleic acid: Bases, nucleosides and nucleotides.
2. DNA structure: DNA double helix (Watson and Crick Model). Types of DNA and RNA, DNA and RNA as genetic material.
3. DNA replication: Semi-conservative replication, Basic mechanism of replication (Prokaryotes / Eukaryotes).
4. Transcriptional unit and basic concept of transcription (Prokaryotes / Eukaryotes).
5. Genetic code and basic mechanism of translation (Prokaryotes / Eukaryotes ).
6. Basic concept of genomics, proteomics and metabolomics.

**Suggested readings**

1. Bolandar, M. (2001). Molecular Endocrinology. Elsevier Science.
2. Alberts, B. et al. (2008). Molecular Biology of the Cell. 5th Ed. Garland Publishing House.
3. Yoshinori Mine (Editor), Kazuo Miyashita (Editor), Fereidoon Shahidi (Editor): Nutrigenomics and Proteomics in Health and Disease: Food Factors and Gene Interactions.
4. Van Ommen, B. (2004). Nutrigenomics: Exploiting systems biology in the nutrition and health arenas. *Nutrition*.20:4-8.
5. Simopoulos, A.P. and Ordovas, J.M. (Editors)(2004). Nutrigenetics and Nutrigenomics.
6. Roche, H.M. (2004). Dietary lipids and gene expression. *Biochem Soc Trans*. 32(Pt 6):999-1002.
7. Mount, D. W. Bioinformatics. Sequence and Genome Analysis, CSHL Press.
8. Jones.N. C., Pevzner, P. A. (2004). An Introduction to Bioinformatics Algorithms, MPI Press.
9. Kaput J, Rodriguez RL. (2004)Nutritional genomics: The next frontier in the Postgenomic era. *Physiol Genomics*.16:166-177.
10. Kaput J. and Rodriguez. R. L. (2006). Nutritional Genomics. John Wiley & Sons, Inc.
11. De Busk RM, Fogarty CP, Ordovas JM, Kornman KS. (2005). Nutritional genomics in practice: Where do we begin? *J Am Diet Assoc*. 105:589-598.

**Or**

**SEC2T: Nutrition and Fitness**

**Credits 02**

**SEC2T: Nutrition and Fitness**

## **Course Contents**

1. Understanding Fitness: Definition of fitness, health and related terms. Assessment of fitness, Approaches for keeping fit.
2. Importance and benefits of physical activity: Physical Activity – frequency, intensity, time and type with examples Physical Activity, physical activity guidelines and physical activity pyramid.
3. Importance of nutrition Role of nutrition in fitness, Nutritional guidelines for health and fitness, Nutritional supplements.
4. Importance of diet and exercise for weight management.

## **Suggested Readings:**

1. Campbell BI. (2014). Sports Nutrition: Enhancing Athletic Performance, CRC Press, Taylor& Francis,
2. Haff GG. (2008). Essentials of Sports Nutrition Study Guide, Humana Press.
3. Dunford M and Doyle JA. (2008). Nutrition for Sport and Exercise, Thomson Wadsworth.
4. Srilakshmi B. (2018). Dietetics, New Delhi: New Age International.

**Or**

**SEC-2: Entrepreneurship Development**

**Credits 02**

**SEC2T: Entrepreneurships Development**

### **Unit-I: Introduction**

Meaning, Needs and Importance of Entrepreneurship, Promotion of entrepreneurship, Factors influencing entrepreneurship, Features of a successful Entrepreneurship.

### **Unit-II: Establishing an enterprise**

Forms of Business Organization, Project Identification, Selection of the product, Project formulation, Assessment of project feasibility.

### **Unit- III: Financing the enterprise**

Importance of finance / loans and repayments, Characteristics of Business finance, Fixed capital management: Sources of fixed capital, working capital its sources and how to move for loans, Inventory direct and indirect raw materials and its management.

### **Unit- IV: Marketing management**

Meaning and Importance, Marketing-mix, product management – Product line, Product mix, stages of product like cycle, marketing Research and Importance of survey, Physical Distribution and Stock Management.

**Unit – V: Entrepreneurship and International business**

Meaning of international business, Selection of a product, Selection of a market for international business, Export financing, Institutional support for exports.

**Suggested Reading:**

1. Holt DH. Entrepreneurship: New Venture Creation.
2. Kaplan JM Patterns of Entrepreneurship.
3. Gupta CB, Khanka SS. Entrepreneurship and Small Business Management, Sultan Chand & Sons.

**Or**

**SEC-2: Women Health & Nutrition**

**Credits 02**

**SEC2T: Women Health & Nutrition**

1. Factors (non-nutritional) affecting pregnancy outcome, importance of adequate weight gain during pregnancy, antenatal care and its schedule, Nutritional requirements during pregnancy and modification of existing diet and supplementation, Deficiency of nutrients, specially energy, iron folic acid, protein, calcium, iodine. Common problems of pregnancy and their managements, specially - nausea, vomiting, pica, food aversions, pregnancy induced hypertension, obesity, diabetes. Adolescent pregnancy.
2. Nutritional requirements during lactation, dietary management, food supplements, galactogogues, preparation for lactation. Care and preparation of nipples during breast feeding.

**Suggested Readings:**

1. Ghosh, S: The Feeding and Care of Infants and Young Children, VHAI. 6th Ed. Delhi.
2. WHO: A growth chart for International use In Maternal and Children Health Care, Geneva.
3. Mann and Truswell: Essentials of Human Nutrition, Oxford University press.
4. Indian Council of Medical Research: Nutrient Requirements and Recommended- Dietary Allowance for Indians, New Delhi.

*Generic Elective Syllabus*  
*GE-4 [Interdisciplinary for other department]*

**GE-4: Family Meal Management**

**Credits 06**

**GE4T: Family Meal Management**

**Credits 04**

**Course Contents:**

1. Introduction to meal management - balanced diet, food groups & the planning of balance diet.
2. Food guides for selecting adequate diet .
3. Diet therapy
4. Diet & stress in current scenario.
5. Meal planning for the family.
6. Indian meal patterns - vegetarian & non-vegetarian.
7. Food faddism & the faulty food habits.
8. Nutritive value of common Indian recepies.
9. Nutrition in pregnancy - Physiological stages of pregnancy, nutritional requirements. Food selection, complication of pregnancy.
10. Nutrition during lactation - Physiology of lactation, nutritional requirements.
11. Nutrition during infancy - growth & development, nutritional requirements, breast feeding, infant formula, introduction of supplementary foods.
12. Nutrition during early childhood (Toddler/Preschool)- Growth & nutrient need, nutrition related problems, feeding patterns.
13. Nutrition of school children- Nutritional requirement, importance of snacks, school lunch.
14. Nutrition during adolescence - Growth & nutrient needs, food choices, eating habits, factor influencing needs.
15. Nutrition during adulthood - Nutritional requirements, feeding pattern.
16. Geriatric nutrition: Factors affecting food intake and nutrient use, nutrient needs, nutrition related problems.

**GE4P: Family Meal Management (Lab)**

**Credits 02**

**Practical:**

Planning, preparation and nutritional evaluation of diets in relation to activity levels and physiological state.

**A:**

1. Planning and preparation of a balanced diet for a pregnant woman.
2. Diet during complication of pregnancy.
3. Planning and preparation of a balanced diet for a lactating woman.
4. Preparation of weaning foods.



5. Planning and preparation of a balanced diet for pre-school child.
6. Balanced diet for school going child. Preparation of packed lunch.
7. Planning and preparation of a balanced diet for adolescence.
8. Planning of meals for adult belonging to different income group.
9. Planning meal for senior citizen.

**B: Project work with proper diet plan based on survey.**

**Or**

**GE-4: Dietetics and Counseling**

**Credits 06**

**GE4T: Dietetics and Counseling**

**Credits 04**

**Course Contents:**

1. Practical consideration in giving dietary advice and counselling -
  - a) Factors affecting and individual food choice.
  - b) Communication of dietary advice
  - c) Consideration of behaviour modification
  - d) Motivation.
2. Counselling and educating patient
  - a) Introduction to nutrition counselling
  - b) Determining the role of nutrition counsellor
  - c) Responsibilities of the nutrition counsellor
  - d) Practitioner v/s client managed care
  - e) Conceptualizing entrepreneur skills and behaviour
  - f) Communication and negotiation skills.
3. Teaching aids used by dietitians- charts, leaflets, posters etc., preparation of teaching material for patients suffering from Digestive disorders, Hypertension, Diabetes, Atherosclerosis & Hepatitis and cirrhosis.
4. Computer application
  - a) Use of computers by dietitian
  - b) Dietary computations
  - c) Dietetic management
  - d) Education/ training
  - e) Information storage
  - f) Administrations
  - g) Research
5. Computer application
  - a) Execution of software packages

- b) Straight line, frequency table, bar diagram, pie chart, Preparation of dietary charts for patients
- c) Statistical computation- mean, median, standard deviation, conclusion and regression test.

**GE4P: Practical**

**Credit 02**

1. Project planning for any one disease.
2. Computer application for different diseases.
3. Submitting computed data.
4. Preparations of teaching aids in the field of nutrition.
5. Preparation of case history of a patient and feeding of information in the hard disc.