COURSE CURRICULUM AND SCHEME OF EXAMINATION

Under

Choice Based Credit System

For

B. Sc. (Food Science and Technology)

(w.e.f. Academic Session 2019-20 (3rd and 4th Semester))

University College

Chaudhary Devi Lal University

Sirsa - 125055

B. Sc. Food Science and Technology (3rd Semester)									
Sr. No.	**Course ID**	**Subject**	**Type**	**Credits**	**Contact Hours per week**	**Internal Assesment (IA)***	**External Exam**	**Maximum Marks**	**Duration of Exam (hours)**
1	BFST-301	Food Microbiology	CC	4	4	30	70	100	3
2	BFST-302	Technology of Fruits & Vegetables Processing	CC	4	4	30	70	100	3
3	BFST-303A	Technology of Egg, Poultry & Meat	CEC (Any One)	4	4	30	70	100	3
	BFST-303B	Technology of Fish & Marine Food		4	4	30	70	100	3
4	BFST-304A	Malting & Brewing Technology	CEC (Any One)	4	4	30	70	100	3
	BFST-304B	Confectionary & Sugar Technology		4	4	30	70	100	3
5	BFST-305	Lab-I Food Microbiology	CC	2	4	00	50	50	6: Two session of 3 Hrs. each
6	BFST-306	Lab-II Technology of Fruits & Vegetables Processing	CC	2	4	00	50	50	6: Two session of 3 Hrs. each
Total				20	24	120	380	500	

*IA = 30 Marks (20-Midterm examination; 5-Assignment hand written; 5-Attendance)

BFST-301 Food Microbiology

Time: 3 Hrs. **Max. Marks: 100**
Credits: 4 **Theory: 70**
IA: 30

Note for the paper setter: The question paper will consists of nine questions in all. The first question will be compulsory and will consists of five short questions of 2 marks each covering the whole syllabus. In addition eight more questions will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt four more questions selecting at least one question from each unit.

UNIT-I

Introduction - Origin of food microbiology as science, Food as nutrient for various microorganisms, Factor affecting the growth and survival of microorganisms in foods, General features and importance of different groups of bacteria, yeasts and molds important in foods.

UNIT-II

Food Spoilage - Microbial and biochemical aspect of food spoilage, role of bacteria, yeast and molds in food spoilage, Spoilage of cereal and cereal products, fruits and vegetables, meat and meat products, milk and milk products, fish and fish products, spoilage of egg and poultry and heated canned foods.

UNIT-III

Food Borne Illness - Food intoxication and food infection, Bacterial food poisoning by *Staphylococcus aureus, Clostridium botulinum, Salmonella, E. coli, Clostridium perfringens, Listeria monocytogenes*, and *Campylobacter jejuni*, Food borne viruses, Aflatoxigenic molds, Investigation of food borne disease outbreak.

UNIT-IV

Methods for microbial examination of foods - Traditional, non-traditional and rapid methods for the microbial examination of food and food products.

Books Recommended:

1. Frazier WC and WestoffDC "Food Microbiology" 4th edition Tata Mcgraw-Hill Publishing
2. Jay JM "Modern Food Microbiology" 3rd edition CBS Publishers and distributors Delhi 1987
3. Adams MR and MossMO "Food microbiology" New Age International (P) Ltd. 1996
4. Gunasekaran P. "Laboratory Manual in Microbiology", New Age International (P) Ltd. 1996.

BFST-305 Lab-I Food Microbiology

Time: 6 Hrs. **Max. Marks: 50**
Credits: 2

1. Sterilization and disinfection of equipment used in food microbiology laboratory.
2. Preparation of media, slant and broths required in the microbial analysis of foods.
3. To count the number of microorganisms by direct microscopic count method.
4. Study of different types of microorganism colony shapes on agar plates.
5. Study of the capsular and spore staining methods.
6. Isolation of fungi from food materials.
7. Study of incubation test of heated canned foods.
8. Study of Dye reduction test of milk.
9. Microbiological analysis of egg, cereal product and fruit product.

BFST-302 Technology of Fruits & Vegetable Processing

Time: 3 Hrs. **Max. Marks: 100**
Credits: 4 **Theory: 70**
IA: 30

Note for the paper setter: The question paper will consists of nine questions in all. The first question will be compulsory and will consists of five short questions of 2 marks each covering the whole syllabus. In addition eight more questions will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt four more questions selecting at least one question from each unit.

UNIT-I

Classification, chemical composition and nutritive value of fruits and vegetables.
Preparing fruits and vegetables for processing-washing, sorting, grading, peeling, blanching, cutting, destoning and pitting.

UNIT-II

Freezing- General Methods of freezing of fruits and vegetables, their packaging and storage.
Drying of fruits and vegetables.
Definition, formulation, preparation and standards of fruit juices, Squashes and cordials; Fruit syrups, nectar, RTS, pulp.

UNIT-III

Preparation and standards of Jam, Jelly & marmalades, preserve candied and crystallized fruits.Preparation of Pickles.Tomato processing-Tomato juice, puree, paste, chutney, sauce, soup and ketchup.

UNIT-IV

Canning and bottling of fruits and vegetables products.Common type of spoilages or defects in canned and bottled fruits as well as vegetables.

Books Recommended:

1. Preservation of fruits and vegetables by GirdhariLal, Sidappa G S and Tandon G L, 1960, ICAR, New Delhi.
2. Food facts & principles by ShanuntalaManay N &Shadoksharaswamy N, 1996, New Age World Publisher, CA.
3. Food Science by Potter, N.N., CBS Publisher, New Delhi.

BFST-306 Lab-II Technology of Fruits & Vegetable Processing

Time: 6 Hrs. **Max. Marks: 50**
Credits: 2

1. Preparation of fruit juice.
2. Preparation of squashes.
3. Preparation of jam, jellies, marmalade.
4. Preparation of potato chips.
5. Preparation of pickles- sweet and sour.
6. Dehydration and sun-drying of fruits and vegetables.
7. Preparation of tomato puree, paste and ketchup.
8. Organoleptic evaluation of fruits and vegetable products.
9. Visit to food industry.

BFST-303A Technology of Egg, Poultry & Meat

Time: 3 Hrs. **Max. Marks: 100**
Credits: 4 **Theory: 70**
IA: 30

Note for the paper setter: The question paper will consists of nine questions in all. The first question will be compulsory and will consists of five short questions of 2 marks each covering the whole syllabus. In addition eight more questions will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt four more questions selecting at least one question from each unit.

UNIT-I

Structure and composition of egg. Nutritive value, interior qualities, grading, handling, packaging, storage, transportation, freezing, pasteurization, de-sugarization, dehydration, functional properties of eggs.

UNIT-II

Types of Poultry –Hen, Turkey, Ducks, Geese.Ante-mortem examination & slaughtering of hen. Poultry sanitation & waste disposal, MAP of Poultry.

UNIT-III

Scope of meat processing industry in India, Structure, composition & nutritive value of meat, Classification of meat - Mutton, Pork & Sheep, Meat quality parameters- Meat color, water holding capacity, Marbling, firmness & factors affecting it.

UNIT-IV

Meat and meat processing: meat tenderization: Methods of tenderization, factors affecting tenderness.

Mechanical deboning of meat, Restructured meat products, Inter-mediate moisture meats, Meat by-products, Fermented meat sausages.

Books Recommended:

1) The Meat We Eat by Romans. JR and Costllo WJ, Carlson WC, Greaser ML and Jones KW, 2004, Interstate Publishers, USA.
2) Meat Science & Applications by Y.H.Hui, Wai-Kit Nip, Robert W. Rogers and Owen A. Young

3. Egg Science and Technology by Stadelman WJ, and Cotterill OJ, 2002, CBS Publishers, New Delhi.

4. Poultry Meat and Egg Production by Parkhurst C. and Mountney GJ, 2002, CBS Publishers, New Delhi.

BFST-303B Technology of Fish & Marine Food

Time: 3 Hrs. **Max. Marks: 100**
Credits: 4 **Theory: 70**
IA: 30

Note for the paper setter: The question paper will consists of nine questions in all. The first question will be compulsory and will consists of five short questions of 2 marks each covering the whole syllabus. In addition eight more questions will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt four more questions selecting at least one question from each unit.

UNIT-I

Types of fish, composition, structure and nutritive value, post – mortem changes in fish, on-board handling, packaging storage and transportation of fish. Fisheries resources of the world.

UNIT-II

Factors affecting quality of fresh fish and other sea foods.
Manufacturing of fish paste, sauces, fish oil, fish protein concentrate and fish meal. Comminuted Fish Products and Surimi type products.

Preservation and processing methods of fish and other sea foods– fish dressing, glazing, salting, cold storage, freezing, Drying and dehydration, smoking, curing and pickling. Canning of fish and fish products.

UNIT-III

Sea food as a source of nutraceuticals: nutraceuticals (bioactive compounds) found in sea foods and their role in combating with various chronic health problems (CHD, osteoporosis, osteoarthritis, diabetes and cancer).

UNIT-IV

Concept of other Sea foods: Crabs, lobsters, prawns, shrimps, shell-fish. By products of fish and other sea food processing industry and their utilization. Utilization of fish and marine industry by-products.

Recommended books:

1. Fish Procesing& Preservation by Charles L. Cutting

BFST-304A Malting & Brewing Technology

Time: 3 Hrs. **Max. Marks: 100**
Credits: 4 **Theory: 70**
IA: 30

Note for the paper setter: The question paper will consists of nine questions in all. The first question will be compulsory and will consists of five short questions of 2 marks each covering the whole syllabus. In addition eight more questions will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt four more questions selecting at least one question from each unit.

UNIT – I

Composition and structure of barley, Preparation and storage of barley for malting Characteristics of barley for malting, suitability of different cereals for malting.

UNIT – II

Malting operations : Steeping, germination, kilning and modification.Composition of malt.

Brewing operations: Grinding, Mashing, Wort filtration, sparging and boiling.Significance of water quality in brewing process.Hops, selection of hops, Acidification of mash, Wort cooling.

UNIT – III

Lagering: objectives and techniques. Spent grain: composition and uses.Use of enzymes in brewing.

UNIT – IV

Beer: composition, filtration, racking, pasteurization and defects. Bear quality–flavor, taste, alcohol content, chemical constituent etc. Head retention–factors affecting head retention. Haze formation.

Recommended Books:

1. Malting and Brewing Science Vol. I: Lewis and Young (1981).

2. Malting and Brewing Science Vol. II: Lewis and Young (1982).

BFST-304B Confectionary & Sugar Technology

Time: 3 Hrs. **Max. Marks: 100**
Credits: 4 **Theory: 70**
IA: 30

Note for the paper setter: The question paper will consists of nine questions in all. The first question will be compulsory and will consists of five short questions of 2 marks each covering the whole syllabus. In addition eight more questions will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt four more questions selecting at least one question from each unit.

UNIT-I

Cocoa beans and production; microbial and chemical changes occurringduring fermentation; drying, storage and transportation of cocoa beans.
Ingredients in chocolate: crystalline and amorphous sugar; lactose, glucose and fructose; milk and other dairy ingredients.
Processing of cocoa beans: cleaning, roasting and winnowing; grinding of nib, production of cocoa butter and cocoa powder.

UNIT-II

Sugar confectionary: Types of sugar- production, storage , alternative bulk sweeteners, cornsyrup and glucose syrup, sorbitol, xylitol, maltitol, isomalt, lactitol, mannitol, polydextrose.
Fondant-structure and manufacturing, remelting and casting of fondant.
Hard Boiled candy- Formulation, ingredients, syrup cooking, forming, pulled sugar, aerated boiling, marsh mallows, naugat.

UNIT-III

Other confectionary products: Hard and soft boiled sugar confectionary:Frappe, caramel, toffee, butterscotch and fudge: formulation and manufacturing process.

UNIT – IV

Jellies and gums- Formulations and ingredients, manufacture process. Hard and Soft Panning. Spoilage problems, fat and sugar bloom- Causes and Preventions. Packaging Requirements of sugar confectionary and material used. Chewing gum and Bubble gum-Ingredients and manufacturing process.

Recommended Books:

1. Chocolate, Cocoa and Confectionary: Science & Technology by Minife, 1997, AVI Publishing Co., New York.
2. Handbook of Cane Sugar Technology by Mathur RBL, 1986, Oxford & IBH Publishing Co., New Delhi.
3. The Science of Cookie & Cracker Production by Faridi H., 1994, Chapman & Hall, UK.
4. The Science of Sugar Confectionary by W.P. Edwards, RSC Publishers.
5. The Science of Chocolate by StephentBecett, RSC Publisher.
6. Chocolate, Cocoa and Confectionary Science and Technology by Bernard W. Minifie.
7. Chocolate, Cocoa and Confectionary Science and Technology by Bernard W. Minifie.

B. Sc. Food Science and Technology (4th Semester)									
Sr. No.	**Course ID**	**Subject**	**Type**	**Credits**	**Contact Hours per week**	**Internal Assesment (IA)***	**External Exam**	**Maximum Marks**	**Duration of Exam (hours)**
1	BFST-401	Technology of Milk & Milk products	CC	4	4	30	70	100	3
2	BFST-402	Food Packaging	CC	4	4	30	70	100	3
3	BFST-403A	Food Plant Hygiene and Sanitation	CEC (Any One)	4	4	30	70	100	3
	BFST-403B	Food Plant Layout		4	4	30	70	100	3
4	BFST-404A	Basic Food Biotechnology	CEC (Any One)	4	4	30	70	100	3
	BFST-404B	Basic Concepts of Nutrition		4	4	30	70	100	3
5	BFST-405	Lab-III Technology of Milk & Milk Products	CC	2	4	00	50	50	6: Two session of 3 Hrs. each
6	BFST-406	Lab-IV Food Packaging	CC	2	4	00	50	50	6: Two session of 3 Hrs. each
Total				20	24	120	380	500	

BFST-401 Technology of Milk & Milk Products

Time: 3 Hrs. **Max. Marks: 100**
Credits: 4 **Theory: 70**
IA: 30

Note for the paper setter: The question paper will consists of nine questions in all. The first question will be compulsory and will consists of five short questions of 2 marks each covering the whole syllabus. In addition eight more questions will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt four more questions selecting at least one question from each unit.

UNIT-I

Milk: Definition, composition of milk, important characteristics of major constituents of milk i.e. milk fat, milk proteins, lactose and minerals and minor constituents of milk. Factors affecting the quality and quantity of milk produced by milch animals. Physical, chemical and nutritive properties of milk.

UNIT-II

Market Milk: Brief introduction to Standard milk, Toned milk, Double toned milk, Flavoured milk, Vitamin enriched milk, Reconstituted milk and recombined milk.

UNIT-III

Milk Processing: Processes of straining, filtration and clarification.
Standardization: Definition of standardization, purpose and uses of standardization process. Use of Pearson's square method to solve the standardization problems in dairy industry.
Homogenization: Definition, Effect of homogenization on milk. Uses of homogenization. Checking the effectiveness of homogenization.
Pasteurization: Definition, purposes and objects of pasteurization – LTLT and HTST processes of pasteurization.
Sterilization: Definition, Method for manufacturing sterilized flavoured milk. UHT process.

UNIT-III

Legal and ISI standards of milk.Adulteration of milk and its detection. Common preservatives used in milk and their detection. Clean milk production.

Recommended Books:

1. Outlines of Dairy Technology by Sukumar De, 1980, Oxford University Press, UK.
2. Milk & Milk Products by Eckles, Combs, Henery C, and Willes C, 1997, Tata McGraw Hill Publishers, USA.
3. Principles of Dairy Processing by Warner JN, 1976, Wiley Science Publishers, USA.

BFST-405 Lab-III Technology of Milk & Milk Products

Time: 6 Hrs. **Max. Marks: 50**
Credits: 2

1. Sampling equipment and sampling of milk.
2. Platform tests (Acidity, COB and Alcohol test).
3. Organoleptic Tests.
4. Determination of milk fat percentage by Gerber's method.
5. Determination of specific gravity by lactometer.
6. Determination of SNF percentage and TS percentage of milk with lactometer.
7. Detection of common adulterants and preservatives of milk.
8. Reporting on the suitability of milk for heat processing.
9. Reporting on the quality of given sample of milk.
10. Visit to milk processing plants/NDRI, Karnal.

BFST-402 Food Packaging

Time: 3 Hrs. **Max. Marks: 100**
Credits: 4 **Theory: 70**
IA: 30

Note for the paper setter: The question paper will consists of nine questions in all. The first question will be compulsory and will consists of five short questions of 2 marks each covering the whole syllabus. In addition eight more questions will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt four more questions selecting at least one question from each unit.

UNIT-I

Packaging Technology: Definitions and functions of packaging. Properties of packaging material in relation to these functions, package design, types of containers-primary & secondary. Package labeling and food safety.

UNIT-II

Packaging materials:
Paper and paper board- structure, making, properties, types (kraft, bleached and greaseproof) and uses of paper and paper board.
Wood-structures, types, properties and wooden containers used in packaging, types of wooden boxes.

UNIT-III

Plastic containers-bottles, cans, jars, cups, tubes, cartons, retort pouch and laminates. Biodegradable plastics.
Metals-properties of metals,different metals used in food packaging,steel plate and functions of various constituents of steel, formation of two piece and three piece cans,tinning process, tin free steel, aluminium containers, lacquering–type and applications.

UNIT-IV

Smart and intelligent packaging, Aseptic packaging, shrink packaging, vacuum and modified atmosphere packaging, Environmentrecycling of food packages.

Recommended Books

1. Food Packaging Materials – M. T. Crospy.
2. Food Packaging Materials – M. Mahadevish R.V. Gowramma.
3. Food Packaging – Stanley Sacharow
4. Food Packaging –Principles & Practices - Gordon L. Robertson
5. A Handbook of Food Packaging, Frank – A – Paine, Heather Y. Paine

BFST-406 Lab-IV Food Packaging

Time: 6 Hrs. **Max. Marks: 50**
Credits: 2

1. Identification of different types of packaging materials.
2. To determine basis weight of paper and paper board.
3. To determine thickness of paper and paper board.
4. Shelf life studies of packaging foods.
5. To determine grease resistance of packaging materials.
6. To see the chemical resistance of packaging material.
7. Determination of water vapour transmission rate of various packaging materials.
8. To determine Cobb's value of a paper board.
9. To find out the uniformity and amount of wax on wax paper.
10. To determine the thermal shock resistance of a glass container.
11. Visit to various industries, dealing with food packaging materials like / paper, board and metal cans.

BFST-403A Food Plant Hygiene & Sanitation

Time: 3 Hrs. **Max. Marks: 100**
Credits: 4 **Theory: 70**
IA: 30

Note for the paper setter: The question paper will consists of nine questions in all. The first question will be compulsory and will consists of five short questions of 2 marks each covering the whole syllabus. In addition eight more questions will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt four more questions selecting at least one question from each unit.

UNIT-I

General principles of food hygiene, Personal hygiene of food handlers-habits, clothes, illness, education of handler in handling and service.

UNIT-II

Cleaning agents (detergents and Sanitizers) and disinfectants.
Cleaning methods – sterilization, disinfection, heat & chemicals, chemical tests for sanitizer strength.
Food sanitation-Principles & methods, control and inspection.

UNIT-III

Control of infestation, rodent control, vector control, Use of pesticides.
Hygiene of water used for processing. Potable water supply and its quality standards.

UNIT-IV

Sanitation in fruits & vegetables industry, cereals industry, dairy industry, meat, egg & poultry units. Planning and implementation of training programmes for food handlers and health personnels. Recommended International code of hygiene for food products.

Recommended books:-

1. Principles of Food Sanitation by Marriott, 5th ed., 2006, CBS Publisher, New Delhi.
2. Hobbs, B. C. and R. J. Gilbert Food Poisoning and Food Hygiene , 4th edition The English Language Book Society and Edward Arnold.
3. Longree K. (1967), Quantity Food Sanitation, Inter science Publishers, New York.
4. Kawata, K. (1963) Environmental Sanitation in India, Lucknow Publisher, New York.
5. Principles of food sanitation –II Edition, AVI Book, Van Noistrand Reinhold, New York.

BFST-403B Food Plant Layout

Time: 3 Hrs. **Max. Marks: 100**
Credits: 4 **Theory: 70**
IA: 30

Note for the paper setter: The question paper will consists of nine questions in all. The first question will be compulsory and will consists of five short questions of 2 marks each covering the whole syllabus. In addition eight more questions will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt four more questions selecting at least one question from each unit.

UNIT-I

Plant Location: Concept and factors governing plant location. Locational economics – comparison of rural vs. urban plant sites, plant site selection guide.Importance of a plant layout selection of site.

UNIT-II

Plant Layout: Classes of layout problems, objectives, principles and types of layouts – process layout, product layout, combination layout, fixed position layout; methods and tools of plant and factory layouts; plant layout procedures.

Factory Building: Selection of building materialfor floors, walls, roofs, etc., Process selection; process flow charts, selection of equipment and machinery; maintenance and replacement, depreciation of machinery. Considerations in building design, types of factory buildings.
Selection and planning of manufacturing process and service facilities.

UNIT-III

Network Analysis of Processes: Basic terms, objectives and advantages of network analysis, various network techniques, PERT and CPM techniques, smoothing.

Cost Analysis: Fixed cost, variable cost, depreciation, methods of economic analysis, profitability analysis of a plant.

UNIT-IV

Management set up in a plant
Layouts: Layouts of different types of food and fermentation industries – canning, dairy, bread, biscuit, beer, tomato processing, rice mill and wheat mill.

Plant Maintenance: Objectives and importance of maintenance, types of maintenance – corrective or Breakdown, Maintenance, scheduled maintenance, preventive maintenance and predictive maintenance. Plant layout symbols.

Recommended Books:

1. Principle of Food Sanitation by Marriott, 5th Ed., 2006, CBS Publishers, New Delhi.
2. Food Processing Waste Management by Green JH and Kramer A, 1979, AVI Publishers, USA.
3. Food Science by Potter NN, 5th Ed., 2006, CBS Publishers, New Delhi.
4. Plant layout and material handling by Sharma S.C.
5. Plant layout & design by James Moore

BFST-404A Basic Food Biotechnology

Time: 3 Hrs. **Max. Marks: 100**
Credits: 4 **Theory: 70**
IA: 30

Note for the paper setter: The question paper will consists of nine questions in all. The first question will be compulsory and will consists of five short questions of 2 marks each covering the whole syllabus. In addition eight more questions will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt four more questions selecting at least one question from each unit.

UNIT-I

Introduction to food biotechnology; basic principles of genetic engineering; improvement of the food crops by genetic engineering; genetically modified plants and animals for enhanced food production; safety of GM food crops.

UNIT-II

Natural antimicrobials for food preservation: phytoalexins, essential oils and their components; bacteriocins: nisin, pediocins etc.; applications of bacetriocins in food systems asbio-preservatives

UNIT-III

Biotechnology and Food ingredients: fat substitutes, bio-colors and sweeteners. Transgenic plant foods: golden rice, Bt-brinjal, maize, tomato, potato, soyabean etc. Intellectual property rights (IPR) issues and biopiracy problems; effect of biotech foods onthe food business of developing and developed countries.

UNIT-IV

Future trend of GM crops, Food ingredients, processing aids, dietary supplements derived from GM microorganisms, Risk of GMOs and GM Foods to Human Health and Environment.

Recommended Books:

1. Lopez G.F.G and Canovas G.V.B. Food Science and Food biotechnology CRC press
2. Fundamentals of Food Biotechnology by Byong H. Lee: Wiley VCH
3. Tripathy S. N. Food Biotechnology Dominant Publishers and distributors ND
   Singh R.P. Biotechnology Central Book depot Allahabad

BFST-404B Basic Concepts of Nutrition

Time: 3 Hrs. **Max. Marks: 100**
Credits: 4 **Theory: 70**
IA: 30

Note for the paper setter: The question paper will consists of nine questions in all. The first question will be compulsory and will consists of five short questions of 2 marks each covering the whole syllabus. In addition eight more questions will be set unit-wise comprising of two questions from each of the four units. The candidates are required to attempt four more questions selecting at least one question from each unit.

UNIT-I

Definition, Scope & History of Nutrition.Functions of Food, Food types and groups, Water Balance & Energy Balance. Energy value of Carbohydrates, Fats & Proteins.

UNIT-II

BMI & BMR: basic concept and affecting factors.Balanced diet, functional foods and Protein energy malnutrition problems.

UNIT-III

Recommended daily allowances and requirement of infants, children, adults, old people, Athletes, Expectant and nursing mothers. Diet surveys& Diet groups, Food Exchange List.

UNIT-IV

Importance of therapeutic nutrition, Deficiency diseases and disorders of metabolism.Planning of diets for patients suffering from Ulcer, Anemia, Diarrhea, Diabetes, and Cardiac diseases, Jaundice, Nephritis and Tuberculosis.

Recommended Book:

Food Nutrition: M. Swami Nathan Vol. I, II.