

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E Semester: 4

BIO-TECHNOLOGY

Subject Name: FOOD SCIENCE AND BIOTECHNOLOGY (INSTITUTE ELECTIVE- I)

Sr. No.	Course content
1.	Introduction to Food Science and Technology Fundamentals and Aims of food science and technology. Interdisciplinary approach, Nutritive value of foods, Food as a source of energy, Food Health and disease. FOOD CHEMISTRY Food chemistry-definition and importance, water in food, water activity and shelf life of food. Carbohydrates- functional properties of sugars and polysaccharides in foods. Lipids: use of lipids in foods, physical and chemical properties, effects of processing on functional properties and nutritive value. Protein and amino acids: physical and chemical properties, distribution, amount and functions of proteins in foods, functional properties, effect of processing.-Losses of vitamins and minerals due to processing.
2.	Food Microbiology Microbial growth pattern, Microbial examination of food Types of micro-organism normally associated with food-mold, yeast, and bacteria. Micro-organisms in natural food products. Contaminants of foods-stuffs, Fisheries, milk and meat during handling and processing. Biochemical changes caused by micro-organisms, deterioration of various types of food product. Food poisoning and microbial toxins, standards for different foods. Food borne intoxicants and mycotoxins. Food Preservation Principles of food preservation: Physical ,chemical ,and biological methods of preservations. Bioprocessing of meat, Fisheries, vegetables, diary products. Irradiated foods.
3.	Food Biotechnology Biotechnology in relation to food industry, Enzymes in foods and food industry, Nature and type of starters, Role of starters in Fermented foods, Fermentation of Milk products-Fermented soy and peanut milk, Fruit and cereal based beverages, Non beverage plant products. Mycoprotein

	production, probiotics, microbial control by new nonthermanl methods,
4.	Food Additives and Analysis Sampling techniques and theory and practice of chemical and physical methods of food analysis for determination of food composition; Pigments in food, food flavours, food additives and toxicants. Natural sweeteners and artificial sweeteners and their role in controlling diseases and deficiencies, Nutraceuticals and Functional Foods FOOD PROCESSING Basic principles, unit operations, and equipment involved in the commercially important food processing methods and unit operations; materials and containers used in food packaging. Basic principle and practice to cleaning and sanitation involved in food industry.
5.	Food Quality Assurance Objectives, importance and functions of quality control. Methods of quality, assessment of food materials-fruits, vegetables, cereals, dairy products, meat, poultry. Food regulations, grades and standards, Concept of Codex Alimentarius/HACCP/USFDA/ISO 9000 series etc. Food laws and standards.

PRACTICALS:

1. Microbial examinations of food and food products
2. Standard plate count of bacteria in food stuff.
3. Estimation of coliform bacteria in food.
4. Estimation of starch from potato/wheat flour.
5. Extraction of starch from given sample.
6. Picric acid test
7. Estimation of extracted starch sample
8. Estimation of lactose in milk by Lane & Eynon's method
9. Extraction & estimation of amino acid from pea
10. To separate different pigment from plant leaves
11. To isolate DNA from cotton seed.
12. Qualitative analysis of milk by MBRT test
13. Detect presence of adulterants in milk.
14. Detect presence of preservatives in milk.

REFERENCEBOOKS:

1. Jay J.M. 1986. Modern Food Microbiology. 3rd Edn. VNR, New York.
2. Food processing and Preservation PHI private ltd, New Delhi
3. Food Microbiology fourth edition William C.Frazier, Tata Mc Graw Hill
4. Food Microbiology 2nd Edition, Michael P.Doyle ,ASM press
5. Fennema, O.R. Ed. 1976. Principles of Food Science: Part-I Food Chemistry. Marcel Dekker, New York.
6. Meyer, L.H. 1973. Food Chemistry. East-West Press Pvt. Ltd., New Delhi.
7. Charalambous, G. and Inglett, G. 1981. The Quality of Foods and Beverages. (2 vol. set). Academic Press, New York.
8. Krammer, A. and Twigg, B.A. 1970. Quality Control for the Food Industry. 3rd Ed. AVI, Westport.
9. Ranganna, S. 1986. Handbook of Analysis and Quality Control for Fruits and Vegetable Products. Tata McGraw Hill, New Delhi.
10. Introduction to Food Biotechnology, Perry Johnson, Green Publishers, CRC Press, 2002.
11. Food biotechnology: techniques & applications: Gauri S. Mittal.