SNDT Women's University, Mumbai

B.Sc. (Food Science Nutrition- Food Science & Quality Control)

2023

Nomenclatures Across Levels:

Level	Semester	Name of the Level	Credits	Nomenclature
4.5	**1**	**Certificate**	**22**	**UG Certificate in Food & Nutrition**
	2		**22**	
5.0	**3**	**Diploma**	**22**	**UG Diploma in Food & Nutrition**
	4		**22**	
5.5	**5**	**Degree**	**22**	**B.Sc. (Food Science Nutrition-Food Science & Quality Control)**
	6		**22**	
	8		**22**	

Programme Degree		**B.Sc.**
Faculty		Science & Technology
Specialization Major		**Food Science Nutrition**
Sub-Specialization		**(Food Science and Quality Control)**
Preamble		The Program lays a strong emphasis on an integrated approach through Multidisciplinary subjects that will enable students to build a variety of skills and a broad base of professional knowledge related to food science and quality control. It encourages the development of scientific perspectives and a research attitude in students related to food science and nutrition. The programme focuses on quality control aspects of food science and nutrition and trains learners in human physiology, biochemistry, nutrition, food microbiology, food preservation, Post-Harvest Technology, Food Processing, Food Equipments, Labeling, Food Toxicology and their relationships. At the end of the programme, the learners can work in the areas of food product development and food quality control.
Programme Specific Outcomes (PSOs)		After completing this programme, Learner will be able to -
	1.	Examine the composition of various foods and the changes taking place during their processing and Cooking.

	2.	Analyze food and nutrition science
	3.	Comprehend the fundamentals of human physiology, biochemistry, nutrition, food microbiology, food preservation, Post-Harvest Technology, Food Processing, Food Equipments, Labeling, Food Toxicology and their relationships.
	4.	Acquire knowledge and confidence to work in the area of food quality control and food product development.
	5.	Undertake research in Food analysis.
Eligibility Criteria for Programme		Any woman who has successfully cleared 10+2 from the recognized Boards in Home Science/Science by the Government of India/respective state or have required credits as per the government norms to be able to join undergraduate programme. Student having studied Chemistry at 10+2 will be given preference.

Programme Structure for Four Years
B.Sc. (Food Science and Quality Control)

Syllabus Structure

S. No.	Courses	Type of Course	Credits	Marks	Internal	External
Semester I						
1.1	Basics of Food Science (Th)	Major (Core)	4	100	50	50
1.2	Basics of Food Science (Pr)	Major (Core)	2	50	0	50
1.3	Applied Science (Th + Pr)	OEC	4	100	50	50
1.4	Cuisines of India (Th)	VSC	2	50	0	50
1.5	English	SEC	2	50	0	50
1.6	Effective Spoken Communication	AEC	2	50	50	0
1.7	Cuisines of India (Th)	IKS	2	50	0	50
1.8	EVS (Th)	VEC	2	50	0	50
1.9	NSS/NCC/CHETNA/Culture	CC	2	50	50	0
			22	**550**	**200**	**350**
Semester II						
2.1	Basics of Nutrition(Theory)	Major (Core)	4	100	50	50
2.2	Basics of Nutrition (Practical)	Major (Core)	2	50	0	50
2.3	Human Ecology and Family Sciences	Minor Stream	2	50	0	50
2.4	Human Physiology (Th+Pr)	OEC	4	100	50	50
2.5	Cuisines of India (Pr)	VSC	2	50	0	50
2.6	English	SEC	2	50	0	50
2.7	Effective Written Communication	AEC	2	50	50	0
2.8	Cuisines of India (Pr)	IKS	2	50	0	50
2.9	NSS/NCC/CHETNA/Culture	CC	2	50	50	0
			22	**550**	**200**	**350**
		TOTAL	**44**	**1100**	**400**	**700**

UG Structures and First Year Syllabi of Food Science & Nutrition were approved in the Academic Council of 22-11-2023.

UG CERTIFICATE (with extra 10 credits)	**54**	**1350**		

Semester III						
SN	**Courses**	**Type of Course**	**Credits**	**Marks**	**Internal**	**External**
3.1	Basic Biochemistry	Major (Core)	4	100	50	50
3.2	Food Microbiology	Major (Core)	4	100	50	50
3.3	Introduction to Food Preservation	Minor Stream	4	100	50	50
3.4	Food Hygiene & Sanitation	OEC	2	50	0	50
3.5	Food Hygiene & Sanitation	VSC	2	50	0	50
3.6	Seminar/ENGLISH	AEC	2	50	50	0
3.7	Food Industry Visit	FP	2	50	50	0
3.8	NSS/NCC/CHETNA/Cultural	CC	2	50	50	0
			22	**550**	**300**	**250**
Semester IV						
4.1	Biochemistry	Major (Core)	4	100	50	50
4.2	Post-Harvest Technology I	Major (Core)	4	100	50	50
4.3	Food Equipment	Minor Stream	4	100	50	50
4.4	Food Labeling	OEC	2	50	0	50
4.5	Food Labeling	VSC	2	50	0	50
4.6	English	AEC	2	50	50	0
4.7	NSS/NCC/Cultural	CC	2	50	50	0
4.8	Community Project	CEP	2	50	50	0
			22	**550**	**300**	**250**
		TOTAL	**44**	**1100**	**600**	**500**
			10	**250**		
UG Diploma in Food & Nutrition			**98**	**2450**		

Semester V						
SN	**Courses**	**Type of Course**	**Credits**	**Marks**	**Internal**	**External**
5.1	Physical and Analytical Chemistry	Major (Core)	4	100	50	50
5.2	Food Science and Sensory Evaluation (3+1)	Major (Core)	4	100	50	50
5.3	Food Packaging	Major (Core)	2	50	0	50
5.4	Post-Harvest Technology II	Major(Elective)	4	100	50	50
5.5	Food Commodities	Minor Stream	4	100	50	50
5.6	Food Packaging	VSC	2	50	0	50
5.7	Project	CEP	2	50	50	0
			22	**550**	**250**	**300**
Semester VI						
6.1	Food Standards and Quality Control	Major (Core)	4	100	50	50
6.2	Quality Control in Foods	Major (Core)	4	100	50	50
6.3	Food Processing Application	Major (Core)	2	50	0	50
6.4	Nutrition For All	Major (Elective)	4	100	50	50
6.5	Food Toxicology and Industrial Waste Water Management	Minor Stream	4	100	50	50
6.6	Internship	OJT	4	100	50	50
			22	**550**	**250**	**300**
		TOTAL	**44**	**1100**	**500**	**600**
***B.Sc.* (Food Science & Quality Control)**			**132**	**3300**		

SEMSTER-1

Syllabus Contents

BASICS OF FOOD SCIENCE (Th)

Subject Code	Subject	Credits	Theory	Practical	Total Marks	Examination by
	Basics of Food Science (Th)	4	4	0	100	College

Course Learning Objectives:

This course enables students to:

1. Learn the basic principles of food science.
2. Understand the food composition and the changes occurred during storage.
3. Examine the factors affecting the changes in the food composition.

1.1 Major (Core)

Course Title	Basics of Food Science (Th)
Course Credits	4 (4+0)
Theory – Practical Internal – External	**Theory** **Internal**
Course Outcomes	After going through the course, learners will be able to
	1. Illustrate the composition of foods and the changes occurring in them during food preparation and storage
	2. Comprehend the reasons for positive and not so positive changes in foods
	3. Select the right techniques to plan recipes of high-quality products acceptable to consumers
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Acknowledge the importance of Sensory evaluation, Comprehend and differentiate between different sensory evaluation Techniques
	2. Describe the role of water in food preparation, forms of water in food and types of water

Content Outline	• **Sensory characteristics of food** • Importance and objectives of Sensory evaluation and its Prerequisites • Tests for Sensory Evaluation**:** Sensitivity Threshold test Difference test – paired comparison, triangle and Duo-trio test, Rating test – Hedonic, Numerical, Composite scoring and ranking test • **Water:** Role of water in cookery, Forms of water – Bound and free water. Types: Hard and Soft • **Beverages:** Types and Classification.
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Characterize the composition of Cereals, Pulses & Legumes, Vegetables and Fruits
	2. Illustrate the changes occurring in the food components and justify their application in food preparation
Content Outline	• **Cereals:** Structure and composition of a cereal grain, Properties of starch – Thickening and Gelatinization, Gel Formation, syneresis, Retrogradation and Lump formation, Dextrinization, Identity of grains, Gluten formation – Factors affecting Gluten formation. • **Leavening agents:** Natural and Chemical and their action. • **Pulses and legumes**: Composition, anti-nutritional factors, effects, and elimination, soaking, fermentation and germination, • **Vegetable and Fruits:** Composition, color pigments and effect of cooking on them Pectic substances: forms – Pectin, Protopectin, Pectic acid, Pectinic acid. Theory of gel formation, Vegetables gums and their commercial uses.
Module 3 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Illustrate about the composition of Milk, Egg, Meat, Fish, Poultry
	2. Explain the changes occurring in the food components and justify their application in food preparation

Content Outline	• **Milk:** Composition, effect of heat, acid, alkali and enzymes on milk, scum formation, Maillard reaction • **Egg:** Structure and composition of egg, protein in egg White and Egg Yolk, Methods to judge Egg quality (grading), Physical and chemical changes during egg storage, foams**, r**ole of egg in Cookery, methods of cooking egg. • **Meat, Fish and Poultry-**Composition, Structure, post mortem changes, ripening or ageing of meat, tenderization of meat, changes during meat cooking. • **Fish**: Classification, quality indicators of fish, types of fish spoilage, gelatin, and Fish Protein Concentrate (FPC).
Module 4 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Define the functional properties and role of fats and oils and sugars in food preparation
	2. Analyse the reasons for spoilage of fats and methods to prevent it
Content Outline	• **Fats and Oils** Physical properties – plasticity, smoke point, flash point, Functional role of fats Functional role of fats – flavor, texture, tenderness, emulsification, shortening and leavening effects. Emulsions Fat Spoilage – rancidity, its types and its prevention. Antioxidants flavor reversion. Fat absorption and factors affecting it • **Sugars** Types of Sugars Stages of Sugar cookery Physical Properties-crystalline, amorphous
Assignments/Activities towards Comprehensive Continuous Evaluation (CCE) 1. Market Survey and discussion on Types of Beverages 2. Market Survey and discussion on Types of Minimally processed cereals, Pulses/Legumes and Vegetable 3. Market Survey and discussion on Types of Milk, Milk products 4. Market Survey and discussion on Types of Fats, Oils and Sugars	

Bibliography:

- Bennion, M. Scheule, B.: (2014): Introductory Foods,14th Edition, Prentice Hall Publications
- Freeland-Graves, J., Peckham, G. C, (1995): Foundations of Food Preparation (6th Edition), Prentice Hall Publishers
- Manay, S. (2020) Foods Facts, 4th Edition New Age International Pvt Ltd Publishers
- Potter, N. N., Hotchkiss J. H: (1999), Food Science, 5th Edition, Springer Publications
- Shadaksharaswamy, M, Manay, S, (2023): Food facts and Principles, 5th Edition, New Age International Publishers
- Srilakshmi, B: (2018) Food Science, 7th Edition, New Age International Pvt Ltd Publishers

- Subbulakshmi, G, Udipi, S. A (2021): Food processing and Preservation, 2nd Edition New Age International Pvt Ltd Publishers

BASICS OF FOOD SCIENCE (Pr)

Subject Code	Subject	Credits	Theory	Practical	Total Marks	Examination by
	Basics of Food Science (Pr)	2	0	2	50	College

Course Learning Objectives:

This course enables students to:

1. Learn the basic principles and techniques used in food preparation.
2. Application of food ingredients to develop products.
3. Conduct sensory evaluation tests and record the nature of food products.

1.2 Major (Core)

Course Title	Basics of Food Science (Practical)
Course Credits	**2 (0+2)**
	Internal Practical
Course Outcomes	After going through the course, learners will be able to
	1. Observe and note the nature and composition of food ingredients
	2. Note the interplay of ingredients during food preparation
	3. Apply use of different ingredients in food preparation to create products and assess them using appropriate sensory evaluation tests
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Conduct a variety of Sensory evaluation tests
	2 Record the changes in sugar and starch in cereals/pulses and vegetables during food Preparation

Content Outline	**Tests for Sensory Evaluation** Sensitivity Threshold test Difference test – paired comparison, triangle and Duo-trio test scoring and ranking test. • **Sugar and Starch Cookery** Preparation of sugar syrups for example: one thread, two thread soft ball and crack stage. Stiffness of starch gel and factors affecting it Factors affecting gluten formation i.e. kneading time, types of cereal and flours, effect of amount of fat etc. • **Vegetable Cookery** Changes in colour pigments due to heat, acid and alkali
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Develop recipes demonstrating the shortening effect and factors affecting fat absorption
	2 .Develop milk products and recipes demonstrating the functional properties of eggs
Content Outline	• **Fat Cookery**- Shortening effect and factors affecting fat absorption. • **Milk Cookery**- Paneer, Maillard Reaction • **Egg Cookery-** Role of Egg – Boiled, omelette, French toast, mayonnaise etc.
Assignments/Activities towards Comprehensive Continuous Evaluation (CCE) 1. Project on home production of Curds and Cream 2. Project on home production of Butter and Ghee	

Bibliography:

- Bennion, M. Scheule, B.: (2014): Introductory Foods,14th Edition, Prentice Hall Publications
- Freeland-Graves, J., Peckham, G. C, (1995): Foundations of Food Preparation (6th Edition), Prentice Hall Publishers
- Manay, S. (2020) Foods Facts, 4th Edition New Age International Pvt Ltd Publishers
- Potter, N. N., Hotchkiss J. H: (1999), Food Science, 5th Edition, Springer Publications
- Shadaksharaswamy, M, Manay, S, (2023): Food facts and Principles, 5th Edition, New Age International Publishers
- Srilakshmi, B: (2018) Food Science, 7th Edition, New Age International Pvt Ltd Publishers
- Subbulakshmi, G, Udipi, S. A (2021): Food processing and Preservation, 2nd Edition New Age International Pvt Ltd Publishers

APPLIED SCIENCE (TH + PR)

Subject Code	Subject	Credits	Theory	Practical	Total Marks	Examination by

	Applied Science (Th + Pr)	4	2	2	100	College

Course Learning Objectives:
This course enables students to:
1. Learn the basic principles of biological sciences.
2. Application of knowledge of biological processes to nutrition practices for upgrading health.

1.3 OPEN ELECTIVE (NOT NECESSARY FROM MAJOR)

Course Title	Applied Science (Th + Pr)
Course Credits	4 (**2 + 2)**
Course Outcomes	After going through the course, learners will be able to
	1. Acquire the basic knowledge of the fundamentals of biological sciences.
	2. Apply the knowledge of the biological processes to nutrition and health.
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Distinguish between types of cells
	2. Comprehend Genetics and its application
Content Outline	• **Cell** • As the basic unit of life • Types of cells • Salient features of animal cell **Introduction to Micro-organisms** • Bacteria-Structure, Classification based on response to Oxygen, nutrition, Importance of bacteria • Fungi- Morphology of molds and yeasts, classification, beneficial and harmful aspects • Virus- Morphology, Classification based on nucleic acid content and hosts **Genetics and Heredity** • Origin of the term gene • Chemical basis of heredity- organization of human genome, sex determination, monogenic and polygenic traits, patterns of inheritance- autosomal, recessive and sex-linked inheritance • Mutation and its type, abnormalities in chromosome number **Genetic Engineering and Biotechnology** • Definition of the terms • Methodology of gene cloning-in brief Application of genetic engineering in plants- insects & virus resistant plants, plants with improved characters. Application in human medicine- pharmaceuticals, thalassemia oncogenes, interferon, production of growth hormone, human insulin ELISA.
Module 2 (Credit 1)	

Learning Outcomes	After learning the module, learners will be able to
	1.Differentiate between Functional groups and Organic & Inorganic compounds
	2. Explore Drugs and types of drugs
Content Outline	**Review of Basic Chemistry** • Important definitions • Difference between Organic & Inorganic compounds • Functional groups • Bohr's model of atom • Atomic number & electronic configuration • **Drugs and Pharmaceuticals** • Properties of good drug • Meaning of important terms with e.g. Analgesic, Antipyretic, Antacid, Antibiotic, Diuretic, anti-inflammatory, Laxatives, Sulfa drugs • Common drugs- use and side effects of Aspirin, Paracetamol, Sulphanilamide
Module 3 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Comprehend the knowledge of various micro-organisms
	2. Determine the required skills to study them.
	3. Apply this knowledge in everyday life
Content Outline	• **Applied Biology** • Study and care of microscope • Observation of motility of bacteria by Hanging drop method (*E.coli* / *Proteus*) • Observation of bacteria by the simple: monochrome staining method (Hay infusion culture or milk) • Gram staining of bacteria in buttermilk • To observe common pathogenic bacteria (any 6 – permanent slides) • Observation of fungi on different food materials • To observe common pathogenic protozoa (permanent slides of *Entamoeba histolytica* and *Plasmodium vivax*) • Study of medicinally important plants
Module 4 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Undertake work systematically in laboratory.
	2. Perform simple chemical procedures

Content Outline	• **Applied Chemistry** • Introduction to chemistry lab & apparatus. • Neutralization of strong acid with strong base (HCl & NaOH) • Neutralization of weak base with strong acid (Na_2CO_3& H_2SO_4) • Neutralization of weak acid with strong base (Oxalic acid & NaOH) • Oxidation- reduction reaction (Oxalic acid & $KMnO_4$) • pH determination of various solutions: acid, base and neutral (two household example for each) Viscosity measurement: water, oil, shampoo by Oswald's viscometer

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Performing experiment
2. Journal
3. Project on Medicinal Plants

Bibliography:

- George A. (1984): Shreeve's Chemical Process Industries 5th Edition, McGraw-Hill International Edition.
- Glazer A. Na Ni Baido H (1995) Microbial Biotechnology, Edition: revised, W.H. Freemen Company.
- K. Venkatraman (1965): The Chemistry of Synthetic Dyes, Vol. I, Revised Edition Academic Press, New York.
- Kent S.A. (2003): Riegel's Handbook of Industrial Chemistry. 10th Edition
- Loewy A. and Sckevilz (1995) Cell Structure and Functions Hold, 3rd Edition. New-York Publication
- Nicholl D.S.T. (1994) An Introduction to Genetic Engineering-Cambridge University, Press.
- Pelczar N.S, Chan F.C.S. Krieg N.R.(2010) Microbiology, Tata Mc Grow Hill. 5th edition.
- Person D. (1983): The Chemical Analysis of Food, 8th edition, Churchill Livings Tone, Edinburgh, London, New York.
- Porter K.R., Bonnevile M.A. (2008) Fine Structure of Cells and Tissues, Digital edition. Lea & Blanchard, Philadelphia.
- Prof. V. A. Shenal (1991): Introduction to the Chemistry of Dyestuffs, 3rd edition. Sevak Publications.
- Rao C.V. (1998) Foundation to Molecular Biology, 3rd Edition. R. Chenda. Co. Publisher
- Thomsen E.G. (1985): Modern Cosmetics Universal publishing Corporation
- Zhdanov L.S. (1980): Physics for the Technician, 2nd edition MIR Publications. Moscow.

1.4 VOCATIONAL SKILL COURSE

1.5 SKILL ENHANCEMENT COURSE

1.6 ABILITY ENHANCEMENT COURSE

1.7 INDIAN KNOWLEDGE SYSTEM COURSE

Course Title	**Cuisines of India (Th.)**
Course Credits	2
Course Learning Objectives:	This course enables students to: 1. Explore the different cuisines of India. 2. Understand the cultural principles for preparations made in different seasons. 3. Learn the varied use of ingredients in different cuisines of India.
Course Outcomes	After going through the course, learners will be able to
	1. Acknowledge the different cuisines of India
	2. Explore the preparations made in different regions of India.
	3. Explore the preparations made in different seasons and Festivals in different regional cuisines
	4. Comprehend the differences in use of various ingredients used in regional cuisines of India.
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Explore and practice the different cuisines of the western and northern regions of India
	2. Explore the various seasonal and festival preparations of the western and northern regions of India
Content Outline	• Western Cuisine: Cuisines of Maharashtra, Gujarat, Rajasthan • North Indian Cuisine: Cuisines of Jammu and Kashmir, Punjab, Uttar Pradesh and Madhya Pradesh
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Explore the different cuisines of the Eastern and Southern regions of India
	2. Acknowledge the various seasonal and festival preparations of the western and northern regions of India
Content Outline	• Southern India Cuisine: Cuisines of Karnataka, Andhra Pradesh, Tamil Nadu and Kerala • Eastern India Cuisine: Cuisines of Bengal, Orissa, Assam

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE) :

- Projects on collating recipes from the students respective regions
- Looking at food magazines and creating scrap book.

Bibliography:

- Cookery Books of Nita Mehta.
- Cookery Books of Tarla Dalal.
- Dalal T. (1999), 'The complete Gujarati Cook Book'
- Nambiar, Vanisha (2021) *Indian Food Anthropology and the Eat Right Movement Volume I*. Selective and Scientific books
- Nambiar, Vanisha (2021) *Indian Food Anthropology and the Eat Right Movement Volume II*. Selective and Scientific books
- Patil V (1998), 'Food Heritage of India: A collection of Unusual Recipes from every corner of India, pp:123-147, revised edition, Vakil & sons ltd Bombay Print. Chitra P,(1989) *Foods of Earth Tastes of Heaven: Vegetarian Cuisine of Gujrath* Prairie Web Press
- Philip T (1978), *'Indian Cuisine'*, Ministry of Information and Broadcasting Government of India: 14-15.
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1.8 VALUE EDUCATION COURSE

1.9 CO-CURRICULAR COURSE

Semester II

Syllabus Contents

2.1 Major (Core)

Course Title	**Basics of Nutrition**
Course Credits	4
Course Learning Objectives:	This course enables students to: 1. Understand the basic concepts and terminologies used in Nutrition. 2. Explore the nutrients available through food and its implications on human body. 3. Learn the application of nutrition in day-to-day life.
Course Outcomes	After going through the course, learners will be able to
	1. Define basic nutrition concepts and terminology.
	2. Comprehend the six types of nutrients available from food
	3. Acknowledge the concept of serving size and balanced diet
	4. Understand the contribution of macronutrients and micronutrients to health

	5. Comprehend the application of basic nutrition knowledge while making food choices to plan a balanced diet
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Acknowledge the basic concepts in nutrition
	2. Explore the six types of nutrients present in food
Content Outline	• Definition of Health, Nutrition, Nutrients, Food, Estimated Average Requirements (EAR), Balanced Diet, Recommended Dietary Allowances (RDA), Tolerable Upper Limit (TUL), Malnutrition (Undernutrition, Overnutrition, Optimum nutrition). • Introduction to the nutrients present in food, namely, Carbohydrates, Proteins, Fats, Vitamins, Minerals & Water.
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Comprehend the sources and functions of water, and the Macronutrients available from food.
	2 Explore the conditions resulting from deficiencies and excess consumption of water and macronutrients.
Content Outline	Sources, Functions, Effects of Deficiencies and Excessive Consumption of - • Carbohydrates • Proteins • Fats • Water
Module 3 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Explore the sources and functions of the Vitamins (Fat-soluble & Water-soluble) available from food.
	2. Understand the conditions resulting from deficiencies and excess consumption Vitamins (Fat-soluble & Water-soluble) available from food.
Content Outline	Sources, Functions, Effects of Deficiencies and Excessive Consumption of • Fat-Soluble Vitamins (Vitamins A, D, E & K) • Water-Soluble Vitamins (Vitamins B1, B2, B3, B6, B9, B12)
Module 4 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Explore the sources and functions of the Minerals (Macrominerals and Microminerals) available from food.

	2. Acknowledge the conditions resulting from deficiencies and excess consumption Minerals (Macrominerals and Microminerals) available from food.
Content Outline	Sources, Functions, Effects of Deficiencies and Excessive Consumption of • Macrominerals (Calcium & Phosphorus) • Microminerals (Iron, Iodine, Selenium, Zinc)

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

➔ Individual or group projects on classifying food items based on their main nutrients.

➔ Individual or group projects on clinical signs of nutrients deficiencies and toxicities.

Bibliography:

- Agarwal, A and Udipi, S. A. (2022). *Textbook of Human Nutrition* (2nd Edition), Jaypee Brothers Medical Publishers (P).
- Bamji, M.S. (2019), *Textbook of Human Nutrition* (4th Edition)**,** Oxford.
- Joshi, S (2021), *Nutrition and Dietetics* (5th Edition), McGraw Hill.
- Mudambi, S.R. and Rajgopal, M.V**. (**2020), *Fundamentals of Foods, Nutrition and Diet Therapy, 5th Edition,* New Age International Pvt. Ltd.

2.2 Major (Core)

Course Title	**Basics of Nutrition (Pr.)**
Course Credits	**2**
Course Learning Objectives:	This course enables students to: 1. Understand the standardization of recipes. 2. Explore the nutrients available through different food sources and understand its application in preparing recipes. 3. Learn to prepare and develop multi-nutrient recipes.
Course Outcomes	After going through the course, learners will be able to
	1. Compare weight and measures of raw foods with cooked amounts.
	2. Acknowledge the concept of standardization of basic recipes (serving size and portion size).
	3. Explore and record food sources of various nutrients.
	4. Plan and prepare recipes using rich sources on nutrients.
	5. Plan and prepare multi-nutrient rich recipes to improve dietary nutrient adequacy.
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Compare weights and measures of raw and cooked food items.
	2. Acknowledge the concept of standardization of recipes (serving size, portion size)
Content Outline	• Weights and measures of cereals, millets, pulses, milk, milk products, eggs, fruits and vegetables. • Standardization of basic recipes.
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Explore and select recipes and calculate nutrients in single serving.
	2. Relate the principles of nutrition to the optimize nutrient content in the recipe.
Content Outline	**Identification, selection and preparation of Recipes for One Serving:** - Energy: high and low calorie - Proteins - Vitamin A - Vitamin C - B- complex vitamins - Calcium - Iron

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)
1. Individual assignments on collating pictures of rich sources of various nutrients 2. Individual assignments on planning multi-nutrient recipes to improve nutrient density of commonly consumed recipes

Bibliography:

- Agarwal, A. and Udipi, S. A. (2022), *Textbook of Human Nutrition* (2nd Edition), Jaypee Brothers Medical Publishers (P).
- Bamji, M.S. (2019), *Textbook of Human Nutrition* (4th Edition)**,** Oxford
- Joshi, S (2021), *Nutrition and Dietetics* (5th Edition), McGraw Hill.
- Mudambi, S.R. and Rajgopal, M.V**. (**2020), *Fundamentals of Foods, Nutrition and Diet Therapy,5th Edition,* New Age International Pvt. Ltd.

2.3 MINOR

Course Title	Human Ecology and Family Sciences (Th.)
Course Credits	**2**
Course Learning Objectives:	This course enables students to: 1. Understand their roles and responsibilities in the context of family, community and society. 2. Explore diverse domains across human ecology.
Course Outcomes	After going through the course, learners will be able to
	1. Build an understanding of self in relation to family and society.
	2. Illustrate their roles and responsibilities as productive individuals, as members of family, community and society.
	3. Integrate learning across diverse domains and form linkages with other academic subjects of human ecology.
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Develop an understanding about Early Childhood Care and education
	2. Acknowledge changes during Adolescence
	3. Discuss Fabric and apparel in brief and describe the textile heritage of India

Content Outline	1.Early Childhood Care and education; and Human Development • Guidance and counselling • Special Education and support services • Support services for children in difficult circumstances • Changes during Adolescence- Biological and Physical; Socio – Cultural context, Emotional and Cognitive 2. Fabric and apparel • Care and maintenance of fabrics • Design for fabric and apparel • Retailing and merchandising • Textile heritage of India
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Build a brief understanding about nutrition, food, public health, catering and food service management
	2.Generate an understanding to identify various resources and their management
	3. Create an understanding of the significance of communication and extension in media, education and learning
Content Outline	Introduction to the following in brief **1.** Nutrition and Food – • Clinical nutrition and dietetics • Public Nutrition and health • Catering and food services management **2.** Resource Management • Human and non-human resources management • Hospitality Management • Designing of interior and exterior space • Event management • Consumer services • Ergonomic Interior/Space **3.** Communication and Extension- • Media and Communication • Learning, education and extension
Assignments/Activities towards Comprehensive Continuous Evaluation (CCE): • Quiz • Assignments • Case study / Survey reports	

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2.4 OPEN ELECTIVE (NOT NECESSARY FROM MAJOR)

Course Title	Human Physiology
Course Credits	4 (2+2)
Course Learning Objectives:	This course enables students to: 1. Understand the structure and functioning of human anatomy. 2. Learn various techniques for assessment of body measurements. 3. Integrate the learned knowledge to draw relation between nutrition and human physiology.
Course Outcomes	After going through the course, learners will be able to
	1. Explore the basic concepts in human physiology
	2. Compare the association between human physiology and Nutrition
	3. Build an understanding of the functioning of various systems of the human body
	4. Demonstrate basic skills for first-aid and measuring and interpreting basic body parameters
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Explore the basic concepts and terminologies used in human physiology
	2. Acknowledge the relationship between human nutrition and physiology
Content Outline	• Introduction to Human Physiology: Skeletal, Circulatory, Respiratory, Gastrointestinal, Excretory, Nervous, Reproductive and Endocrine systems of the body • Physiology and Human Nutrition
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Illustrate the functioning of the circulatory, immune, respiratory and excretory systems of the human body
	2. Explore the basics of the mechanism by which the human body maintains homoeostasis (Body temperature, Fluid-Electrolyte and Acid-Base balance)
Content Outline	• The Circulatory system and functioning of the heart • The Immune System • The Respiratory System • The Excretory System • The Homoeostatic mechanisms of the human body
Module 3 (Credit 1)	

Learning Outcomes	After learning the module, learners will be able to
	1. Comprehend the functioning of the Gastrointestinal and Nervous systems of the human body
	2.Comprehendthe functioning of the Endocrine and Reproductive Systems of the human body
Content Outline	• The Gastrointestinal System – Organs of the GI system and basic process of digestion, absorption, utilization of food in the human body. • The Endocrine and Reproductive Systems of the human body.
Module 4 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Demonstrate basic first-aid skills, and learn the methods of measurement of body temperature and blood pressure
	2. Analyse the basic interpretation of urine analysis and complete blood count parameters
Content Outline	Contents of the First-Aid box and different types of bandages and bandaging techniques • First-aid for dehydration, heat-stroke, etc • Measurement of body temperature and blood pressure • Determination of blood groups, making of a peripheral blood smear, basic interpretation of urinary and CBC parameters.
Assignments/Activities towards Comprehensive Continuous Evaluation (CCE): • Quiz • Assignments • Individual measurement of body temperature, blood pressure, determination of blood group	

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2.5 VOCATIONAL SKILL COURSE

2.6 SKILL ENHANCEMENT COURSE

2.7 ABILITY ENHANCEMENT COURSE

2.8 INDIAN KNOWLEDGE SYSTEM COURSE

Course Title	**Cuisines of India (Pr.)**
Course Credits	2
Course Learning Objectives:	This course enables students to: 1. Understand the principles of using different ingredients in different seasons. 2. Learn the different cuisines prepared in India. 3. Prepare recipes that are traditionally made in different regions of India.
Course Outcomes	After going through the course, learners will be able to
	1. Comprehend and explore the use of various ingredients used in regional cuisines.
	2.Demonstrate common recipes made in different regions of India.
	3. Design various seasonal recipes made in different regions of India.
	4. Develop various festivals recipes made in different regions of India.
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Demonstrate recipes from cuisines of the western and northern regions of India
	2. Develop various seasonal and festival preparations of the western and northern regions of India.
Content Outline	Western Cuisine: Cuisines of Maharashtra, Gujarat, Rajasthan North Indian Cuisine: Cuisines of Jammu and Kashmir, Punjab, Uttar Pradesh and Madhya Pradesh
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Demonstrate recipes from cuisines of the Southern and Eastern regions of India
	2. Develop various seasonal and festival preparations of the Southern and Western regions of India
Content Outline	• Southern India Cuisine: Cuisines of Karnataka, Andhra Pradesh, Tamil Nadu and Kerala • Eastern India Cuisine: Cuisines of Bengal, Orissa, Assam

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE):

- Projects on preparing recipes from the students respective regions

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2.9 CO-CURRICULAR COURSE

End of Semester II