GUJARAT TECHNOLOGICAL UNIVERSITY

FOOD PROCESSING & TECHNOLOGY (14)

FOOD NUTRITION & BIOCHEMISTRY

SUBJECT CODE: 2141401

B.E. 4th SEMESTER

Type of course: Food Processing Technology

Prerequisite: Nil

Rationale: Nutrition is the study of food and its relation to health. The course enables the making of informed choices regarding food consumption and physical activity patterns that contribute to optimal health, and prevention of diseases. The course will cover topics like functions of various nutrients and non nutrients like Carbohydrates, Protein, Lipids, Vitamins, Minerals, Dietary Fiber, and Water. This course highlights on digestion, absorption and utilization of nutrients in human being. It also enlightens students on effect of heat processing on nutrients and causes of nutrient destruction. The knowledge can be utilized as a basis to design food product and menu planning effectively..

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
3	0	2	5	70	20	10	20	10	20	150

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	**Food & Nutrition:** Introduction to the course, Definitions of nutrient, nutrition, food, Factors affecting human nutrition, Functions of food, Classification of food, Food Groups, Food guide pyramid, Nutrient wheel Definitions, functions, deficiency symptoms and excessive consumption consequences of macronutrients, water, dietary fiber	**7**	**20**
2	**Nutritional requirement:** RDA for individuals, Balance diets for infants, children, adults, Basal metabolism rate and factors affecting	**3**	**12**
3	**Vitamins and Minerals:** Introduction, Classification of vitamins, major source, functions and deficiency symptoms, requirement	**7**	**20**
4	**Digestion and Absorption of Food in Human System:** Digestion and Absorption of protein, carbohydrate, lipids Factor affecting on digestion and absorption,	**5**	**12**
5	**Processing Aspects of Nutrients:** Effect of heat processing on carbohydrate, protein and fat, Addition of nutrients like fortification, supplementation, enrichment, restoration	**3**	**13**
6	**Enzymes:** Introduction, Structure & characteristics, Specificities, Catalysis & regulation, Nomenclature & classification, Co-factors, mechanism of enzyme action, Factors affecting enzyme catalysed reactions, Enzyme competitive and uncompetitive	**6**	**15**

	inhibition Role and applications of enzymes in food processing		
7	**Metabolism:** Anabolism and Catabolism of carbohydrate, protein and lipid with major metabolic pathways, Role of hormone in metabolism	**6**	**8**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks				
R Level	U Level	A Level	N Level	E Level
27%	22%	21%	15%	15%

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate and above Levels (Revised Bloom's Taxonomy)

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 above table

Reference Books:

1. Advanced Text Book on Food and Nutrition Vol. 1 by M. Swaminathan (The Banglore Printing and Publishing Co. Ltd., Banglore)
2. Food Nutrition and Dietetics 2nd Edn. by Shubhangini Joshi (Tata McGraw Hill Education Pvt. Ltd., New Delhi)
3. Food Chemistry by L H Meyor (CBS Publisher, Delhi)

Course Outcomes:

After successful completion of the course students should be able to:

1. evaluate the dietary sources, roles and functions of key nutrients
2. explain the role that diet and other life style practices play in the management and prevention of diseases / disorders
3. explain the digestion, absorption and metabolism of nutrients in human health
4. formulate food product on the nutritional requirement and energy requirements based on recommendations of Recommended Dietary Allowances (RDA) for different age groups and physiological life stage
5. explain the role of enzymes in food processing

List of Practicals:

1. Calculation of calorific value of food products
2. Preparation of various Buffer solution of specified pH and ionic concentration and verify the pH with pH meter /
3. Determination of ascorbic acid content of food by DCPIP method
4. Study of enzymatic browning reactions and factors controlling
5. To determine colorific need and Body Mass Index of individual
6. Study of balanced diet
7. Qualitative test for carbohydrates
8. Determination of reducing sugar by DNSA method
9. To study the effect of substrate concentration on enzymatic reaction
10. To study the effect of temperature on enzymatic reaction

Open Ended Problems:

a. To assess the nutritional status of individual and nutritional requirement of various age groups
b. To formulate balanced diet based on food groups

List of Open Source Software/learning website:

a. www.who.int/health info
b. www.fao.org/pulications
c. www.unicef.org/publications

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ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.