Gyanmanjari Innovative University

Course Syllabus
Gyanmanjari Institute of Technology
Semester-2

Subject: Fundamentals of Food Science & Technology- BETFT12301

Type of course: Major

Prerequisite: Basic Understanding of Biology

Rationale: This course provides a comprehensive foundation for understanding the role of food and nutrition in human health. By exploring macronutrients (carbohydrates, proteins, and lipids), micronutrients (minerals and vitamins), and the principles of a balanced diet, students will gain essential knowledge about how different nutrients contribute to overall well-being.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
				Theory Marks		Practical Marks		CA	
CI	T	P	C	ESE	MSE	V	P	ALA	
4	0	2	5	60	30	10	20	30	150

Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.

Course Content:

Unit No.	Course content	Hrs	% Weightage
1	**Introduction to Food and Nutrition** • Food and Its Functions: Overview of food's role in human health, physico-chemical properties of foods. • Food Preparation Techniques: Introduction to various methods and their impact on nutritional value. • Nutrition and Health: Relation between nutrition and good health, characteristics of well-nourished vs. malnourished populations. • Energy and Nutrition: Definition of energy, determination of energy requirements, food energy, and the total energy needs of the body.	15	25%

2	**Macronutrients – Carbohydrates, Proteins, and Lipids** • **Carbohydrates**: Classification, properties, functions, sources, requirements, digestion, absorption, and utilization. • **Proteins**: Classification, properties, functions, sources, requirements, digestion, absorption, essential and non-essential amino acids, quality of proteins (PER, NPR, NPU), supplementary value, and deficiency. • **Lipids**: Classification, properties, functions, sources, requirements, digestion, absorption, utilization, saturated and unsaturated fatty acids, deficiency, rancidity, and refining of fats.	15	25%
3	**Micronutrients – Minerals and Vitamins** • **Mineral Nutrition**: Overview of macro and micro-minerals (Calcium, Iron, and Phosphorus), their functions, utilization, requirements, sources, and deficiency effects. • **Vitamins**: Functions, sources, deficiency effects, and requirements for water-soluble and fat-soluble vitamins.	15	25%
4	**Balanced Diet and Nutritional Assessment** • **Balanced Diet**: Concept and importance, recommended dietary allowances (RDAs) for various age groups. • **Nutritional Status Assessment**: Methods and significance of assessing the nutritional status of populations.	15	25%

Continuous Assessment:

Sr. No.	Active Learn	Marks
1.	**Food Source Comparison and Dietary Analysis:** Students will compare different food sources for carbohydrates, proteins, and lipids, create a food diary for one week, track their nutrient intake, and analyze how well their diet aligns with recommended intake levels. The completed food diary and analysis report will be uploaded on the GMIU portal.	10
2.	**Balanced Diet Plate Design:** Students will design a balanced meal plan for a specific target group (e.g., athletes, pregnant women, children) by creating a visual representation (e.g., a food plate) and justifying their nutritional choices based on the Recommended Dietary Allowances (RDAs). The final meal plan and report will be submitted on the GMIU portal.	10
3.	**Food Product Modification**: students will take an existing food product and propose changes to increase its nutritional value (e.g., fortifying a breakfast cereal with vitamins or reducing sugar content). Students will research the scientific basis for their modifications and upload detail report on GMIU portal	10
Total		30

Suggested Specification table with Marks (Theory): 60

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	20%	40%	30%	10%	-	-

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from the above table.

List of Practical

Sr. No	Title	Hours
1	Introduction to food lab	3
2	Methods of measuring food ingredients	3
3	Effect of cooking on volume and weight	3
4	Determination of percentage of edible portion	3
5	Browning reaction of vegetables and fruit	3
6	Estimation of energy value of food	3
7	Estimation of protein value of food	3
8	Estimation of fat value of food	3
9	Microscopic examination of starch	3
10	Prepare a diet planning based on nutritional requirements for different age groups	3
Total		30

Course Outcome:

After learning the course, the students should be able to:	
CO1	Measure food ingredients accurately and understand the effect of cooking on food volume, weight, and edible portions.
CO2	Identify and explain the browning reactions in fruits and vegetables and their impact on food quality and nutrition.
CO3	Estimate the energy value, proteins, and fats in different food items.
CO4	Plan balanced diets for various age groups by understanding their nutritional requirements and dietary guidelines.

Instructional Method:

The course delivery method will depend upon the requirement of content and the need of students. The teacher in addition to the conventional teaching method by blackboard, may also use any of the tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content, 10% of topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done based on the Active Learning Assignment

Reference Books:

[1] Srilakshmi, B. (2003). *Food Science* (3rd Edition). New Age International Publishers, New Delhi.
[2] Shubangini, A. Joshi. (2004). *Nutrition and Dietetics* (2nd Edition). Tata McGraw-Hill Publishing Company Limited, New Delhi.
[3] Swaminathan, M. (1999). *Essentials of Food and Nutrition* (Volume 1, 2nd Edition). The Bangalore Printing and Publishing Co. Ltd.
[4] Srilakshmi, B. (2005). *Dietetics* (5th Edition). New Age International Publishers, New Delhi.
[5] Gopalan, C., B.V. Ramanasastri, & S.C. Balasubramanian. (1991). *Nutritive Value of Indian Foods*. National Institute of Nutrition, ICMR, Hyderabad.
[6] Benion, M. (1990). *Introductory Foods* (8th Edition). The MacMillan Co., London.
[7] Meyer, L.H. (1991). *Food Chemistry*. Affiliated East-West Press Pvt. Ltd., New Delhi.
[8] Swaminathan, M. (1995). *Food Science and Experimental Foods*. Ganesh and Co., Madras.
[9] Potter, N. (1987). *Food Science*. CBS Publishers and Distributors, Delhi.