ADIKAVI NANNAYA UNIVERSITY: RAJMAHENDRAVARAM

B.Sc Food Science and Nutrition

Single Major

From 2023-24 (Syllabus-Curriculum)

Course Structure

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
I	I	1	Introduction to Food Science and Nutrition	3+2	4
		2	Health, Hygiene & Wellness	3+2	4

ADIKAVI NANNAYA UNIVERSITY: RAJMAHENDRAVARAM

SEMESTER-I

COURSE 1: INTRODUCTION TO FOOD SCIENCE AND NUTRITION

Theory Credits: 4 5 hrs/week

Objectives

- Understanding the role of foods in our daily life
- To gain knowledge of different plant and animal derived foods and their nutritive values and properties
- Understand the vital link between nutrition and health.

Course Outcome: On completion of the course, the students shall display ability to/ knowledge about

- Design food products that meet the various food regulations and laws.
- Comprehend the idea of food safety of the product and preserving it in good condition
- Plan adequate meals for different stages of life cycle to maintain health.
- Principles of diet therapy and different therapeutic diets.

UNIT – I

- Introduction to nutrition – Definition of nutrition, nutrients, and Food.
- Functions Of Food – Physiological, Social, Psychological and Emotional.
- Food Groups-– Sources and functions of Basic five food groups.

UNIT- II

- Classification of Nutrients- Macronutrients and Micronutrients- Sources and functions.
- My Plate, Food Pyramid and portion size- Definition and Illustration
- Inter relationship between Food , nutrition and health.

UNIT-III

- Nutrition during Life cycle- Nutritional requirement for all age groups.
- Nutritional requirement during – Pregnancy, Lactation.
- Nutritional requirement during Childhood – Infancy (weaning) and school going.
- Nutritional requirements of youngsters- Adolescents and Adults.
- Geriatric Nutrition- Physiological changes and nutritional requirement.

UNIT- IV

- Nutrition During Disease- Classification of Diseases- Communicable and Non-Communicable, mode of transmission.
- Communicable diseases- Types, Diet and lifestyle modifications.
- Non-Communicable diseases- Types, Diet and lifestyle modifications.
- Relation Between Immunity, Health and Nutrition.

Unit -V

Research and standards organization of Food Science and Food Technology-

- Role and Function of the organizations.
- Nutritional research organization- ICMR-NIN, NNMB.
- Food Technology research organization- AFSTI, CFTRI, DFRL, NIFTEM.
- Food Standards- FSSAI, AMARK, FPO, MMPO.

References:

1. Food Facts & Principles by Shakunthala manay & Shadakhraswamy.
2. Food Science by Srilakshmi , second edition,2002
3. Food science, Chemistry and Experimental foods by M. Swaminathan.
4. Food Science by Norman.N.Potter.
5. Experimental study of Foods by Griswold R.M.
6. Food Science by Helen Charley.
7. Vijaya Khader, Text book of food science and technology, Indian council of Agricultural research New Delhi, 2001.
8. Stainley Sacharous. Roger C Griffin. Principles of food packaging 2nd Ed. Avi pub Co. Westport.
9. F.A. & Paine. H.Y. Leonard hill. A hand book of food packaging. Blackie Sons Ltd London.

Recommended Activities

- Visits to food industries
- Market survey of preserved fruits and vegetable products.
- Visit to food testing lab or any agency of food standards.

ADIKAVI NANNAYA UNIVERSITY: RAJMAHENDRAVARAM

SEMESTER-I

COURSE 2: HEALTH, HYGIENE & WELLNESS

Theory Credits: 4 5 hrs/week

Learning Outcome: On completion of the course a student shall

- Possess an understanding of the concept of good health and means to achieve it**.**
- Display the ability to identify the morphology, growth and reproductive features of various microorganisms
- Acquire the skills in various sterilization techniques

Theory

Unit I Health & wellness – Definition & meaning

- Dimension/ Elements of health and wellness – Physical, Social, Emotional, Intellectual, and Spiritual.
- Factors affecting Health and Wellness
- Indicators of health- concept of Mortality, Morbidity, Disability

Unit II Classification & Study of Microorganisms- in terms of morphology, growth, Nutrition and Reproduction

- Bacteria, Virus, Yeasts, Algae and Mould
- Beneficial Applications of Microorganisms in Food Industry, Agriculture and other areas.

Unit III Mode of infection

- Infection- sources, mode of transmission.
- Diseases caused by microorganisms-Symptoms, aetiology, mode of transmission of
- a. Bacterial diseases- Typhoid, Tuberculosis, Jaundice, Dysentery;
- b. Viral Diseases: Influenza, Measles, Poliomyelitis, AIDS
- c. Parasite transmitted diseases- Malaria, Dengue, Filariasis.

Unit IV Prevention & Control

- Control of Micro-organisms – Sanitation, Sterilization & Disinfection- Physical and chemical method.
- Immunity- definition & types, Immunization schedule
- Hygiene - Meaning and importance of personal hygiene
- Standard precautions to prevent infections

Unit V Management of Health & Wellness

- Modern lifestyle and hypo-kinetic diseases; prevention and management through Physical exercise
- Stress, anxiety, and depression- Definition and concept
- Role of Yoga, asanas and meditation in maintaining health and wellness.
- Role of sleep-in maintenance of physical and mental health.

Course – I & II Model Paper (70 Marks)

SECTION A (Multiple Choice Questions) ***30 x 1 = 30 M***

30 Multiple Choice Questions (Each Unit 6 Questions)

SECTION B (Fill in the blanks) ***10 x 1 = 10 M***

10 Fill in the Blanks (Each Unit 2 Questions)

SECTION C (Very short answer questions) ***10 x 1 = 10 M***

10 Very short answer questions (Each Unit 2 Questions)

SECTION D (Matching) (From 5 Units) ***2 x 5 = 10 M***

1 A
B
C
D
E

2 A
B
C
D
E

SECTION E (True or False) ***10 x 1 = 10 M***

10 True or False (Each Unit 2 Questions)

Programme: B.Sc. Honours in Food Science and Nutrition (Major)
SEMESTER – II
COURSE STRUCTURE

Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
II	3	Food Science	3	3
		Food Science Practical	2	1
	4	Food Chemistry-I	3	3
		Food Chemistry-I Practical	2	1

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Single Major B.Sc. Food Science and Nutrition (w.e.f:2023-24A.B)

SEMESTER-II
COURSE 3: FOOD SCIENCE

Theory Credits: 3 3 hrs/week

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.

Learning outcomes:

1. Demonstrate and use the different methods of cooking
2. Understand the composition and nutritive value of both animal and plant food
3. Apply the different techniques to check the stages in sugar cookery.
4. Able to identify different structures and identification of spoilage of egg
5. Interpret the importance and functions of food and its nutrients

UNIT –I

Food groups: 8 hours

1. Basic food groups in foods and nutrition. Functional and objectives of food groups-energy yielding, body building and protective foods. Food Pyramid, My Plate.
2. Study of various cooking methods - Boiling, steaming, stewing, frying, baking, roasting, broiling, cooking under pressure.
3. Solar cooking and Microwave Methods-Advantages and disadvantages
4. Cereals – Structure, composition and nutrition of rice, wheat, milling process, cooking on parboiled and raw rice, principles of starch cookery, gelatinization.

UNIT –II 10 hours

1. Pulses and grams – Varieties of pulses & grams, composition, nutritive value, forms of pulses, effects of cooking, role of pulses in cookery, toxic constituents.
2. Vegetables - Classification, composition, nutritive value, selection and processing for cooking, methods and principles involved in cooking.
3. Fruits - Composition, nutritive value, changes during ripening, methods and effects of cooking, enzymatic browning.

UNIT –III 10 hours

1. 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.
2. Sugar cookery- Stages of sugar cookery, crystallization and factors affecting crystallization.

UNIT –IV 10 hours

1. Milk - Composition, nutritive value, kinds of milk, pasteurization and homogenization of milk, changes in milk during heat processing, preparation of cheese and milk powder
2. Egg - Structure, composition, classification, nutritive value, uses of egg in cookery, methods of cooking, foam formation and factors affecting foam formation.

UNIT –V 10 hours

1. Meat -Structure, composition, nutritive value, selection of meat, post mortem changes in meat, aging, tenderness, methods of cooking meat and their effects.
2. Poultry – types, composition, nutritive value, selection, methods of cooking.
3. Fish - Structure, composition, nutritive value, selection of fish, methods of cooking and effects.

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SEMESTER-II
COURSE 3: FOOD SCIENCE

Practical Credits: 1 2hrs/week

Learning Outcomes:

1. Knowledge on standardization of weights.
2. Differentiate different methods of cooking
3. Understanding different pre preparation methods and time saving procedures
4. Able to calculate energies required for various health conditions
5. Skill in preparation of score cards for sensory evaluations

1. Measuring ingredients Methods of measuring different types of foods – grains, flours & liquids
2. Cooking methods Moist heat methods – (i) boiling, simmering, steaming, & Pressure cooking, (ii). Dry heat methods – baking. (iii), Fat as a medium, Cooking-shallow and deep fat frying.
3. Methods of cooking fine and coarse cereals. Examination of starch
4. Cooking of soaked and un soaked pulses, Common preparations with pulses.
5. Experimental cookery using vegetables of different colours & textures. Common Preparations with vegetables. Preparation of soups and salads. Prevention of darkening in fruits & vegetables.
6. Milk & milk products: Common preparation with milk, cheese & curd-cheese curry & cooking vegetables in milk.
7. Flesh foods: Fish, meat & poultry- preparations.
8. Egg Experimental cookery- boiled egg, poached egg. Common preparations with egg.
9. Beverages Preparation of hot beverages- coffee, tea. Preparation of cold Beverages-fruit drinks & milk shake.
10. Sensory Evaluation and preparation of score card.

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.
6. Modern Cookery for teaching and trade, volume I&II, Thangam Philip. OrientLongmans Ltd.
7. Food Fundamentals by MacWiliams, John Willy and son‟s, New York.
8. Food Facts & Principles by Shakunthala manay & Shadakhraswamy.
9. Food Science by Srilakshmi, second edition,2002.

Co-Circular activities

1. Student Seminars on different food groups
2. Collection of samples of different food products available in the market and study their nutrient composition and use in cookery.
3. Field visits – Visit to food processing units.
4. Field study – Survey on Food Additives used in various food products/ processed foods.
5. Collection of different ready to eat foods and processed foods.
6. Celebration of Important Days (National and International)
   - World Nutrition day-May 28th
   - Nutrition week (Sep 1st 7th
   - World food day - October16th

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SEMESTER-II

FOOD CHEMISTRY

Theory Credits: 3 2hrs/week

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.

Learning outcomes:

1. Acquiring knowledge on components and functions cooking.
2. Understanding different formations of gels and solutions.
3. Gaining knowledge foaming agents
4. Discovering the effects of water activity
5. Gaining knowledge about biochemical changes in food

UNIT – I 8 hours

1. Definitions **–** Food**,** nutrients**,** principle components of foods, functions of foods
2. Classification of foods, properties of foods, physical, chemical, functional and kinetic properties.

UNIT –II 10 hours

1. Colloidal system in foods – meaning, types, properties.
2. Sols – meaning, types, properties:
3. Gels – meaning, type, properties, theory of gel formation, factors influencing gel formation.

UNIT – III 10 hours

1. Emulsion – meaning, types, properties, emulsifying agents, natural and synthetic emulsifier, functions of emulsifying agent, common food emulsions:
2. Foams – meaning, methods of foam formation, theory of foam formation, properties – factors influencing foam formation, factors affecting stability of foam, foaming agents – natural and synthetic.

UNIT – IV 8 hours

1. Water –Types of water, hydrogen bonding in water, water and ice properties, functions of water in food.
2. Water activity– definition, measurement and control of water activity, estimation of moisture in foods.

UNIT – V 10 hours

1. Heat transfer operations in foods – conduction, convection, radiation, gelatinization, retro gradation, dextrinization of starches
2. Enzymatic and non-enzymatic browning reaction in foods, rancidity – types and prevention. Biochemical changes in foods.

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SEMESTER-II

FOOD CHEMISTRY

Practical Credits: 1 2 hrs/week

Learning Outcomes:

1. Practically applying different methods of thickening agents
2. Identifying moisture content in foods
3. Knowing sugar cookery- application in preparation of desserts and confectionaries.
4. Determination of smoking points
5. Identification of different Ph in foods to control microorganisms.

1. To study the gelatinization temperature range & percentage sag of various cereal starches.
2. To study dextrinization properties of various cereals and legumes.
3. To study the development of gluten in various flours.
4. To study the effect of enzymatic browning in fruits and vegetables and non enzymatic browning, caramelization in various sugars.
5. Determination of P^H of foods.
6. Determination of Moisture content in foods.
7. To study pasteurization of milk & fruit juices.
8. Specific gravity of fats and oils

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.
6. Modern Cookery for teaching and trade, volume I&II ,Thangam Philip. OrientLongmans Ltd.
7. Food Fun damentals by MacWiliams, John Willy and son‟s, New York.
8. Food Facts & Principles by Shakunthala manay & Shadakhraswamy.
9. Food Science by Srilakshmi , second edition,2002.

Co-Circular activities

1. Preparation of poster, charts, ppt and videos on different concepts
2. Seminar presentation, Quiz, JAM and fun games on food system
3. Celebration of weeks related to food and nutrition
4. Visits to various food industry and record the process
5. Food mela for monthly once with on well balanced diet

ADIKAVI NANNAYA UNIVERSITY: RAJMAHENDRAVARAM
Single Major B.Sc. Food Science and Nutrition (w.e.f:2023-24A.B)

Single Major
Model Question Paper
SEMESTER-II
BSc. FOOD SCIENCE AND NUTRITION
PAPER: FOOD SCIENCE

Time:3hrs *MAX MARKS: 70 M*

SECTION – A

Answer any 5 questions. Each question carries 4 marks (5 X 4 = 20M)

1. Write about Food Pyramid and My Plate Concept.
2. Give Nutritive value of any four pulses
3. Write about functions of fats.
4. Write about Pasteurization of milk.
5. Write about structure of meat muscle with neat diagram.
6. Write about nutritional composition of Fish and Poultry.
7. Write about factors effecting sugar Crystallization.
8. Write about factors effecting absorption of oil.

SECTION – B

Answer all the questions. Each question carries 10 marks. (5 X 10 = 50M)

9. Write in brief about methods of cooking.

(OR)

Write about principles of starch cookery and gelatinization

10. Classify vegetables and write about principles involved in vegetable cooking.

(OR)

Write about changes during ripening of fruits and enzymatic browning in fruits.

11. Write about shortening effects of oils and types of oils.

(OR)

Define spices and condiments. What are the uses of spices and condiments.

12. Define Milk and write about nutritional composition of milk.

(OR)

Explain structure and composition of egg with a neat diagram.

13. Write about types of poultry, composition and nutritive value.

(OR)

Write about Aging and Tendering of meat

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Single Major
Model Question Paper
SEMESTER-II
BSc. FOOD SCIENCE AND NUTRITION
PAPER: FOOD CHEMISTRY

Time:3hrs ***MAX MARKS: 70 M***

SECTION – A

Answer any 5 questions. Each question carries 4 marks (5 X 4 = 20M)

1. Define Nutrients. Write about functions of Foods.
2. Write about theory of gel formation.
3. Write about functions of emulsifying agents.
4. Write about types and functions of water in food.
5. Write about rancidity in foods.
6. Write about factors effecting formation of foam.
7. Write about properties of sols.
8. Write about types of emulsifiers.

SECTION – B

Answer all the questions. Each question carries 10 marks. (5 X 10 = 50M)

9. Classify foods and write about different properties of foods.
(OR)
Define food. Write about principal components of foods.

10. Write briefly about colloidal systems in foods.
(OR)
Define Sol and Gel. Write about factors influencing gel formation.

11. Define Emulsion. Write about types of emulsifying agents.
(OR)
Define foam and write about methods of foam formation

12. Write about Water and Ice Properties.
(OR)
What is water activity. How do you measure moisture in foods?

13. Write about heat transfer operations in foods. Explain dextrinization of starches.
(OR)
Write about types of rancidity and biochemical changes in foods.