

DEPARTMENT OF FOOD SCIENCE & TECHNOLOGY

Course Code							
Title of the Course				THERAPEUTIC NUTRITON			
Offered to: (Programme/s)				Major: B.SC. FOOD SCIENCE AND TECHNOLOGY			
L	4	T	0	P	0	C	4
Year of Introduction:		2024-25		Semester:			III
Course Category:		MAJOR		Course Relates to:		GLOBAL	
Year of Introduction:		2024		Percentage:		NA	
Type of the Course:				EMPLOYABILITY			
Crosscutting Issues of the Course :				GENDER			
Pre-requisites, if any				HUMAN NUTRITION			

Course Description:

Diet has a powerful yet complex effect on health. The importance of a balanced diet can't be emphasized enough for a healthy lifestyle. A healthy lifestyle can be attained by maintaining a balanced diet and keeping into consideration all the essential nutrients required by the body. A proper meal plan helps to attain ideal body weight and reduce the risk of chronic diseases like diabetes, cardiovascular and other types of cancer.

Course Aims and Objectives:

S.NO	COURSE OBJECTIVES
1	To understand the importance of Therapeutic Diets
2	To Develop aptitude for taking up dietetics as a profession
3	To Acquire knowledge of IV feeds
4	To Gain knowledge about principles of diet therapy and different Therapeutic diets
5	To Understand the various special diets for various diseases

Course Outcomes

At the end of the course, the student will/will be able to...

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Understands about Modification of normal Diets to Therapeutic diets	K2	1	1
CO2	Comprehension of various diseased conditions	K3	1, 2	1, 2
CO3	Skills in planning diets for different diseases	K3	1, 2	2
CO4	Calculation and preparation of diets for different diseases	K1	1	1
CO5	Counsel patients regarding chronic diseases	K2	1	1

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

CO-PO MATRIX									
CO NO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2							2	
CO2	2	2						2	

CO3	2	2						2	2
CO4	2	2						2	
CO5	3							3	

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

Course Structure:

Unit – 1 :

(10 Hrs)

I. Therapeutic Nutrition:

- 1.1 Purpose and Principles of Therapeutic Nutrition
- 1.2 Classification of Therapeutic diets, Modifications of Normal diet – Liquid diet, Semi solid diet, etc.
- 1.3 Methods of Feeding Patients: Tube feeding, Intravenous feeding,
- 1.4 Pre and Post-operative diet.

1.1 Role of Dietician

- 1.1.1. Responsibilities of Dieticians,
- 1.1.2. Types of dietician
- 1.1.3. Interpersonal relationship other patient, Planning and Implementing Dietary care, Their Approach to Nutritional care.

Examples/Applications/Case Studies:

Assignment -1: Plan three recipes suitable for clear fluid, full fluid and soft diet

Assignment – 2: Plan to conduct Diet counselling for **five** individuals with different nutritional disorders.

Specific Resources: (web)

- www.ncbi.nlm.nih.gov
- www.mayoclinic.org
- www.msdmanuals.com

UNIT II

(12 Hrs)

Diet in Fevers:

- 2.1. Metabolic changes in fevers
- 2.2 Dietary guidelines for Typhoid,
- 2.3 Dietary guidelines for Tuberculosis

2. 1. Diet in Energy Imbalance:

- 2.1.1 Over Nutrition - Causes, Complications
- 2.1.2 Dietary treatment and other recommendations.
- 2.1.3. Under nutrition - causes, complications, Nutritional and food requirement.

Examples/Applications/Case Studies:

Assignment -1: Assessment of obesity among staff and students

Assignment – 2: Mention any ten fluid diets suitable for Fever patients

Specific Resources: (web)

- www.ncbi.nlm.nih.gov
- www.mayoclinic.org
- www.msdmanuals.com

UNIT III

(12 Hrs)

2. Diet in Gastro Intestinal Diseases:

- 3.1 Peptic ulcer – Etiology, symptoms, clinical findings, dietary principles and modifications.
- 3.2 Gastritis: Etiology, classification, modification of diet
- 3.3 Diarrhoea: Etiology, classification, modification of diet
- 3.4 Constipation : Etiology, classification, modification of diet

Examples/Applications/Case Studies:

Assignment -1: Summarize Bland diet for Gastro Intestinal diseases

Assignment – 2: List out the Fiber rich foods.

Specific Resources: (web)

- www.ncbi.nlm.nih.gov
- www.mayoclinic.org
- www.msdmanuals.com

UNIT IV

(13 Hrs)

3. Diet in liver diseases:

4.1 Functions of liver, agents responsible for liver damage, damage caused to liver

4.2 Hepatitis: Etiology, symptoms, dietary treatment

4.3 Cirrhosis of liver: Etiology, symptoms, dietary treatment

4.4 Hepatic coma: Etiology, symptoms, dietary treatment

4.5 Pancreatitis: Etiology, symptoms, dietary treatment.

4.1. Diet in Cardio-Vascular diseases:

4.1.1 Atherosclerosis - Etiology, role of fat in the development of Atherosclerosis,

4.1.2 Symptoms, Dietary Modification

4.1.3. Hypertension – causes, symptoms and dietary management

4.1.4 Hypercholesterolemia - causes, symptoms and dietary management

Examples/Applications/Case Studies:

Assignment -1: Mention the important functions of liver & Heart.

Assignment – 2 Give the list of high cholesterol and low cholesterol foods

Specific Resources: (web)

- www.ncbi.nlm.nih.gov
- www.mayoclinic.org
- www.msdmanuals.com

UNIT V

(13 Hrs)

Diet in Renal Disease:

5.1. Glomerulonephritis: Causes, symptoms, Dietary Treatment,

5.2 Acute and Chronic Renal failure: Causes, symptoms, Dietary Treatment

5.3 Urinary calculi: Causes, Dietary Treatment

5.1 Diet in Diabetes Mellitus:

5.1.1. Types, Causes, Symptoms, Tests for detection (Diagnosis)

5.1.2. Metabolic changes, Dietary Treatment (GI Foods, Foods Exchange)

5.1.3. Diabetic complications.

Examples/Applications/Case Studies:

Assignment -1: Mention the sodium rich foods

Assignment – 2 List out high and low Glycemic Index foods

Specific Resources: (web)

- www.ncbi.nlm.nih.gov
- www.mayoclinic.org
- www.msdmanuals.com

Activities:

1. Exhibition of Therapeutic Diet
2. Cookery competition on Nutritious recipes

Text Books:

1. Swaminathan, M. (1980). *Dietetics*. The Bangalore Printing & Publishing Co. Ltd., Bangalore.
2. Sri Lakshmi, B., (2005). *Dietetics*. New Age International (P) Ltd., Publishers, New Delhi.

References:

- i. Antia, F.P. (1989). Clinical dietetics and nutrition, 3rd edition Oxford University press, Bombay,.
- ii. Passmore, P. and Eastwood, M. A.. (1989). Human Nutrition and Dietetics, 8th edition, ELBS, Churchill, Livingstone,.
- iii. Robinson, C.H. and Winley, E.S. (1984). Basic Nutrition And Diet Therapy, 5th ed, Macmillan Pub, Co., N.Y.,.
- iv. Bamji, Mehtab S, et al., (ed), (2002). Textbook of Human Nutrition, Oxford and IBM publishing, Co., Pvt., Ltd., New Delhi.

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA, VJA -10
An Autonomous College in the Jurisdiction of Krishna University, Machilipatnam

Course Code							
Title of the Course				THERAPEUTIC NUTRITION - PRACTICAL			
Offered to: (Programme/s)				Major: B.SC. FOOD SCIENCE AND TECHNOLOGY			
L	0	T	0	P	2	C	1
Year of Introduction:		2024-25		Semester:			III
Course Category:		Major		Course Relates to:		GLOBAL	
Year of Revision:		2024		Percentage:			
Type of the Course:				EMPLOYABILITY			
Crosscutting Issues of the Course :				GENDER			
Pre-requisites, if any				HUMAN NUTRITION			

Course Description:

Diet has a powerful yet complex effect on health. The importance of a balanced diet can't be emphasized enough for a healthy lifestyle, A healthy lifestyle can be attained by maintaining a balanced diet and keeping into consideration all the essential nutrients required by the body. A proper meal plan helps to attain ideal body weight and reduce the risk of chronic diseases like diabetes, cardiovascular and other types of cancer.

Course Aims and Objectives:

S.NO	COURSE OBJECTIVES
1	To plan the Therapeutic Diets
2	To Develop skills required for a dietitian
3	To Acquire knowledge of IV feeds
4	To Gain knowledge about principles of diet therapy and different Therapeutic diets
5	To plan and prepare special diets for various diseases

Course Outcomes

At the end of the course, the student will be able to...

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Understands about Modification of normal Diets to Therapeutic diets.	K2	1	1
CO2	Comprehension of various diseased conditions	K3	1, 2	1, 2
CO3	Skills in planning diets for different diseases	K3	1, 2	2
CO4	Calculation and preparation of diets for different diseases	K1	1	1
CO5	Counsel patients regarding chronic diseases	K2	1	1

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

CO-PO MATRIX									
CO NO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2							2	

CO2	2	2						2	
CO3	2	2						2	2
CO4	2	2						2	
CO5	3							3	

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

Course Structure

This lab list covers the key areas of Therapeutic Nutrition course, providing hands-on practice with Diet planning and calculations

Unit 1: (6Hrs)

Lab 1: Planning and Preparation of soft and liquid Diet

Lab 2: Planning and Preparation of diet for Typhoid.

Unit 2: (6Hrs)

Lab 3: Planning and Preparation of diet for Over Nutrition

Lab 4: Planning and Preparation of diet for Peptic Ulcer

Unit – 3 (6Hrs)

Lab 5: Planning and Preparation of diet for Constipation

Lab 6: Planning and Preparation of diet for Hepatitis

UNIT 4: (6Hrs)

Lab 7: Planning and Preparation of diet for cardiovascular diseases.

Lab 8: Planning and Preparation of diet for Renal Diseases

Unit 5: (6Hrs)

Lab 9: Planning and Preparation of diet for Diabetes Mellitus..

Lab 10: Visit to Dietetics Department in a Hospital.

Lab Manual:

Thomas, B., & Bishop, J. (Eds.). (2013). *Manual of dietetic practice*. John Wiley & Sons.

References:

1. Colyer, K. D. (1985). *Diet therapy specialist (AFSC 62251)*. Extension Course Institute, Air University.
2. Mondeika, T. (1961). Food, Nutrition and Diet Therapy. *JAMA*, 177(8), 586-587.

SEMESTER -END QUESTION PAPER STRUCTURE

Course Code & Title of the Course:	Therapeutic Nutrition
Offered to:	Major: B. Sc. Food Science & Technology
Category:	SEMESTER: 3
Max. Marks	70
Max. Time	3 Hrs

Section – A short answer questions

ANSWER THE FOLLOWING:

5×4 = 20 Marks

1. (a) Advantages of tube feeding (K2)
(Or)
(b) Types of Dietician (K2)
2. (a) Metabolic changes in fever (K1)
(Or)
(b) Complications and health effects of Underweight (K2)
3. (a) Gastritis (K1)
(Or)
(b) Write a brief note on constipation and high fiber importance (K3)
4. (a) Dietary management during hepatic coma (K3)
(Or)
(b) Role of fat in development of atherosclerosis (K3)
5. (a) Types of urinary calculi and contributing factors (K3)
(Or)
(b) Food exchange list (K4)

Section – B

Answer the following:

5X10 = 50 M

6. (a) Explain the purpose and principles of therapeutic diets. (K2)
Or
(b) Elaborate the role and responsibilities of dietician in planning diets to patients. (K2)
7. (a) What is Over Nutrition? Write about grading and dietary treatment for Over Nutrition. (K3)
Or
(b) Discuss about typhoid condition and its dietary management. (K3)
8. (a) Discuss the etiology, symptoms and dietary treatment for peptic ulcer. (K3)
Or
(b) What is diarrhea? State its complications. Explain dietary and ORS treatment for diarrhea. (K4)
9. (a) Give an account of factors responsible for liver damage and Suggest dietary management for cirrhosis of liver. (K3)
Or
(b) Explain causes, symptoms and dietary management of Hypertension. (K3)
10. (a) Discuss the dietary treatment for acute and chronic renal failure. (K3)
Or
(b) Explain the symptoms and diagnosis of diabetes the dietary management. (K4)

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Course Code							
Title of the Course				FOOD CHEMISTRY			
Offered to: (Programme/s)				B.SC. FOOD SCIENCE AND TECHNOLOGY			
L	4	T	0	P	0	C	4
Year of Introduction:		2024-25		Semester:			III
Course Category:		MAJOR		Course Relates to:		GLOBAL	
Year of Revision:		2024		Percentage:		NA	
Type of the Course:				EMPLOYABILITY			
Crosscutting Issues of the Course :				ENVIRONMENT AND SUSTAINABILITY			
Pre-requisites, if any				FOOD SCIENCE			

Course Description:

Chemical substances can play a significant role in food manufacture and safeguarding. Food chemistry plays a key role in warranting that the food being processed is of high quality and safe for eating. Understanding food chemistry helps us develop proper ways of handling food and also develop good manufacturing practices.

Course Aims and Objectives:

S.NO	COURSE OBJECTIVES
1	To study about the composition & classification of foods.
2	To understand about the nutritional & functional aspects of food components
3	To gain knowledge on chemical properties of food
4	To assess the functions of water in food
5	To understand the effect of various food processing methods on physicochemical properties of the food

Course Outcomes

At the end of the course, the student will be able to...

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Acquiring knowledge on components and functions of food	K1	1	
CO2	Understanding chemical properties of food	K2	1	
CO3	Study about biochemical changes in Food	K2	1	
CO4	Application of Foaming agents in preparation of various foods	K3	1,2	1, 2
CO5	Identifying chemical and biochemical changes in various processed foods	K1	1, 2	

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

CO-PO MATRIX									
CO NO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3							3	
CO2	3	2						3	2
CO3	2	1						2	
CO4	3	2						3	2
CO5	2							2	

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

Course Structure:

Unit – 1 :

(12 Hrs)

- 1.1 Definitions – Food, nutrients, principle components of foods, functions of foods
- 1.2 Classification of foods, properties of foods, physical, chemical, functional and kinetic properties.

Examples/Applications/Case Studies:

Assignment 1: List out the components & functions of the food eaten for 1 week

Assignment 2: Find out the physical, chemical and functional properties of foods consumed for 1 week.

Specific Resources: (web)

- www.embibe.com
- <https://ugcmoocs.inflibnet.ac.in/assets/>
- www.egyankosh.ac.in/bitstream

UNIT –II

(12 Hrs)

- 2.1 Colloidal system in foods – meaning, types, properties.
- 2.2 Sols – meaning, types, properties:
- 2.3 Gels – meaning, type, properties, theory of gel formation, factors influencing gel formation.

Assignment 1: Write any 10 colloidal systems in foods

Assignment 2: List out the gelling agents used in food from FSSAI standards

- www.chemistrylearner.com
- www.egyankosh.ac.in/bitstream
- <http://ecoursesonline.iasri.res.in/>

UNIT – III 10 hours

(14 Hrs)

- 3.1 Emulsion – meaning, types, properties, emulsifying agents, natural and synthetic emulsifier, functions of emulsifying agent, common food emulsions
- 3.2 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.

Assignment 1: Enumerate the emulsifying agents observed on food labels along with their INS numbers.

Assignment 2: List out any 10 foaming and Anti foaming agents from FSSAI standards.

- <https://foodgrads.com/>
- <https://ebooks.inflibnet.ac.in/>
- www.egyankosh.ac.in/bitstream

UNIT – IV

(10 Hrs)

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

Assignment 1: Poster presentation on functions of water in food

Assignment 2: write the % moisture in various packed foods

- www.chemistrylearner.com
- www.egyankosh.ac.in/bitstream
- <http://ecoursesonline.iasri.res.in/>

UNIT – V

(12 Hrs)

Physico-chemical and nutritional changes occurring during food processing treatments:

- 5.1 Drying and dehydration
- 5.2 Irradiation
- 5.3 Freezing
- 5.4 Canning

Assignment 1: market survey on commonly available canned foods

Assignment 2: Find out the Freezing times and freezer burn in frozen foods.

- [DFE: Lesson 28. Changes undergone by the food components during Freezing \(iasri.res.in\)](#)
- <https://microbenotes.com/>
- <https://foodgrads.com/>

Activities:

1. Preparation of poster, charts, ppt and videos on different concepts
2. Seminar presentation, Quiz, JAM and fun games on food systems

Reference Books:

1. Fennema, O. R. (1996). *Food chemistry* (Vol. 76). CRC Press.
2. Belitz, I. H. D., & Grosch, I. W. (2013). *Food chemistry*. Springer Science & Business Media.
3. DeMan, J. M., Finley, J. W., Hurst, W. J., & Lee, C. Y. (1999). Principles of food chemistry.

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Course Code							
Title of the Course				FOOD CHEMISTRY -LAB			
Offered to: (Programme/s)				B.SC. FOOD SCIENCE AND TECHNOLOGY			
L	0	T	0	P	2	C	1
Year of Introduction:		2024-25		Semester:			III
Course Category:		MAJOR		Course Relates to:		GLOBAL	
Year of Revision:		2024		Percentage:		NA	
Type of the Course:				EMPLOYABILITY			
Crosscutting Issues of the Course :				ENVIRONMENT AND SUSTAINABILITY			
Pre-requisites, if any				FOOD CHEMISTRY THEORY KNOWLEGDGE			

Course Description:

This hands-on course is designed to complement the theoretical principles of food chemistry by providing students with practical experience in the laboratory. The experiments focus on the study of fundamental reactions and transformations that occur in food during processing and storage. Students will learn to apply a variety of analytical techniques to measure these parameters, interpret the results, and understand their implications for food quality and safety. By the end of the course, students will be equipped with the practical skills necessary to perform food analysis and to apply this knowledge in both academic research and the food industry.

Course Aims and Objectives:

S.NO	COURSE OBJECTIVES
1	To Understand the Food Chemistry Concepts
2	To equip students with knowledge to conduct food chemistry experiments
3	To apply analytical Techniques in evaluation of various food properties
4	To analyze the Impact of Processing on Food Quality
5	To equip students with knowledge to critically analyze various food related experiments

Course Outcomes

At the end of the course, the student will be able to...

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Understand the Role of Chemistry in Food Production	K1	1	
CO2	Gaining knowledge on food colloidal systems	K2	1	
CO3	Gaining proficiency in Food Chemistry Experiments	K2	1	
CO4	Analyzing the effects of Food Processing on nutritive and physicochemical properties of food	K3	1,2	1, 2
CO5	Application of analytical methods to Food Quality Evaluation	K1	1, 2	

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

CO-PO MATRIX									
CO NO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3							3	
CO2	3	2						3	2

CO3	2	1						2	
CO4	3	2						3	2
CO5	2							2	

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

Course Structure

This lab list covers the key areas of Food Chemistry course, providing hands-on practice with food analytical procedures.

Unit 1: (6Hrs)

Lab 1: study of Gelatinization temperature range and percentage sag of various cereal starches

Lab 2: Study of dextrinization properties of various cereals and legumes

Unit 2: (6Hrs)

Lab 3: Study of development of gluten in various flours

Lab 4: Determination of pectin strength of different fruits & vegetable extracts

Unit 3: 6Hrs)

Lab 5: Determination of emulsification properties

Lab 6: To study the effect of salt, acid, sugar, fat and other variables on the stability of egg white foams

Unit 4: 6Hrs)

Lab 7: Determination of moisture content in foods

Lab 8: Determination of pH of foods

Unit 5: (6Hrs)

Lab 9: Effect of enzymatic browning in fruits and vegetables and Non enzymatic browning.

Lab 10: study on effect of freezing on food

Lab Manual:

Sadasivam, S. (1996). *Biochemical methods*. New age international.

References:

1. Miller, D. D., & Yeung, C. K. (2022). *Food chemistry: A laboratory manual*. John Wiley & Sons.
2. Weaver, C. M., & Daniel, J. R. (2003). *The food chemistry laboratory: a manual for experimental foods, dietetics, and food scientists*. CRC press.
3. Campbell, A. M. (1979). The experimental study of food. *Houghton Mifflin*, 459.

SEMESTER -END QUESTION PAPER STRUCTURE

Course Code & Title of the Course:	Food Chemistry
Offered to:	B. Sc. Food Science & Technology
Category:	SEMESTER: 3
Max. Marks	70
Max.Time	3 Hrs

Section A: Short Answer Questions (20 Marks)

Answer All questions. Each question carries 4 Marks.

1. (a.) Explain kinetic properties of food (K1)
(Or)
(b) Functions of foods (K1)
2. (a.). Write about properties and types of sols (K2)
(Or)
(b). Write about properties and types of gels (K2)
3. (a). Natural emulsifying agents (K1)
(Or)
(b). Foaming agents (K1)
4. (a) Write about the functions of water in food (K1)
(Or)
(b). Discuss water activity in foods (K2)
5. (a). Irradiation and its nutritional changes (K3)
(Or)
(b). what is canning and what is the effect of canning on nutritional changes (K2)

SECTION- B

Answer All questions. Each question carries 10 Marks.

Total : 50 M

- 6.(a) Define food. Explain the principle components of food (K1)
(or)
(b) Discuss the physical and functional properties of food (K1)
- 7.(a) Define colloid. Explain the types and properties of colloids (K2)
(Or)
(b) Write about the theory of gel formation and the factors influencing it (K2)
8. (a) Write in detail the emulsion and emulsifiers. (K2)
(or)
(b) Explain the properties and theory of foam formation. (K2)
- 9.(a) Discuss types of water and hydrogen bonding in water. (K2)
(or)
(b) How do you estimate the moisture content of foods? (K3)
10. (a). Explain the physicochemical and nutritional changes occur during freezing (K2)
(Or)
(b) Discuss the changes that take place in food during dehydration. (K2)

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Course Code							
Title of the Course				DAIRY TECHNOLOGY -			
Offered to: (Programme/s)				B.SC. FOOD SCIENCE AND TECHNOLOGY			
L	4	T	0	P	0	C	4
Year of Introduction:		2024-25		Semester:			III
Course Category:		MAJOR		Course Relates to:		GLOBAL	
Year of Revision:		2024		Percentage:		NA	
Type of the Course:				EMPLOYABILITY			
Crosscutting Issues of the Course :				PROFESSIONAL ETHICS			
Pre-requisites, if any				BASIC FOOD SCIENCE			

Course Description:

This course introduces students to the basic processes in dairy technology. It teaches students the compositional properties used in the processing of milk

Course Aims and Objectives:

S.NO	COURSE OBJECTIVES
1	To gain Knowledge of the fundamentals of dairy processing
2	To understand the Principles involved in the processing of milk and milk products
3	To learn the significance of safety and hygiene in dairy industry
4	To acquire technical specificities on milk and milk products.
5	To analyze the use of tools to measure properties of milk

Course Outcomes

At the end of the course, the student will be able to...

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Gaining knowledge on physicochemical properties of milk	K1	1	1
CO2	Understanding importance and applications of compositional differences in milk	K2	1	1
CO3	Recognizing the importance and application of processing of milk.	K1	1, 2	1, 2
CO4	Applying the concepts of composition and processing to develop various milk products	K3	1	1
CO5	Analyzing the principles of safety to avoid milk spoilage	K3	1, 2	1, 2

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

CO-PO MATRIX									
CO NO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2						3	2
CO2	2							2	
CO3	3	2						3	
CO4	3	2						3	
CO5	3	2						3	2

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

Course Structure:

UNIT-I

Processing of Milk

- 1.1 Milk Industries in India – Role of operation flood program.
- 1.2 Definition of milk – Source as food composition and nutritive value.
- 1.3 Physical and Chemical Properties of milk.
- 1.4 Processing of milk: Receiving of milk, Platform tests, Filtration and Clarification, Standardization. Pasteurization methods– Sterilization methods. Homogenization, Packaging and distribution of milk.
- 1.5 Definition – Standardized milk, Single toned, Double toned milk.
- 1.6 Manufacture and shelf life of Sterilized bottle milk and flavored milk

Examples/Applications/Case Studies:

Assignment 1: Survey of different types of milk available in the market

Assignment 2: Finding out household uses of milk using questionnaire method

Specific Resources: (web)

- www.embibe.com
- <https://ugcmoocs.inflibnet.ac.in/assets/>
- www.egyankosh.ac.in/bitstream

UNIT –II

Cream & Butter

- 2.1 Cream – cream separation, cream separator, Methods of cream separation
- 2.2 Factors governing richness of cream, factors governing fat percentage.
- 2.3 Butter- introduction, composition process involved, cream neutralization, addition of starter cultures, cream ripening, churning, Packing- factors influencing churning, over-run in butter. packing of butter.
- 2.4 Butter defects- their causes and prevention.

Assignment 1: Estimation of cream in different types of milk

Assignment 2: Uses of butter

- www.egyankosh.ac.in/bitstream
- <http://ecoursesonline.iasri.res.in/>
- www.ijfans.org

UNIT – III

Cheese

- 3.1 Cheese- introduction, history, definition, Classification, composition, nutritive value, legal standards.
- 3.2 Manufacturing of cheddar cheese, their defects and control.
- 3.3 Manufacture of processed cheese their defects and control.
- 3.4 Manufacture of Swiss cheese and their defects and control.
- 3.5 Manufacture of cottage cheese, their defects and control.

Assignment 1: Survey of different types of cheese available in the market

Assignment 2: Various types of foods prepared using cheese

- <https://foodgrads.com/>
- <https://ebooks.inflibnet.ac.in/>
- www.egyankosh.ac.in/bitstream

UNIT – IV

Concentrated & Dehydrated Milk Products

- 4.1 Condensed milk- history, composition, and types, Methods of manufacture, vacuum pan condensing, and defects in condensed milk.

4.2 Dried milk (Milk Powder)- history, types, composition of dried milk- Methods of manufacture- drum drying, spray drying, freeze-drying, Packaging of milk powder

4.3 Properties of dry milk- bulk density, solubility, solubility index, wettability, dispersability

4.4 Defects in dried milk, Reconstitution- instant milk powder

4.5 Malted milk beverages like horlicks, viva, etc.

Assignment 1: Preparation of condensed milk and types of sweets prepared with condensed milk

Assignment 2: Preparation of beverages like tea, coffee, milk shakes using milk powder.

- www.researchgate.net
- www.egyankosh.ac.in/bitstream
- <http://ecoursesonline.iasri.res.in/>

UNIT – V

Ice Cream

5.1 Ice cream – history, definition, classification, composition Ingredients sweethearts, stabilizers, flavours, etc.

5.2 Preparation of ice cream, calculation of ice cream mix, Pasteurization of milk, homogenization, ageing, freezing, packaging of ice cream

5.3 Defects and over run in ice cream.

5.4 Indigenous milk products: Rabri, kheer, channa, paneer, rasogolla, ghee, khoa, Kalakhand, srikhand & lassi. Methods of preparation of Indigenous milk products & composition.

5.5 Cultured milk products: Dahi / Yoghurt – their composition, Changes in constituents during fermentation and flavor development.

Assignment 1: Preparation of millet ice creams

Assignment 2: Effect of different time periods of fermentation on fermented products.

- <https://microbenotes.com/>
- <https://foodgrads.com/>
- www.sciencedirect.com

Activities:

1. Preparation of poster, charts, ppt and videos on different concepts
2. Seminar presentation, Quiz and JAM on Dairy products

Reference Books:

1. Sukumar De (1980). *Outlines of Dairy Technology*, Oxford Univ. Press, London
2. Aneja RP, Mathur BN, Chandan RC & Banerjee AK. (2002) . *Technology of Indian Milk Products*, Dairy India Publications.,
3. 3. Rathore NS et.al. (2008). *Fundamentals of Dairy Technology – Theory & Practices*, Himanshu Pub.,.
4. Henderson JL (1971). “*Fluid Milk Industry*”, AVI Pub.
1. Web BH, Johnson AH & Lford JA (1987). *Fundamentals of Dairy Chemistry*, 3rd Edition. AVI Pub.

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA, VJA -10
An Autonomous College in the Jurisdiction of Krishna University, Machilipatnam

Course Code							
Title of the Course				DAIRY TECHNOLOGY – LAB			
Offered to: (Programme/s)				B.SC., HONOURS (FOOD SCIENCE & TECHNOLOGY)			
L	0	T	0	P	2	C	1
Year of Introduction:		2024-25		Semester:			III
Course Category:		MAJOR		Course Relates to:		GLOBAL	
Year of Revision:		2024		Percentage:		NA	
Type of the Course:				EMPLOYABILITY			
Crosscutting Issues of the Course :				PROFESSIONAL ETHICS			
Pre-requisites, if any				Basic Food science			

Course Description:

This course introduces students to the basic processes in dairy technology. It teaches students the compositional properties used in the processing of milk

Course Aims and Objectives:

S.NO	COURSE OBJECTIVES
1	To study the basics of dairy processing
2	To understand the principles involved in the processing of milk and milk products
3	To learn the importance of safety and hygiene in dairy industry
4	To acquire technical specificities on milk and milk products.
5	To analyze the use of tools to measure properties of milk

Course Outcomes

At the end of the course, the student will be able to...

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Gaining knowledge on physicochemical stability of milk	K1	1	1
CO2	Understanding importance of compositional measurements in milk	K2	1	1
CO3	Recognizing the importance and yield of processing of milk products.	K1	1, 2	1, 2
CO4	Applying the concepts of composition and processing to develop various milk products	K3	1	1
CO5	Analyzing the principles of chemistry to test milk spoilage	K3	1, 2	1, 2

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

CO-PO MATRIX									
CO NO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2						3	2
CO2	2							2	
CO3	3	2						3	

CO4	3	2						3	
CO5	3	2						3	2

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

Course Structure

This lab list covers the key areas of Dairy technology course, providing hands-on practice with analytical procedures regarding Dairy processing.

Unit 1: (6Hrs)

Lab 1: Effect of Heat, acid, alkali on milk protein

Lab 2: Comparison of Nutritive value of different market milk

Unit 2: (6Hrs)

Lab 3: Preparation of Flavored milk

Lab 4: Preparation of Paneer

Unit 3: (6Hrs)

Lab 5: Preparation of Ice cream.

Lab 6: Determination of pH, Specific gravity in milk

Unit 4: (6Hrs)

Lab 7: Platform tests: Methylene blue reduction test,

Lab 8: Clot on boiling test and Alcohol test

Unit 5: (6Hrs)

Lab 9: Detection of Adulterants in milk.

Lab 10: Visit to Milk Chilling and Processing Center

Lab Manual:

Deibel, C. T., & Deibel, R. H. (2015). Laboratory analysis of milk and dairy products. *Dairy processing and quality assurance*, 600-646.

References:

1. Early, R. (Ed.). (1998). *Technology of dairy products*. Springer Science & Business Media.
2. Bintsis, T., Angelidis, A. S., & Psoni, L. (2008). Modern laboratory practices—Analysis of dairy products. *Advanced dairy science and technology* (Britz TJ & Robinson RK, eds). Wiley Online Library. pp, 183-261.
3. Baibaturov, T., & Akhmetova, A. (2022). Technology of dairy products.

SEMESTER -END QUESTION PAPER STRUCTURE

Course Code & Title of the Course:	Dairy Technology
Offered to:	B. Sc. Food Science & Technology
Category:	SEMESTER: 3
Max. Marks	70
Max.Time	3 Hrs

Section A: Short Answer Questions (20 Marks)

Answer All questions. Each question carries 4 Marks.

1. (a). Explain the physical properties of milk. (K1)
(Or)
(b) Platform tests of milk (K2)
2. (a). Write on butter defects their causes and prevention. (K2)
(Or)
(b) Cream neutralization and cream ripening (K2)
3. (a) Nutritive value of cheese. (K1)
(Or)
(b) Swiss cheese. (K1)
4. (a) Malt based beverages. (K1)
(Or)
(b) Re-constituted milk (K2)
5. (a) Role of stabilizers and sweeteners in ice cream (K2)
(Or)
(b) Indigenous milk products (K1).

SECTION- B

Answer all the Questions:

5×10= 50 Marks

Each question carries 10 Marks

6. (a) Explain in brief about milk industries in India and operation flood program (K2)
(or)
(b) Discuss Filtration, clarification, pasteurization, sterilization of milk (K2)
7. (a) Explain the processing of butter (K2)
(or)
(b) Write about cream separation and the factors governing richness of cream and fat percentage. (K2)
8. (a) Discuss the manufacture of cheddar cheese (K2)
(or)
(b) Discuss the manufacture of cottage cheese (K2).
9. (a) What is condensed milk? Explain the types and manufacture of condensed milk (K3)
(or)
(b) Explain different methods of manufacture of milk powders (K2)
10. (a) Discuss the preparation and defects in ice cream (K2)
(or)
(b) Write the preparation of cultured milk products (K2)

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA, VJA -10
An Autonomous College in the Jurisdiction of Krishna University, Machilipatnam

Course Code							
Title of the Course				CONFECTIONERY TECHNOLOGY			
Offered to: (Programme/s)				B.SC. FOOD SCIENCE AND TECHNOLOGY			
L	4	T	0	P	0	C	4
Year of Introduction:		2024-25		Semester:			III
Course Category:		MAJOR		Course Relates to:		GLOBAL	
Year of Revision:		2024		Percentage:		NA	
Type of the Course:				EMPLOYABILITY			
Crosscutting Issues of the Course :				PROFESSIONAL ETHICS			
Pre-requisites, if any				CONFECTIONERY TECHNOLOGY			

Course Description:

Confectionery Technology is a specialized course that explores the science, technology, and art involved in the production of various confectionery products. This course covers the fundamental principles of confectionery manufacturing, including the ingredients, processes, and equipment used to prepare candies, chocolates, gums, jellies, and other sweet treats.

Course Aims and Objectives:

S.NO	COURSE OBJECTIVES
1	To Understand the Fundamentals of Confectionery
2	To study about the key ingredients used in confectionery
3	To learn product formulation and quality aspects
4	To Understand the principles of sugar crystallization and its defects.
5	To acquire knowledge on manufacture of crystalline and non-crystalline confectionery

Course Outcomes

At the end of the course, the student will be able to...

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Gaining knowledge about the status of confectionery industries & information about sugar.	K1	1	1
CO2	Learning about the various ingredients used in confectionery products.	K2	1, 2	1, 2
CO3	Learning the manufacturing methods of chocolates.	K2	1, 2	1
CO4	Studying the technology involved in the production of various confections	K1	1	1
CO5	Understanding the process of cereal bars preparation	K2	1	1

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

CO-PO MATRIX									
CO NO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2						3	2
CO2	2							2	
CO3	2	2						2	
CO4	2							2	
CO5	3	2						3	2

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

Course Structure:

Unit – 1:

(15/12Hrs)

- 1.1 Status of confectionery industries in India
- 1.2 Types of sugar: granulated, Caster, Icing, Liquid sugars, Brown Sugars, Molasses, and microcrystalline sugars.
- 1.3 Composition of sugars
- 1.4 Properties of sugar and sugar solutions - Glucose syrups and refined glucose syrups in sugar confectionery manufacture.

Examples/Applications/Case Studies:

Assignment 1: Preparation of a report on comparative analysis of different types of sugars.

Assignment 2: write about the Role of Glucose Syrup and refined glucose syrup in Sugar Confectionery

Specific Resources: (web)

- www.embibe.com
- <https://ugcmoocs.inflibnet.ac.in/assets/>
- www.egyankosh.ac.in/bitstream

UNIT –II

- 2.1 Oils and Fats – uses in confectionery items,
- 2.2 Milk and related products, Composition of milk and functional properties of its major components, Application of milk and milk based ingredients.
- 2.3 Colors – Factors influencing choice – natural and Synthetics colors.
- 2.4 Flavoring - Natural and Artificial – Flavor Strength, factors effecting stability of flavoring compounds.
- 2.5 General technical aspects of industrial sugar confectionery manufacture, Compositional effects, change of state, evaporation, sweetness and taste.

Assignment 1: write the ingredient list of at least 3 different confectionery products and write down the application of each ingredient in confectionery

Assignment 2: write case study about The Impact of Alternative Ingredients on Healthier Confectionery

- www.egyankosh.ac.in/bitstream
- <http://ecoursesonline.iasri.res.in/>
- www.ijfans.org

UNIT – III

- 3.1 Manufacture of hard-boiled sweets: ingredients, Prevention of recrystallization and stickiness,
- 3.2 Manufacturing methods of toffee and fudge, Product types: Caramel, toffee and fudge: - Ingredients, Structure of toffee, formulation, processing, toffee stability.
- 3.3 Cocoa beans, cocoa fruit, pulp. Cocoa chocolate and related products: Sequence of processes, Chocolate recipes, Cocoa powder, mixing, refining and conching, tempering of chocolates.

Assignment 1: Survey on Consumer Preferences in chocolates

Assignment 2: Comparative Analysis: Hard-Boiled Candies vs. Toffees

- <https://foodgrads.com/>
- <https://ebooks.inflibnet.ac.in/>
- www.egyankosh.ac.in/bitstream

UNIT – IV

Gums and Jellies

- 4.1 Technology and Chemistry of hydrocolloids
- 4.2 Hydrocolloid pretreatment process
- 4.3 Liquor preparation, shaping, drying, finishing treatment, re-work, common faults, causes and cures.
- 4.4 Liquorices paste, cream paste and aerated confectionery,
 - 4.4.1. Ingredients of liquorices paste and manufacture, Liquorices all shorts.
 - 4.4.2 ingredients of cream paste, Manufacture and extrusion of cream paste.

4.4.3 aerated confectionery, Methods of aeration – Marshmallow –Nougat.

Assignment 1: Market survey on different types of gums and jellies

Assignment 2: write about the development of healthy gummies

- www.researchgate.net
- www.egyankosh.ac.in/bitstream
- <http://ecoursesonline.iasri.res.in/>

UNIT – V

Tablets, Lozenges and Sugar panning

5.1 Tablets granulation, ingredients compression, lozenges, Sugar panning, hard panning soft panning, polishing. Additional panning techniques.

5.2 Chewing gums technology: Gum base, sugar, flavors, humectants, Fruit acids, sugar-free chewing gum ingredients, formulation Chewing gum mixing, count line components, Manufacturing of count-lines

5.3 Cereal bars.

Assignment 1: Survey: Consumer Preferences for Medicinal Lozenges

Assignment 2: poster presentation.

- <https://microbenotes.com/>
- <https://foodgrads.com/>
- www.sciencedirect.com

Activities:

3. Preparation of poster, charts, ppt and videos on different concepts
4. Seminar presentation, Quiz, JAM and fun games on confectionery

Reference Books:

1. Jackson, E. B. (Ed.). (1995). *Sugar confectionery manufacture* (p. 400). Blackie Academic & Professional.
2. Lees, R. (2012). *Sugar confectionery and chocolate manufacture*. Springer Science & Business Media.
3. Hartel, R. W., von Elbe, J. H., & Hofberger, R. (2018). *Confectionery science and technology* (Vol. 536). Berlin/Heidelberg, Germany: Springer

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA, VJA -10
An Autonomous College in the Jurisdiction of Krishna University, Machilipatnam

Course Code							
Title of the Course				CONFECTIONERY TECHNOLOGY PRACTICAL			
Offered to: (Programme/s)				B.SC., HONOURS (FOOD SCIENCE & TECHNOLOGY)			
L	0	T	0	P	2	C	1
Year of Introduction:		2024-25		Semester:			III
Course Category:		MAJOR		Course Relates to:		GLOBAL	
Year of Revision:		2024		Percentage:		NA	
Type of the Course:				EMPLOYABILITY			
Crosscutting Issues of the Course :				PROFESSIONAL ETHICS			
Pre-requisites, if any				BASIC FOOD SCIENCE			

Course Description:

This course offers an in-depth exploration of the science and art behind confectionery production. Students will gain hands-on experience in creating a variety of candies, chocolates, and sugar-based products, while also learning the underlying chemical and physical principles that influence texture, flavor, and shelf-life. Students will gain practical knowledge of the techniques involved in the production of both traditional and modern confectionery products.

Course Aims and Objectives:

S.NO	COURSE OBJECTIVES
1	To Gain experience in essential confectionery processes such as sugar boiling, tempering of chocolate, and candy molding.
2	To study the functional properties of various confectionery ingredients
3	To learn the manufacturing process of various confections
4	To study the effect of changes in processing variables (e.g., temperature, mixing time, cooling rate) on the final product characteristics and learn to optimize these parameters.
5	To gain practical experience on curing the defects of different confections

Course Outcomes

At the end of the course, the student will be able to...

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Gaining experience in essential confectionery processes such as sugar boiling, tempering of chocolate, and candy molding.	K1	1	1
CO2	Studying the functional properties of various confectionery ingredients	K2	1, 2	1, 2
CO3	Learning the manufacturing process of various confections	K2	1, 2	1
CO4	Studying the changes in processing variables such as temperature, mixing time, cooling rate and their effect on the final product characteristics	K1	1	1
CO5	Gaining practical experience on curing the defects of different confections	K2	1	1

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

CO-PO MATRIX									
CO NO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2						3	2
CO2	2							2	
CO3	2	2						2	
CO4	2							2	
CO5	3	2						3	2

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

Course Structure

This lab list covers the key areas of confectionery course, providing hands-on practice with confectionery preparation and analytical procedures.

Unit 1: (6Hrs)

Lab 1: stages of sugar cookery

Lab 2: Traditional Indian confectionery

Unit 2: (6Hrs)

Lab 3: Preparation of cake

Lab 4: Preparation of Rasagulla

Unit 3: (6Hrs)

Lab 4: Preparation of Dark, White chocolates and chocolate syrup

Lab 5: Preparation of Hard boiled sweets (Candy/ Fudge/ Fondant)

Unit 4: (6Hrs)

Lab 6: Preparation of Jelly

Lab 7: Preparation of cream paste

Unit 5: (6Hrs)

Lab 9: Preparation of cereal Bar

Lab 10: Visit to confectionery industry

Lab Manual:

Ranken, M. D., Kill, R. C., & Baker, C. (1997). Sugar and chocolate confectionery. In *Food Industries Manual* (pp. 406-443). Boston, MA: Springer US.

References:

1. Lyon, C. C. (2000). Confectionery and candy makers. In *Handbook of Occupational Dermatology* (pp. 863-867). Berlin, Heidelberg: Springer Berlin Heidelberg
2. Edwards, W. P. (2018). *The science of sugar confectionery*. Royal Society of Chemistry.
3. Ranken, M. D., Kill, R. C., & Baker, C. (1997). Sugar and chocolate confectionery. In *Food Industries Manual* (pp. 406-443). Boston, MA: Springer US.***

SEMESTER -END QUESTION PAPER STRUCTURE

Course Code & Title of the Course:	Confectionery technology
Offered to:	B. Sc. Food Science & Technology
Category:	SEMESTER: 3
Max. Marks	70
Max.Time	3 Hrs

Section A: Short Answer Questions (20 Marks)

Answer All questions. Each question carries 4 Marks.

1. (a). write about glucose syrup (K1)
(Or)
(b). Write about the properties of sugar(K1)
2. (a). Discuss the functional properties of milk in confectionery (K2)
(Or)
(b). What are the uses of fats and oils in confectionery? (K2)
3. (a). How do you prevent recrystallization and stickiness of toffee? (K3)
(Or)
(b). Write about caramel types and application of caramel (K3)
4. (a). Cream paste manufacturing process (K2)
(Or)
(b). What are the common faults of jellies and cures? (K2)
5. (a). Lozenge manufacturing process (K2)
(Or)
(b). Explain sugar panning in confectionery. (K1)

SECTION- B

Answer the following Questions:

5×10= 50 Marks

Each question carries 10 Marks

- 6.(a) Discuss different types of sugars (K2)
(or)
(b) Discuss the current status of the confectionery industry in India. (K2)
- 7.(a) Discuss the role of colouring and flavouring agents in confectionery (K2)
(or)
(b) Write a detailed note on industrial sugar confectionery manufacture (K3)
- 8.(a) Write the flow chart for chocolate manufacture and discuss the critical steps in chocolate manufacturing (K2)
(or)
(b) Discuss the manufacture of crystalline sugar confectionery (K2)
9. (a) Discuss aerated confectionery and methods of aeration (K2)
(or)
(b) Write on the manufacture of gums (K2)
10. (a) Explain the manufacturing of cereal bars (K2)
(or)
(b) What is the role of different ingredients in chewing gum manufacture? (k2)

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA, VJA -10
An Autonomous College in the Jurisdiction of Krishna University, Machilipatnam

Course Code							
Title of the Course				HUMAN NUTRITION			
Offered to: (Programme/s)				MINOR: B.Sc., Honours (Microbiology) & B.Sc., Honours (Biochemisry)			
L	4	T	0	P	0	C	4
Year of Introduction:		2024-25		Semester:			III
Course Category:		MAJOR		Course Relates to:		GLOBAL	
Year of Revision:		2024		Percentage:		NA	
Type of the Course:				GLOBAL			
Crosscutting Issues of the Course :				GENDER			
Pre-requisites, if any				INTRODUCTION TO FOOD SCIENCE AND NUTRITION			

Course Description:

The main aim of the course is to assess the nutritional status of the individuals by knowing the physiological changes that takes place in different age groups. The course also deals with the nutritional requirements, general problems and complications of different age groups. The course will create awareness on various National and International Program on nutrition.

Course Aims and Objectives:

S.NO	COURSE OBJECTIVES
1	To understand the nutritional status of the individuals by knowing the physiological changes that takes place in different age groups.
2	To learn nutritional requirements, general problems and complications of different age groups.
3	To plan diets for various age groups
4	To create awareness on various National Programmes on nutrition.
5	To learn about the significance of various International Programmes on nutrition and Health

Course Outcomes

At the end of the course, the student will be able to...

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	assessing the nutritional status of the individual	K2	1	1
CO2	attaining knowledge on physiological changes of different age groups	K1	1	1
CO3	Planning a balanced diet based on the economic status of the family.	K3	1, 2	2
CO4	Creating nutritional awareness among public.	K3	1, 2	2
CO5	Planning develop and create awareness among public about Low Cost Nutritious Foods.	K2	1	1

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

CO-PO MATRIX									
CO NO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2							2	
CO2	3	2						3	
CO3	2							2	2

CO4	2							2	
CO5	3	2						3	

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

Course Structure:

UNIT I

10 Hours

1.1 Methods of Assessment of Nutritional Status:

- 1.1.1 Diet Survey
- 1.1.2 Anthropometry Assessment
- 1.1.3 Clinical Assessment
- 1.1.4 Bio-chemical Assessments.

1.2 Nutrition during Pregnancy:

- 1.2.1 Physiological changes,
- 1.2.2 Stages of Pregnancy
- 1.2.3 Nutritional Requirement
- 1.2.4 Dietary modification
- 1.2.5 General dietary problems
- 1.2.6 Complications of Pregnancy.

Assignment 1: BMI of adolescent girls

Assignment 2: Survey of eating habits of pregnant women

Specific Resources: (web)

- www.ncbi.nlm.nih.gov
- <https://spscc.pressbooks.pub/>
- www.unicef.org

UNIT II

10 Hours

2.1 Nutrition during Lactation:

- 2.1.1 Physiology of Lactation,
- 2.1.2 Nutritional Requirements
- 2.1.3. Dietary Guidelines,
- 2.1.4 Deficiency disorders
- 2.1.5 Feeding the baby.

2.2 Nutrition during Infancy:

- 2.2.1. Growth and Development
- 2.2.2 Nutritional Requirements,
- 2.2.3. Breast Feeding, Artificial feeding,
- 2.2.4 Weaning- Introduction of Supplementary foods, feeding pattern, Problems during weaning, Pre-term baby.

Assignment 1: Breast feeding awareness

Assignment 2: Preparation of weaning mixes

Specific Resources: (web)

- www.ncbi.nlm.nih.gov
- <https://jn.nutrition.org/>
- <https://iris.who.int/bits>

UNIT III

9 Hours

3.1. Nutrition during Pre-School

- 3.1.1 Physiological Development & Food Intake
- 3.1.2 Nutritional Requirements
- 3.1.3 Nutrition related problems.

3.2. Nutrition during School age

- 3.2.1 Growth & Development
- 3.2.2 Nutritional Requirements
- 3.2.3 Importance of Breakfast, Packed lunches, Healthy Snacks, School lunch programs

Assignment 1: Poster presentation on nutrition during Pre- school

Assignment 2: Power point presentation

Specific Resources: (web)

www.ncbi.nlm.nih.gov

<https://jn.nutrition.org/>

<https://iris.who.int/bits>

UNIT IV

9 Hours

4.1 Nutrition during Adolescence:

4.1.1 Growth and Nutritional needs

4.1.2 Food Habits

4.1.3 Eating disorders

4.1.4 Factors influencing Food Intake.

4.2 Nutrition during Adulthood:

4.2.1 Reference Man, Reference Women, Nutrition needs and Requirements during various Physical Activities (Sedentary, Moderate, Heavy work)

4.2.2. Life style disorders (Obesity, Cardiovascular diseases, Diabetes, Cancer) – Diet and their prevention.

Assignment 1: Survey on Food habits

Assignment 2: Group discussion on nutrition during adulthood

Specific Resources: (web)

- www.ncbi.nlm.nih.gov
- <https://jn.nutrition.org/>
- <https://iris.who.int/bits>

UNIT V

7 Hours

5.1 Geriatric Nutrition

5.1.1 Process of ageing,

5.1.2 Nutritional Requirements

5.1.3 Factors affecting Food Intake

5.1.4 Nutrition related Problems

5.1.5 Food modifications

5.1.6 Degenerative diseases

5.1.7 Drug – Nutrient interactions.

5.2 Malnutrition Eradication Programmes:

5.2.1 ICDS

5.2.2 Vitamin A & Iron Prophylaxis programme,

5.2.3 Iodine deficiency disorders control programme

Assignment 1: Visit to old age home

Assignment 2: Visit to anganwadi center

Specific Resources: (web)

www.ncbi.nlm.nih.gov

<https://jn.nutrition.org/>

<https://iris.who.int/bits>

Text Books:

- Swaminathan, M. (1980). *Dietetics*. The Bangalore Printing & Publishing Co. Ltd., Bangalore.
- Sri Lakshmi, B., (2005). *Dietetics*. New Age International (P) Ltd., Publishers, New Delhi.

References:

- Guthrie Helen A. & Mary Frances Picciano, (1999). *Human Nutrition*. WCB Mc. GrawHill, Boston.
- Proudfit Robinson (1971). *Normal and Therapeutic Nutrition*, Oxford & IBH Publishing Co., London

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA, VJA -10
An Autonomous College in the Jurisdiction of Krishna University, Machilipatnam

Course Code							
Title of the Course				HUMAN NUTRITION - LAB			
Offered to: (Programme/s)				MINOR: B.Sc., Honours (Microbiology) & B.Sc., Honours (Biochemistry)			
L	0	T	0	P	2	C	1
Year of Introduction:		2024-25		Semester:			3
Course Category:		MAJOR		Course Relates to:		GLOBAL	
Year of Revision:				Percentage:			
Type of the Course:				EMPOLYABILITY			
Crosscutting Issues of the Course :				GENDER			
Pre-requisites, if any				INTRODUCTION TO FOOD SCIENCE AND NUTRITION			

Course Description:

The main aim of the course is to assess the nutritional status of the individuals by knowing the physiological changes that take place in different age groups. The course also provide hands on experience to plan diets and compare with the RDA for different age groups.

Course Aims and Objectives:

S.NO	COURSE OBJECTIVES
1	To assess the nutritional status of the individuals by taking Anthropometric measurements
2	To record and analyze a 24 hour dietary recall
3	To plan diets and compare with the RDA for different age groups
4	To plan nutritious snacks for different age and income groups
5	To create awareness on various National Programmes on nutrition.

Course Outcomes

At the end of the course, the student will be able to...

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Assessment of the nutritional status of the individual	K2	1	1
CO2	Acquiring knowledge on physiological changes of different age groups	K1	1	1
CO3	Planning a balanced diet based on the economic status of the family.	K3	1, 2	2
CO4	Creating nutritional awareness among public.	K3	1, 2	2
CO5	Planning, develop and create awareness among public about Low Cost Nutritious Foods.	K2	1	1

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

CO-PO MATRIX									
CO NO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2							2	
CO2	3	2						3	
CO3	2							2	2
CO4	2							2	

CO5	3	2						3	
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Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

Course Structure

This lab list covers the key areas of a Human Nutrition course, providing hands-on practice with Anthropometric analysis

Unit 1: (6Hrs)

Lab 1: Record diet of self-using 24 hour dietary recall and its Nutritional analysis.

Lab 2: Methods of Assessment by Anthropometry.

Unit 2: (6Hrs)

Lab 3: Planning and Preparation of a Balanced Diet for a Pregnant Women

Lab 4: Planning and Preparation of a Balanced Diet for a Nursing Mother.

Unit 3: (6Hrs)

Lab 5: Planning and Preparation of a Balanced Diet for a Pre-School child.

Lab 6: Planning and Preparation of a Balanced Diet for a School aged child.

Unit 4: (6Hrs)

Lab 7: Planning and Preparation of a Balanced Diet for an Adolescent.

Lab 8: Planning and Preparation of a Balanced Diet for an Adult Man & Women (Sedentary, Moderate & Heavy).

Unit 5: (6Hrs)

Lab 9: Planning and Preparation of a Balanced Diet for an Elderly.

Lab 10: Visit to Anganwadi centre

Lab Manual:

Dashman, T., Blocker, D. E., & Baker, N. (1991). *Laboratory manual for human nutrition* (pp. xv+-237).

References:

1. Sri Lakshmi, B., (2005). *Dietetics*. New Age International (P) Ltd., Publishers, New Delhi.
2. Sauberlich, H. E. (2018). *Laboratory tests for the assessment of nutritional status*. Routledge.

SEMESTER -END QUESTION PAPER STRUCTURE

Course Code & Title of the Course:	HUMAN NUTRITION
Offered to:	MINOR: B.Sc., Honours (Microbiology) & B.Sc., Honours (Biochemisry)
Category:	SEMESTER: 3
Max. Marks	70
Max.Time	3 Hrs

Section A: Short Answer Questions (20 Marks) Answer All questions. Each question carries 4 Marks.

1. (a) Anthropometry (K1) 4M
 (Or)
 (b) Stages of pregnancy (K1) 4M
2. (a) Artificial feeding. (K2) 4M
 (Or)
 (b) Factors affecting quality of breastmilk. (K2) . 4M
3. (a) Nutrition related problems in pre-school children (K1) 4M
 (Or)
 (b) Importance of Breakfast (K1) 4M
4. (a) Anorexia and Bulimia nervosa (K3) 4M
 (Or)
 (b) Types of cardiovascular diseases. (K3) 4M
5. (a) Osteoporosis in the elderly. (K2) 4M
 (Or)
 (b) Iodine deficiency disorders (K2) 4M

Section – B

6. (a) What is ABCD? Explain in detail the dietary surveys. (K2) 10M
 (Or)
 (b) Write the physiological changes and complications of pregnancy. (K2) 10M
7. (a) Explain the physiology and nutritional requirements of lactation period. (K2) 10M
 (Or)
 (b) Define weaning. Discuss the supplementary foods in infant nutrition. (K3) 10M
8. (a) What are the physiological developments and nutritional requirements of Pre- school children (K2) 10M
 (Or)
 (b) Explain the nutritional needs, importance of packed lunches and snacks in school going children. (K3) 10M
9. (a) Discuss the following – under-nutrition, teenage pregnancy, anemia and obesity in adolescents. (K3) 10M
 (Or)
 (b) Explain the causes, symptoms and complications of diabetes mellitus. (K3) 10M
10. (a) Write about the nutritional related problems and diet management in elderly adults. (K2) 10M
 (Or)
 (b). Write about the importance of ICDS and Vitamin – A prophylaxis program (K3) 10M

FOOD SCIENCE & TECHNOLOGY	FST- AOCT22	2024-2025	FOOD FERMENTATION
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Credits: 2

VALUE ADDED COURSE

Hours: 15

FOOD FERMENTATION (Theory)

Objectives:

1. To understand the principles of food fermentation technology
2. To study the types of starters used in food industry
3. To study the production of various fermented foods
4. To understand the role of microorganisms in food industry
5. To study the various aspects of fermentation technology

Outcomes:

1. Learn the basics of fermentation.
2. Learn about role of microorganisms in food industry
3. Learn about lactic acid fermentation
4. Learn about fermented milk products
5. Learn about traditional fermented foods

Unit I:

2hr

Fermentation – definition and types
Microorganisms used in foods
Benefits of fermentation

Unit 2:

2hr

Fermented Foods – types

- Acetic acid fermentation
- Lactic acid fermentation
- Alcohol fermentation (Yeasts)

Unit 3:

3hr

Methods of Fermentation

- Dairy Fermentation
- Oriental Fermented foods
- Preparation of pickles
- Traditional Fermented foods

RECOMMENDED READINGS

1. Casida L. E. JR. (1968). Industrial Microbiology, New Age international publishers.
2. W. C. Frazier, D. C. Westhoff and N. M. Vanitha (2014). Food Microbiology, 4/e, McGraw Hill

VALUE ADDED COURSE

Credits: 2

Food Fermentation (Practical)

Hours:30

Objectives:

1. To equip students with the necessary skills for Food Fermentation

Practicals

1. Preparation of Yoghurt
2. Preparation of kombucha
3. Preparation of sauerkraut
4. Preparation of Tofu
5. Preparation of Soya sauce
6. Preparation of Fruit Bread
7. Traditional Indian Fermented Foods (Dhokla)
8. Preparation of pickles
9. Preparation of fruit vinegar
10. Nutritious Fermented snacks

Text books:

1. A. H. Patel.(2012). Industrial Microbiology, 2/e, Mac Millan Publishers
2. N. Okafor (2007). Modern Industrial Microbiology and Biotechnology, Science Publishers,

MODEL PAPER

Total 35M

Scheme of External Evaluation

1. Question number 1

- | | |
|-------------|-----|
| • Theory | 5M |
| • Practical | 10M |

2. Question Number 2

- | | |
|-------------|----|
| • Theory | 5M |
| • Practical | 5M |

3. Viva 5M

4. Record 5M

Total = 35 Marks

Scheme of internal Evaluation

Internal assessment	= 15 marks
Performance of 10 tasks	= $10 \times 15 = 150$ marks
Average marks	= 15 marks

Grand total marks (external 35m + internal 15 m) = 50 marks.