### CHOICE BASED CREDIT SYSTEM - ACADEMIC YEAR 2020-21
### B.Sc., Food Science and Nutrition Course Structure

#### SEMESTER – V

<table>
<thead>
<tr>
<th>S. No</th>
<th>Course</th>
<th>Total Mark</th>
<th>Mid Sem</th>
<th>Sem End Exam</th>
<th>Teaching Hours</th>
<th>Credits</th>
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CCBCS/SEMESTER SYSTEM (2020-21) - V SEMESTER  
B. Sc., FOOD SCIENCE AND NUTRITION  

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

Teaching Hours: 3 Hours / week (Total - 60 Hours)  
Mid Sem Exam: 25 Marks  
Sem End exam: 75 Marks  
Credits: 3  

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

DSC-5, PAPER-1: POST HARVEST TECHNOLOGY  (PRACTICAL)

Teaching Hours: 3 Hours / week  
Mid Sem Exam: 0 Marks  
Credits: 2  
Sem End exam: 50 Marks

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: 3 Hours / week  (Total - 60 Hours)  Credits: 3  
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: 3 Hours / week  Credits: 2
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.
DSC-5, PAPER-3: DAIRY TECHNOLOGY (THEORY)

Teaching Hours: 3 Hours / week  (Total - 60 Hours)  Credits: 3
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)

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

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

Teaching Hours: 3 Hours / week          Credits: 2
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.
CBCS/SEMESTER SYSTEM- V SEMESTER
B.Sc. FOOD SCIENCE AND NUTRITION

DSC-5, PAPER-4: NUTRITION IN CRITICAL CARE (THEORY)

Teaching Hours: 3 Hours / week (Total - 60 Hours) Credits: 3
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
DSC-5, PAPER-4: NUTRITION IN CRITICAL CARE (PRACTICAL)

Teaching Hours: 3 Hours / week
Mid Sem Exam: 0 Marks
Sem End exam: 50 Marks

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: 3 Hours / week (Total - 60 Hours) Credits: 3
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: 3 Hours / week
Mid Sem Exam: 0 Marks
Credits: 2
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.
DSC-5, PAPER-6: FUNCTIONAL FOODS AND NUTRACEUTICALS (THEORY)

Teaching Hours: 3 Hours / week   (Total - 60 Hours)   Credits: 3
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

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

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