



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Bachelor of Science

Level: Under Graduate

Branch Name: Honors/ Honors With Research (Biotechnology)

Course / Subject Code: BS01001031

Course / Subject Name: Nutritional Biology

W.e.f. Academic Year:	2024-25
Semester:	1
Category of the Course:	Minor Elective Subject (any one)

Prerequisite:	Students must be aware about the nutrients required for human growth and development. They know about the different kinds of essential nutrients like carbohydrates, lipids & proteins.
Rationale:	It is a branch of biology that focuses specifically on the role of nutrition in the human body. Through nutritional biology students would be equipped with the skill of critical and creative thinking with nutrition requirements and its applicability for the human body.

Course Scheme:

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks	
L	T	PR		C	Theory		Practical		
					ESE (E)	PA(M)	ESE (V)		PA (I)
3	0	2	4	70	70	30	30	200	

Course Content:

Sr. No.	Course Content	No. of Hours	% of Weightage
1	Introduction to Nutrition and Energy Metabolism Defining Nutrition, role of nutrients. Unit of energy, Biological oxidation of foodstuff. Measurement of energy content of food, Physiological energy value of foods, SDA. Measurement of energy expenditure. Direct and Indirect Calorimetry, factors affecting thermogenesis, factors affecting energy input - hunger, appetite, energy balance Energy expenditure in man. Estimating energy requirements, Recommended Dietary Allowances for different age groups. Balanced diet	9	20
2	Dietary carbohydrates and health Review functions of carbohydrates. Digestion, absorption, utilization and storage, hormonal regulation of blood glucose. Dietary requirements and source of carbohydrates, Dietary fiber, role of fibre	8	16



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Bachelor of Science

Level: Under Graduate

Branch Name: Honors/ Honors With Research (Biotechnology)

Course / Subject Code: BS01001031

Course / Subject Name: Nutritional Biology

	in lipid metabolism, colon function, blood glucose level and GI tract functions.		
3	Dietary lipid and health Review of classification, sources, functions, digestion, absorption, utilization and storage. Essential Fatty Acids; Functions of EFA, RDA, – excess and deficiency of EFA. Lipotropic factors, role of saturated fat, cholesterol, lipoprotein and triglycerides. Importance of the following: a) Omega – fatty acids. Omega 3/ omega 6 ratio b) Phospholipids c) Cholesterol in the body d) Mono, Polyunsaturated and Saturated Fatty Acids. Dietary implications of fats and oils	11	25
4	Dietary Proteins and health Review of functions of proteins in the body, Digestion and absorption. Essential and Non-essential amino acids. Amino Acid Availability Antagonism, Toxicity and Imbalance, Amino acid Supplementation. Effects of deficiency. Food source and Recommended Dietary Allowances for different age groups. Amino acid pool. NPU, Biological Value, Nitrogen balance. PEM and Kwashiorkor.	7	14
5	Food and drug interactions and Nutraceuticals Nutrient interactions affecting ADME of drugs, Alcohol and nutrient deficiency, Anti-depressants, psychoactive drugs and nutrient interactions, Appetite changes with drug intakes and malnutrition. Food as medicine	11	25

Reference Books:

1. Srilakshmi B. Dietetics, 7th Multicolour Ed. New Age International (P) Ltd. 2014.
2. Martha H. Stipanuk. Biochemical, Physiological, and Molecular Aspects of Human Nutrition. vHardback ISBN13: 978-1437709599
3. Guthrie AH. Introductory Nutrition, 6th Revised Ed., McGraw-Hill Inc., US.1986

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
1	Gain insight into the mechanistic aspects of nutrition and energy metabolism	UN,AP,RM
2	Absorption, Utilization, Transport, Excretion, Balance, Deficiency, Toxicity, Sources of nutritional diet 3	UN,RM,AP
3	Students will gain insight into the mechanistic aspects of Assessment of Nutritional status and also Food and drug interactions and Nutraceuticals	UN,RM,AP



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Bachelor of Science

Level: Under Graduate

Branch Name: Honors/ Honors With Research (Biotechnology)

Course / Subject Code: BS01001031

Course / Subject Name: Nutritional Biology

*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create

List of Experiments: (Minimum 6 experiments need to be performed)

1. Qualitative Tests for Carbohydrates in Food Samples
2. Quantifying Glucose Levels using Spectrophotometry
3. Extracting and Identifying Lipids from Food Samples
4. Protein Content Analysis using Kjeldahl Method
5. Amino Acid Profiling with Paper Chromatography
6. Measuring pH Levels of Different Foods
7. Analyzing Vitamin C Content in Fruits using Titration
8. Qualitative Analysis of Proteins using Biuret Test
9. Extraction and Identification of Starch from Potatoes
10. Preparation of Balanced Diet Plans for Different Age Groups
