SYLLABUS

(APPROVED BY ANDHRA UNIVERSITY)

B.Sc. FOOD SCIENCE AND NUTRITION

(w.e.f- 2020-21)
## CHOICE BASED CREDIT SYSTEM-AC ADEMIC YEAR 2020-21
B.SC. (FOOD SCIENCE AND NUTRITION) COURSE STRUCTURE

### SEMESTER –I

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## CHOICE BASED CREDIT SYSTEM-ACADEMIC YEAR 2020-21
### B.SC., (FOOD SCIENCE AND NUTRITION) COURSE STRUCTURE

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# CHOICE BASED CREDIT SYSTEM-ACADEMIC YEAR 2020-21

## B.SC. (FOOD SCIENCE AND NUTRITION) COURSE STRUCTURE

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## CHOICE BASED CREDIT SYSTEM-ACADEMIC YEAR 2020-21
### B.SC., FOOD SCIENCE AND NUTRITION COURSE STRUCTURE

#### SEMESTER –IV

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CHOICE BASED CREDIT SYSTEM-ACADEMIC YEAR 2020-21
B.SC., FOOD SCIENCE AND NUTRITION COURSE STRUCTURE

SEMIESTER – V

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<th>Credits</th>
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| 1     | DSC-5, Paper-1 (Core)  
Post Harvest Technology (THEORY) | 100 | 25 | 75 | 4 | 4 |
| 2     | DSC-5, Paper-1 (Lab):  
Post Harvest Technology (PRACTICAL) | 50 | 0 | 50 | 2 | 1 |
| 3     | DSC-5, Paper-2 (Core)  
Fermentation Technology (THEORY) | 100 | 25 | 75 | 4 | 4 |
| 4     | DSC-5, Paper-2 (Lab):  
Fermentation Technology (PRACTICAL) | 50 | 0 | 50 | 2 | 1 |
| 5     | DSC-5, Paper-3 (Core)  
Dairy Technology (THEORY) | 100 | 25 | 75 | 4 | 4 |
| 6     | DSC-5, Paper-3 (Lab):  
Dairy Technology (PRACTICAL) | 50 | 0 | 50 | 2 | 1 |
| 7     | DSC-5, Paper-4 (Core)  
Nutrition in Critical Care (THEORY) | 100 | 25 | 75 | 4 | 4 |
| 8     | DSC-5, Paper-4 (Lab):  
Nutrition in Critical Care (PRACTICAL) | 50 | 0 | 50 | 2 | 1 |
| 9     | DSC-5, Paper-5 (Core)  
Health and Fitness (THEORY) | 100 | 25 | 75 | 4 | 4 |
| 10    | DSC-5, Paper-5 (Lab):  
Health and Fitness (PRACTICAL) | 50 | 0 | 50 | 2 | 1 |
| 11    | DSC-5, Paper-6 (Core)  
Functional Foods and Nutraceuticals (THEORY) | 100 | 25 | 75 | 4 | 4 |
| 12    | DSC-5, Paper-6 (Lab):  
Functional Foods and Nutraceuticals (PRACTICAL) | 50 | 0 | 50 | 2 | 1 |
|       | Total | 900 | 150 | 750 | 36 | 30 |
## CHOICE BASED CREDIT SYSTEM-ACADEMIC YEAR 2020-21
### B.SC., FOOD SCIENCE AND NUTRITION COURSE STRUCTURE

### SEMESTER –VI

*(Apprenticeship/ Internship/ Industrial Training)*

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CHOICE BASED CREDIT SYSTEM-AC ADEMIC YEAR 2020-21

B.SC. (FOOD SCIENCE AND NUTRITION) COURSE STRUCTURE

**SEMESTER –I**

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CBCS/Semester System (2020-21) - I Semester Syllabus
B.Sc. FOOD SCIENCE AND NUTRITION

DSC-1 Paper-1: FOOD SCIENCE (THEORY)

Teaching Hours: 4 Hours / week  (Total - 60 Hours)  Credits: 4
Mid Sem Exam: 25 Marks  Sem End exam: 75 Marks

Objectives: To enable students
1. Obtain knowledge of different food groups, their composition and role in diet.
2. To gain knowledge of different plant and animal derived foods and their nutritive values and properties.
3. Different methods of processing and cooking.

UNIT –I (12 Hours)
Food groups: Basic 4, 5&7 food groups. Functional food groups-energy yielding, body building and protective foods (only sources and not properties and functions). Food Pyramid, My Plate. Study of various cooking methods - Boiling, steaming, stewing, frying, baking, roasting, broiling, cooking under pressure. Cereals - composition of rice, wheat, effects of cooking on parboiled and raw rice, principles of starch cookery, gelatinization.

UNIT –II (12 Hours)

UNIT –III (12 Hours)
Beverages - Classification, nutritive value, Milk based beverages- methods of preparing tea and coffee, fruit based beverages and preparation of carbonated non – alcoholic beverages. Spices and Condiments - Uses and abuses. Fats and Oils - Types of oils, function of fats and oils, shortening effects of oil, smoking point of oil, factors affecting absorption of oil. Sugar cookery- Stages of sugar cookery, crystallization and factors affecting crystallization.
UNIT –IV  (12 Hours)
Milk - Composition, nutritive value, kinds of milk, pasteurization and homogenization of milk, changes in milk during heat processing, preparation of cheese and milk powder
Egg - Structure, composition, classification, nutritive value, uses of egg in cookery, methods of cooking, foam formation and factors affecting foam formation.

UNIT –V  (12 Hours)
Meat -Structure, composition, nutritive value, selection of meat, post mortem changes in meat, aging, tenderness, methods of cooking meat and their effects.
Poultry – types, composition, nutritive value, selection, methods of cooking.
Fish - Structure, composition, nutritive value, selection of fish, methods of cooking and effects.

Reference Books:
1. Food science, Chemistry and Experimental foods by M. Swaminathan.
2. Food Science by Norman.N.Potter.
3. Experimental study of Foods by Griswold R.M.
4. Food Science by Helen Charley.
5. Foundation of Food Preparation by A.G. Peckam.
7. Food Fundamentals by MacWiliams, John Willy and son’’s, New York.
CBCS/Semester System ((2020-21) - I Semester Syllabus
B.Sc. FOOD SCIENCE AND NUTRITION

DSC-1 Paper-1 Lab: FOOD SCIENCE (PRACTICAL)

Teaching Hours: 2 Hours / week       Credits: 1
Mid Sem Exam: 0 Marks         Sem End exam: 50 Marks

1. Food group- Grouping of foods, discussion on nutritive value.
2. Measuring ingredients Methods of measuring different types of foods – grains, flours & liquids
3. Edible portion: Determination of edible portion percentage of different foods.
5. Methods of cooking fine and coarse cereals. Examination of starch
6. Cooking of soaked and unsoaked pulses, Common preparations with pulses.
10. Flesh foods: Fish, meat & poultry- preparations.
13. Sensory Evaluation and preparation of score card.
CBCS/Semester System (2020-21) - I Semester Syllabus
B.Sc. FOOD SCIENCE AND NUTRITION

DSC-1 Paper-2: CHEMISTRY-1 (THEORY)

Teaching Hours: 4 Hours / week (Total - 60 Hours)  Credits: 4
Mid Sem Exam: 25 Marks  Sem End exam: 75 Marks

Objectives: To enable student
1. To understand the basics of chemical bonding and configurations.
2. Synthesis of silicones, fuel gases and their application
3. Application of fertilizers and important dyes.

Unit I (12 Hours)

Unit II (12 Hours)
2. Fertilizers: urea, ammonium sulphate, ammonium nitrate, potassium nitrate NPK fertilizer. Triple superphosphate.

Unit III (12 Hours)

Unit IV (12 Hours)
1. Terms: chromophore, auxochrome, bathochromic shift, hypsochromic shift, hyperchromic effect, hypsochromic effect.
2. Dyes: azo and triphenylmethane dyes- Preparation one example.
Unit V (12 Hours)

Reference Books:
1. Allied Chemistry author by Dr. V. Veeraiyan
3. Unified Chemistry by O.P. Agrawal
5. Text book of Physical Chemistry by Peter Atkins, Julio d. Paula
8. Industrial Chemistry by M.G. Arora
9. Inorganic Chemistry by Chopra and Kapoor
10. Chemical bonding and molecular geometry by R.J. gillepsy and P.L. Popelier
CBCS/Semester System (2020-21) - I Semester Syllabus
B.Sc. FOOD SCIENCE AND NUTRITION

DSC-1, Paper-2 Lab: CHEMISTRY-1 (PRACTICAL)

Teaching Hours: 2 Hours / week
Mid Sem Exam: 0 Marks
Credits: 1
Sem End exam: 50 Marks

VOLUMETRIC ANALYSIS:
1. Estimation of sodium hydroxide using standard oxalic acid.
2. Estimation of hydrochloric acid using Sodium carbonate.
3. Estimation of Mohr’s salt by dichrometry.
4. Estimation of KMNO4 by using oxalic acid.
5. Estimation of Vitamin C
CBCS/Semester System (2020-21) - I Semester Syllabus
B.Sc. FOOD SCIENCE AND NUTRITION

DSC-1 Paper –3: CHEMISTRY OF FOODS (THEORY)

Teaching Hours: 4 Hours / week (Total - 60 Hours) Credits: 4
Mid Sem Exam: 25 Marks Sem End exam: 75 Marks

Objectives: To enable students
1. To understand the chemistry of foods - composition of food, role of each component and their interaction.
2. To understand the functional aspects of food components and to study their role in food processing.

UNIT – I  (12 Hours)
Definitions – Food, nutrients, principle components of foods, functions of foods, classification of foods, properties of foods, physical, chemical, functional and kinetic properties.

UNIT –II  (12 Hours)
Colloidal system in foods – meaning, types, properties. Sols – meaning, types, properties: gels – meaning, type, properties, theory of gel formation, factors influencing gel formation.

UNIT – III  (12 Hours)

UNIT – IV  (12 Hours)
UNIT – V  (12 Hours)
Heat transfer operations in foods – conduction, convection, radiation, gelatinization, retro gradation, dextrinisation of starches, enzymatic and non enzymatic browning reaction in foods, rancidity – types and prevention. Biochemical changes in foods.

Reference Books:
1. Food science, Chemistry and Experimental foods by M. Swaminathan.
2. Food Science by Norman.N.Potter.
3. Experimental study of Foods by Griswold R.M.
4. Food Science by Helen Charley.
5. Foundation of Food Preparation by A.G. Peckam.
7. Food Fundamentals by MacWiiliams, John Willy and son”s, New York.
DSC-1, Paper-3 Lab: CHEMISTRY OF FOODS (PRACTICAL)

Teaching Hours: 2 Hours / week  
Mid Sem Exam: 0 Marks  
Credits: 1  
Sem End exam: 50 Marks

1. To study the gelatinization temperature range & percentage sag of various cereal starches.
2. To study the factors affecting gelatinization of cereal starches.
3. To study dextrinization properties of various cereals and legumes.
4. To study the development of gluten in various flours.
5. To study the effect of enzymatic browning in fruits and vegetables.
6. To study non enzymatic browning, caramelization in various sugars.
7. Determination of pH of foods.
8. Determination of Moisture content in foods.
9. To study pasteurization of milk & fruit juices.
10. Specific gravity of fats and oils.
## CHOICE BASED CREDIT SYSTEM-ACADEMIC YEAR 2020-21
### B.Sc., (Food Science and Nutrition) Course Structure

### SEMESTER –II

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CBCS/Semester System (2020-21) - II Semester Syllabus
B.Sc., FOOD SCIENCE AND NUTRITION

DSC- 2, Paper-1: HUMAN PHYSIOLOGY (THEORY)

Teaching Hours: 4 Hours / week (Total - 60 Hours)  Credits: 4
Mid Sem Exam: 25 Marks  Sem End exam: 75 Marks

Objectives: To enable students
1. Understand the structure and functions of various organs of the body.
2. Understanding of the physiology of various organ systems in human body.

UNIT-I (12 Hours)
Cell - Structure and functions
Tissues - Structure and functions
Digestive system - Anatomical consideration – structure & functions, Brief study of the organization of the digestion, absorption and assimilation of food.

UNIT-II (12 Hours)

UNIT-III (12 Hours)
Respiratory system - Basic anatomy of the respiratory system, process of respiration, transport and exchange of oxygen and carbon dioxide in the body. Endocrine glands - Structure and function of pituitary, thyroid, islets of langerhans and adrenal gland.

UNIT-IV (12 Hours)

UNIT-V (12 Hours)
Excretory system - Excretory organs - structure of kidney and functions, formation of urine, composition of urine. Muscles - physiology of muscular action. Central nervous system - Physiology of the nerve cell, parts of the central nervous system and function.
Reference Books:
5. Stuart Ira Fox, Human Physiology(2003)
CBCS/Semester System (2020-21) - II Semester Syllabus
B.Sc. FOOD SCIENCE AND NUTRITION

DSC- 2, Paper-1 Lab: HUMAN PHYSIOLOGY (PRACTICAL)

Teaching Hours: 2 Hours / week
Mid Sem Exam: 0 Marks
Credits: 1
Sem End exam: 50 Marks

1. Identification of tissues
2. Bleeding time
3. Clotting time
4. Blood groups – identification
5. Measurement of Hemoglobin
6. Measuring Pulse Rate
7. Measuring Blood Pressure
8. Measurement of height, weight and calculation of BMI
9. Physical fitness test
10. RBC, WBC – demonstration
11. Demonstration of Packed Cell Volume (PCV)
CBCS/Semester System (2020-21) - II Semester Syllabus
B.Sc. FOOD SCIENCE AND NUTRITION

DSC- 2, Paper-2: CHEMISTRY-2 (THEORY)

Teaching Hours: 4 Hours / week  (Total - 60 Hours)  Credits: 4
Mid Sem Exam: 25 Marks  Sem End exam: 75 Marks

Objectives: To enable students
1. To understand the basics of aromatic and heterocyclic and organic compounds
2. To understand the laws of thermodynamics and energetic.

Unit I  (12 Hours)
Metals General methods of extraction of metals. Types of ores. Methods of ore dressing. Reduction methods, electrical methods, types of refining Van Arkel Zone refining.

Unit II  (12 Hours)
1. Aromatic compounds: Electrophilic substitution in benzene- Mechanism of nitration, halogenation, alkylation, acylation, sulphonation, Preparation and properties of naphthalene.
2. Heterocyclics: Preparation and properties of furan, thiophene, pyrrole and pyridine.

Unit III  (12 Hours)

Unit IV  (12 Hours)
Unit V  (12 Hours)

Reference Books:
1. Allied Chemistry author by Dr. V. Veeraiyan
2. Biochemistry - author – U. sAtyanarayan, U. chakrapani
3. Unified Chemistry by O.P. Agrawal
5. Text book of Physical Chemistry by Peter Atkins, Julio d. Paula
8. Industrial Chemistry by M.G. Arora
9. Inorganic Chemistry by Chopra and Kapoor
10. Chemical bonding and molecular geometry by R.J. gillepsy and P.L. Popelier
CBCS/Semester System (2020-21)- II Semester Syllabus
B.Sc. FOOD SCIENCE AND NUTRITION

DSC- 2, Paper-2 Lab: CHEMISTRY-2 (PRACTICAL)

Teaching Hours: 2 Hours / week
Mid Sem Exam: 0 Marks
Credits: 1
Sem End exam: 50 Marks

ORGANIC ANALYSIS:
Systematic analysis

2. To distinguish between aliphatic and Aromatic.

3. To distinguish between saturated and unsaturated.

4. Functional group tests for phenols, acids (mono and di), aromatic primary amine, amide, diamide, carbohydrate,

5. Functional groups characterized by confirmatory test
CBCS/Semester System (2020-21)-II Semester Syllabus
B.Sc. FOOD SCIENCE AND NUTRITION

DSC- 2, Paper-3: PRINCIPLES OF NUTRITION (THEORY)

Teaching Hours: 4 Hours / week (Total - 60 Hours)    Credits: 4
Mid Sem Exam: 25 Marks    Sem End exam: 75 Marks

Objectives: To enable students
1. Understand the vital link between nutrition and health.
2. Gain knowledge on functions, metabolism and effects of deficiency of nutrients

UNIT-I (12 Hours)

UNIT-II (12 Hours)
Protein - Functions, sources and requirements, utilization, Protein quality – PER, BV, NPU, digestibility coefficient. Essential amino acids, their importance. Fats and Lipids – Classification of Fatty acids, functions, sources, requirement, importance of essential fatty acids, their requirements and deficiency.

UNIT-III (12 Hours)

UNIT-IV (12 Hours)

UNIT-V (12 Hours)
Water Balance – Functions of water, water distribution, maintenance of water and regulation of acid-base balance in the body
Reference Books:
2. Human Nutrition and Dietetics –Davidson S. Passmore
3. Normal and Therapeutic Nutrition- Corinne. H.Robinson & Marilyn Lawler
DSC- 2, Paper-3: PRINCIPLES OF NUTRITION (PRACTICAL)

Teaching Hours: 2 Hours / week  
Mid Sem Exam: 0 Marks  
Credits: 1  
Sem End exam: 50 Marks

1. Food Groups and My plate
2. Menu Planning
3. RDA Table
4. Plan and calculate one day menu for an adult woman mentioning the portion size and nutritive value of each.

5. Study of the nutritive foods supplied by the government through ICDS projects during the current 5 year plan.

6. Preparation and calculation of nutritive values of low cost weaning foods.

7. Planning and preparing diet for low, medium and high income groups of sedentary life style.
# CHOICE BASED CREDIT SYSTEM-ACADEMIC YEAR 2020-21
## B.SC. (FOOD SCIENCE AND NUTRITION) COURSE STRUCTURE

### SEMESTER –III

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**Total**                                  | 800        | 125     | 675          | 32            | 28      |
Objectives: To enable students
1. The knowledge about basic biochemical components of foods and their metabolism.
2. Biological role of vitamins and minerals.

UNIT 1  (12 Hours)
**Introduction to Biochemistry:** Definition, objectives, scope and inter-relationship between biochemistry and other biological sciences.
**Carbohydrates:** Definition, Structure and general properties of:

UNIT 2  (12 Hours)
**Lipids:** Definitions and classification of lipids
Types and properties of fatty acids
Composition and properties of fats
Significance of acid value, iodine value and saponification value

UNIT 3  (12 Hours)
**Proteins:** Definition, classification, elementary knowledge of structure of proteins, biomedical importance. **Amino acids:** Definition, classification, Essential and non-essential amino acids, structure of important amino acids.
**Introduction to Enzymes:** Co-enzymes, Enzyme Inhibition

UNIT 4  (12 Hours)
**Vitamins: Structure and biochemical role:**
Fat soluble vitamins – A, D
Water soluble vitamins – B1, B2, niacin, pyridoxine, folic acid, B12 and C
UNIT 5 (12 Hours)
Minerals
Biological role and occurrence of inorganic elements – iron, calcium, phosphorous, iodine, selenium and zinc

RECOMMENDED READINGS
DSC-3, Paper-1 LAB: BIOCHEMISTRY-1 (PRACTICAL)

Teaching Hours: 2 Hours / week  
Credits: 1  
Mid Sem Exam: 0 Marks  
Sem End exam: 50 Marks

1. Carbohydrates  
Qualitative tests for mono, di and polysaccharides and their identification in unknown mixtures  
Quantitative estimation of glucose, sucrose and lactose by titrimetric method  

2. Fats  
Properties of Fats  

3. Proteins  
Qualitative tests for proteins  

4. Minerals  
Estimation of calcium using EDTA by titration  

5. Vitamins  
Estimation of ascorbic acid by using 2, 6 dichlorophenol indophenols method
CBCS/Semester System (2020-21) -III Semester Syllabus
B.Sc. FOOD SCIENCE AND NUTRITION

DSC-3, Paper-2: NUTRITION IN HEALTH (THEORY)

Teaching Hours: 4 Hours / week (Total - 60 Hours) Credits: 4
Mid Sem Exam: 25 Marks Sem End exam: 75 Marks

Objectives: To enable students
1. Understand the nutritional demands in various stages of life cycle.
2. Acquire skills in planning adequate meals in different stages of life cycle to maintain health.

UNIT I (12 Hours)
Basic Principles of Meal Planning – Basic Principles & factors to be consider while planning menu for different age groups, My Plate.
Recommended dietary allowances-RDA for Indians, basis for requirement of energy allowance for different growth pattern of children, energy allowance for various activities.

UNIT II (12 Hours)

UNIT III (12 Hours)
Nutrition during Infancy - Growth and development, factors influencing growth, difference between breast feeding and bottle feeding, factors to be considered in bottle feeding, different types of milk formulae available commercially. Weaning Foods – Preparation of Weaning foods, commercially & by other organisations. Uses of growth chart to monitor growth & development. Nutritional requirements of infants” upto one year. Problems of feeding in normal and premature infants.

UNIT IV (12 Hours)
Nutritional needs of toddlers (1-5 year) & School children - Nutritional requirements of toddlers & school going children. Factors to be considered while planning meals for pre-school children. Eating problems of children
and their management, packed lunch.

UNIT V (12 Hours)

Reference Books:
5. Food, nutrition and diet therapy - Krause, Eleventh edition
DSC-3, Paper-2 Lab: NUTRITION IN HEALTH (PRACTICAL)

Teaching Hours: 2 Hours / week
Mid Sem Exam: 0 Marks
Credits: 1
Sem End exam: 50 Marks

1. Standardization of portions for cooked food.
2. Preparation and serving the planned menu for men and women of different occupations.
3. Planning a low cost balanced menu for a pregnant mother and display.
4. Planning a low cost balanced menu for a lactating mother and display.
   Calculation of nutritive value for the prepared menu.
5. Planning and preparing diet for infants and preschool children
6. Packed lunch planning for school going children.
7. Menu planning for and adolescent girls and boys.
8. Menu planning for adult Man and Woman (moderate man and sedentary woman).
CBCS/Semester System (2020-21)-III Semester Syllabus
B.Sc., FOOD SCIENCE AND NUTRITION

DSC- 3, Paper-3: FOOD MICROBIOLOGY (THEORY)

Teaching Hours: 4 Hours / week  (Total - 60 Hours)  Credits: 4
Mid Sem Exam: 25 Marks  Sem End exam: 75 Marks

Objectives: To enable students
1. To know the important genera of microorganisms associated with food and
their characteristics.
2. To understand the role of microbes in fermentation, spoilage and food borne
diseases.

UNIT 1  (12 Hours)
Introduction to Food Microbiology: Introduction of microbiology and its
relevance to everyday life, Inter-relationship of microbiology with other
sciences. History and Development of Food Microbiology. Definition and
Scope of food microbiology. General characteristics of bacteria, fungi, virus,
protozoa, and algae. Beneficial effect of microorganisms.

Characteristics of Microorganisms in Food: Types of microorganisms
associated with food, their morphology and structure. Significance of spores in
food microbiology.

UNIT 2  (12 Hours)
Cultivation of Micro-organisms: Methods of isolation and cultivation,
Serial dilution method, Pure culture technique. Enumeration of
Microorganisms- qualitative and quantitative.

Microbial Growth in Food: Bacterial growth curve and microbial growth in
food. Factors affecting the growth of micro organisms in food, effect of
environmental factors in growth of microorganism - pH , water activity ,
oxxygen availability, temperature and others.

UNIT 3  (12 Hours)
Microbial Food Spoilage: Sources of Microorganisms in foods. Some
important food spoilage microorganisms. Spoilage of specific food groups-
Milk and dairy products, Meat, poultry and seafoods, Cereal and cereal
products, Fruits and vegetables and Canned products.
UNIT4  (12 Hours)
Foodborne Diseases: Microbial intoxication and infections: Sources of contamination of food, Types – food borne infections, food borne intoxications, symptoms and method of control. Toxins in foods. Common and Recent Examples of Food borne out breaks. Importance of sanitation and hygiene in relation with spreading of microorganisms. Relevance of microbiology standards for food safety. Rapid Methods of detection and recent advances.

UNIT5  (12 Hours)

Recommended Readings
1) Frazier William C and Westhoff, Dennis C. Food Microbiology, TMH, New Delhi, 2004
2) Jay, James M. Modern Food Microbiology, CBS Publication, New Delhi, 2000
4) Banwartt: Food Microbiology
CBCS/Semester System (2020-21) -III Semester Syllabus
B.Sc. FOOD SCIENCE AND NUTRITION

DSC- 3, Paper-3 Lab: FOOD MICROBIOLOGY (PRACTICAL)

Teaching Hours: 2 Hours / week
Mid Sem Exam: 0 Marks
Credits: 1
Sem End exam: 50 Marks

1. Introduction to the Basic Microbiology Laboratory Practices and Equipments
2. Functioning and use of compound microscope
3. Cleaning and sterilization of glassware
4. Preparation and sterilization of nutrient broth
5. Preparation of slant, stab and plates using nutrient agar
6. Cultivation and sub-culturing of microorganisms
7. Morphological study of bacteria and fungi using permanent slides
8. Simple staining
9. Gram’s staining
10. Standard Plate Count Method
11. Visits (at least two) to food processing units or any other organization dealing with advanced methods in food microbiology.
**CHOICE BASED CREDIT SYSTEM-ACADEMIC YEAR 2020-21**  
**B.SC., FOOD SCIENCE AND NUTRITION COURSE STRUCTURE**

**SEMESTER –IV**

<table>
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<tr>
<th>S. No</th>
<th>Course</th>
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<th>Teaching Hours</th>
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</table>
Objectives: To enable the students

1. Metabolism of biochemical constituents of foods in human body.
2. Role of these metabolites in maintaining health.

Unit I (12 Hours)

Unit II (12 Hours)

Unit III (12 Hours)

Unit IV (12 Hours)
Integration of carbohydrate, lipid and protein metabolism. Bioenergetics-Exergonic and endergonic reactions, Source of energy, Release of energy oxidative phosphorylation, High energy compounds, Biological Oxidation, Reduction (electron transport chain)
Unit V: (12 Hours)

**Enzymes:** Introduction, Classification of enzymes.
Vitamins as coenzymes in the metabolism of carbohydrates, lipids and proteins,
Coenzyme functions of Biotin, folic acid, Vitamin B12. Nucleic acid – DNA & RNA, Synthesis and Metabolism

**Reference Books:**

3. Elements of Biochemistry, H.S. Srivasthava and Dr. M.C. Pant; Rastogi publishers, Meerut.
4. Essentials of Biochemistry, Dr. M.C. Pant; Kedarnath, Ramnath & Co., Meerut, U.P.
7. Text book of Biochemistry, West and Todd; The Macillan Co.
1. Estimation of total carbohydrates by Anthrone method.
2. Quantitative estimation of reducing sugars by Dinitro Salicylic acid (DNS) method.
3. Estimation of total protein by Lowery’s method
4. Estimation of ascorbic acid in lime juice
5. Estimation of iodine value of fat/ free fatty acid value (sesame oil, groundnut oil, or coconut oil)

**Demonstrations:**
1. Estimation of blood glucose (Glucose Tolerance Test) Chromatographic Separation of carbohydrates/amino acids
2. Enzymes-ptyalin or salivary amylase action on boiled starch solution-spot plate testing with iodine.
CBCS/SEMESTER SYSTEM- IV SEMESTER
B. Sc FOOD SCIENCE AND NUTRITION

DSC-4, Paper-2: DIETETICS (THEORY)

Teaching Hours: 4 Hours / week  (Total - 60 Hours)  Credits: 4
Mid Sem Exam: 25 Marks  Sem End exam: 75 Marks

Objectives: To enable students
1. Gain knowledge about principles of diet therapy and different therapeutic diets.
2. Develop aptitude for taking up dietetics as a profession.

UNIT – I  (12 Hours)
Objectives of diet therapy - Role of a dietitian. Principles of diet preparation and
counselling. Normal diet in the hospitals –, liquid ,semi liquid, light , soft diet,
bland diet and regular diet Different types of Feeding - Basic concepts of oral
feeding, tube feeding, IV feeding, gastrostomy feeding.

UNIT – II  (12 Hours)
Therapeutic diets for the following disorders:
a. Under weight - definition, etiology, treatment
c. Diseases of the gastro intestinal tract- ulcer, constipation & diarrhea

UNIT – III  (12 Hours)
Diseases of the liver and gall bladder (risk factors and diet therapy)
a) jaundice b) hepatitis c) cirrhosis d) fatty liver and diet therapy Diseases of the
cardio vascular system (risk factors and diet therapy)
a) atherosclerosis b) arteriosclerosis c) hypertension d) congestive heart failure

UNIT – IV  (12 Hours)
Diabetes mellitus – Types,causes, symptoms, bio-chemical changes, insulin,
hypo-glycemic drugs, types only, food exchange list, dietary management.
Diseases of the kidney and urinary tract- Acute and chronic nephritis, Nephrotic
syndrome, Renal failure, Urinary calculi. Causes and dietary treatment of kidney
diseases and dialysis, ESRD (End Stage Renal Dialysis). Nutrition and cancer-
Dietary guidelines for management.
UNIT – V  
(12 Hours)

**Diet in Allergy** - Definition, classification, common food allergy, test of allergy, diet therapy. Diet in febrile conditions - Short duration e.g. Typhoid, Long duration e.g. Tuberculosis. Diet in relation to deficiency diseases-Protein calorie deficiency, vitamin A deficiency and anemia.

**Reference Books:**
7. B. Srilakshmi (2002) Nutrition science, New age international (P) limited, New Delhi
10. The Indian journal of nutrition and dietetics, Avinashilingam Deemed University, Coimbatore
DSC-4-Paper-2 LAB: DIETETICS (PRACTICAL)

Teaching Hours: 2 Hours / week  
Mid Sem Exam: 0 Marks  
Credits: 1  
Sem End exam: 50 Marks

1. Weights and measures of foods.  
2. Planning and preparation of hospital diets  
a. normal diet, regular diet, light diet, soft diet, full liquid diet, clear liquid diet & bland diet.  
b. Diet for obesity  
c. Diet for under weight  
d. Diet for anaemia  
e. Diet for diseases of the GI tract – peptic ulcer, diarrhoea, constipation.  
f. Diet for Cardio-vascular diseases- atherosclerosis, hypertension.  
h. Diet for diabetes – Type I & II, Diabetes with CVD disease.  
i. Diet in febrile conditions- Short duration – typhoid; long duration – tuberculosis  
j. Diet in liver diseases – Viral hepatitis and cirrhosis  
3. Observation of a dietary department in a hospital.

4. Preparation of power point presentations on diet and disease conditions
CBCS/SEMESTER SYSTEM (2020-21) - IV SEMESTER  
B. Sc FOOD SCIENCE AND NUTRITION

DSC-4, Paper-3: **FOOD PACKAGING** (THEORY)

Teaching Hours: 4 Hours / week    (Total - 60 Hours)    Credits: 4
Mid Sem Exam: 25 Marks         Sem End exam: 75 Marks

**Objectives:** enable the student

1. To impart comprehensive overview of the scientific and technical aspects of food packaging.
2. To instill knowledge on packaging machinery, systems, testing and regulations of packaging.
3. To gain knowledge on food packaging and applications during transportation.

**UNIT I**  (12 Hours)
**Food packaging:** Definition, functions of packaging materials for different foods, characteristics of packaging material. Food packages – bags, pouches, wrappers, tetra packs-applications.

**UNIT II**  (12 Hours)
**Packaging materials Packaging materials:** Introduction, purpose, requirements, types of containers. Modern packaging materials and forms-Glass containers, metal cans, composite containers, aerosol containers, rigid plastic packages, semi rigid packaging, flexible packaging.

**UNIT III**  (12 Hours)
**Packages of radiation stabilized foods:**

**UNIT - IV**  (12 Hours)
**Packages of dehydrated products:**
Orientation, metallization, co-extrusion of multilayer films, stretch, package forms and techniques. Aspetic packaging, retortable containers, modified and controlled atmosphere packaging, skin, strink and cling film packaging, micro-ovenable containers, other package forms and components of plastics.
UNIT - V (12 Hours)
Packaging of finished goods: Weighing, filling, scaling, wrapping, cartooning, labeling, marking and trapping. Labelling: Standards, purpose, description types of labels, labeling regulation barcode, nutrition labeling, health claims, and mandatory labeling provision.

REFERENCES
7. NIIR. Food packaging technology Hand book, Delhi.
1. Testing of physical/mechanical properties of food packaging material.
5. Edible packaging of Food Samples.
7. Packaged food cut-out analysis.
8. To study the operation of FFS machine.
CBCS/SEMESTER SYSTEM (2020-21) - IV SEMESTER  
B. Sc FOOD SCIENCE AND NUTRITION

DSC- 4, Paper- 4: COMMUNITY NUTRITION (THEORY)

Teaching Hours: 4 Hours / week  (Total - 60 Hours)  
Mid Sem Exam: 25 Marks  
Sem End exam: 75 Marks

Credits: 4

Objectives: To enable the students

1. To know about under nutrition, mal nutrition, causes and consequences.
2. Major nutritional problems existing in India its prevention and control.
3. Role of national and International agencies in health promotion in society.

UNIT I  (12 Hours)
Definitions - Community, family, village and block, Meaning of Optimum Nutrition, Malnutrition- Under nutrition and over nutrition. Effects of malnutrition in different age groups, IMR, MMR, morbidity. Causes of malnutrition-Factors contributing to malnutrition in the community-habits, customs and practices, availability of food, Socio-economic factors.

UNIT II  (12 Hours)

UNIT III  (12 Hours)
Nutritional problems of infants and children- PEM-Marasmus and Kwashiorkor, Vitamin A deficiency, B-complex deficiency diseases, other problems- Goitre, fluorosis and anemia, ,

UNIT IV  (12 Hours)

UNIT V  (12 Hours)
Home Science- Meaning and Objectives. Role of Home-Scientists in rural development with reference to ongoing programmers like Family Welfare
Programme, Adult Education for community-different methods, advantages and disadvantages. Nutrition education- merits and demerits of different methods of education.

**Reference Books:**
1. Jellife DN, Assessment of Nutritional Status of the community.
1. Assessment of nutritional status by direct methods- Height, weight, head circumference, chest and mid arm circumference.
2. Assessment of nutritional status by indirect methods-clinical, biochemical methods.
3. Know about various governmental programmes implemented regarding Community health.
4. Estimation of clinical parameters like, blood glucose, hemoglobin to assess health status.
5. Diet and nutrition surveys: (a) Identification of vulnerable and risk groups. (b) Diet survey for breast-feeding and weaning practices of specific groups. (c) Use of anthropometric measurement in children.
6. Preparation of visual aids.
7. Field visit to (a) Observe the working of nutrition and health oriented programmes (survey based result).
8. Hospitals to observe nutritional deficiencies.
DSC-4, Paper-5: FOOD SAFETY AND QUALITY CONTROL (THEORY)

Teaching Hours: 4 Hours / week   (Total - 60 Hours)  Credits: 4
Mid Sem Exam: 25 Marks  Sem End exam: 75 Marks

Objectives: To enable the students
1. To gain knowledge about food laws and standards for food quality
2. To know about food additives and quality control of foods.

UNIT-I   (12 Hours)
Principles of Quality control of foods –Raw material control, processed food control and finished product inspection. Leavening agents- classification, uses and optimum levels. Food additives - Preservatives, colouring, flavouring, sequestering agents, emulsifiers, antioxidants.

UNIT-II   (12 Hours)
Standardisation systems for quality control of foods: National and International standardization system, GMP, GHP. Different types of food grade materials. Food adulteration - Common adulterants in foods and tests to detect common adulterants.

UNIT-III   (12 Hours)
Standards for foods: Cereals and pulses, milk and milk products, Coffee, tea, sugar and sugar products.

UNIT-IV   (12 Hours)
Methods for determining quality - Subjective and objective methods. Sensory assessment of food quality-appearance, color, flavour, texture and taste, different methods of sensory analysis, preparation of score card, panel criteria, sensory evaluation room.

UNIT-V   (12 Hours)
Food safety, Risks and hazards: Food related hazards, Microbial consideration in food safety, HACCP-principles and structured approach. FSSAI
Reference Books:

1. Food science-Norman potter
2. Food Technology-Presscott.S.C.and Procter
3. Food chemistry-Meyer
4. Food science, Chemistry and experimental foods-M.Swaminathan
5. Food chemistry-Lee
9. Manoranjan Kalia-Food processing and preservation.
10. Roday-Food hygiene and sanitation.
11. Indian Food industry,2000,Vol19:2
CBCS/SEMESTER SYSTEM (2020-21) - IV SEMESTER
B. Sc FOOD SCIENCE AND NUTRITION

DSC-4, Paper-5: FOOD SAFETY AND QUALITY CONTROL
(PRACTICAL)

Teaching Hours: 2 Hours / week
Mid Sem Exam: 0 Marks
Credits: 1
Sem End exam: 50 Marks

1. Market survey of preserved fruits and vegetable products.
2. Visit to food testing lab or any agency of food standards.
3. Nutrition labeling requirements and developments.
4. Simple tests for food adulteration.
5. Care study on food safety issues – ICDS/MDM, Diarrheal our break / any other.
DSC-4, Paper-6: FOOD PROCESSING AND PRESERVATION (THEORY)

Teaching Hours: 4 Hours / week  (Total - 60 Hours)  Credits: 4
Mid Sem Exam: 25 Marks  Sem End exam: 75 Marks

Objectives: To enable students
1. To enable students to learn different methods of processing of plant and animal derived foods.
2. To understand the principles of food preservation and acquire skills in methods of food preservation

UNIT I  (12 Hours)
Principles of food processing and preservation- Preservation by Low and high temperatures, Canning, osmotic pressure, dehydration & drying, Irradiation. & use of Preservatives, Food additives, Definition, types, importance and industrial uses of Food additives.

UNIT II  (12 Hours)
Methods of Plant food processing- different methods of processing of cereals, legumes, nuts and oilseeds.

UNIT III  (12 Hours)
Methods of Processing of milk & milk products-

UNIT IV  (12 Hours)
Methods of Fruits and Vegetables processing.

UNIT V  (12 Hours)
Methods of Processing of Animal Foods.
Food fortification and enrichment -current trends & applications. fermented food products.

BOOKS AND JOURNALS
7. Journal of Food chemistry
8. Indian food Industry Journals- AFST Pbs
CBCS/SEMESTER SYSTEM (2020-21) - IV SEMESTER  
B. Sc., FOOD SCIENCE AND NUTRITION  

**DSC-4, Paper-6 LAB: FOOD PROCESSING AND PRESERVATION**  
(PRACTICAL)

Teaching Hours: 2 Hours / week  
Mid Sem Exam: 0 Marks  
Credits: 1  
Sem End exam: 50 Marks

1. Methods of Food Preservation using salt and sugar.  
2. Drying and Dehydration  
3. Food Adulteration tests for some common foods.  
4. Preservation and bottling of fruit and vegetable products.  
5. Preservation by using chemicals  
6. Sensory analysis of preserved and processed foods.
# CHOICE BASED CREDIT SYSTEM-ACADEMIC YEAR 2020-21

## B.Sc., Food Science and Nutrition Course Structure

### SEMESTER - V

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<th>S. No</th>
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<th>Teaching Hours</th>
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| 1     | DSC-5, Paper-1 (Core)  
Post Harvest Technology (THEORY) | 100 | 25 | 75 | 4 | 4 |
| 2     | DSC-5, Paper-1 (Lab):  
Post Harvest Technology (PRACTICAL) | 50 | 0 | 50 | 2 | 1 |
| 3     | DSC-5, Paper-2 (Core)  
Fermentation Technology (THEORY) | 100 | 25 | 75 | 4 | 4 |
| 4     | DSC-5, Paper-2 (Lab):  
Fermentation Technology (PRACTICAL) | 50 | 0 | 50 | 2 | 1 |
| 5     | DSC-5, Paper-3 (Core)  
Dairy Technology (THEORY) | 100 | 25 | 75 | 4 | 4 |
| 6     | DSC-5, Paper-3 (Lab):  
Dairy Technology (PRACTICAL) | 50 | 0 | 50 | 2 | 1 |
| 7     | DSC-5, Paper-4 (Core)  
Nutrition in Critical Care (THEORY) | 100 | 25 | 75 | 4 | 4 |
| 8     | DSC-5, Paper-4 (Lab):  
Nutrition in Critical Care (PRACTICAL) | 50 | 0 | 50 | 2 | 1 |
| 9     | DSC-5, Paper-5 (Core)  
Health and Fitness (THEORY) | 100 | 25 | 75 | 4 | 4 |
| 10    | DSC-5, Paper-5 (Lab):  
Health and Fitness (PRACTICAL) | 50 | 0 | 50 | 2 | 1 |
| 11    | DSC-5, Paper-6 (Core)  
Functional Foods and Nutraceuticals (THEORY) | 100 | 25 | 75 | 4 | 4 |
| 12    | DSC-5, Paper-6 (Lab):  
Functional Foods and Nutraceuticals (PRACTICAL) | 50 | 0 | 50 | 2 | 1 |

| Total | 900 | 150 | 750 | 36 | 30 |
CCBCS/SEMESTER SYSTEM (2020-21) - V SEMESTER  
B. Sc., FOOD SCIENCE AND NUTRITION

DSC-5, PAPER-I: POST HARVEST TECHNOLOGY (THEORY)

Teaching Hours: 4 Hours / week  (Total - 60 Hours)    Credits: 4
Mid Sem Exam: 25 Marks   Sem End exam: 75 Marks

Objectives: To enable the students
1. Knowledge about food spoilage agents and prevention.
2. Understand the safety control measures in handling foods from harvest to consumption agencies of control.

UNIT I  (12 Hours)
Introduction to Post Harvest Technology - Definition, importance and Governmental measures to augment food production- need for food conservation. Role of Post Harvest Technology in combating malnutrition in India.

UNIT II  (12 Hours)
Agents Causing Food Losses - Physical agents, (moisture, temperature), Chemical losses, biological losses- insects

UNIT III  (12 Hours)
Control of Spoilage Agents - Importance and methods of sanitary handling,

UNIT IV  (12 Hours)
Physical methods and chemical methods including fumigation techniques.

UNIT V  (12 Hours)
Storage of Grains - Importance of storage structures- requirements, traditional & modern and underground & above ground storage and their improvements, FCI godowns. PDS. Agencies Controlling Food Losses - Role of SGC, FCI, CWC, SWC, IGSI in controlling food losses.
Reference Books:
2. Handling and storage of food grains in tropical and subtropical areas- D W Hall, FAD, Rome, 1970.
5. Gordon G Birth, Food science, Pub in New York.
7. Technology of cereals by NL Kent and JAD Evers.
DSC-5, PAPER-1: POST HARVEST TECHNOLOGY  (PRACTICAL)

1. Processing of Selected Food Items – wheat, rice, breakfast cereals, pulses and oilseeds.
2. Related Experiences
3. Isolation of microbial contaminants from different foods, vegetables and fruits.
4. Visit to FCI (Food Processing Industries)
5. Visit to Processing Mill (Cereal & Pulse)
6. Preparation of Reports.
CBCS/SEMESTER SYSTEM (2020-21) - V SEMESTER  
B.Sc., FOOD SCIENCE AND NUTRITION  

DSC-5, PAPER-2:  FERMENTATION TECHNOLOGY (THEORY)  

Teaching Hours: 4 Hours / week   (Total - 60 Hours)   Credits: 4  
Mid Sem Exam: 25 Marks   Sem End exam: 75 Marks  

Objectives: Enable the students  
1. To understand the principles of food fermentation technology  
2. To study the production of various fermented food.  
3. To gain knowledge about different downstream methods.  

Unit-I   (12 Hours)  
Introduction to Industrial Fermentations: Screening, isolation and maintenance of industrially important microorganisms. Types of fermentation processes, Fermentor, Fermentation media, carbon and nitrogen sources, Application of non-conventional raw materials. Isolation and purification of microbial metabolites.  

Unit-II   (12 Hours)  
Production of microbial metabolites: Production of organic acids: citric acid, Acetic acid and lactic acid. Production of amino acids: L-glutamic acid and L-aspartic Acid.  

Unit-III   (12 Hours)  

Unit-IV   (12 Hours)  
Food fermentations: Fermented milk foods: Cheese and Butter. Fermented vegetable foods- Sauerkraut and soya sauce. Single cell protein- Production of Baker’s yeast and Commercial Production of bread.  

Unit-V   (12 Hours)  
Production of industrial pigments: Commercial production of red and violet bacterial pigments. Mushroom culture- Button (Agaricus) and Oyster (Pleurotus) mushrooms. Production of fermented beverages – beer and wine.
Text Book(s)

References
CBCS/SEMESTER SYSTEM (2020-21) - V SEMESTER
B. Sc., FOOD SCIENCE AND NUTRITION

DSC-5, PAPER-2: FERMENTATION TECHNOLOGY (PRACTICAL)

Teaching Hours: 2 Hours / week  Credit: 1
Mid Sem Exam: 0 Marks  Sem End exam: 50 Marks

1. Isolation and characterization of industrial cultures.
3. Fermented beverages – Production and analysis of wine and beer
4. Production of Amino acid, glutamic acid
5. Production of Citric acid
7. Production of Vinegar.

Text Books:
1. Fermentation, A Practical approach IRL.
CBCS/SEMESTER SYSTEM (2020-21) - V SEMESTER
B.Sc., FOOD SCIENCE AND NUTRITION

DSC-5, PAPER-3: DAIRY TECHNOLOGY (THEORY)

Teaching Hours: 4 Hours / week (Total - 60 Hours)  Credits: 4
Mid Sem Exam: 25 Marks  Sem End exam: 75 Marks

Objectives: Enable the students
1. To know the need and importance of dairy and fishery industry
2. To know the compositional and technological aspects of milk and processed milk products.
3. To develop young entrepreneurs for self-employment through dairy technology and associated activities.

UNIT 1 (12 Hours)
Properties of milk: Physicochemical properties of milk- Color, taste, pH and buffering capacity, refractive index, viscosity, surface tension, freezing, boiling point, specific heat. Milk Composition, its Constituents and Nutritional Importance Preservatives, Neutralizers and Adulterants in Milk and their Detection.

UNIT-2 (12 Hours)
Equipment and Cold storage:

UNIT-3 (12 Hours)
UNIT-4 (12 Hours)
Processing of milk products:
Composition, Standards, Manufacturing - Flow diagram of the following milk products, -Butter, ghee, flavored milk, yoghurt, dahi, shrikhand, ice-cream, channa, paneer, cheese. Defects during Manufacturing and Storage of- Curd/Dahi, Yoghurt, Shrikhand, Cheese (cheddar). Quality control and sensory evaluation of the products.

UNIT-5 (12 Hours)
Dairy By products:

Recommended Readings
DSC-5, PAPER-3: DAIRY TECHNOLOGY (PRACTICALS)

Teaching Hours: 2 Hours / week  
Mid Sem Exam: 0 Marks  
Sem End exam: 50 Marks

1. Performing the platform tests of milk. (Acidity, COB, MBRT, specific gravity, SNF).
2. Estimation of milk protein by Folin method.
4. Preparation of curd and Yoghurt.
5. Preparation of Shrikhand.
6. Preparation of Cheddar Cheese.
7. Preparation of Processed Cheese.
8. Preparation of Ice Cream and Determination of Overrun.
9. Visit to Ice-Cream Factory Experiment
11. Sensory evaluation and shelf life determination of the prepared products.
DSC-5, PAPER-4: NUTRITION IN CRITICAL CARE (THEORY)

Teaching Hours: 4 Hours / week (Total - 60 Hours)     Credits: 4
Mid Sem Exam: 25 Marks                           Sem End exam: 75 Marks

Objectives: To enable the students
1. To develop skills to assess various critical conditions of patients’s health.
2. To develop skills to counsel nutrition in critical conditions of health.

UNIT – I    (12 Hours)
Nutritional status assessment of the critically ill patients, complications, nutritional support systems for the critically ill, commercial feeding formulas and special diets for critically ill

UNIT – II    (12 Hours)
Diseases of the cardio vascular system- atherosclerosis, hypertension, congestive heart failure, etiology, symptoms, risk factors and diet therapy

UNIT- III    (12 Hours)
Diabetes mellitus – Types, causes, symptoms, complications and dietary management

UNIT – IV    (12 Hours)

UNIT – V    (12 Hours)
Reference Books:
1. Nutrition in critical care, Author Gary. P. Zaloga
3. Textbook of Critical Care, Author: Jean-Louis Vincent Edward Abraham Patrick Kochanek Frederick Moore Mitchell Fink
A. Nutritional status Assessment of critically ill patients
B. Computation of nutrient requirements, planning, preparation and evaluation of therapeutic diets, formula diets for the following conditions

1. Cardiovascular diseases
2. Diabetes
3. Kidney diseases
4. Cancers
CBCS/SEMESTER SYSTEM (2020-21) - V SEMESTER
B.Sc. FOOD SCIENCE AND NUTRITION

DSC-5, PAPER-5: HEALTH AND FITNESS (THEORY)

Teaching Hours: 4 Hours / week (Total - 60 Hours) Credits: 4
Mid Sem Exam: 25 Marks Sem End exam: 75 Marks

Objectives: Enable students
1. To understand the importance of health for quality living.
2. To acquire knowledge about the role of food and exercise for sound health.

UNIT I (12 Hours)
Health – Definition, meaning of health and factors affecting health. Health hazards – environment, population explosion, explosives, adulteration, dampness and measures to prevent health hazard.

UNIT II (12 Hours)
Food for health promotion: Definition of food, Nutrition, Nutrients and Nutritional status. Functions of food – Physiological, psychological and socio-cultural functions, constituents of food and their functions.

UNIT III (12 Hours)

UNIT IV (12 Hours)
UNIT V (12 Hours)
Health insurance scheme (government & non government) – Mediclaim policy, Employee state insurance scheme, ICICI health scheme, Specialised insurance scheme and others.

Reference Books and websites:
CBCS/SEMESTER SYSTEM (2020-21) - V SEMESTER
B.Sc. FOOD SCIENCE AND NUTRITION

DSC-5, PAPER-5: HEALTH AND FITNESS (PRACTICALS)

Teaching Hours: 2 Hours / week  
Credits: 1  
Mid Sem Exam: 0 Marks  
Sem End exam: 50 Marks

1. Identification of health hazards.  
2. Simple tests for food adulteration.  
3. Food intake during cultural festivals.  
4. Food selection for balanced diet for different age groups.  
5. Planning a health education for any specific group.  
6. Visit to a health club / fitness centre.  
7. Assessment of fitness – simple test, Stepper technique (any two).  
8. Guest lecture on health insurance schemes.  
9. Observation of / Compulsory yoga exercise.  
10. Observation of physical training for sports person.
CBCS/SEMESTER SYSTEM (2020-21)- V SEMESTER
B.Sc., FOOD SCIENCE AND NUTRITION

DSC-5, PAPER-6: FUNCTIONAL FOODS AND NUTRACEUTICALS
(THEORY)

Teaching Hours: 4 Hours / week (Total - 60 Hours) Credits: 4
Mid Sem Exam: 25 Marks Sem End exam: 75 Marks

Objectives: To enable the students
1. To develop comprehensive understanding of different nutraceuticals and functional foods
2. To understand phytochemical components and its management on health and diseases.
3. To understand the potential of various functional foods in promoting human health
4. To understand the relationship of human health with diet

Unit I (12 Hours)

Unit II (12 Hours)

Unit III (12 Hours)

Unit IV (12 Hours)
Unit V  (12 Hours)
Nutraceutical compounds – Phytochemicals, phytosterols and other bioactive compounds, peptides and proteins, carbohydrates, prebiotics, probiotics and synbiotics, lipids, vitamins and minerals; their sources and role in promoting human health.

References:

Text Book(s)

References
DSC-5, PAPER-6: FUNCTIONAL FOODS AND NUTRACEUTICALS
(PRACTICAL)

Teaching Hours: 2 Hours / week
Mid Sem Exam: 0 Marks
Sem End exam: 50 Marks

Credits: 1

1. Market research analysis of functional foods
2. Market survey of locally available functional foods
3. Formulation of the functional foods and assessment of its nutritional value.
4. Formulation of the food products using nutraceuticals
5. Shelf life studies on developed functional foods
**CHOICE BASED CREDIT SYSTEM-ACADEMIC YEAR 2020-21**  
**B.SC., FOOD SCIENCE AND NUTRITION COURSE STRUCTURE**

**SEMESTER –VI**

(Apprenticeship/ Internship/ Industrial Training)

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CBCS/Semester System (2020-21) - VI Semester Syllabus
B.Sc., FOOD SCIENCE AND NUTRITION

APPRENTICESHIP/INTERNSHIP /ON THE JOB TRAINING

Hours of instruction: 0  
Credits: 12

Internals : 0  
Sem end exam: 400

Objectives: To enable the students

1. To acquire professional skills as diet consultant in hospitals/ public health Institutions and various fields of food industry.
2. To become an entrepreneur by starting his own startup.

Every candidate shall undergo professional training for 90 days in Hospitals /Large scale/Small scale food industries/Food processing units in VI Semester of the course. Internal evaluation will be carried out to assess the progress of the work during mid semester exams. At the end of the professional training the student has to submit a report for which viva will be conducted both by Internal and External Examiners. Allocation of total 400 marks will be carried out as mentioned below.

**Break up of marks for on the job training/apprenticeship**

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