

GANPAT UNIVERSITY

FACULTY OF SCIENCE

TEACHING AND EXAMINATION SCHEME

Program		B.Sc. – Food Technology	Branch	Food Technology	Semester	I	Version	1.0.0.0								
Effective from		2018-19	Effective for batches admitted onwards		2018-19											
S. N	Subject Code	Subject Name	Theory / Practical	Teaching Scheme								Examination Scheme				
				Credit				Hours Per Week				Theory Marks		Practical Marks		Total Marks
				Th	Tu	Pr	Total	Th	Tu	Pr	Total	Internal	ES	Internal	ES	
1	BFT101	Principles of Food Science	Theory / Practical	3	1	2	6	3	1	4	8	40	60	40	60	200
2	BFT102	Fundamental of Food Technology	Theory / Practical	3	1	2	6	3	1	4	8	40	60	40	60	200
3	BFT103	Basics of Microbiology	Theory / Practical	3	1	2	6	3	1	4	8	40	60	40	60	200
4	BFT104	Environment Science	Theory	3	-	-	3	3	-	-	3	40	60	-	-	100
		Total		12	3	6	21	12	3	12	27	160	240	120	180	700

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Program	B.Sc. – Food Technology				Branch/Spec.	Food Technology						
Semester	I				Version	1.0.0.0						
Effective from Academic Year	2018-19				Effective for the batches Admitted onwards					June 2018		
Subject code	BFT101		Subject Name		Principles of Food Science							
Teaching scheme					Examination scheme							
	T h	T u	Pr	Total	Marks	CE	SE	ES	Total	Duration	SE	ES
Hours	3	1	4	8	Theory	20	20	60	100	Theory	1 hr.	3 hr.
Credit	3	1	2	6	Practical	20	20	60	100	Practical	4 hr.	4 hr.
Pre-requisites												
Nil												
Scope and Objectives:												
After studying this chapter, students will be able to												
<ul style="list-style-type: none"> • Compare reasons for evaluating food products subjectively and objectively . • List physical, psychological, cultural, and environmental influences on food likes and dislikes. • Explain how taste and aroma combine to give foods their flavors. 												
Learning Outcome:												
Impart basic knowledge about the food Science and its principles												
Understand the various types of food processing and analysis methods.												
Identify and apply knowledge for solving problem relative to food safety and food spoilage and food packaging												
Apply the knowledge of food, and data analysis in the determination of food properties												
Evaluate the Analytical parameters of raw food and food products.												
Create skills in Preparation of products from various food												
Syllabus- Theory												
Unit	Content										Hrs	
1	Food dispersions Characteristics, sols, gels, pectin gels, colloidal sols, stabilization of colloidal system, syneresis, emulsions, properties of emulsions, formation of emulsion, emulsifying agent, food foams, formation stability and destruction of foam, application of colloidal chemistry to food preparation.										10	
	Sensory evaluation of food Objectives, type of food panels, characteristics of panel member, layout of sensory evaluation laboratory, sensitivity tests, threshold value, paired comparison test, duotrio test, triangle test, hedonic scale, chemical dimension of basic tastes, Amoore’s classification of odorous compounds. Sherman and Szczniak classification of food texture.										6	
2	Growth of microorganisms in foods Food as a substrate for microorganism, factors affecting growth of microbes : pH, water activity, O-R potential, nutrient contents, inhibitory substance and biological structure.										5	
	Hurdle technology Principles and applications, Hurdle effect in fermented foods, shelf stable products, intermediate moisture foods, application of hurdle technology.										5	
	Minimal processing Minimal processing of foods with thermal methods and non thermal methods-safety criteria in minimally processed foods-Minimal processing in practice-fruits and vegetables-seafood-effect on quality-Future developments										5	
3	Ohmic heating and High Pressure processing Principles, equipment and processing, effect heat and pressure on food.										5	
4	Packaging Objectives of packaging,flexible packaging, properties of the following packaging materials-low density polyethylene, high density polyethylene, polypropylene,polyvinyl chloride, polyvinylidene chloride, ethylene vinyl alcohol, polystyrene, polyethylene terephthalate, nylon, ethylene vinyl acetate, ethylene acrylic acid, ethylene methacrylic acid, ionomers. .										9	
Syllabus-Practical												
1	Estimation of reducing sugar by Fehlings procedure.											
2	Estimation of salt content in brine.											
3	Preparation of brix solution and checking by hand refractometer.											
4	Application of colloidal chemistry to food preparation.											

5	Demonstration of the Soxhlet method for determination of fat content.
6	Determination of acidity of water.
7	Determination of alkalinity/ hardness of water
8	Demonstration of the Kjeldahl's method for estimation of protein content
9	Sensory evaluation of seafood on 10 point hedonic scale.
10	Estimation of total salt content in butter.
11	Estimation of total ash content of the food.
12	Determination of TBA.
13	To study different types of sanitization process.
14	To study different types of packaging material.
15	Preparation of product using milk and milk products.
Text books	
1	Coles R, McDowell D and Kirwan MJ, Food Packaging Technology, CRC Press, 2003.
2	De S, Outlines of Dairy Technology, Oxford Publishers, 1980.
3	Demman JM, Principles of Food Chemistry, 2nd ed. Van Nostrand Reinhold, NY 1990.
4	Frazier WC and Westhoff DC, Food Microbiology, TMH Publication, New Delhi, 2004.
5	Jenkins WA and Harrington JP, Packaging Foods with Plastics, Technomic Publishing Company Inc., USA, 1991.
6	Manay NS and Shadaksharaswamy M, Food-Facts and Principles, New Age International (P) Ltd. Publishers, New Delhi, 1987 .
7	Meyer LH, Food Chemistry, CBS Publication, New Delhi, 1987.
8	Potter NH, Food Science, CBS Publication, New Delhi, 1998.
9	Ramaswamy H and Marcott M, Food Processing Principles and Applications CRC Press, 2006
10	Ranganna S, Handbook of Analysis and Quality Control for Fruits and Vegetable Products, 2nd ed. TMH Education Pvt. Ltd, 1986

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Semester	I				Version	1.0.0.0						
Effective from Academic Year	2018-19			Effective for the batches Admitted onwards						June 2018		
Subject code	BFT102			Subject Name	Fundamentals of Food Technology							
Teaching scheme					Examination scheme							
	Th	Tu	Pr	Total	Marks	CE	SE	ES	Total	Duration	SE	ES
Hours	3	1	4	8	Theory	20	20	60	100	Theory	1 hr.	3 hr.
Credit	3	1	2	6	Practical	20	20	60	100	Practical	4 hr.	4 hr.
Pre-requisites												
Nil												
Scope and Objectives:												
	To understand the history and evolution of food processing.											
	To study the structure, composition, nutritional quality and post harvest changes of various plant foods.											
	To study the structure and composition of various animal foods.											
	To study the structure, composition, nutritional quality and post harvest changes of various plant foods.											
Learning Outcome:												
	Impart fundamental knowledge about the food and its allied problems											
	Understand the structure, composition, nutritional quality and post harvest changes of various plant based (cereals, millets)foods.											
	Understand the structure, composition, nutritional quality and post harvest changes of various animal based (meat, fish, poultry, and dairy) foods.											
	Develop the skills of analytical techniques to perform the estimation of composition of various foods.											
	Perform various experiments to developed new product or modify existing products on the basis of knowledge acquired from the subject.											
	Creat skills to co-relate between fundamental of food with their technology											
Syllabus- Theory												
Unit	Content										Hrs	
1	Introduction Historical evolution of food processing technology.										4	
2	Compositional, Nutritional and Technological aspects of Plant foods Cereals and Millets Structure and composition of cereals Wheat- structure and composition, types (hard, soft/ strong, weak) Diagrammatic representation of longitudinal structure of wheat grain. Malting, gelatinization of starch, types of browning- Maillard & caramelization. Rice- structure and composition, parboiling of rice- advantages and disadvantages.										9	
	Pulses Structure and composition of pulses, toxic constituents in pulses, processing of pulses soaking, germination, decortications, cooking and fermentation.										5	
	Fats and Oils Classification of lipids, types of fatty acids - saturated fatty acids, unsaturated fatty acids, essential fatty acids, trans fatty acids. Refining of oils, types- steam refining, alkali refining, bleaching, steam deodorization, hydrogenation. Rancidity –Types- hydrolytic and oxidative rancidity and its prevention.										5	
	Fruits and Vegetables Classification of fruits and vegetables, general composition, enzymatic browning, names and sources of pigments, Dietary fibre. Post-harvest changes in fruits and vegetables – Climacteric rise, horticultural maturity, physiological maturity, physiological changes, physical changes, chemical changes, pathological changes during the storage of fruits and vegetables.										6	

3	Flesh Foods - Meat, Fish, Poultry Meat - Definition of carcass, concept of red meat and white meat, composition of meat, Marbling, post-mortem changes in meat- rigor mortis, tenderization of meat, ageing of meat. Fish - Classification of fish (fresh water and marine), aquaculture , composition of fish, Characteristics of fresh fish, spoilage of fish- microbiological, physiological, biochemical. Poultry - Structure of hen's egg, composition and nutritive value, egg proteins, characteristics of fresh egg, deterioration of egg quality, difference between broiler and layers.	11
	Milk and Milk Products Definition of milk, chemical composition of milk, its constituents, processing of milk, Pasteurization, homogenization. An overview of types of market milk and milk products.	5
Syllabus practical		
1	Study different types of browning reactions: enzymatic and non-enzymatic.	
2	To study gelatinization behavior of various starches.	
3	To study the concept of gluten formation of various flours.	
4	To study malting and germination.	
5	To study dextrinization in foods.	
6	Identification of pigments in fruits and vegetables and influence of pH on them.	
7	Quality inspection of animal foods.	
8	Method of measuring food ingredients.	
9	Effect of cooking on volume and weight.	
10	Microscopic examination of starches.	
11	determination of percentage of edible portion in fruit and vegetables.	
12	Preparation of product by fruits.	
13	Preparation of product by roots and tuber.	
14	Preparation of product by Germinated pulses.	
15	Weights and Measures of raw and cooked food.	
Text books		
1	Bawa. A.S, O.P Chauhan etal. Food Science. New India Publishing agency, 2013.	
2	Roday,S. Food Science, Oxford publication, 2011.	
3	B. Srilakshmi, Food science, New Age Publishers,2002.	
4	Meyer, Food Chemistry, New Age,2004.	
5	De Sukumar., Outlines of Dairy Technology, Oxford University Press, 2007.	

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Semester	I				Version	1.0.0.0						
Effective from Academic Year	2018-19			Effective for the batches Admitted onwards	June 2018							
Subject code	BFT103			Subject Name	Basics of microbiology							
Teaching scheme					Examination scheme							
	Th	Tu	Pr	Total	Marks	CE	SE	ES	Total	Duration	SE	ES
Hours	3	1	4	8	Theory	20	20	60	100	Theory	1 hr.	3 hr.
Credit	3	1	2	6	Practical	20	20	60	100	Practical	4 hr.	4 hr.
Pre-requisites												
Nil												
Scope and Objectives:												
To teach about microorganisms, diversity and their role in nature.												
To provide awareness about nutrition and growth of microorganisms.												
To impart knowledge about role of microorganisms in air, water and soil.												
To understand the role of microorganisms in fermented foods, food spoilage, food infections and intoxications.												
Learning Outcome:												
After the completion of the course, the students will be able to:												
Remember gross morphology, structure and functions of various microorganism and microscopes												
Understand the role of microorganism in food spoilage, food infection and food fermentation												
Apply the knowledge of microbial nutrition on their growth kinetics												
Analyse, compare and optimized best suitable parameters for analysis of microbial growth.												
Perform various experiments to isolates and identifies the microorganism												
Perform various experiments for sterilization and staining of microorganism												
Syllabus- Theory												
Unit	Content											Hrs
1	Introduction and Scope of Microbiology: Definition and history of microbiology, Importance and scope of Microbiology as a modern Science Branches of microbiology. Microscope Construction and working principles of different types of microscopes – compound, dark field, Phase contrast, Fluorescence and Electron (Scanning and transmission). Prokaryotic Cell Structure and Function: Structures external to the cell wall, Size, shape and arrangement of bacterial cell, Cell wall, Structure internal to the cell wall.											10
	Cultivation of Micro-organisms Pure culture technique, Methods of isolation and cultivation, Enumeration of Microorganisms-qualitative and quantitative.											5
2	Microbial Taxonomy: Concept of microbial species and strains, classification of bacteria based on – morphology (shape and flagella), staining reaction, nutrition and extreme environment. General Account of Viruses and Bacteria, Bacteria – Ultra structure of bacteria cell (both Gram positive and Gram negative) including, endospore and capsule, Viruses – Structure and classification. General characteristics of fungi, algae, cyanobacteria.											10
3	Principles of Microbial Nutrition: the requirements for carbon, nitrogen, sulfur, growth factors etc., role of oxygen in nutrition, nutritional categories among micro-organisms. Microbial growth: Kinetics of microbial growth, growth curve, synchronous growth, factors affecting bacterial growth. Microbial Nutrition and Growth: Nutritional types of microorganisms, growth factors, culture media, isolation of pure cultures, bacterial growth curve.											11
4	Control of microorganisms: Principles and Applications of Physical Methods. Autoclave, Hot air oven, laminar airflow, Seitz filter, Sintered glass filter, and membrane filter. Chemical Methods: Alcohol, Aldehydes, Phenols, Halogens and Gaseous agents. Radiation Methods: UV rays and Gamma stains. Staining techniques: Principles of staining, types of stains – simple stains, structural stains and Differential stains.											9

Syllabus-Practical	
1	Study of compound microscope.
2	To study the growth curve of bacteria.
3	To prepare the nutrient media and sterilize the glasswares to be used for media preparation.
4	Study of bacteria from contaminated water.
5	Study of plant disease.
6	Viable count of bacteria by serial dilution and pour plating.
7	Isolation of pure culture by streak plate method.
8	To perform various culture techniques.
9	To prepare various culture media.
10	To study various types of sterilization process.
11	To perform serial dilution process.
12	To perform different types of staining.
13	Bacteriological examinations of drinking water.
14	To perform the qualitative test of glucose.
15	To perform qualitative analysis of proteins by heat coagulation method.
Text books	
1	Atlas, R.M. (1998) Microbiology: Fundamental and applications. 2 nd edition, Macmillan Publishing Company, New York.
2	Pelezar, M.J., Chan, E.G.S. and Krieg, N.R. (1998) Microbiology.
3	Heritage, J., Evance, E.G.V. and Killington, R.A. (1999) Microbiology inaction. Cambridge University Press.
4	Frazier William C and Westhoff, Dennis C. Food Microbiology, TMH, New Delhi, 2004
5	Garbutt, John. Essentials of Food Microbiology, Arnold, London, 1997
6	Stainier R.Y. Ingraham J. L., Wheelis M. L. & Painter P. R. (2003) General Microbiology.

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Semester	I				Version	1.0.0.0						
Effective from Academic Year			2018-19		Effective for the batches Admitted onwards					June 2018		
Subject code	BFT104			Subject Name	Environment science							
Teaching scheme					Examination scheme							
	Th	Tu	Pr	Total	Marks	CE	SE	ES	Total	Duration	SE	ES
Hours	3	-	-	3	Theory	20	20	60	100	Theory	1 hr.	3 hr.
Credit	3	-	-	-	Practical	-	-	-	-	Practical	-	-
Pre-requisites												
Nil												
Scope and Objectives:												
<ul style="list-style-type: none"> To aware students about their environment and its constituents. 												
Learning Outcome:												
After completion this course student will be able to:												
Impart basic knowledge about the environment and its allied problems												
Understand the various types of environmental problems												
Identify and apply knowledge for solving environmental problems.												
Develop an attitude of concern for the environment.												
Participative in environment protection and environment improvement												
Syllabus- Theory												
Unit	Content											Hrs
1	The Multidisciplinary nature of environmental studies Natural Resources Renewable and non-renewable resources: Natural resources and associated problems a) Forest resources; b) Water resources; c) Mineral resources; d) Food resources; e) Energy resources; f) Land resources: Role of an individual in conservation of natural resources.											15
2	Ecosystems: Concept of an ecosystem. Structure and function of an ecosystem. Introduction, types, characteristic features, structure and function of the ecosystems: Forest ecosystem; Grassland ecosystem; Desert ecosystem; Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).											15
3	Environmental Pollution: Air pollution; Water pollution; Soil pollution.											15
Text books												
1	Y.K. Sing, Environmental Science, New Age International Pvt, Publishers, Bangalore.											
2	Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.											
3	Bharucha Erach, The Biodiversity of India, Mapin Pu blishing Pvt. Ltd., Ahmedabad – 380 013, India.											
4	Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p.											
5	Clark R.S., Marine Pollution, Clanderson Press Oxford											
6	Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p.											
7	De A.K., Environmental Chemistry, Wiley Eastern Ltd. 8 Down of Earth, Centre for Science and Environment.											