

**VANITA VISHRAM WOMEN'S UNIVERSITY**  
**SCHOOL OF SCIENCE AND TECHNOLOGY**



**VANITA VISHRAM**  
**WOMEN'S UNIVERSITY**  
— SURAT —

**BACHELOR OF SCIENCE (B.Sc.) HONOURS**  
**FOOD AND NUTRITION PROGRAMME**  
**under Learning Outcomes-based Curriculum Framework (LOCF)**  
**for UnderGraduate (UG) Education**

**Core Courses (CC), Ability Enhancement Compulsory Courses (AECC),**  
**Generic Elective Courses (GE)**

*Course Structure is applicable to the students seeking admission in the following programmes*

**B.Sc. Food and Nutrition under LOCF**  
**w.e.f. the Academic Year 2022-2023**

## **1. Preamble – VVWU**

Vanita Vishram Women's University (VVWU) is the First-ever Women's University of Gujarat approved by the Government of Gujarat under the provisions of the Gujarat Private Universities Act, 2009. It is a University committed to achieve Women's Empowerment through Quality Education, Skill Development, and by providing employment opportunities to its girl students through its model curriculum, integration of technology in pedagogy and best-in-class infrastructure. The focus is on prioritizing practical component and experiential learning supported through academia-industry linkages, functional MoUs, skill development training, internships etc. It aims at providing opportunities to the girl students for holistic development and self-reliance.

### **VISION**

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

### **MISSION**

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

## **2. Introduction of the Programme**

It is a three-year undergraduate course offered after completion of 10+2 schooling. The course aims to provide broad and balanced knowledge in Food and Nutrition in addition to understanding of key chemical concepts, principles and theories. It will provide knowledge and skill to the students' thus enabling them to undertake further studies in Food and Nutrition, in related areas or multidisciplinary areas that can be helpful for self-employment / entrepreneurship. The course is designed to provide intellectual and laboratory skills according to the UGC module for CHOICE BASED CREDIT SYSTEM (CBCS) pertaining to B.Sc. Food and Nutrition (Honours).

## **3. Programme Specific Objectives (PSOs)**

- To provide knowledge of Food and Nutrition with board and balanced aspects
- Development of laboratory analysis skills.
- To develop critical thinking approaches for problem solving.
- To provide skill base training to hold out in the current competitive environment.
- Multidisciplinary approach for overall development.

## **4. Programme Specific Outcomes (PSOs)**

- Identifying Food and Nutrition related problems, analysis and application of data using appropriate methodologies.
- Finding opportunity to apply subject-related skills for acquiring jobs and self-employment.
- Understanding new frontiers of knowledge in Food and Nutrition for professional development.
- Applying subject knowledge for solving societal problems related to application of Food and Nutrition in day to day life.
- Applying subject knowledge for sustainable environment friendly green initiatives.

**B.Sc. Food and Nutrition Programme**

Semester	Subjects	Core Course	Credits	TOTAL
SEMESTER-1	Nutrition Science	Fundamentals of Food and Health (Th)-2 Principles of Macronutrients (Th)-2 Applied Science (Pr)- 2	6	24
	Clinical Dietetics	Basic Dietetics (Th)-2 Human Physiology -I (Th)- 2 Food Laboratory (Pr)- 2	6	
	Food Science	Food Hazards & Prevention (Th)-2 Essential of Food Science (Th)-2 Basic Food Chemistry (Pr)- 2	6	
	AECC	English Communication-I Environmental Studies-I	2 2	
	Elective	Food Safety & Hygiene	2	
SEMESTER-2	Nutrition Science	Lifecycle Nutrition (Th)-2 Principle of Micronutrients (Th)-2 Family Meal Management (Pr)- 2	6	24
	Clinical Dietetics	Nutrition in Physical Fitness (Th)-2 Human Physiology -II (Th)-2 Assessment of Nutritional Status (Pr)- 2	6	
	Food Science	Advance Food Science (Th)-2 Food Adulteration and Legislation (Th)-2 Food Preservation and Processing (Pr)- 2	6	
	AECC	English Communication-II Environmental Studies-II	2 2	
	Elective	Elective (From other Discipline)	2	
SEMESTER-3	Nutrition Science	Nutrition Policies and Programs (Th) -2 Nutrition in Special Condition (Th)-2 Food and Nutrition Security (Th)- 2 Analytical Instrumentation (Pr)- 3	9	24
	Clinical Dietetics	Paediatric Nutrition (Th) -2 Community Nutrition (Th) - 2 Diet in Metabolic Disorders (Th)- 2 Diet for Vulnerable groups (Pr)- 3	9	
	SEC	Basics of Computer Applications-(Th) -2	4	

		Global Cuisines- (Th) -2		
	Department Elective	Growth and Development (Th) -2 (Certificate Course (30 Hrs)*/ In House or Outside Training (30 Hrs)/ Student Exchange Program)	2	
SEMESTER-4	Nutrition Science	Sensory Evaluation (Th)-2 Food Entrepreneurship (Th)-2 Food Microbiology (Th)-2 Food Analysis (Pr)-3	9	24
	Clinical Dietetics	Diet in GI disorders (Th) - 2 Geriatric Nutrition (Th) - 2 Parenteral and Enteral Nutrition (Th)- 2 Nutrition in Critical Care (Pr)- 3	9	
	SEC	Food Engineering (Th) -2 Ayurveda and Nutrition (Th) - 2	4	
	Department Elective	Food Anthropology (Th) -2 Professional Applications in Food Science and Nutrition- Department Elective-2 (Certificate Course (30 Hrs)*/ In House or Outside Training (30 Hrs)/ Student Exchange Program)	2	
SEMESTER-5	Nutrition Science	Nutritional Biochemistry-I (Th) - 2 Food Packaging and Labelling (Th) - 2 Food Commodities- I (Th) - 2 Food Service Management (Th) - 2 Functional Food and Nutraceuticals (Th) - 2 Nutrition Education and Counseling (Th) - 2 Food Product Development (Pr) - 6	18	24
	Department Elective	Nutrition Updates (Th)-2 Food Technology (Th)-2 Bakery and Confectionery (Pr)-2	6	
SEMESTER-6	Nutrition Science	Nutritional Biochemistry-II (Th) - 2 Avenues in Food and Nutrition (Th)-2 Food and Mood (Th)-2 Nutrition Behaviour and Lifestyle Management (Th)-2 Internship and Report Writing (Pr)-4	12	24
	Department Elective	Nutrition Softwares and Screening tools (Th)-2 Food Fortification (Th)-2 Nutrition Transformation (Pr)-2	6	

		Project Work/ Training (90 Hrs)/ Internship (2 Weeks)	6	
SEMESTER-7	Nutrition Science	Human Health, Nutrition and Environment- Core Course-XXI (Credit-4) Ancient Nutrition- Core Course Lab-7 (Credit=2)	6	22
	Research Specific Elective	Research Methodology (Th) -2 Research Area Specific Elective-I (Credit-2)	4	
	Research Component	Dissertation (Credit-9) Seminar (Credit-1) Research Article Writing (Credit-2)**	12	
SEMESTER-8	Nutrition Science	Nutritional Epidemiology (Credit-4) Nutrition Communication- Core Course Lab-8 (Credit-2)	6	22
	Research Specific Elective	Data Analysis Course (Credit-2) Research Area Specific Elective-II (Credit-2)	4	
	Research Component	Dissertation (Credit-9) Seminar (Credit-1) Research Paper Presentation in Seminar or Conference (Credit-2)	12	
			Total	188

**Note:**

1. Course structures are to be passed year by year with necessary changes from the respective board of studies.
2. Students will have an exit option at the end of the Semester-6 and she will be awarded with the regular B.Sc Degree (Non-Honours).
3. Course structure of Semester-7 & 8 will require rigorous analysis before implementation in terms of academic requirements, finance and implementation challenges.
4. Subjects suggested above are examples of how subjects can be offered.
5. \*Certificate Course may be in Online/Offline or in blended mode.
6. \*\*Research Article Writing comprises articles submitted to the supervisor. Suggestive
7. Notes for the implementation of NEP 2020:
  - a. ● As per Government guidelines, yet we can implement NCC/NSS/ Saptdhara/ Physical Training as 2 Credit component in each semester and incorporate it in the Course Curriculum
  - b. ● Students with CGPA > 7.5 at the end of Semester-6 will only become eligible to go for B.Sc (Honours) Program (Research Track) in Semester-7. Rest of the students will be awarded traditional B.Sc Degree at the end of Semester-6

**BACHELOR IN FOOD AND NUTRITION**  
**SEMESTER I**  
**CORE COURSE**

<b>FN11010- Fundamentals of Food and Health (Th)</b>	
<b>Course Objectives</b>	
This course will enable students	
<ul style="list-style-type: none"> <li>● To understand the interrelationship between Food, Nutrition and Health.</li> <li>● To understand in brief about the functions of food and various nutrients, their requirements, dietary sources, their deficiency and excess.</li> <li>● To be familiar with different methods of cooking, their advantages and disadvantages.</li> <li>● To gain knowledge of improving nutritional quality of food.</li> </ul>	
<b>Course Outcome:</b>	
At the end of the course, the students will be able to understand the role of food and nutrients in health and disease processes and they will be able to prepare and deliver effective presentations of technical information to food science and nutrition professionals and to the general public.	
<b>FN11010-THEORY COURSE CONTENTS (2 Credits)</b>	
<b>S.No</b>	<b>STRUCTURE</b>
<b>Unit 1</b>	<b>Introduction to Nutrition</b> <ul style="list-style-type: none"> <li>● Terminologies: Definition of Health, Nutrition, Nutrients, Foods, Balanced Diet, Malnutrition, Undernutrition, Over Nutrition.</li> <li>● Functions of Foods- Physiological, Psychological and Social.</li> <li>● Various Food groups.</li> </ul>
<b>Unit 2</b>	<ul style="list-style-type: none"> <li>● Nutrients and its Classification</li> <li>● Balanced diet, use of Food exchange list</li> <li>● My Plate</li> </ul>
<b>Unit 3</b>	<ul style="list-style-type: none"> <li>● RDA, Reference man and Reference woman.</li> <li>● Food pyramid</li> <li>● Improving Nutritional quality of foods: Germination, Fermentation , Supplementation, Fortification and Enrichment.</li> </ul>
<b>Unit 4</b>	<ul style="list-style-type: none"> <li>● Objectives of Cooking, Preliminary preparations of Food,</li> <li>● Methods of Cooking- Moist heat methods, Dry heat methods, Microwave cooking, Solar cooking, their advantages and disadvantages, Effect of cooking on nutritive value.</li> </ul>
<b>REFERENCES</b>	
<ol style="list-style-type: none"> <li>1. Mudambi, S.R., Rajgopal, M.V. (2012) Fundamentals of Foods, Nutrition and Diet Therapy. 7th Edition, New Age International Pvt. Ltd.</li> <li>2. Nutrient Requirements and Recommended Dietary Allowances for Indians- I.C.M.R. Publication 1999.</li> <li>3. Guthrie Helen (1986) Introductory Nutrition. Times Mirror/ Mosby College Publishing.</li> </ol>	

4. Robinsson, and Lawler. (1986) Normal and Therapeutic Nutrition. Mac Millan Pub. Co.
5. Elenaor N., Whitney S., Rady R. (1993): Understanding Nutrition, West Publishing Company, Minneapolis.
6. Wardlaw (1993): Perspectives in Nutrition, Paul Insel Mosby.
7. Bhatia Arti: Nutrition & Dietetics- Anmol Publication Pvt. Ltd.- New Delhi.
8. Khanna K. (1998): The Art and Science of Cooking, Phoenix Publishing House Pvt. Ltd., New Delhi.

**Teaching Methodology**

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



**BACHELOR IN FOOD AND NUTRITION  
SEMESTER I  
CORE COURSE**

<b>FN11020- Principles of Macronutrients (Th)</b>	
<b>Course Objectives</b> This course will enable students to	
<ul style="list-style-type: none"> <li>● To understand the macronutrients, their functions and their metabolic utilization.</li> <li>● To learn about macronutrients, their sources, types, needs and deficiency.</li> <li>● To understand the processes of digestion, absorption, and transport.</li> <li>● To gain knowledge about nutrient deficiencies or excesses based on principles of macronutrient</li> </ul>	
<b>Course Outcome:</b> At the end of the course, the students will be able to understand the role of macronutrients in health and understand the basis of energetic and nutritional equilibrium, and its regulation. Student will understand how to maintain body structure and systems.	
<b>FN11020-THEORY COURSE CONTENTS (2 Credits)</b>	
<b>S.No</b>	<b>STRUCTURE</b>
<b>Unit 1</b>	<b>Carbohydrates</b> <ul style="list-style-type: none"> <li>● Types of Carbohydrates &amp; Their Food Sources <ul style="list-style-type: none"> <li>○ Simple Carbohydrates</li> <li>○ Complex Carbohydrates</li> </ul> </li> <li>● Dietary Requirements and Physiological Significance</li> <li>● Digestion, Absorption and Metabolism of Carbohydrates</li> <li>● Glycaemic index of foods</li> </ul>
<b>Unit 2</b>	<b>Proteins</b> <ul style="list-style-type: none"> <li>● Composition, Types of Amino Acids &amp; Food Sources <ul style="list-style-type: none"> <li>○ Essential Amino Acids</li> <li>○ Non-Essential Amino Acids</li> </ul> </li> <li>● Digestion, absorption, transport, utilization and excretion</li> <li>● Nutritional Classification of Protein &amp; Function</li> <li>● Protein-Energy Malnutrition</li> </ul>
<b>Unit 3</b>	<b>Lipids</b> <ul style="list-style-type: none"> <li>● Composition &amp; Classification of Lipids</li> <li>● Food Sources &amp; Functions of Lipids</li> <li>● Types of Fatty Acids <ul style="list-style-type: none"> <li>○ Food Sources, Function &amp; Effect of Deficiency</li> </ul> </li> <li>● Digestion, absorption, transport, utilization, storage &amp; excretion</li> <li>● Dietary Recommendation of Lipids</li> <li>● Cholesterol- sources, functions and implications</li> <li>● Lipids and Diseases</li> </ul>

<b>Unit 4</b>	<p><b>Water</b></p> <ul style="list-style-type: none"> <li>● Introduction to Water</li> <li>● Functions of Water</li> <li>● Distribution of Water in the Body</li> <li>● Water Recommendation and Balance</li> </ul> <p><b>Dietary Fiber</b></p> <ul style="list-style-type: none"> <li>● Dietary fiber- types, properties, sources and its role</li> </ul>
<p><b>REFERENCES</b></p> <ol style="list-style-type: none"> <li>1. Srilakshmi.B. Food Science, New age international Pvt. Ltd. New Delhi, 2001.</li> <li>2. Gopalan, G. RamaShastri B.V &amp;Balasuvramnian, S.C. (2000). Nutritive Value of Indian Foods. National Institute of Nutrition, Indian Council of Medical Research, Hyderabad 500-007, India.</li> <li>3. Swaminathan, M. (2009). Textbook of Food and Nutrition. Bappco publishers, Bangalore.</li> </ol>	
<p><b>Teaching Methodology</b></p> <ul style="list-style-type: none"> <li>● Chalk and talk method</li> <li>● Powerpoint presentations</li> <li>● Videos</li> <li>● Posters</li> <li>● Quiz and Debates</li> </ul>	

**BACHELOR IN FOOD AND NUTRITION**  
**SEMESTER I**  
**CORE COURSE**

<b>FN11030- Applied Science (Pr)</b>	
<b>Course Objectives</b> This course will enable students to	
<ul style="list-style-type: none"> <li>● To enable students to develop skill and ability to work systematically in the laboratory.</li> <li>● To apply the knowledge in day to day life.</li> <li>● To understand the qualitative and quantitative analysis of the human body</li> <li>● To be able to skillfully perform all the experiments.</li> <li>● To understand their implication to clinical conditions.</li> </ul>	
<b>Course Outcome:</b> This course will help to: Students should be able to understand the concepts and processes learned and answer any of the questions investigated in the activity. Students are expected to identify microscopic tissues/organs and state functions, concisely express concepts learned, and explain outcomes of experiments on lab practical exams.	
<b>FN11030-PRACTICAL COURSE CONTENTS (2 CREDIT)</b>	
<b>S.No</b>	<b>STRUCTURE</b>
<b>Unit 1</b>	Introduction to laboratory apparatus
<b>Unit 2</b>	Acid - Base Titration <ul style="list-style-type: none"> <li>● Strong acid-Weak base</li> <li>● Weak acid- Strong base</li> <li>● Strong acid-strong base</li> </ul>
<b>Unit 3</b>	pH determination using pH papers
<b>Unit 4</b>	Determination of pulse rate in Resting condition and after exercise
<b>Unit 5</b>	Determination of blood pressure by Sphygmomanometer
<b>Unit 6</b>	Determination of Bleeding Time (BT) and Clotting Time (CT)
<b>Unit 7</b>	Detection of Blood group (Slide method)
<b>Unit 8</b>	Measurement of Haemoglobin level (Sahli's or Drabkin Method)
<b>REFERENCES</b>	
<ol style="list-style-type: none"> <li>1. Lehninger, A.L. (1987) Principles of Biochemistry – CBS Publishers and Distributors.</li> <li>2. West, E.S. Todd W.R. Mason, H.S. and Van Bruggen J.T (1974) 4th Ed. TextBook of Biochemistry, Amerind Publishing Co. Pvt. Ltd.</li> <li>3. Harper, H.A. Review of Physiological Chemistry. Lange Medical Library.</li> </ol>	
<b>Teaching Methodology-</b>	
<ul style="list-style-type: none"> <li>● Chalk and talk method</li> <li>● Powerpoint presentations</li> <li>● Videos</li> <li>● Posters</li> <li>● Quiz and Debates</li> </ul>	

**BACHELOR IN FOOD AND NUTRITION**  
**SEMESTER I**  
**CORE COURSE**

<b>FN11040- Basic Dietetics (Th)</b>	
<b>Course Objectives</b> This course will enable students to	
<ul style="list-style-type: none"> <li>● To develop the skills and attitudes required for working in the broad field of Dietetics &amp; Nutrition.</li> <li>● To study the role of various nutrients, their requirements and dietary sources to prevent and cure the disease condition.</li> <li>● To gain knowledge of improving disease conditions through diet.</li> </ul>	
<b>Course Outcome:</b>	
<ul style="list-style-type: none"> <li>● At the end of the course, students will understand how to maintain good nutritional status, correct deficiencies or disease conditions through diet and make changes in diet when necessary.</li> </ul>	
<b>FN11040-THEORY COURSE CONTENTS (2 Credits)</b>	
<b>S.No</b>	<b>STRUCTURE</b>
<b>Unit 1</b>	<b>DIET THERAPY</b> <ul style="list-style-type: none"> <li>● Definition and Objectives of Diet Therapy,</li> <li>● Therapeutic Nutrition and Modification of normal diet into therapeutic diets.</li> <li>● Types of hospital diet – Clear fluid, full fluid, soft and bland diet.</li> <li>● Special feeding methods – tube feeding, parenteral nutrition.</li> </ul>
<b>Unit 2</b>	<b>DIETITIAN</b> <ul style="list-style-type: none"> <li>● Definition of Dietician, Educational Qualification of Dietician</li> <li>● Difference between registered dietician &amp; Nutritionist</li> <li>● Role of dietitian in hospital and community</li> </ul>
<b>Unit 3</b>	<b>DIET IN INFECTIONS AND FEVERS</b> <ul style="list-style-type: none"> <li>● <b>Infection</b> :- Nutrient &amp; immune response during infection•</li> <li>● <b>Fever</b>:-classification of fever - acute and chronic fever</li> <li>● Metabolic changes during fever</li> <li>● Mode of transmission, signs &amp; symptoms, stages of fever, complications, dietary modification <ul style="list-style-type: none"> <li>○ <b>Acute fever</b>- Typhoid</li> <li>○ <b>Chronic fever</b>- Tuberculosis</li> </ul> </li> </ul>
<b>Unit 4</b>	<b>DIET IN WEIGHT MANAGEMENT</b> <ul style="list-style-type: none"> <li>● Obesity - Causes, classification, assessment of obesity• hazards of Obesity and nutritional management</li> <li>● Underweight - Etiology, Complications, Prevention and dietary management</li> </ul>
<b>REFERENCES</b>	
<ol style="list-style-type: none"> <li>1. Srilakshmi B: Dietetics, New Age International (P) Ltd, Publishers, 2018.</li> <li>2. Shubhangini. A. Joshi; Nutrition and Dietetics, 3rd edition, McGraw Hill Education (India) Private Limited.</li> <li>3. Swaminathan. M; Advanced Text-Book on Food and Nutrition, Volume I and II 2nd Edition, The Bangalore printing and publishing co., LTD, Reprint 2015.</li> <li>4. Antia.F.P, Clinical Dietetics and Nutrition Oxford University Press New Delhi, 1989.</li> <li>5. Robinson. C.H. Basic Nutrition and Diet therapy, McMillan Pub, co, New York, 1989.</li> </ol>	
<b>Teaching Methodology</b>	
<ul style="list-style-type: none"> <li>● Powerpoint presentations</li> <li>● Videos</li> <li>● Chalk and talk method</li> <li>● Guest Lectures</li> <li>● Group discussions</li> </ul>	

- Quiz and Debate

## BACHELOR IN FOOD AND NUTRITION

### SEMESTER I

### CORE COURSE

#### FN11050- Human Physiology- I (Th)

##### Course Objectives

This course will enable students:

- To give students in-depth instruction about the organization, structures and functions of the human body.
- Students will learn the terminology, anatomy and physiology, and pathology of each body system and how they interrelate to maintain homeostasis.
- To ensure that students understand how the body works.

**Course Outcome:** This course will help the students to have an enhanced knowledge and the functions of important physiological systems including the cardio-respiratory, renal, reproductive and excretory etc. and they will be able to recognise and identify principal tissue structures.

#### FN11050-THEORY COURSE CONTENTS (2 CREDIT)

S.No	STRUCTURE
Unit 1	<p><b>Unit of Life:</b> · General terms- anatomy, physiology, symmetrical arrangement, anatomical position. Median plane / lateral plane, internal/ external, superficial /deep, superior/ inferior, anterior/posterior.</p> <ul style="list-style-type: none"> <li>• Basic human tissues. Structure and functions of cells with special reference to Plasma membrane.</li> <li>• Mitochondria, Ribosome, Endoplasmic reticulum, Nucleus (nuclear membrane, nuclear chromatin and nucleolus).</li> </ul>
Unit 2	<p><b>Circulatory and Cardiovascular system:</b></p> <ul style="list-style-type: none"> <li>• Blood and its composition, Blood clotting, Blood groups, Structure and functions of heart, Cardiac cycle, cardiac output, blood pressure and its regulation.</li> </ul>
Unit 3	<p><b>Digestive System:</b></p> <ul style="list-style-type: none"> <li>• Structure and functions of G.I. tract, Process of digestion and absorption of food, Structure and functions of liver, gallbladder and pancreas</li> </ul>
Unit 4	<p><b>Respiratory System:</b></p> <ul style="list-style-type: none"> <li>• Respiratory pathway</li> <li>• Structure of Lungs and gaseous exchange (oxygen and carbon dioxide transport).</li> </ul>

#### REFERENCES

1. Ross and Wilson. (2006): Anatomy and Physiology in Health and Illness, 10<sup>th</sup> Edition, Churchill Livingstone Elsevier.
2. Mahan, L.K. and Escott-Stump, S. (2000): Krause's Food Nutrition and Diet Therapy, 10th Edition, W.B. Saunders Ltd.
3. Shils, M.E., Olson, J.A., Shike, M. and Ross, A.C. (1999): Modern Nutrition in Health and Disease, 9th Edition, Williams and Wilkins.
4. Lehninger, A.L. (1987) Principles of Biochemistry – CBS Publishers and Distributors.
5. West, E.S. Todd W.R. Mason, H.S. and Van Bruggen J.T (1974) 4th Ed. TextBook of Biochemistry, Amerind Publishing Co. Pvt. Ltd.

<b>FN11050- Human Physiology- I (Th)</b>	
<b>Course Objectives</b> This course will enable students:	
<ul style="list-style-type: none"> <li>• To give students in-depth instruction about the organization, structures and functions of the human body.</li> <li>• Students will learn the terminology, anatomy and physiology, and pathology of each body system and how they interrelate to maintain homeostasis.</li> <li>• To ensure that students understand how the body works.</li> </ul>	
<b>Course Outcome:</b> This course will help the students to have an enhanced knowledge and the functions of important physiological systems including the cardio-respiratory, renal, reproductive and excretory etc. and they will be able to recognise and identify principal tissue structures.	
<b>FN11050-THEORY COURSE CONTENTS (2 CREDIT)</b>	
<b>S.No</b>	<b>STRUCTURE</b>
<b>Unit 1</b>	<p><b>Unit of Life:</b> · General terms- anatomy, physiology, symmetrical arrangement, anatomical position. Median plane / lateral plane, internal/ external, superficial /deep, superior/ inferior, anterior/posterior.</p> <ul style="list-style-type: none"> <li>• Basic human tissues. Structure and functions of cells with special reference to Plasma membrane.</li> <li>• Mitochondria, Ribosome, Endoplasmic reticulum, Nucleus (nuclear membrane, nuclear chromatin and nucleolus).</li> </ul>
6. Harper, H.A. Review of Physiological Chemistry. Lange Medical Library.	

**BACHELOR IN FOOD AND NUTRITION  
SEMESTER I  
CORE COURSE**

<b>FN11060- Food Laboratory (Pr)</b>	
<b>Course Objectives</b> This course will enable students to:	
<ul style="list-style-type: none"> <li>• To understand the concept of serving, exchange sizes and their cooked amount.</li> <li>• To learn the various cooking methods and mediums of cooking.</li> <li>• To learn the use of a food guide.</li> <li>• Apply the knowledge of food science and observe the changes occurring during food preparation</li> <li>• To standardize different recipes based on portion size.</li> <li>• To list rich sources of various nutrients, plan and prepare recipes.</li> </ul>	
<b>Course Outcome:</b> This course will help the students to inculcate the values of entrepreneurship and that facilitates the food product development at the larger level.	
<b>FN11060- PRACTICAL COURSE CONTENTS ( 2 CREDIT)</b>	
<b>Sr. No.</b>	<b>STRUCTURE</b>
<b>Unit 1</b>	<ul style="list-style-type: none"> <li>• Hand Washing Techniques.</li> </ul>

<b>Unit 2</b>	<ul style="list-style-type: none"> <li>● Calculation of Energy, Carbohydrates, Protein and Fat content of foods using ICMR tables.</li> </ul>
<b>Unit 3</b>	<ul style="list-style-type: none"> <li>● Preliminary treatment of food</li> <li>● Methods of food preparation</li> </ul>
<b>Unit 4</b>	<ul style="list-style-type: none"> <li>● <b>Identification and preparation:</b> Energy and Protein rich recipes</li> </ul>
<b>Unit 5</b>	<ul style="list-style-type: none"> <li>● <b>Plan and prepare recipe for Minerals:</b> Calcium &amp; Iron rich recipe</li> </ul>
<b>Unit 6</b>	<ul style="list-style-type: none"> <li>● <b>Plan and prepare recipe for Vitamins</b> <ul style="list-style-type: none"> <li>○ Vitamin A</li> <li>○ Vitamin C</li> <li>○ Vitamin B-Complex</li> </ul> </li> </ul>

#### **REFERENCES**

1. Srilakshmi.B. Food Science, New age international Pvt. Ltd. New Delhi, 2001.
2. Gopalan, G. RamaShastri B.V & Balasuvramnian, S.C. (2000). Nutritive Value of Indian Foods. National Institute of Nutrition, Indian Council of Medical Research, Hyderabad 500-007, India.
3. Swaminathan, M. (2009). Textbook of Food and Nutrition. Bappco publishers, Bangalore.

#### **Teaching Methodology-**

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

**BACHELOR IN FOOD AND NUTRITION**  
**SEMESTER I**  
**CORE COURSE**

<b>FN11070- Food Hazards And Prevention(Th)</b>	
<b>Course Objectives</b> This course will enable students to:	
<ul style="list-style-type: none"> <li>● The value of safety, sanitation and hygiene principles and sound practices.</li> <li>● It provides an orientation on the various categories of hazard and factors involved in food safety, to prevent outbreak of food-borne illnesses and intoxication.</li> <li>● Using Hazard Analysis Critical Control Point (HACCP) as guidelines, the students are oriented towards the proper handling of food from preparation, production to service.</li> </ul>	
<b>Course Outcome:</b> This course will discuss the effect of food hazard such as biological, physical and chemical hazards on food production and service; Gain knowledge on the importance of Hazard Analysis Critical Control Point (HACCP) and appreciate its principles; and Appreciate the importance of food safety and sanitation in the hospitality industry and apply its principle in the day-to-day preparation of food.	
<b>FN11070- PRACTICAL COURSE CONTENTS ( 2 CREDIT)</b>	
<b>Sr. No.</b>	<b>STRUCTURE</b>
<b>Unit 1</b>	<b>Food Safety and Hazards</b> <ul style="list-style-type: none"> <li>● Objectives, Introduction &amp; Guidelines on Prevention of Food Hazards</li> <li>● Food safety Hazards &amp; Quality Defects               <ul style="list-style-type: none"> <li>○ Physical</li> <li>○ Chemical</li> <li>○ Biological</li> <li>○ Microbiological</li> </ul> </li> </ul>
<b>Unit 2</b>	<b>Hazard to Food Safety</b> <ul style="list-style-type: none"> <li>● Foodborne Illness</li> <li>● Potentially Hazardous Foods (PHF)</li> <li>● Foodborne Illness caused by Bacteria, viruses, parasites and chemicals</li> <li>● Added man-made Chemicals</li> <li>● Foodborne Illness caused by Physical Hazards</li> </ul>
<b>Unit 3</b>	<b>Factors that Affect Foodborne Illness</b> <ul style="list-style-type: none"> <li>● Factors that contribute to foodborne illness</li> <li>● Keep Cold Foods cold and Hot Foods hot</li> <li>● Cross Contamination</li> <li>● Other Sources of Contamination</li> <li>● Importance of Handwashing and Good Personal Hygiene</li> </ul>
<b>Unit 4</b>	<b>The Hazard Analysis Critical Control Point (HACCP) System: A Safety Assurance Process</b> <ul style="list-style-type: none"> <li>● The HACCP System</li> <li>● The Principle in a HACCP System</li> <li>● Education and Training</li> <li>● Roles and Responsibilities under HACCP</li> <li>● Safety in Food Establishments</li> </ul>



**REFERENCES**

1. David Mc Swane, H.S.D. et. Al., Essentials of Food Safety and Sanitation , 4th ed., 2006
2. Roday S. Food hygiene and sanitation with case studies, 2nd Ed., Tata McGraw Hill Education Pvt Ltd., 2011
3. Kirk, R.S and Sawyer, R. Pearson's composition and analysis of foods, Longman Scientific and technical. 9th Ed., England, 1991
4. Bryan, F.L. Hazard analysis critical control point evaluation. A guide to identifying Hazards and assessing risks associated with food preparation and storage. WHO, Geneva, 1992 .

**Teaching Methodology-**

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

**BACHELOR IN FOOD AND NUTRITION**  
**SEMESTER I**  
**CORE COURSE**

<b>FN11080- Essentials of Food Science (Th)</b>	
<b>Course Objectives</b>	
This course will enable students to	
<ul style="list-style-type: none"> <li>● Understand the composition, nutritive value, properties and processing of different food commodities including cereals, pulses, nuts, oilseeds, Fats, Oils, vegetables and fruits</li> <li>● Apply the knowledge of Difference between various methods of cooking and their significance.</li> <li>● Analyze the processing and its effect on Nutritional Content of different foods</li> </ul>	
<b>Course Outcome:</b>	
At the end of the course, the students will be able to understand the role of food and nutrients in health and disease processes and they will be able to prepare and deliver effective presentations of technical information to food science and nutrition professionals and to the general public.	
<b>FN11080-THEORY COURSE CONTENTS (2 Credits)</b>	
<b>S.No</b>	<b>STRUCTURE</b>
<b>Unit 1</b>	<b>Introduction to Food science</b> <ul style="list-style-type: none"> <li>● Definition of Food Science, Functions of Food, basic food groups, food guide.</li> <li>● Physical properties of foods</li> <li>● Chemical properties of foods</li> </ul>
<b>Unit 2</b>	<b>Cereals and Pulses</b> <ul style="list-style-type: none"> <li>● Cereals: Composition, Nutritive value and processing of wheat, rice, barley, rye, oats, millets and its products , convenient cereal products. Pulses: Composition and nutritive value, Digestibility of pulses, Processing, Toxic constituents, Pulse cookery.</li> </ul>
<b>Unit 3</b>	<b>Vegetables and Fruits</b> <ul style="list-style-type: none"> <li>● Vegetables: Classification, Composition and Nutritive value, storage, post harvest losses, changes during maturation, ripening of fruits- Enzymatic browning reaction, Role of Vegetables in Cookery.</li> </ul>
<b>Unit 4</b>	<b>Milk and Milk products</b> <ul style="list-style-type: none"> <li>● Milk and Milk products: Composition and Nutritive value of milk, properties of milk, Milk cookery, effect of heat on milk, milk products -Non fermented and fermented products- Role of milk in cookery.</li> </ul>
<b>REFERENCES</b>	
1. N. Shakuntala Manay, M Shadakshara Swamy, Foods Facts and Principles, New age international Publishers, 4 th Edition, 2020	

2. Rick Parker, Miriah Pace, Introduction to Food Science and Food Systems, Cengage Publishers, 2 nd Edition. 2019
3. Swaminathan, M, Handbook of Food and Nutrition, The Bangalore Press, 5 th Edition. 2018
4. Sunetra Roday, Food Science and Nutrition, Oxford university Press, 3 rd Edition. 2018
5. Srilakshmi B, Food Science, New Age International Publishers, 6th Edition. 2015
6. Vijaya khader, Textbook of Food Science and Technology, ICAR Publishers, 2013
7. B.Poornima ,Fundamentals of Food Science, Technology, Processing and Preservation , Centrum Press 2012

**Teaching Methodology**

- Powerpoint presentations
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- Quiz and Debate

**BACHELOR IN FOOD AND NUTRITION**  
**SEMESTER I**  
**CORE COURSE**

<b>FN11090- Basic Food Chemistry (Pr)</b>	
<b>Course Objectives</b>	
This course will enable students to:	
<ul style="list-style-type: none"> <li>● To understand the molecular mechanisms via which genetic information is stored and expressed, regulated and transmitted among generations.</li> <li>● To apply the knowledge about the basic techniques used in genetic engineering</li> <li>● To analyse environmental toxicology in relation to health..</li> </ul>	
<b>Course Outcome:</b> This course will help the students to inculcate the values of entrepreneurship and that facilitates the food product development at the larger level.	
<b>FN11090- PRACTICAL COURSE CONTENTS ( 2 CREDIT)</b>	
<b>Sr. No.</b>	<b>STRUCTURE</b>
<b>Unit 1</b>	<p><b>Introduction</b> Composition of food, water in food, types of water, absorption and adsorption phenomenon, Water activity, Water activity and shelf-life.</p>
<b>Unit 2</b>	<ul style="list-style-type: none"> <li>● <b>Vegetables and Fruits:</b> Enzymatic browning reactions, Moisture Content</li> </ul>
<b>Unit 3</b>	<ul style="list-style-type: none"> <li>● <b>Cereal cookery:</b> Gluten formation and Non Enzymatic Browning Reactions- Maillard reaction, Caramelization, Gelatinization and dextrinization.</li> </ul>
<b>Unit 4</b>	<ul style="list-style-type: none"> <li>● <b>Pulses cookery:</b> Germination, fermentation</li> </ul>
<b>Unit 5</b>	<ul style="list-style-type: none"> <li>● <b>Milk:</b> Specific Gravity, pH of milk.</li> </ul>
<b>REFERENCES</b>	
<ol style="list-style-type: none"> <li>1. Fennema, Food Chemistry, 3rd Ed., Marcell Dekker, New York, 1996</li> <li>2. Whitehurst and Law, Enzymes in Food Technology, CRC Press, Canada, 2002</li> <li>3. Wong, DWS. Food Enzymes, Chapman and Hall, New York, 1995</li> <li>4. Potter, N.N. and Hotchkiss, J.H, Food Science, 5th Ed., Chapman &amp; Hall, 1995</li> <li>5. DeMan, J.M., Principles of Food Chemistry, AVI, New York, 1980</li> <li>6. DeMan, J.M., Principles of Food Chemistry, 3rd Ed., Springer 1999</li> <li>7. Nooralabettu, K.P. Enzyme Technology, Pacemaker of Biotechnology, PHI Learning Private Limited, New Delhi. 2011</li> </ol>	
<b>Teaching Methodology-</b>	
<ul style="list-style-type: none"> <li>● Chalk and talk method</li> <li>● Powerpoint presentations</li> <li>● Videos</li> <li>● Posters</li> <li>● Quiz and Debates</li> </ul>	

**BACHELOR IN FOOD AND NUTRITION**  
**SEMESTER I**  
**CORE COURSE**

<b>FN23020- GE- Food Safety And Hygiene (Th)</b>	
<b>Course Objectives</b>	
This course will enable students to	
<ul style="list-style-type: none"> <li>● Understand the quality control measures and strategies in food systems.</li> <li>● Apply the knowledge of concepts and principles of hygiene and sanitation measures required in food industries.</li> <li>● Analyze the Hygienic parameters to be followed in food service establishments.</li> </ul>	
<b>Course Outcome:</b>	
At the end of the course, students will able to understand how to prevent illness by focusing on food manufacturing activities on preventing or minimizing exposure of consumers to pathogens	
<b>FN23020-THEORY COURSE CONTENTS (2 Credits)</b>	
<b>S.No</b>	<b>STRUCTURE</b>
<b>Unit 1</b>	<b>Personal Hygiene</b> <ul style="list-style-type: none"> <li>● Necessity for personal Hygiene, Health of staff, Personal Appearance, Sanitary practices, Habits, Protective Clothing.</li> <li>● Importance of rest, exercise and recreation.</li> <li>● Reporting illness and first aid.</li> </ul>
<b>Unit 2</b>	<b>Introduction to Sanitation and Hygiene</b> <ul style="list-style-type: none"> <li>● Definition of sanitation and hygiene,</li> <li>● Significance of sanitation in the food industry.</li> <li>● Cross-Contamination, Sanitation Training and Education,</li> <li>● Accidents and Their Effects, Types of Accidents,</li> <li>● Safety Instructions to Kitchen staff.</li> </ul>
<b>Unit 3</b>	<b>Sanitation of Premises and Environment</b> <ul style="list-style-type: none"> <li>● Cleaning Procedures: Sterilization and Disinfection- products and methods, use of detergents, heat, chemicals, steps in cleaning utensils and equipments, Post cleaning Storage</li> <li>● Waste Product Handling – Solid Waste, Liquid Waste or Sewage, Gaseous Waste, Pest control.</li> <li>● Water Supply: Sources, Contamination of water, Hazards of water Pollution, Purification, Criteria for Judging water Quality, Water Quality Standard, Water supply for catering Establishment, sewage and contamination of water</li> </ul>
<b>Unit 4</b>	<b>Hygienic Food Handling</b> <ul style="list-style-type: none"> <li>● Introduction, Purchasing and Receiving Safe Food—Important points to be observed for receiving various foods.</li> <li>● Sanitary procedures while preparing, cooking and holding food.</li> <li>● Food Storage- Guidelines for storage of foods at various temperatures, Storage of Specific Foods Procedures to minimize microbial Load.</li> <li>● Preparation of Specific Foods , Common faults in food Preparations</li> </ul>
<b>REFERENCES</b>	
1. Knechtges P.L. Food Safety-Theory and Practice: Jones & Bartlett Learning, 2012	

2. Roday S. Food hygiene and sanitation with case studies, 2nd Ed., Tata McGraw Hill Education Pvt Ltd., 2011
3. Kirk, R.S and Sawyer, R. Pearson's composition and analysis of foods, Longman Scientific and technical. 9th Ed., England, 1991
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