

**T.Y.B.Sc Applied Component
Food Production and Food Processing**

Revised Syllabus w.e.f. 2008-2009

	Paper I: Food Production	No. of Lect.
Unit 1	Food Science and Nutrition	15
Unit 2	Traditional Production Methods	15
Unit 3	Modern Methods of Food Production	15
Unit 4	Production of Fermented Foods and Beverages, Nutraceuticals	15
	Paper II : Food Processing	
Unit 1	Principles of Processing of Foods	15
Unit 2	Principles and Methods of Food Preservation	15
Unit 3	Food Safety and Quality Assurance	15
Unit 4	Food Packaging and Marketing	15

- Each paper shall have four periods per week.
- Each practical shall be of four periods per week.
- Each Theory Paper shall be assessed for 60 marks at the annual examination
- Practicals based on each Paper shall be assessed for 40 marks at the annual examination
- A 5-6 pages Written Report on **A Commercial/Home-made Food Product** wrt its production/processing method, analysis of the physical, sensory and microbiological characteristics and comments on its safety for human consumption shall be included in the Practical Journal. The same shall be evaluated for 10 marks at the annual University Practical examination.

Paper I

Food Production

Objectives: To develop 1) an understanding of the significance of various foods in human nutrition, and 2) an awareness of food production technology

Unit-1: Food Science and Nutrition

15 lectures

- I.1..Chemical nature, source and functions of nutrients (5)
Examples: Protein, carbohydrates, fats, minerals, vitamins, water, fibre, antioxidants, phytochemicals.
- I.2..Food Additives – Intentional/unintentional, general (3)
Examples: Antioxidants, chelating agents, colouring agents, emulsions, flavours and flavour enhancers, flour improvers, humectants, and anticaking agents, leavening agents, nutrient supplements, nonnutritive sweeteners, pH controlling agents.
- I.3..Energy value of foods (2)
Methods of measurement of energy, value of nutrients – direct and indirect
Basal metabolic rate – measurement and factors affecting BMR
- I.4..Adequate diet: Food guide (2)
- I.5..Nutritional disorders due to deficiency and excess of nutrients (3)
Vitamin deficiency – Pernicious anemia, scurvy, night blindness, rickets
Protein deficiency – kwashiorkor
Mineral deficiency – due to iron, iodine, calcium

Unit-2: Traditional Production Methods

15 lectures

- 2.1..Animal Food Production (5)
- Dairy farm management
- Poultry farm management
- Animal breeding
- 2.2..Methods of Plantation (4)
- crop rotation
- farming practices
- methods of irrigation
- fertilizers – chemical and microbial
- insecticides – chemical and microbial
- organic farming
- plant breeding technique
- 2.3..Aquaculture (2)
- General principles
- Prawn and oyster farming
- 2.4..Foods of Microbial Origin (4)
- Mushroom – Agaricus and Pleurotus
- SCP – fungal, algal, bacterial.

Unit-3: Modern Methods of Food Production

15 lectures

- 3.1..General Methodology of Genetic Engineering (1)
- 3.2..Applications of Genetic Engineering (8)
 - modification of plant nutritional content
 - modification of plant – taste and appearance
 - plant yield
 - fruit ripening
 - edible vaccines
- 3.3..Plant Tissue Culture (2)
- 3.4..Transgenic Animals (2)
- 3.5..Nanotechnology (2)

Unit-4: Production of Fermented Foods and Beverages, 15 lectures

Nutraceuticals

- 4.1.. Beverages: wine and beer (3)
- 4.2.. Milk Products: cheese (cheddar, camembert), yoghurt (2)
- 4.3.. Animal products: Fermented Sausages (2)
- 4.4.. Plant products: Idli (2)
- 4.5.. Fermented Soyabean Products – miso, tofu, soy sauce (2)
- 4.6.. Nutraceuticals (2)
- 4.7.. Probiotic Foods (2)

Practicals based on Paper I

- 1) Estimation of carbohydrate from milk
- 2) Estimation of protein in milk
- 3) Estimation of protein from soybean flour and gram flour
- 4) Plant tissue culture preparation
- 5) Demonstration: a)Effect of growth promoting substances on plant growth
b)Mushroom cultivation
- 6) Planning of a diet : Report of 2 pages
- 7) Estimation of Vitamin C from lemon juice
- 8) Determination of iodine number
- 9) Study of microbial fermentation of idli batter – DMC, SPC, LAB count, titrable acidity (at 2hrs and 8hrs of incubation)

Text books:

- 1)Glick and Pasternak 3rd Edition. ASM Press.Molecular Biotechnology: Principles and Applications of Recombinant DNA –
- 2) S.K.Kulkarni. Nanotechnology:Principles and Practices. Capital Publishing Co.
- 3) Sawhney S.K. and R. Singh 2005 Introductory Practical Biochemistry. Narosa Pub House Pvt. Ltd.
- 4) Mudambi R. and M. V. Rajagopal 2001- Fundamentals of Food and Nutrition 4th edn New Age International Ltd Publication .
- 5) Swaminathan M. Principles of Nutrition and Dietetics 2nd edn
- 6) Banerji G. C. 1998 ..8th edn ..a Textbook of Animal Husbandry

References :

- 1)Modern Food Science Journal 2007
- 2)The Hindu Survey of Indian Agriculture 2007

Paper II**Food Processing**

Objectives: To develop an awareness of the role of a microbiologist/biotechnologist in the food processing industry for preservation of food and for maintaining hygienic quality of processed foods.

Unit-1: Principles of Processing of Foods**15 lectures**

- I.1..Processing of cereal grains (5)
 - milling, parboiling, flakes, puffs
 - malting, starch extraction, gluten extraction
 - pasta products
- I.2..Processing of fruits and vegetables (3)
 - jams, jellies, squash
 - ketchup, pickles, sauce
- I.3..Processing of pulses
 - soya chunks
- I.4..Processing of oilseeds (extraction of oil) (1)
- I.5 Probiotics, Prebiotics, synbiotic foods (1)
- I.5..Processing of meat, fish, eggs (3)
 - aging, tenderizing, curing
 - fish processing
 - egg protein, egg foam
- I.6..Effect of Processing on Nutritive Value of Foods (2)
 - newer methods of food processing: Microwave, high pressure, Ohmic heating, radiation sterilization, minimally processed foods

Unit-2: Principles and Methods of Food Preservation**15 lectures**

- 2.1.. Physical Methods (5)
 - blanching, pasteurization, canning
 - chilling, freezing
 - irradiation
 - dehydration
- 2.2..Chemical Methods (5)
 - salt, sugar
 - Na benzoate, metabisulfile
 - citrate, acetate
- 2.3..Emerging Preservation Technologies (5)
 - natural antimicrobials, hydrostatic pressure, electric pulse, light pulse, high magnetic pulse

Unit-3: Food Safety and Quality Assurance**15 lectures**

- 3.1..Principles of food spoilage (3)

- physical, chemical
- microbial
- 3.2..Food Hazards (3)
 - microbial ---bacterial, fungal, protozoal, viral , emerging food pathogens
 - non microbial --adulteration, natural, artificial colouring agents, Metals, etc.
- 3.3..Food Analysis (3)
 - Sensory, chemical, microbiological, rapid detection methods.
 - CDC Programs—PulseNet, FoodNet.
- 3.4..Safe Process design and operation (4)
 - GMP, HACCP, food hygiene and sanitation, risk assessment
 - flow sheets
- 3.5..Food Standards and Laws (2)
 - national, international legislation and agencies governing food and its quality

Unit-4: Food Packaging and Marketing

15 lectures

- 4.1.. Functions of packaging (2)
- 4.2..Types of packages (2)
- 4.3.. Types of packaging material (3)
- 4.4.. Labeling, printing (2)
- 4.5.. Food and food packaging interaction (2)
- 4.6.. Shelf-life testing (2)
- 4.7.. Transportation and storage (2)

Practicals based on Paper II

- (1) Preparation of ketchup
- (2) Preparation of jam
- (3) MIC of salt/sugar/other preservative
- (4) Detection of spoilage causing organisms
- (5) Food adulteration
- (6) RPT of milk
- (7) Types of packaging
- (8) Testing of packaging material
- (9) Study of Probiotic food sample.

Text books:

- 1) Van Garde S. J. and M. Woodburn 1999...Food Preservation and Safety-Principles and Practice. Surabhi Publications
- 2) Manay N.S. and Shadasaraswamy2001. Foods-Facts and Principles. New Age International (P) Ltd, 2nd edn.

- 3) Sivashankar B. 2002-Food Processing and Preservation. Prentice Hall of India Pvt Ltd.
- 4) Clive de Blackburn and Peter Mc Clure..Food borne Pathogens. (Hazards, risk analysis and control)..CRC Wood Publishing Ltd.

References :

- 1)Indian Food Industry AFST Journal(s) 2007
 - 2)The Hindu Survey of Indian Agriculture 2007
- *****