



BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI - 620024

B.SC. NUTRITION AND DIETETICS

**CHOICE BASED CREDIT SYSTEM-LEARNING OUTCOMES BASED
CURRICULUM FRAME WORK (CBCS - LOCF)**

(Applicable to the candidates admitted from the academic year 2026-2027 onwards)

Sem	Part	Courses	Title	Ins. Hrs.	Credits	Exam. Hours	Maximum Marks		
							Int.	Ext.	Total
I	I	Ability Enhancement Course – I (AEC - I)	(Tamil\$ / Other Languages+, #)	6	3	3	30	70	100
	II	Ability Enhancement Course –II (AEC - II)	English Course - I	6	3	3	30	70	100
	III	Core Course -1 (CC - 1)	Food Science	4	4	3	30	70	100
		Core Practical - 1 (CP - 1)	Food Science (P)	4	4	3	40	60	100
		Allied Course – 1 (AC - 1)	Human Physiology	4	4	3	30	70	100
		Allied Course Practical - 1 (ACP-1)	Human Physiology and Food Chemistry	2	**	**	**	**	**
	IV	Value Education		2	2	3	30	70	100
		Interdisciplinary Course – 1 (IDC - 1) #	One Course from Outside Department	2	2	3	30	70	100
	Total			30	22	--	--	--	700
II	I	Ability Enhancement Course –III (AEC - III)	(Tamil\$ / Other Languages+, #)	6	3	3	30	70	100
	II	Ability Enhancement Course –IV (AEC - IV)	English Course - II	6	3	3	30	70	100
	III	Core Course- 2(CC - 2)	Principles of Nutrition	4	4	3	30	70	100
		Core Practical - 2(CP - 2)	Principles of Nutrition (P)	4	4	3	40	60	100
		Allied Course – 2 (AC - 2)	Food Chemistry	4	4	3	30	70	100
		Allied Course Practical - 1 (ACP-1)	Human Physiology and Food Chemistry	2	4	3	40	60	100
	IV	Skill Enhancement Course - 1(SEC - 1) ##	Naan Mudhalvan Course/SEC (List enclosed)	2	2	3	30	70	100
		Interdisciplinary Course – 2 (IDC - 2) #	One Course from Outside Department	2	2	3	30	70	100
	Total			30	26	--	--	--	800

III	I	Ability Enhancement Course –V(AEC - V)	(Tamil\$ / Other Languages+, #)	6	3	3	30	70	100
	II	Ability Enhancement Course –VI (AEC - VI)	English Course - III	6	3	3	30	70	100
	III	Core Course- 3(CC - 3)	Nutrition Through Life Cycle	4	4	3	30	70	100
		Core Practical - 3 (CP - 3)	Nutrition Through Life Cycle (P)	4	4	3	40	60	100
		Allied Course - 3 (AC - 3)	Fundamentals of Biochemistry	4	4	3	30	70	100
		Allied Course Practical - 2 (ACP-2)	Fundamentals of Biochemistry and Food Processing and Preservation	2	**	**	**	**	**
	IV	Skill Enhancement Course - 2 (SEC - 2) ##	Naan Mudhalvan Course/SEC (List enclosed)	2	2	3	30	70	100
		Interdisciplinary Course – 3 (IDC - 3) \$\$	One Course from Outside Department	2	2	3	30	70	100
		Health & Wellness @		–	1	–			100
	Total			30	23	–	--	--	800
I	Ability Enhancement Course –VII (AEC - VII)	(Tamil\$ / Other Languages+, #)	6	3	3	30	70	100	
IV	II	Ability Enhancement Course –VIII (AEC - VIII)	English Course - IV	6	3	3	30	70	100
	III	Core Course- 4(CC - 4)	Dietetics	4	4	3	30	70	100
		Core Practical - 4(CP - 4)	Dietetics (P)	4	4	3	40	60	100
		Allied Course – 4 (AC - 4)	Food Processing and Preservation	4	4	3	30	70	100
		Allied Course Practical - 2 (ACP-2)	Fundamentals of Biochemistry and Food Processing and Preservation	2	4	3	40	60	100
	IV	Skill Enhancement Course - 3 (SEC - 3) ##	Naan Mudhalvan Course/SEC (List enclosed)	2	2	3	30	70	100
		Interdisciplinary Course – 4 (IDC - 4) \$\$	One Course from Outside Department	2	2	3	30	70	100
	Total			30	26	–	--	--	800
		Summer Internship / Industrial Activity during the Summer Vacation after II Year							

V	III	Core Course - 5 (CC - 5)	Bakery and Confectionary	4	4	3	30	70	100
		Core Course - 6 (CC - 6)	Food Service Management	5	4	3	30	70	100
		Core Course - 7 (CC - 7)	Fundamentals of Research Methodology and Statistics	5	4	3	30	70	100
		Core Course - 8 (CC - 8)	Community Nutrition	5	4	3	30	70	100
		Core Practical - 5(CP - 5)	Food Service Management (P)	5	4	3	40	60	100
	IV	Skill Enhancement Course - 4 (SEC - 4)		2	2	3	30	70	100
		Skill Enhancement Course - 5 (SEC - 5) ##	Naan Mudhalvan Course/SEC (List enclosed)	2	2	3	30	70	100
		Introduction to Disaster Management		2	2	3	30	70	100
		Summer Internship / Industrial Activity @@	(with Viva-Voce)	--	2	--	20	80	100
	Total			30	28	--	--	--	900
VI	III	Core Course - 9(CC - 9)	Perspectives in Home Science	4	4	3	30	70	100
		Core Course- 10(CC - 10)	Food Standards and Quality Control	5	4	3	30	70	100
		Core Course- 11(CC - 11)	Functional Foods and Nutraceuticals	5	4	3	30	70	100
		Core Project Work(CPW) @@	Project Work (with Viva-Voce)	6	4	3	20	80	100
	IV	Value Added Course	General Studies for Competitive Examinations	2	1	--	30	70	100
		Skill Enhancement Course - 6 (SEC - 6)	Any one from the list	2	2	3	30	70	100
		Skill Enhancement Course - 7 (SEC - 7) ##	Naan Mudhalvan Course/SEC (List enclosed)	2	2	3	30	70	100
		Environmental Studies		2	2	3	30	70	100
		Gender Studies		2	1	3	30	70	100
		Extension Activities *		--	1	--	--	--	--
	Total			30	25	--	--	--	900
	Grand Total			180	150	--	--	--	4900

ALLIED COURSE

First Year	Second Year
1. Human Physiology 2. Human Physiology and Food Chemistry 3. Food Chemistry	1. Fundamentals of Biochemistry 2. Fundamentals of Biochemistry and Food Processing and Preservation 3. Food Processing and Preservation

SKILL ENHANCEMENT COURSE(SEC)			
Sl. No.	Title of paper	Sl. No.	MANDATORY Naan Mudhalvan Scheme##
1.	Hygiene and Sanitation	1.	2nd Semester:
2.	Early childhood care and Education		
3.	Palliative Care	2.	3rd Semester:
4.	Home science extension and Communication		
5.	Consumer Education	3.	4th Semester:
6.	Bakery and Confectionary (P)		
7.	Principles of Interior Design (P)	4.	5th Semester:
--		5.	6th Semester:

INTERDISCIPLINARY COURSE (IDC) FOR WHO HAVE OPT TAMIL AS PART-I (for other Department Students only)	
1 st Semester	Food Microbiology
2 nd Semester	Food Product Development
3 rd Semester	Food Packaging
4 th Semester	Sports Nutrition

INTERDISCIPLINARY COURSE (IDC)# FOR WHO HAVE NOT OPT TAMIL AS PART - I		
Those who have studied Tamil upto 10 th +2 but opt for other languages in degree	1 st Semester	Special Tamil - I
	2 nd Semester	Special Tamil - II
Those who have not studied Tamil in school level	1 st Semester	Basic Tamil - I
	2 nd Semester	Basic Tamil – II
Those students who opt for either special Tamil (or) Basic Tamil as IDCs, have to choose 2 more IDCs courses in their 3rd and 4th Semester from Outside his/her department.		

INTERDISCIPLINARY COURSE (IDC) \$\$ FOR NCC CADETS ONLY	
NCC Course is a Compulsory Course for the NCC Cadets in the 3rd Semester:	NCC Course is a Compulsory Course for the NCC Cadets in the 4th Semester:
Introduction to NCC	1. Special Subject Army (or) 2. Special Subject Navy (or) 3. Special Subject Air force
Those students who opt for NCC Courses as IDCs, have to choose 2 more IDCs courses in their 1 st and 2 nd Semester from Outside his/her department.	

SUMMARY OF CURRICULUM STRUCTURE OF UG PROGRAMMES

Sl. No.	Part	Types of the Courses	No. of Courses	Credits for each Course	Total Credits	Marks
1.	I	Ability Enhancement Course	4	3	12	400
2.	II	Ability Enhancement Course	4	3	12	400
3.	III	Core Course	11	4	44	1100
4.		Core Practical	5	4	20	500
5.		Allied Course (AC)	4	4	16	400
6.		Allied Course Practical (AP)	2	4	8	200
7.		Core Project Work (CPW)	1	4	4	100
8.	IV	Skill Enhancement Course (SEC)	7	2	14	700
9.		Interdisciplinary Course (IDC)	4	2	8	400
10.		Value Education	1	2	2	100
11.		Health and Wellness	1	1	1	100
12.		Introduction to Disaster Management	1	2	2	100
13.		Summer Internship / Industrial Activity	1	2	2	100
14.		Value Added Course	1	1	1	100
15.		Environmental Studies	1	2	2	100
16.		Gender Studies	1	1	1	100
17.		EXTENSIONACTIVITIES (NCC / NSS / SPORTS / ANTI DRUG CELL / YRC & Any Other Activities	--	1	1	--
Total			49	-	150	4900

\$ For those who have studied Tamil upto 10th+2 (Regular Stream)

+ Syllabus for other Languages should be on par with Tamil at degree level

Those who have studied Tamil upto 10th+2 but opt for other languages in degree level under Part –I should study special Tamil and those who have not studied Tamil in the school level should study Basic Tamil in Part– IV under the Interdisciplinary Course.

** Examination at the end of the next semester

Naan Mudhalvan Scheme: As per the Naan Mudhalvan Scheme instructions, 5 courses from 2nd to 6th semester should be studied under Skill Enhancement Course.

\$\$\$ NCC Course is one of the Choices in the Interdisciplinary Course. Only the NCC Cadets are eligible to choose this course. However, NCC Course is a Compulsory Course for the NCC Cadets.

@ **Health and Wellness: Assessments:**

- Use self-reflective worksheets to assess their understanding
- submit the worksheets to internal audit / external audit
- Every student's activity report should be documented and the same have to be assessed by the Physical Director with Mentor. The evaluation should be for 100 marks. No examination is required.

Scheme of Evaluation:

Part	Description	Marks
A	Report	40
B	Attendance	20
C	Activities (Observation During Practice)	40
Total		100

@@ **Summer Internship / Industrial Activity**

Internship will be carried out during the summer vacation after the second year. Viva-Voce will be conducted by the college and Marks shall be sent to the University and the same will be included in the 5th semester Mark Statement.

Summer Internship / Industrial Activity& Project Work

Scheme of Evaluation:

Description	Marks
Report	80
Viva-Voce	20
Total	100

* Extension Activities shall be outside instruction hours.

PROGRAMME OUTCOMES

PO 1	Communication Skill: Mandatory language courses facilitate to become proficient in communication, culturally aware, and more employable in both Indian and global contexts. Improve presentations skill, debates, and professional communication.
PO 2	Disciplinary Knowledge: Learn in-depth complex scientific concepts, demonstrate their ability to explain and apply their knowledge. Consistent in learning by earning extra credits in specialized courses within the science domain and enhance disciplinary knowledge.
PO 3	Critical thinking: Field and academic visits will help students to develop observation skills, grasping ability, collect and interpret data and propose models that will help them to understand hypotheses and conclusions.
PO 4	Analytical Reasoning: Through the interactions, students will develop skills of critical reading of texts, identifying gaps in knowledge, formulating scientific questions, and on will recognizing the synthesis of new ideas.
PO 5	Scientific Reasoning: Skill oriented courses will provide details on principles, conduct of proper calibration and use of scientific instrumentation and appropriate use of scientific techniques in experimental design
PO 6	Self-directed Learning: Preparation of field reports helps them to present their results and discussion in a written format that is typically required for their future professions.
PO 7	Reflective Thinking: All core courses with laboratory components will provide exposure to a wide range of research techniques, therein enhancing their understanding of the application of techniques in their domain.
PO 8	Problem Solving: Students will develop the ability to reason, apply numerical concepts, and equations in their fields of study for interpreting scientific data and drawing relevant scientific conclusions.
PO 9	Research-related Skills: Students undertaking a internship will have the opportunity to design, develop and execute their own research ideas in their experiments, thus expanding their knowledge of research methods and laboratory skills.
PO 10	Lifelong Learning: Ability to understand the gaps in knowledge and skill, adapt to technological change, engage in self-directed learning.

Code:

**FOOD SCIENCE
(Theory)**

Credits 4

COURSE OBJECTIVES:

To enable the students to

- Understand the classification of foods according to their functions.
- Gain knowledge on the composition and nutritive value of foods.
- Aware about the basics cooking methods.
- Analyse the composition, processing, and functional properties of foods
- Examine the quality characteristics of foods.

UNIT – I INTRODUCTION TO FOOD SCIENCE AND COOKING METHODS:

Definitions - Food Science, Food, Nutrients, Nutritional Status, Mal-nutrition- Under – nutrition, over nutrition, Balanced diet, Hunger-Hollow Hunger, Hidden Hunger, Health, Meal, Menu. Food Groups - Basic five, My Plate, Nutritional classification of foods – Energy yielding, Body building and Protective foods. Cooking - Objectives, cooking methods- Moist and Dry heat methods of cooking, merits and demerits. Microwave cooking, ohmic cooking, induction cooking and solar cooking.

UNIT – II CEREALS AND PULSES:

Cereals and Cereal products - Structure and Nutritive value of rice and wheat, Nutritional importance of millets– maize, jowar, ragi, bajra; Milling of rice and wheat; Parboiling of rice, Products of wheat and rice, Enrichment and fortification of cereals and flours, Batters and doughs; Malting of cereals. Pulses - Nutritive value, factors affecting cooking quality of pulses, germination – process, advantages. Nuts - Composition and nutritive value-toxins in nuts and oilseeds

UNIT – III VEGETABLES, FRUITS AND MILK:

Vegetables - Classification, Nutritive value; Pigments- fat soluble, water soluble; selection of vegetables, cooking of vegetables- changes during cooking, nutrient loss, effect of cooking on the pigments. Fruits - Classification, Nutritive value; Changes during ripening of fruits, enzymatic browning and prevention, storage. Milk and Milk Products - Composition and Nutritive value, Different types of milk, effect of heat, acid and enzymes on milk.

UNIT – IV EGG AND FLESH FOODS:

Egg - Structure, Composition and Nutritive value. Factors affecting coagulation and foam formation, testing freshness in egg- candling. Meat - Structure, composition, a list of different types of meat, cuts of meat, post mortem changes in meat, and tenderness of meat. Poultry - Composition and classification. Fish- Structure, composition, nutritive value, selection of fish.

UNIT – V FATS, SUGARS AND SPICES:

Fats and oils- composition, processing and refining of fats, refined oils, plasticity, hydrogenation, winterization. Smoking point, factors that lower smoking point, absorption of fat during cooking. Sugar- nutritive value, sugar related products, stages of sugar cookery, crystallization, factors affecting crystallization.

Spices and condiments - types and uses in Indian cookery, medicinal value.

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only):

Effect of cooking on the nutritive value of different foods. Food Sample Booklet. Develop games on food and nutrients

TEXTBOOKS:

1. Srilakshmi, B., (2010), Food Science, 6th edition New Age International (P) Limited, New Delhi.
2. Sunetra, R., (2007), Food Science and Nutrition, Oxford University Press, India.
3. Chandrasekhar, U., (2002), Food Science and Application in Indian Cookery, Phoenix Publishing House P. Ltd., New Delhi.
4. Potter, N., and Hotchkiss, J.H., (1995), Food Science, 5th edition, Chapman & Hall, New York.

REFERENCES BOOKS:

1. Shakuntala, M. and Shadaksharaswamy. M., (2000), 2nd Edition, Foods, Facts and Principles, New Age International Pvt. Ltd., Publishers, New Delhi.
2. Brow, A., (2000), Understanding Food, Thomson Learning Publications,
3. Parker, R. (2000), Introduction to food Science, Delmer, Thomson Learning Co., Delma.
4. Mehas, K.Y. and Rodgers, S.L. Food Science and You, Mc Millan Mc Graw Company, New York, 2000.

E-REFERENCES:

1. <https://www.pdfdrive.com/food-science-books.html>
2. <https://archive.org/details/textbookoffoodsc0000khad>
3. <https://himitepa.lk.ipb.ac.id/e-book/>
4. www.fao.org
5. www.wfp.org

COURSE OUTCOMES: (With Mapping)

At the end of the course, the students will have the ability to	
CO1	Identify the foods and classify them based on the basic V food group system
CO2	Define the foods and describe its structure
CO3	Demonstrate their ability in selecting the good food and reject those with low quality
CO4	Analyse the different nutrients present in a food
CO5	Compare the nutrients present in the different types of food and suggest the nutrient rich foods.
CO6	Apply food science principles to improve food quality, nutrient retention, food safety, and the preparation of nutritious meals.

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	1	1	2	2	2	2	2	2
CO 2	3	3	2	2	2	2	1	1	2	2
CO 3	3	3	2	2	2	3	1	1	1	1
CO 4	3	3	2	2	1	3	2	1	1	1
CO 5	3	2	2	1	1	2	2	1	2	2
CO 6	3	3	3	2	2	3	2	2	3	2

Code:

**FOOD SCIENCE
(Practical)**

Credits 4

GENERAL:

1. Different types of cereals, pulses, vegetables, fruits and nuts and oil seeds – Observation
2. Guidelines to be followed in laboratory.
3. Method of Measuring Ingredients.
4. De-monstration of Cooking Methods.
5. Estimate the percentage of edible portion of foods.

PRACTICALS:

1. Microscopic examination of food starches before and after gelatinization - Rice, wheat, corn and tapioca
2. Gluten formation in different cereal flours- Wheat, Refined wheat flour, rice flour
3. Effect of different methods of making dough with other flour mixtures-Preparation of Chappathi, phulka
4. Effect of time, temperature and water required for sprouting whole pulses and legumes-Green gram, Bengal gram, cow pea and horse gram
5. Factors affecting cooking quality of pulses- Green gram dhal
6. Effect of heat and acid on the proteins of milk.
7. Effect of cooking time on the colour, texture and acceptability of whole egg; Formation of ferrous sulphide in boiling egg and its preventive measures.
8. Coagulation property of eggs.
9. Browning reaction in fruits and vegetables and its prevention methods
10. Effect of heat on vegetables.
11. Changes in pH during cooking of vegetables and fruits.
12. Determine the smoking point of any 4 cooking oils.
13. Stages of sugar cookery.

COURSE OUTCOMES: (With Mapping)

At the end of the course, the students will have the ability to		
CO1	Identify the foods and classify them based on the basic V food group system	LO1
CO2	Define the foods and describe its structure	LO4
CO3	Demonstrate their ability in selecting the good food and reject those with low quality	LO5
CO4	Analyse the different nutrients present in a food	LO7 LO13
CO5	Compare the nutrients present in the different types of food and suggest the nutrient rich foods.	LO10 LO11
CO6	Apply food science principles to improve food quality, nutrient retention, food safety, and the preparation of nutritious meals.	LO6 LO15

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	1	1	-	2	2	-	2	2
CO 2	3	3	2	2	2	2	1	1	2	2
CO 3	3	3	2	2	2	3	1	1	1	1
CO 4	3	3	2	2	1	3	2	1	1	1
CO 5	3	2	2	1	1	2	2	1	2	2
CO 6	3	3	3	2	2	3	2	2	3	2

Code:

**HUMAN PHYSIOLOGY
(Theory)**

Credits 4

COURSE OBJECTIVES:

To enable the students to

- Understand the structure and functions of various organs of the body
- Obtain a better understanding of the principles of nutrition through the study of physiology
- To gain knowledge on the importance of hormonal and nervous regulation of the body.

UNIT – I TISSUE AND BLOOD:

Cell and tissues - Structure of Cell and functions of different organelles. Classification, structure and functions of tissues. Blood - Constituents of blood- RBC, WBC and Platelets and its functions. Erythropoiesis, Blood clotting, Different Blood groups. Haemoglobin – Structure and functions; erythropoiesis, Blood coagulation, Reticulo-Endothelial System – Definition and functions, Lymphatic System.

UNIT – II CARDIO VASCULAR AND RESPIRATORY SYSTEM:

Heart and Circulation - Structure of heart and blood vessels; Properties of cardiac muscle, cardiac cycle, origin and conduction of heart beat; measurement of arterial blood pressure. Respiratory System - Structure of Respiratory organs; Sub – divisions of lung air; Mechanism of respiration.

UNIT – III DIGESTIVE AND EXCRETORY SYSTEM:

Digestive System - General Anatomy; Digestion in the mouth, stomach and intestines. Movements of the intestine; Role of Liver and Pancreas – Structure and Functions. Excretory system - Physiology of the Urinary System- Structure of kidney and nephron; Formation of urine, micturition. Skin – Structure and function of skin.

UNIT – IV ENDOCRINE AND REPRODUCTIVE SYSTEM:

Endocrine System - Structure and functions of thyroid, pituitary, parathyroid, adrenals, islets of langerhans of pancreas. Reproductive System - Anatomy of the male and female reproductive organs; menstrual cycle, Development of Embryo; Pregnancy and parturition.

UNIT – V NERVOUS SYSTEM AND SENSE ORGANS:

Nervous System - General classification of nervous system , Structure of nerve cell and Spinal cord; Basic Knowledge of different parts of the brain – anatomy and functions of cerebrum, cerebellum and medulla oblongata. Sense Organs - Structure and function of eye, ear, physiology of taste and smell.

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only):

Write an assignment on Artificial respiration and ECG. Develop E content on Structure and physiological functions of any one organ.

REFERENCES:

1. Sembulingam, K. (2000). Essentials of Medical Physiology. Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
2. Saradhasubrahmanyam and MadhavanKutty, (2020). Text book of Human Physiology. S.Chand Publication.
3. Chatterjee C.C (2004). Human Physiology. Volume I. Medical Allied Agency. Kolkata.
4. Chatterjee C.C (2004). Human Physiology/ Volume II. Medical Allied Agency. Kolkata.
5. Gillian Pocock, Christopher D. Richards, David A. Richards (2018). Human Physiology. oxford University Press. (5th ed).
6. Lauralee Sherwood (2015). Human Physiology: Cells to systems. Cengage Learning.
7. H S Ravi Kumar Patil, H. K. Makari, H. Gurumurthy, S. V. Sowmya, (2009). A text book of Human Physiology. I.K. International Publishing House Pvt. Limited.
8. Guyton and Hall (2000). Textbook of Medical Physiology. Saunders. States of America.
9. Wilson, Ross (2014). Anatomy and Physiology in Health and Illness. Reed Elsevier India Private Limited. New Delhi.
10. Murugesh. N (2011). Anatomy and Physiology. Sathya Publishers. Madurai.
11. Chaudhri, K. (1993). Concise Medical Physiology, New Central Book Agency Ltd., Calcutta.
12. <https://egyankosh.ac.in/handle/123456789/81726>
13. <https://tripurauniv.ac.in/>
14. <https://nwtc.libguides.com/>
15. <https://palmbeachstate.libguides.com/>

COURSE OUTCOMES: (With Mapping)

At the end of the course, the students will have the ability to		
CO1	Outline composition and functions of blood	LO1
CO2	Interpret anatomy and physiology of circulatory and respiratory system	LO4
CO3	Discuss regulation of digestive and excretory system	LO5
CO4	Relate structure and functions of endocrine and reproduction system	LO7 LO13
CO5	Explain the structure, functions of nervous system and sense organs	LO10 LO11
CO6	Interrelate the functions of organs	LO6 LO15

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	1	1	-	2	2	-	2	2
CO 2	3	3	2	2	2	2	1	1	2	2
CO 3	3	3	2	2	2	3	1	1	1	1
CO 4	3	3	2	2	1	3	2	1	1	1
CO 5	3	2	2	1	1	2	2	1	2	2
CO 6	3	3	3	2	2	3	2	2	3	2

Code:

**HUMAN PHYSIOLOGY AND FOOD
CHEMISTRY
(Practical)**

Credits **

COURSE OBJECTIVES:

To enable the students to

- To acquire knowledge on cellular arrangements and blood components.
- To learn methods to be adopted for the measurement of various blood parameters

PRACTICALS:

1. Histology of Tissues - Columnar, cubical, ciliated, squamous, stratified squamous.
2. Microscopic structure of organs - lungs, artery, vein, stomach, ovary, testis, uterus, pancreas.
3. Histology of muscles - cardiac, striated, non-striated
4. Estimation of Haemoglobin, Bleeding time, Clotting time
5. Measurement of Blood pressure using Sphygmomanometer.
6. Determination of Pulse rate using Pulsoximeter.
7. Blood smear preparation and staining procedure
8. Determination of Blood group and Rh factor.
9. Enumeration of Red blood cells.
10. Enumeration of White blood cells.
11. Demonstration of differential count of leucocyte.

REFERENCES:

1. G.K.Pal and Parvati Pal (2016). Textbook of practical physiology. Universities press(India) private limited.
2. Sembulingam, K. (2000). Essentials of Medical Physiology. Jaypee Brothers Medical Publishers (P) Ltd.New Delhi.
3. Chatterjee C.C (2004). Human Physiology Volume I. Medical Allied Agency. Kolkata
4. Saradha Subrahmanyam and K. Madhavan Kutty (2020). Text book of Human Physiology. S. Chand Publication.
5. Gillian Pocock, Christopher D. Richards, David A. Richards (2018). Human Physiology. (5th ed) Oxford University Press
6. Lauralee Sherwood (2015). Human Physiology: Cells to systems. Cengage Learning.

COURSE OUTCOMES: (With Mapping)

CO1	Identify cells present in the body
CO2	Describe cellular arrangement in tissues and organs
CO3	Articulate the methods to be adapted for the measurement of various blood parameters
CO4	Explain cellular arrangement in tissues and organs
CO5	Appraise number of cells present in blood.
CO6	Demonstrate the different forms of cell count in blood

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	1	1	-	2	2	-	2	2
CO 2	3	3	2	2	2	2	1	1	2	2
CO 3	3	3	2	2	2	3	1	1	1	1
CO 4	3	3	2	2	1	3	2	1	1	1
CO 5	3	2	2	1	1	2	2	1	2	2
CO 6	3	3	3	2	2	3	2	2	3	2

Code:

**FOOD MICROBIOLOGY
(Theory)**

Credits 2

COURSE OBJECTIVES:

To enable the students to

- Know the basics of food microbiology and understand the important genera of microorganisms associated with food and their characteristics.
- Identify and recognize the methods of isolation and cultivation of microbes
- Identify and differentiate the sources of Microorganisms in foods.
- Understand the role of microbes in disease progression of food borne illness
- Learn, Solve and apply the simple preservation methods.

UNIT – I INTRODUCTION TO FOOD MICROBIOLOGY:

Introduction and scope of food microbiology; Growth of microorganisms, General characteristics of bacteria, fungi, virus, protozoa, and algae; Intrinsic Factors (Substrate Limitations)-nutrient content, pH and buffering Capacity, redox potential, Eh, antimicrobial barriers and constituents water Activity; Extrinsic Factors (Environmental Limitations)-relative Humidity, temperature, gaseous atmosphere.

UNIT – II MICROBIOLOGY OF PLANT BASED FOODS:

Outline of contamination and spoilage of vegetables and fruits; cereals and cereal products; pulses, nuts and oilseeds; sugar and sugar products

UNIT – III MICROBIOLOGY OF ANIMAL BASED FOODS:

Outline of Contamination and spoilage of milk and milk products; canned foods; meat and meat products; egg, poultry and fish

UNIT – IV FOOD INTOXICATION AND FOOD INFECTION:

Food Borne Diseases – classification- intoxication – botulism and staphylococcal intoxication- infection – salmonellosis, clostridium perfringens illness, bacillus cereus, E. coli, shigellosis, Yersinia and streptococcus faecalis – foods involved, diseases outbreak, preventive and control measures

UNIT – V APPLICATIONS OF MICROORGANISMS IN FOODS:

Food Product-Alcoholic drinks, Dairy products (yoghurt, butter milk, and cheese), Bread, Vinegar, Pickled foods, Mushrooms, Single-cell protein; Products from microorganisms-Enzymes, Amino acids, Antibiotics, Citric acid; Indian fermented foods -mechanism of fermentation, effect on nutritional value; Fermentation of vegetables and fruits Fermentation of meat and fish. Cereal based fermented foods, cereal & Pulse based fermented foods

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only):

Observation of spoiled foods under Microscope. Virtual tour of brewery industry.

TEXT BOOK:

1. MO Moss & MR Adams Food Microbiology (2008) New Age Publishers ISBN 8122410146
2. Ramesh Singh Food Microbiology (2021) MJP Publishers ISBN 8180940195
3. FOSTER W.M Food Microbiology (2020) CBS Publisher ISBN 8123928297
4. Annak. Joshua, (2001). Microbiology, Popular Book Depot. Chennai-15.

REFERENCE BOOK:

1. Frazier William C and Westhoff, Dennis C. Food Microbiology, McGraw Hill Education; Fifth edition 2017 ISBN 9781259062513
2. Jay, James M. Modern Food Microbiology, CBS Publication, New Delhi, 2000
3. Garbutt, John. Essentials of Food Microbiology, Arnold, London, 1997. Banwartt: Food Microbiology
4. Pelczar MJ, Chan E.C.S and Krieg, Noel R. Microbiology, 5th Ed., TMH, New Delhi, 1993.

E-Resources:

1. <http://nuristianah.lecture.ub.ac.id/>
2. <https://guides.library.iit.edu/>
3. <https://onlinelibrary.wiley.com/>
4. <https://www.microbes.info/>
5. www.microbeworld.org/

COURSE OUTCOMES: (With Mapping)

CO1	Understand different terminology related to role and significance of microbial inactivation, adaptation and environmental factors on growth and response of microorganisms in various environments
CO2	Analyse and describe the microbial pathogens in food - Cereals and Pulses
CO3	Recognize and realize the Microbiology of fruits and vegetables
CO4	Discover and understand the Microbiology of Specific foods
CO5	Learn and understand the role of microbes in industrial applications
CO6	Recent applications of microorganisms in foods:

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	1	1	-	2	2	-	2	2
CO 2	3	3	2	2	2	2	1	1	2	2
CO 3	3	3	2	2	2	3	1	1	1	1
CO 4	3	3	2	2	1	3	2	1	1	1
CO 5	3	2	2	1	1	2	2	1	2	2
CO 6	3	3	3	2	2	3	2	2	3	2

Code:

**PRINCIPLES OF NUTRITION
(Theory)**

Credits 4

COURSE OBJECTIVES:

To enable the students to

- Understand role of macro and micro nutrient relevant to human health.
- Introduce composition of various food groups.
- Gain knowledge on physiological role, requirement and deficiency conditions of macro and micro nutrient.
- Learn to calculate energy expenditure of humans.
- Know the importance of water to maintain homeostasis of human body.

UNIT – I INTRODUCTION TO NUTRITION:

Definition of nutrition, health, nutritional status and malnutrition. Inter-relationship between health and nutrition. RDA– Definition, factors affecting RDA, general principles of deriving RDA, Determination of RDA of different nutrients.

UNIT – II CARBOHYDRATES AND ENERGY:

Carbohydrates – Definition, nutritional classification, functions, RDA, sources and deficiency and excess effects. Dietary Fibre – definition, Classification, components of dietary fibre, physiological and metabolic effect, role of fibre in prevention of diseases, RDA and sources. Energy – Forms of energy, units of measurement, determination of energy value of food, total energy requirement, energy requirements during work, thermic effect of food. Basal Metabolic Rate – Factors affecting Basal metabolic rate,

UNIT – III PROTEINS AND LIPIDS:

Proteins – Definition, nutritional classification of proteins and amino acids, functions of proteins and amino acids, RDA, sources, and deficiency and excess. Evaluation of protein quality. (PER, BV, NEU, CS).Lipids – Definition, nutritional classification of lipids, functions, RDA, sources. Essential fatty acids – Definition, functions, sources, deficiency and excess effects, omega fatty acids-functions and food sources.

UNIT – IV MICRONUTRIENTS:

Vitamins - Fat Soluble Vitamins (A, D, E &K) - Functions, RDA, sources, deficiency and excess. Water Soluble Vitamins (B&C) - Functions, RDA, sources, deficiency and excess. Minerals - Macro Minerals (Calcium, Phosphorus, Potassium, Sodium) - Functions, RDA, sources, deficiency and excess effects. Micro Minerals (Iron, Iodine, Fluorine) - Functions, RDA, sources, deficiency and excess effects

UNIT – V WATER AND NUTRIENT INTERRELATIONSHIP:

Definition, distribution of water, function, requirements, sources, water balance, maintenance of water balance, distribution of electrolytes, maintenance of electrolyte balance. Macronutrients and vitamin interrelationship

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only):

Determine energy requirements of any five individuals by factorial approach method. Record clinical symptoms of any one vitamin deficiency among the community.

TEXTBOOK:

1. Raheena Begum M (2009). Textbook of Foods. Nutrition and Dietetics Sterling Publishers, New Delhi
2. Mahtab S. Bamji (2017). Textbook of Human Nutrition. Oxford & IBH Publishing Co Pvt Ltd
3. Bogert, J.G.V. Briggs, D.H. Calloway (1985). Nutrition and physical fitness. (11th ed) W.B. Saunders Co., Philadelphia. London. Toronto
4. Wardlaw, G.M. Insel, P.H. (1990) Perspectives in Nutrition. Times Mirror / Mosby College Publishing Co. St. Louis. Toronto. Boston.
5. William, S.R. (1985). Nutrition and Diet Therapy. (5th ed) Mosbey Co. St. Louis.
6. M. Swaminathan (1993). Principles of Nutrition and Dietetics. Bappco 88. Mysore Road. Bangalore.

REFERENCE BOOK:

1. Maurice E. Shils, James A. Olson, Moshe Shike (1994). Modern Nutrition in health and disease. Vol. I & II (8th ed) febiger Philadelphia. A waverly Company.
2. Martin Eastwood (2013). Principles of Human Nutrition Wiley Publishing
3. Raheena Begum M (2009). Textbook of Foods. Nutrition and Dietetics Sterling Publishers, New Delhi
4. Mahtab S. Bamji (2017). Textbook of Human Nutrition. Oxford & IBH Publishing Co Pvt Ltd.
5. Mahan Kathleen L, Sylvia Escott Stump (2001). Krause's, Food nutrition and Therapy, W.B. Saunders Co.

E-RESOURCES:

1. <https://www.anme.com.mx/libros/Principles%20of%20Human%20Nutrition.pdf>
2. <https://egyankosh.ac.in/bitstream/123456789/333>
3. <https://www.anme.com.mx/libros/Principles%20of%20Human%20Nutrition.pdf>
4. <https://open.umn.edu/opentextbooks/textbooks/622>

COURSE OUTCOMES: (With Mapping)

CO1	Illustrate sources, requirements, role and deficiency of macro and micro nutrient
CO2	Explain beneficial effects of macro and micro nutrient on human health.
CO3	Analyse the quality of nutrients present in food.
CO4	Describe basal metabolism rate and energy expenditure of humans.
CO5	Relate water and electrolyte balance in human body and the interrelationship of nutrients
CO6	Interrelate the macro and micronutrients

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	1	1	-	2	2	-	2	2
CO 2	3	3	2	2	2	2	1	1	2	2
CO 3	3	3	2	2	2	3	1	1	1	1
CO 4	3	3	2	2	1	3	2	1	1	1
CO 5	3	2	2	1	1	2	2	1	2	2
CO 6	3	3	3	2	2	3	2	2	3	2

Code:

**PRINCIPLES OF NUTRITION
(Practical)**

Credits 4

COURSE OBJECTIVES:

To enable the students to

- Gain knowledge on calculate nutritive value of Indian foods.
- Know sources of macro and micro nutrient.
- Learn about the analytical methods of nutrients.

PRACTICALS:

1. Plan, prepare and calculate the nutrients of macro nutrient rich dishes of one serving
 - a. Energy - High Calorie and Low Calorie
 - b. Carbohydrate - High Carbohydrate and Low Carbohydrate
 - c. Protein - High Protein and Low Protein
 - d. Fat - High Fat and Low Fat
 - e. Dietary Fibre - High Fibre and Low Fibre
2. Plan, prepare and calculate the nutrients of micro nutrient rich dishes of one serving -Vitamins: Vitamin A, Vitamin C, Thiamine, Riboflavin, Niacin, Pyridoxine, Folic Acid and Cyanocobalamine.
3. Plan, prepare and calculate the nutrients of micro nutrient rich dishes of one serving - Minerals: Calcium, Iron, Zinc, Phosphours, Sodium and Potassium
4. Demonstration on estimation of nitrogen in food using Kjeldahl method.
5. Demonstration on estimation of total fat in food using Soxhlet method

TEXT BOOKS:

1. Gopalan.C, Rama Sastri.V.B and Balasuramanian.S.C (2016). Nutritive Value of Indian Foods National Institute of Nutrition (ICMR) Hyderabad.
2. Food Safety and Standards Authority of India (2015) Manual of Analysis of Foods Food Safety and Standards Authority of India.

REFERENCES BOOKS:

1. Thangam E. Philip,(2015). Modern Cookery for Teaching and The Trade
2. Volume-I Orient Blackswan Private Limited. New Delhi.
3. Varley, H., Gowenlak, A.H. and Hill, M. Practical Clinical Biochemistry, William Itinmaon Medical Books, London, 2000.
4. Oser, B.L., Harke's Physiological Chemistry XIV Edition Tata McGraw Hill Publishing Company Ltd., Bombay, 2001.

COURSE OUTCOMES: (With Mapping)

At the end of the course, the students will have the ability to	
CO1	Plan, prepare, and evaluate one-serving dishes rich or low in macronutrients (energy, carbohydrate, protein, fat, and dietary fibre) based on nutritional requirements.
CO2	Formulate and assess one-serving dishes enriched with essential vitamins (Vitamin A, Vitamin C, Thiamine, Riboflavin, Niacin, Pyridoxine, Folic Acid, and Cyanocobalamin) using food composition data.
CO3	Plan, prepare, and analyze one-serving dishes rich in essential minerals (Calcium, Iron, Zinc, Phosphorus, Sodium, and Potassium) to meet recommended dietary requirements.
CO4	Calculate the nutrient composition of prepared dishes using standard food composition tables and interpret their nutritional adequacy.
CO5	Demonstrate the principles and laboratory procedures involved in estimating nitrogen content in foods using the Kjeldahl method and total fat content using the Soxhlet extraction method.
CO6	Analyze laboratory findings and evaluate the nutritional quality of prepared foods by integrating food preparation techniques with nutrient analysis and standard laboratory practices.

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	1	1	-	2	2	-	2	2
CO 2	3	3	2	2	2	2	1	1	2	2
CO 3	3	3	2	2	2	3	1	1	1	1
CO 4	3	3	2	2	1	3	2	1	1	1
CO 5	3	2	2	1	1	2	2	1	2	2
CO 6	3	3	3	2	2	3	2	2	3	2

COURSE OBJECTIVES:

To enable the students to

- Gain insight into the chemistry of foods
- Understand the scientific principles involved in food preparation
- Understand the physicochemical changes and various properties exhibited by foods

UNIT – I PHYSICOCHEMICAL PROPERTIES OF FOOD:

Definition and history of food chemistry. Role of food chemist in food industry; Physicochemical properties of foods - physical properties of water and ice; types of water, Water Activity in Foods and stability, packaging, sorption phenomenon, temperature dependence, Determination of Moisture Content in Foods; True Solutions, Dispersions, Sols, Gels, Foams, Colloids and Emulsions.

UNIT – II CHEMISTRY OF STARCH AND SUGARS:

Structure of important polysaccharides (starch, glycogen, cellulose, pectin, hemicellulose, gums) Modified celluloses and starches- Components of Starch, Swelling of Starch Granules, Gel Formation, Retrogradation, Syneresis; Effect of Sugar, Acid, Alkali, Fat and Surface-Active Agents on Starch; Stages of Sugar Cookery, Crystallization and factors affecting it. Chemistry of Milk Sugar, Non-Enzymatic Browning.

UNIT – III CHEMISTRY OF PROTEINS:

Nature of Food Proteins (Plant and Animal), Structure and Classification of Protein, Properties of Protein-Electrophoresis, Sedimentation, Amphoterism and Denaturation, Solubility, Viscosity, Binding, Gelation, Texturization, Emulsification and Foaming; Functional Properties of Protein Rich Foods.

UNIT – IV CHEMISTRY OF FATS AND OILS:

Classification and Characteristics of lipids. Physical properties- melting point, softening point, specific gravity, refractive index, smoke, flash and fire point, turbidity point, Chemical properties- Reichert meissel value, Polenske value, iodine value, peroxide value, saponification value; Effect of frying on fats, Changes in fats and oils- rancidity, lipolysis, flavor reversion, Technology of edible fats and oils- Refining, Winterization, Plasticity, Hydrogenation and Interesterification, Shortening Power of Fats, Changes in Fats and Oils during Heating, Factors Affecting Fat Absorption in Foods.

UNIT – V ENZYMES, PIGMENTS AND FLAVOURS ENZYMES:

Enzymes: Introduction, classification General characteristics, Enzymes in food processing, Industrial Uses of Enzymes, Immobilized enzymes. Pigments: Types of Plant Pigments- Water Soluble and Fat Soluble, Effect of Acid, Alkaline and Heat on Pigments. Flavors: Definition and basic tastes, Chemical structure and taste, Description of food flavors, Flavor enhancers.

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only):

Prepare e-content for stages of sugar cookery. Visit to Oil mills and prepare a report for processing of fat.

TEXT BOOK:

1. Chandrasekhar, U. 2002. Food Science and applications in Indian Cookery, Phoenix Publishing House, New Delhi.
2. Chopra, H.K. and Panesar, P.S. 2015. Food Chemistry, Narosa Publishing House (P) Ltd, New Delhi.
3. Iqbal, Syed Aftab, 2011. Advanced Food Chemistry, Discovery Publishing House, New Delhi.
4. Shakuntala Manay, Shadaksharaswamy, M. 2000. Foods, Facts and Principles, 2nd Edition New Age International Pvt Ltd Publishers.
5. Srilakshmi, B. 2016. Food Science, New Age International Publishers, New Delhi.
6. Swaminathan, M. 2005. Food Science, Chemistry and Experimental Foods, Bappco Publishers, Bangalore.

REFERENCE:

1. Yadav, Seema, 2006. Food Chemistry, Anmol Publications (P) Ltd, New Delhi.
2. Chopra H.K, Panesar, P.S, 2010. Food Chemistry, Narosa Publishing House, New Delhi.
3. Meyer, L.H, 2004. Food Chemistry, 4th edition, CBS Publishers and Distributors.
4. Paul, P.C. and Palmer, H.H. 2000. Food Theory and Applications, Revised Edition, John Wiley and Sons, New York.
5. Satarkar, Archana, 2008. Food Science and Nutrition ABD Publishers, Jaipur.
6. Shubhangini, A. Joshi, 2010. Nutrition and Dietetics with Indian case studies, Mc Graw Hill Education (India), Pvt., Ltd, New Delhi.

E-Resources:

1. <https://libraryguides.mcgill.ca/>
2. <https://ipa-pasca.unpak.ac.id/>
3. <http://ecoursesonline.iasri.res.in/>
4. <https://link.springer.com/>

COURSE OUTCOMES:

CO1	Infer the chemistry of underlying properties and reactions of water and basics of food chemistry
CO2	Relate the chemistry of starch and sugars and know the major chemical reactions that limit shelf life of foods using sugars.
CO3	Apprehend the chemistry of protein, their functional properties in food.
CO4	Select the appropriate fats to be used in cooking and their storage and functional uses.
CO5	Appraise the role of enzymes and flavours in Indian cookery
CO6	Apply food chemistry principles to understand quality changes in foods and solve problems related to food processing, storage, and product development.

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	1	1	-	2	2	-	2	2
CO 2	3	3	2	2	2	2	1	1	2	2
CO 3	3	3	2	2	2	3	1	1	1	1
CO 4	3	3	2	2	1	3	2	1	1	1
CO 5	3	2	2	1	1	2	2	1	2	2
CO 6	3	3	3	2	2	3	2	2	3	2

COURSE OBJECTIVES:

To enable the students to

- Understand the chemical properties and functional characteristics of starches and sugars during food preparation and processing.
- Study the physicochemical changes occurring in proteins during cooking and various food processing methods.
- Examine the properties of fats and oils and evaluate factors influencing their stability and absorption during cooking.
- Investigate the behavior of pectic substances and plant pigments under different processing conditions and understand methods to prevent undesirable changes.
- Develop practical laboratory skills for conducting experiments, observing food chemistry phenomena, and interpreting experimental results.

FOOD CHEMISTRY- PRACTICAL:

1. Chemistry of Starch and Sugars
 - a) Gelatinization of Starch, Microscopic Examination of uncooked and gelatinized Starch.
 - b) Retrogradation and Syneresis
 - c) Stages of Sugar Cookery, Preparation of Fondant, Fudge, and Toffee, Scum formation in milk.
2. Chemistry of Proteins
 - a) Gluten Formation
 - b) Effect of Soaking, germination and fermentation of Pulses
 - c) Coagulation of egg white and egg yolk
 - d) Boiled Egg, Poached Egg, Omelettes, Custards and Mayonnaise
 - e) Coagulation and precipitation of milk proteins.
 - f) Changes observed in Cooking Meat, Fish and Poultry, Testing the Tenderness of meat.
3. Chemistry of Fats and Oils
 - a) Smoking Temperature of Different Fats
 - b) Factors Affecting Absorption of Fats
4. Chemistry of Pectic Substances and Plant Pigments.
 - a) Effect of acids, alkali and heat on water soluble and fat-soluble pigments
 - b) Enzymatic Browning and Methods of prevention

COURSE OUTCOMES: (With Mapping)

At the end of the course, the students will have the ability to	
CO1	Explain the chemical changes occurring in starches and sugars during gelatinization, retrogradation, syneresis, sugar cookery, and related food preparation processes.
CO2	Demonstrate and analyze the functional properties of proteins by performing experiments on gluten formation, pulse processing, egg coagulation, milk protein coagulation, and cooking of meat, fish, and poultry
CO3	Evaluate the physicochemical properties of fats and oils by determining smoke points and assessing factors affecting fat absorption during cooking.
CO4	Analyze the effects of acids, alkalis, heat, and enzymatic reactions on pectic substances and plant pigments, and apply suitable methods to control quality deterioration.
CO5	Perform laboratory experiments, record observations, interpret results, and relate food chemistry principles to practical food preparation and quality improvement.
CO6	Apply scientific laboratory practices to evaluate food chemistry experiments, interpret experimental data, prepare laboratory records, and communicate findings effectively while adhering to laboratory safety and good laboratory practices (GLP).

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	1	1	-	2	2	-	2	2
CO 2	3	3	2	2	2	2	1	1	2	2
CO 3	3	3	2	2	2	3	1	1	1	1
CO 4	3	3	2	2	1	3	2	1	1	1
CO 5	3	2	2	1	1	2	2	1	2	2
CO 6	3	3	3	2	2	3	2	2	3	2

COURSE OBJECTIVES:

To enable students to

- Understand various aspects of development of a food product.
- Acquire knowledge on the importance of Consumer Research, Finance and Communication.
- Learn to perform organoleptic evaluation of foods.

UNIT – I BASICS OF PRODUCT DEVELOPMENT:

New food product development: definition, classification, characterization, phases in food product development factors influencing new product development - social concerns, health concerns, impact of technology and market place influence. Generation of new product ideas: internal and external sources of ideas, market place analysis, standardization methods involved in product development; portion size and portion control, calculation of nutritive value & cost of production, shelf life & storage stability evaluation procedure of developed food products.

UNIT – II STAGES AND PRODUCT LIFE CYCLE:

Stages of food product development, formulation of new food products for specific target groups. idea generation, screening and evaluation, business analysis, development. Product management/ product life cycle -introduction, growth, maturity and decline stages market testing and commercialization, feasibility study and promotion of new products, food product planning-modifying the product, modifying the market, repositioning the product.

UNIT – III SUBJECTIVE AND OBJECTIVE EVALUATION OF FOODS:

Sensory characteristics of food, types of evaluation, reasons for testing food quality; Overview of the subjective tests with its advantages and disadvantages. Basic guidelines for conducting objective evaluation of foods: advantages and disadvantages, types of tests and equipments. Sensory analysis softwares- Overview

UNIT – IV FOOD PACKAGING AND LABELING:

Packaging - definition, functions, packaging environment, selection of packaging; Basic packaging materials and films; Packaging methods - traditional food packaging, retortable, lined cartons, bag in box, aseptic, modified atmosphere, vacuum, gas packaging, controlled atmospheric, microwave packaging, active, intelligent, edible packaging, nano packaging, green packaging, antimicrobial packaging, shrink and stretch packaging. Labeling - definition, purpose, types, materials, adhesives; food and nutritional labeling; barcoding, labeling laws and regulations.

UNIT – V INTELLECTUAL PROPERTY RIGHTS AND PATENT:

Research and new product development- patents- patent laws. International code for intellectual property rights, branding, licensing and acquisition franchising, product warranty.

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only):

Case study of the self help groups preparing and marketing Case study of microenterprise preparing and marketing food products. food products

TEXTBOOKS:

1. Srilakshmi.B.,(2010), Food Science, New Age International Publishers, New Delhi.
2. Earle, R., & Anderson, A. (Eds.), (2001), Food product development: Maximizing success, CRC press, New Delhi.
3. Charis Galanakis., (2016), Innovation Strategies in the Food Industry, 1st Edition, Academic Press, Cambridge.
4. Robertson, G.L. (2006), Food Packaging: Principles and Practice, 2nd edition, CRC Press, Taylor & Francis.
5. NIIR, (2003), Food Packaging Technology Handbook, National Institute of Industrial Research Board, Asia Pacific Business Press Inc, New Delhi.
6. Ahvenainen, R. (Ed.) (2003), Novel Food Packaging Techniques, CRC Press, New Delhi.

REFERENCE BOOKS:

1. Fuller, G. W. New Food Product Development from Concept to Marketplace, CRC Press, Boca Raton.
2. Carpenter, R. P., Lyon, D. H., & Hasdell, T. A. (2012), Guidelines for sensory analysis in food product development and quality control, Springer Science & Business Media.
3. MacFie, H. (Ed.), (2007), Consumer - led food product development, Elsevier, Cambridge.
4. Food Packaging Technology Handbook, (2003), NIIR Board of Consultants and Engineers, National Institute of Research, New Delhi.
5. Modern Packaging Industries, (2004), NIIR Board of Consultants and Engineers, National Institute of Industrial Research, New Delhi.
6. Robertson, G.L., (2012), Food Packaging: Principles and Practice, 3rd Edition, CRC Press, New Delhi.

E-RESOURCES:

1. <https://guides.library.iit.edu/>
2. <https://open.umn.edu/>
3. <https://www.destechpub.com/>
4. <https://nzifst.org.nz/>

COURSE OUTCOMES: (With Mapping)

CO1	Define and identify new product development concepts
CO2	Demonstrate and evaluate the sensory attributes of the developed food product
CO3	Interpret the step involved in standardization of food product
CO4	Analyse the stages of new product development
CO5	Evaluate the product innovation and feasible aspects of the product.
CO6	Validate patent rights of new products and process.

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	1	1	-	2	2	-	2	2
CO 2	3	3	2	2	2	2	1	1	2	2
CO 3	3	3	2	2	2	3	1	1	1	1
CO 4	3	3	2	2	1	3	2	1	1	1
CO 5	3	2	2	1	1	2	2	1	2	2
CO 6	3	3	3	2	2	3	2	2	3	2

Code:

**NUTRITION THROUGH LIFE
CYCLE
(Theory)**

Credits 4

COURSE OBJECTIVES:

To enable the students to

- Understand the importance of nutrition and health.
- Comprehend the basic aspects of meal planning.
- Obtain knowledge on the nutritional needs pertaining to different stages of life.
- Plan diet for various age groups.

UNIT – I MEAL PLANNING AND NUTRITION IN ADULTHOOD:

Acceptable Dietary Intake, Use of ICMR RDA in planning balanced diet, Basic principles of meal planning, RDA, food allowance for different age groups, factors influencing nutritional requirements for all age groups. Nutrition in adulthood – reference man and reference women, nutritional and food requirements of an adult man and women, body composition, nutrition and health issues, meal planning to suit different income levels.

UNIT – II NUTRITION IN PREGNANCY AND LACTATION:

Nutrition during pregnancy – stages of pregnancy, physiological changes, weight gain in pregnancy, complications, factors influencing the outcome of pregnancy, nutritional requirements and meal planning for pregnant women. Nutrition for lactating women – Physiology and psychology of lactation, hormonal control, colostrum – composition, composition of breast milk, factors affecting the volume and composition of breast milk, nutritional requirements of a nursing mother, meal planning, factors responsible for lactation failure.

UNIT – III NUTRITION IN INFANCY:

Nutrition in infancy – birth weight of infants, rate of growth, milestones in development (only stages), immunization schedule, nutritional requirements, process of breast feeding, superiority of breast milk, advantages of breast feeding, comparison of human milk with cow's milk, artificial feeding, weaning and supplementary foods, weaning problems and complications. Characteristics of low-birth weight infant, small for date babies, pre-term babies-Feeding of preterm infants.

UNIT – IV NUTRITION IN THE PRESCHOOLERS AND SCHOOL AGE CHILDREN:

Nutrition in preschool age – Growth and development, nutritional requirements, factors affecting nutritional status, food requirement, low cost supplementary foods, nutrition related problems in childhood, meal planning for the preschool child. Nutrition in the school age children – Growth pattern in school children, nutritional and food requirement, packed lunch – factors to be considered, sample menu, nutritional problems, meal plan for the school children.

UNIT – V NUTRITION IN ADOLESCENCE AND ELDERLY:

Nutrition in adolescence - growth and development, body composition, puberty, secondary sexual characteristics, psychological changes, nutritional requirements, nutritional problems, malnutrition due to early marriage, food habits and meal plan. Eating disorders-Binge eating, anorexia nervosa, bulimia nervosa. Nutrition in elderly – definition of geriatrics, changes in body composition, physiological changes, psychological and socio- economic factors in relation to food intake, nutritional requirement, food modification in old age. Nutrition related problems.

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only):

Dissemination of nutrition knowledge for chosen target groups during National Nutrition Month. Sensitising the nursing mothers on the importance of breast feeding during World Breast Feeding Day.

TEXTBOOKS:

1. Mahtab, S., Bamji, Krishnasamy, K., Brahman, G.N.V., (2012) Text Book of Human Nutrition, Third Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi.
2. Srilakshmi, B., (2013), Dietetics, New Age International (P) Ltd., New Delhi.
3. Swaminathan, M., (2012), Advanced Textbook on Food and Nutrition, Vol. 1, Second Edition, Bangalore Printing and Publishing Co. Ltd., Bangalore.
4. Shubhangini, A., Joshi (2002): Nutrition and Dietetics, 2nd edition, Tata McGraw-
5. Hill Publishing Company Limited, New Delhi.
6. Krishnasamy, K. and Sesikeran, B., (2013), Dietary Guidelines for Indians, National Institute of Nutrition, ICMR, Hyderabad.
7. Gopalan, C. Rama Sastri, B.V. and Balasubramanian, (2014), Nutritive Value of Indian Foods, NIN, ICMR, Hyderabad.

REFERENCE BOOKS:

1. Longvah, T., Ananthan, R., Baskarachary, K. and Venkaiah, K., (2017), Indian Food Composition Table, NIN, ICMR, Hyderabad.
2. Krause, M.V. and Hunscher, M.A., (2000) Food,

- Nutrition and Diet Therapy, 14th Edition, W.B. Saunders, London.
- Antia, F.P. (2005): Clinical Nutrition and Dietetics, Oxford University Press, Delhi.
 - Wardlaw, G.M., Hampi, J.S., DiSilvestro, R.A., (2004), Perspectives in Nutrition, 6th edition, McGraw Hill, New York.
 - Chadha, R. and Mathur, P., (2015), Nutrition: A Lifecycle Approach, Orient Blackswan, New Delhi.

E-RESOURCES:

- <https://www.pdfdrive.com/nutrition-through-the-life-cycle-e187862410.html>
- https://ocw.ui.ac.id/pluginfile.php/12209/mod_resource/content/1/Nutrition%20Through%20the%20Life%20Cycle%20by%20Judith%20E.%20Brown%20%28z-lib.org%29.pdf
- http://www.freebookcentre.net/medical_text_books_journals/nutrition_ebooks_online_texts_download.html
- <https://vdoc.pub/documents/nutrition-through-the-life-cycle-3rd-edition-6krnmbdqjeq0>

COURSE OUTCOMES: (With Mapping)

CO1	Relate the different stages of growth and nutrient requirements in the human life cycle.
CO2	Compare the Recommended Dietary Allowance for different age groups based on gender and activity.
CO3	Illustrate the food and nutritional requirements for specific groups of people based on their age and food habits.
CO4	Explain the nutrition related problems common in different stages of life cycle and its impact on health.
CO5	Recommend specific nutrients and foods for various age groups quantitatively and qualitatively.
CO6	Relate the food and nutrients requirements in relation to health

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	1	1	-	2	2	-	2	2
CO 2	3	3	2	2	2	2	1	1	2	2
CO 3	3	3	2	2	2	3	1	1	1	1
CO 4	3	3	2	2	1	3	2	1	1	1
CO 5	3	2	2	1	1	2	2	1	2	2
CO 6	3	3	3	2	2	3	2	2	3	2

Code:

**NUTRITION THROUGH LIFE
CYCLE
(Practical)**

Credits 4

COURSE OBJECTIVES:

To enable the students to

- Prepare and evaluate supplementary foods of different consistencies for improving nutritional status.
- Gain practical experience in diet planning using nutrition and diet analysis software.
- Enhance skills in dietary assessment, nutrient calculation, menu planning, and nutrition counseling.

Planning, nutritive value calculation and preparing one serving meal for:

1. Adult man belonging to low socio-economic group.
2. Adult man belonging to middle socio-economic group.
3. Adult man belonging to low socio-economic group.
4. Adult woman.
5. Pregnant woman.
6. Lactating woman.
1. Liquid supplementary food.
2. Semisolid supplementary food.
3. Solid supplementary food.
4. Preschool child.
5. School going child.
6. Adolescent boy.
7. Adolescent girl.
8. Elderly.
9. Demonstration of Diet Software

REFERENCE:

1. Seth, V. and Singh, K., (2013), Diet Planning through the Life.

COURSE OUTCOMES: (With Mapping)

At the end of the course, the students will have the ability to	
CO1	Explain the nutritional requirements and dietary recommendations for adults, women, pregnant and lactating mothers, and individuals from different socioeconomic groups.
CO2	Plan and prepare balanced diets for adults, women, pregnant and lactating women, considering age, physiological status, socioeconomic conditions, and nutritional needs.
CO3	Formulate and evaluate liquid, semi-solid, and solid supplementary foods suitable for different population groups.
CO4	Design nutritionally adequate meal plans for preschool children, school-going children, adolescents, and elderly individuals based on Recommended Dietary Allowances (RDAs).

CO5	Demonstrate proficiency in using diet planning software to assess dietary intake, calculate nutrient composition, and develop individualized diet plans.
CO6	Evaluate the nutritional adequacy of diets and communicate appropriate dietary modifications through scientific interpretation, menu planning, and nutrition counseling.

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	1	1	-	2	2	-	2	2
CO 2	3	3	2	2	2	2	1	1	2	2
CO 3	3	3	2	2	2	3	1	1	1	1
CO 4	3	3	2	2	1	3	2	1	1	1
CO 5	3	2	2	1	1	2	2	1	2	2
CO 6	3	3	3	2	2	3	2	2	3	2

COURSE OBJECTIVES:

To enable the students to

- Review the biological system of energy metabolism.
- Study the chemical/biochemical properties and metabolic pathways of carbohydrates, lipids, and proteins.
- Examine the regulatory mechanisms of macronutrient metabolism and associated signaling pathways.
- Understand the research techniques used in basic biochemistry and nutritional biochemistry research.

UNIT – I CARBOHYDRATE:

Monosaccharides - types, characteristics and properties; disaccharides, oligosaccharides, polysaccharides - biological significance, Carbohydrate metabolism - Metabolic Pathway - Glycolysis, TCA cycle, HMP shunt, Gluconeogenesis from TCA intermediates / amino acids / acetyl-CoA, concept of Glycogenesis and glycogenolysis.

UNIT – II PROTEIN:

Amino acids - classification, structure, properties, Protein structure: peptide linkage, covalent backbone, three-dimensional conformation; quaternary structure of oligomeric proteins. Determination of -N and -C terminal amino acids, Protein functions. Metabolism – Synthesis of protein and metabolism of amino acid

UNIT – III LIPID:

Classification, structure, properties; biological significance. Bioenergetics - electron transport and oxidative phosphorylation, redox potential, high energy compounds, ATP and significance, Lipid metabolism - beta oxidation of fatty acids, Biosynthesis of fatty acids.

UNIT – IV NUCLEOTIDES AND NUCLEIC ACIDS:

Structure of Purine and pyrimidine nucleotides - double helical structure of DNA, biosynthesis and catabolism of purine and pyrimidine nucleotides.

UNIT – V ENZYMES:

Enzymes - Definition, IUPAC classification of enzymes, factors affecting enzyme activity, Line weaver burk plot, Michaelis –Menton model, rate of enzyme activity, Inhibition of enzyme activity – feedback inhibition, allosteric inhibition

UNIT – VI CURRENT CONTOURS (For continuous internal assessment only):

Learn life at the molecular level. Functions of enzyme. Prepare models for Carbohydrate/ Protein metabolism.

TEXTBOOKS:

1. J. L. Jain, Sunjay Jain and Nitin Jain, Fundamentals of Biochemistry Publishers: S. Chand & Co Ltd, 2008.
2. Ambika Shanmugam, Fundamentals of Biochemistry for Medical Students, 7th Edition, Lippincott Williams and Wilkins, 2012.

REFERENCE BOOKS:

1. Jeremy M. Berg, John L. Tymoczko, Lubert Stryer, Biochemistry, Palgrave MacMillan; 7th revised international edition, 2011
2. Victor Rodwell, David Bender, Kathleen M. Botham, Peter, J. Kennelly, P. Anthony Weil, Harpers Illustrated Biochemistry, McGraw-Hill Education/ Medical; 30th edition, 2015
3. David L. Nelson, Michael M. Cox, Lehninger's Principles of Biochemistry, W.H. Freeman; 5th edition, 2008.

E-REFERENCE:

1. <https://labalbaha.files.wordpress.com/2014/04/fundamentals-of-biochemistry.pdf>
2. <http://www.freebookcentre.net/Chemistry/BioChemistry-Books-Download.html>
3. <https://agrimoon.com/fundamentals-of-biochemistry-pdf-book/>
4. <https://biochem.oregonstate.edu/content/biochemistry-free-and-easy>

COURSE OUTCOMES: (With Mapping)

At the end of the course, the students will have the ability to	
CO1	Interpret the significance of Carbohydrate metabolism
CO2	Acquire Knowledge on role of protein in metabolism and functions.
CO3	Infer Knowledge on lipid metabolism and biosynthesis of lipids.
CO4	Exemplify Nucleotides and Nucleic Acids
CO5	Understand the role of enzymes in metabolism and clinical conditions.
CO6	Interpret the significance of Carbohydrate metabolism

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	1	1	-	2	2	-	2	2
CO 2	3	3	2	2	2	2	1	1	2	2
CO 3	3	3	2	2	2	3	1	1	1	1
CO 4	3	3	2	2	1	3	2	1	1	1
CO 5	3	2	2	1	1	2	2	1	2	2
CO 6	3	3	3	2	2	3	2	2	3	2

Code:

**FUNDAMENTALS OF
BIOCHEMISTRY AND FOOD
PROCESSING AND PRESERVATION
(Practical)**

Credits **

COURSE OBJECTIVES:

To enable the students to

- Understand the principles, theory and calculations of each experiment.
- Acquire skills on preparation of all the solutions and to standardize solutions individually.

QUALITATIVE ANALYSIS:

1. Handling of Microscope.
2. Qualitative analysis of carbohydrates (glucose, fructose, maltose, galactose, sucrose, lactose),
3. Estimation of reducing sugar by Benedict's quantitative method.
4. Identification of both monosaccharides and disaccharides in mixtures.
5. Qualitative analysis of Proteins.
6. Qualitative analysis of Lipids
7. Determination of saponification number of edible oil.
8. Estimation of Iodine value of oil.

TEXTBOOKS

1. Varley, H., Gowenlak, A.H. and Hill, M. Practical Clinical Biochemistry, William Itinmaon Medical Books, London, 2000.
2. Oser, B.L., Harke's Physiological Chemistry XIV Edition Tata McGraw Hill Publishing Company Ltd., Bombay, 2001.
3. Sadasivam, S. and Manickam, A. Biochemical Method, Second Edition, New Age International P. Ltd., Publishers, New Delhi, 2003.
4. Raghuramulu, N., Madhavannair, K. and Kalyana Sundaram, National Institute of Nutrition, 2003, A Manual of Laboratory Techniques, Hyderabad, 500007.
- 5.

REFERENCE BOOKS

1. Dr. J. Jayaraman, Manuals in Biochemistry -New Age International Pub, Bangalore 2011.
2. Practical Biochemistry - Plummer, New Delhi: Tata Mcgraw Hill Publishing Company, 2000.
2. S. Sadasivam, V.A Manickam Biochemical methods, 2ed, New Age International Publishers, 2006.
3. Anil Kumar, Sarika Garg and Neha Garg. Vinod Vasishtha Biochemical Tests – Principles and Protocols. Viva Books Pvt Ltd, 2012.

COURSE OUTCOMES: (With Mapping)

At the end of the course, the students will have the ability to	
CO1	Demonstrate safe handling and proper use of laboratory equipment, including the microscope, while following good laboratory practices.
CO2	Perform qualitative analysis to identify carbohydrates, proteins, and lipids using standard biochemical tests.
CO3	Estimate reducing sugars quantitatively using Benedict's quantitative method and interpret the analytical results.
CO4	Differentiate and identify monosaccharides and disaccharides in unknown mixtures based on their chemical reactions.
CO5	Determine the physicochemical properties of edible oils by estimating their saponification number and iodine value using standard laboratory procedures.
CO6	Analyze, interpret, and document experimental observations accurately, relating biochemical test results to the composition and quality of food constituents.

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	1	1	-	2	2	-	2	2
CO 2	3	3	2	2	2	2	1	1	2	2
CO 3	3	3	2	2	2	3	1	1	1	1
CO 4	3	3	2	2	1	3	2	1	1	1
CO 5	3	2	2	1	1	2	2	1	2	2
CO 6	3	3	3	2	2	3	2	2	3	2

Code:**FOOD PACKAGING
(Theory)****Credits 2****OBJECTIVES:**

At the end of the course, students will be able to

- Understand the different packing materials available.
- Outline the packaging techniques

UNIT – I FUNCTIONS AND REQUIREMENTS FOR EFFECTIVE FOODS

Functions and requirements for effective food packaging. Types of food packaging, rigid, semi rigid, flexible. Types of container- primary, secondary and tertiary.

UNIT – II FOOD PACKAGING MATERIALS

Metal and metal cans, Glass and glass containers in food packaging. Paper, paper board and fiber board. Plastics and Laminates, retortable pouches and trays.

UNIT – III Packaging techniques and Performances

Aseptic Packaging, Modified atmosphere packing and controlled atmosphere packaging. Vacuum packaging, shrink packaging, Bioactive packaging and Nanotechnologies in food packaging. Tetra packaging, Nitrogen filling packaging, ozone packaging.

UNIT – IV MODERN PACKAGING TECHNIQUES

Ventilation of packages, cushioning materials used during packaging.

UNIT – V EDIBLE PACKAGING

Edible packaging, concepts and its importance, packaging points, standardisation of packaging, biodegradable packaging materials

TEXT BOOKS:

1. Norman N. Potter “Food Science” 5th edition, CBS Publisher and Distributors Pvt.Ltd. (2007)
2. Niir Board, Hand Book on Modern Packaging Industries, Asia Pacific Business Press Inc.
3. Doney Sun Lee, Food Packaging Science and Technology, CRC Press(2008).

REFERENCE BOOKS:

1. Fuller and John, Modern Restaurant Service, Hutchinson, London (1983).

E- REFERENCE:

1. <http://eagri.org/eagri50/HORT381/pdf/lec09.pdf>
2. <https://www.sciencedirect.com/science/article/pii>
3. <http://eagri.org/eagri50/HORT381/pdf/lec09.pdf>
4. <http://eagri.org/eagri50/HORT381/pdf/lec09.pdf>

COURSE OUTCOMES: (With Mapping)

At the end of the course, the students will have the ability to	
CO1	Explain the new advances and State-of the art in food packing.
CO2	Apply how to use appropriate packaging materials for varied food products.
CO3	Analyse the use of various techniques in food packaging.
CO4	Aware the regulations followed in food packaging.
CO5	Explain the new advances and State-of the art in food packing.
CO6	Analyse the packaging techniques and performances

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	1	1	-	2	2	-	2	2
CO 2	3	3	2	2	2	2	1	1	2	2
CO 3	3	3	2	2	2	3	1	1	1	1
CO 4	3	3	2	2	1	3	2	1	1	1
CO 5	3	2	2	1	1	2	2	1	2	2
CO 6	3	3	3	2	2	3	2	2	3	2

COURSE OBJECTIVES:

To enable the students to

- Understand the concept, principles, and scope of diet therapy and the role of a dietitian.
- Gain knowledge on dietary modifications for various deficiency and infectious diseases.
- Learn principles of dietary management for gastrointestinal and liver disorders.
- Understand nutritional management of lifestyle-related diseases.
- Acquire knowledge on dietary management of renal diseases and special health conditions.

UNIT – I DEFINITION AND CONCEPT OF DIET THERAPY:

Definition of Dietitian, Classification of a dietitian; Role of dietitian- functions and Team approach in patient care Purpose and principle of therapeutic diets, modification of normal diet, classification of therapeutic diets; Special feeding techniques – enteral and parenteral feeding.

UNIT – II DIETARY MANAGEMENT OF FEVER AND DEFICIENCY DISEASES:

Aetiology, symptoms and principles of dietary management:- Protein energy Malnutrition; Vitamin A deficiency; Anaemia & Iodine deficiency; Febrile conditions – Acute & Chronic-Typhoid, influenza, malaria, tuberculosis Dengue, Covid 19.

UNIT – III DIETARY MANAGEMENT OF GI TRACT & LIVER:

Aetiology, symptoms and principles of dietary management:- Diarrhoea, dysentery and constipation; Peptic ulcer, Irritable bowel syndrome; Disease of liver Etiology, metabolic & clinical aberrations, diagnosis, complications, treatment and diet therapy in Jaundice, Hepatitis, Fatty liver and Cirrhosis, Hepatomegaly & Gall bladder- cholelithiasis and cholecystitis

UNIT – IV LIFE STYLE DISORDERS/DISEASES:

Aetiology, symptoms, complications and principles of dietary management: - Obesity, Diabetes mellitus; Cardio vascular diseases – hypertension, atherosclerosis; Congestive cardiac failure, hyperlipidemia, Cancer.

UNIT – V DIETARY MANAGEMENT OF RENAL DISEASES & SPECIAL CONDITIONS:

Aetiology, symptoms and principles of dietary management. Nephritis, nephrosis, urolithiasis, renal failure – acute and chronic and Dialysis – types and Diet in Dialysis;

Nutrition for children with special needs – Autism, Cerebral palsy, ADHD and Downs Syndrome

UNIT – VI CURRENT CONTOURS (Self-directed learning for Continuous Internal Assessments Only):

Prepare charts, posters and presentations related to therapeutic nutrition and disease conditions.

Visit hospitals, clinics or dietary departments to observe therapeutic diet planning and patient counselling.

Create awareness materials such as pamphlets, videos or PowerPoint presentations on diet therapy and healthy lifestyle practices.

TEXT BOOKS:

1. Srilakshmi B, Dietetics (2017), New Age International Publishing Ltd.
2. Antia F. P. Clinical Dietetics and Nutrition, 2002 4th edition, Oxford university press.
3. Indian Dietetic Association, (2018) Clinical Dietetics Manual Elite Publishing House Pvt. Ltd

REFERENCE BOOKS:

1. Meenakshi Bajaj (2019) Diet Metrics: Hand Book of Food Exchanges, Notion Press Media Pvt Ltd,
2. Shubhangini A Joshi (2021) Nutrition and Dietetics, McGraw Hill
3. Sheila John, Jasmine Devaselvam (2016) Essentials of Nutrition and Dietetics for Nursing, Wolters Kluwer India Pvt. Ltd
4. Davidson and Passmore, Human Nutrition and Dietetics, Churchill Livingstone publication.
5. Sue Rodwell Williams, Basic Nutrition and Diet Therapy, 2000 Mosby publication.
6. Garrow J.S, James W. P.T, (2000), Human Nutrition and Dietetics, 10th edition, Churchill Livingstone, London.
7. Robinson C.H., Lawler M.R, Cheweth W.L; and Gaswick A.E, Normal and Therapeutic Nutrition, 17 th edition, Mac Milan Publishers.

E-RESOURCE:

1. <https://www.cdc.gov/nutrition/index.html>
2. <https://archive.nptel.ac.in/courses/126/104/126104004/>
3. <https://www.pdfdrive.com/nutrition-and-dietetics-text-books-online-e6071568.html>
4. <https://www.infobooks.org/free-pdf-books/medical/nutrition/>

COURSE OUTCOMES: (With Mapping)

CO1	Explain the concepts, principles, and classifications of therapeutic diets and the role of dietitians in patient care.
CO2	Describe the etiology, symptoms, and dietary management of deficiency diseases and febrile conditions.
CO3	Discuss the dietary management and nutritional care for gastrointestinal and liver disorders.
CO4	Explain the causes, complications, and dietary management of lifestyle disorders such as obesity, diabetes, cardiovascular diseases, and cancer.
CO5	Describe the dietary management of renal diseases and nutritional care for children with special needs.

CO6	Apply principles of diet therapy in planning and modifying diets for various diseases and special conditions.
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Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	3	1	2	1	2	1	-	-	1
CO 2	2	3	2	2	2	3	1	1	-	1
CO 3	2	3	2	3	2	3	1	2	1	1
CO 4	2	3	3	3	2	3	2	2	1	1
CO 5	2	3	3	3	2	3	2	2	1	1
CO 6	3	3	3	3	3	3	2	3	2	2

S- Strong (3) M-Medium (2) L-Low (1)

COURSE OBJECTIVES:

To enable the students to

- Understand principles of diet planning for various diseases and clinical conditions.
- Develop skills in planning and preparing therapeutic diets for different disorders.
- Learn to calculate nutritive value of diets based on individual requirements.
- Gain practical knowledge in modifying normal diets according to disease conditions.
- Apply diet therapy principles in hospital and community settings.

PRACTICAL:

Planning, Nutritive value Calculation and preparation of diets for one serving for the following deficiencies/ diseases/disorders/ conditions:

1. Routine hospital diets – full fluid, clear fluid, soft
2. PEM and Anaemia
3. Constipation, Diarrhoea
4. Peptic ulcer
5. Hepatitis and Cirrhosis
6. Fever – Typhoid and Tuberculosis
7. Obesity
8. Diabetes Mellitus
9. Hypertension, Atherosclerosis and Congestive cardiac Failure.
10. Nephritis
11. Nephrosis
12. CRF
13. Autism

COURSE OUTCOMES: (With Mapping)

CO1	Plan and prepare routine hospital diets such as clear fluid, full fluid and soft diets.
CO2	Design therapeutic diets for deficiency diseases including PEM and anaemia.
CO3	Apply dietary modifications for gastrointestinal disorders such as constipation, diarrhoea and peptic ulcer.
CO4	Demonstrate skills in nutritional assessment, diet history collection, and preparation of patient-specific diet plans during hospital internship.
CO5	Plan appropriate diets for lifestyle and renal disorders including obesity, diabetes, hypertension and CRF.
CO6	Calculate nutritive values and assess therapeutic diets for special conditions such as autism and nephrotic disorders.

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	3	2	2	3	2	2	3	-	1
CO 2	2	3	3	3	3	2	2	3	1	1
CO 3	2	3	3	3	3	2	2	3	1	1
CO 4	3	3	3	3	3	3	3	3	3	2
CO 5	2	3	3	3	3	3	2	3	2	2
CO 6	2	3	3	3	3	3	2	3	2	2

S- Strong (3) M-Medium (2) L-Low (1)

COURSE OBJECTIVES:

To enable the students to

- Acquire knowledge of food preservation and preservation technique.
- Infer the importance and basic principles of food preservation
- Classify the various methods of food preservation.
- use these principles to preserve different types of foods.
- Relate the mode of action of different preservatives.

UNIT – I INTRODUCTION TO FOOD PROCESSING:

Principles, Importance and Methods of processing - Primary processing:- Introduction, Classification & Method of Cleaning, Sorting, Grading, Cutting, Seeding, Chilling and freezing; Secondary processing:- Introduction, Classification & Method of Slicing, Pulping, Paste, Frying, Chilling and freezing, Milling Common food processing: - Introduction, Classification & Method of Cooking, Baking, Frying, Roasting, Toasting, Grilling, Blanching, Extrusion

UNIT – II PRESERVATION BY LOW AND FREEZING TEMPERATURE:

Food Freezing and thawing process: Introduction, freezing point and freezing rate, comparison of Freezing and thawing process; freezing methods: Air freezing, plate freezing, liquid immersion freezing and cryogenic freezing. Freezer selection. Advantages and disadvantages of freezing.

UNIT – III PRESERVATION BY THERMAL APPLICATION & DEHYDRATION

Thermal application Sterilization, Blanching, Pasteurization UHT processing, canning, extraction cooking, dielectric heating, microwave heating, baking, roasting and frying; Food Drying/Dehydration: Definition, factors affecting drying, Drying methods and equipment: sun/solar drying, Cabinet drying, tunnel dryer, spray dryer, freeze dryer, fluidized bed dryer, Nutritional, physico-chemical changes during drying.

UNIT – IV PRESERVATION BY OTHER METHODS:

Preservatives -Concept and definition -Types -Natural preservatives -Synthetic preservatives; and their application; Irradiation - Concept, definition -Principles of irradiation-Types -Application

UNIT – V PRESERVATION USING FOOD CONCENTRATE & MEMBRANE PROCESSING

Food Concentration: Evaporation- Definition, types of evaporator (single effect, double effect and multiple effect evaporator); Freeze concentration- General principles and applications, basic elements; Membrane Processing: General principles and advantages, Classification of membrane system: Reverse Osmosis,

Nano Filtration, Ultra Filtration, Micro Filtration, Electrodialysis and Pervaporation; application in the food industries; Limitation of membrane processes.

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only):

1. In your region / community, list the foods that are preserved at home and identify the method and preservatives used for preservation.
2. Identify the processed food made using artificial sweeteners that are available in your area.

TEXTBOOK:

1. Manay, N.S. Shadaksharaswamy, M. (2004), “Foods- Facts and Principles”, New age international publishers, NewDelhi.
2. Srilakshmi, B. (2003), “Food Science”, New Age International Publishers, New Delhi.
3. Subalakshmi, G and Udipi, S.A. (2001), “Food processing and preservation”. New Age International Publishers, New Delhi.
4. Shafiur Rahman M.: Hand Book of Food Preservation, Marcel Dekker Inc, New York.
5. Prakash Triveni: Food Preservation, Aadi Publication, De Sivasankar Food Processing and Preservation, Prentice Hall India Learning Private Limited (1 January 2002)

REFERENCE BOOK:

1. Gopala Rao, Chandra. “Essentials of Food Process Engineering”. B.S. Publications, 2006.
2. Desrosier N. W. The Technology of Food Preservation; BS Publishers & Distributors Pvt Ltd, India; 4th edition (1 January 2004)
3. Gould, G. W. (2012), “New Methods of food preservation”, Springer Science & Business Media.
4. Ramaswamy H and Marcott M. Food Processing Principles and Applications. CRC Press, 2005
5. Norman N Potter and Joseph H. Food Science by Hotchkiss, CBS Publishers and Distributors.
6. Barbosa-Canovas, Tapia & Cano Novel Food Processing Technologies by CRC Press, 2004.

E-Resources:

1. National Center for Home Food Preservation. <http://nchfp.uga.edu/>
2. Ministry of Food Processing Industries. <http://mofpi.nic.in/>

COURSE OUTCOMES: (With Mapping)

CO1	Apply the principles and methods involved in the processing of different foods
CO2	Discuss and Compare various food processing technology
CO3	Differentiate the mechanisms used in the various methods of preservation
CO4	Identify novel technologies in the processing of food
CO5	Infer the high end techniques in food processing and preservation.
CO6	Analyse the application of food processing technology

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	3	2	2	3	2	2	3	-	1
CO 2	2	3	3	3	3	2	2	3	1	1
CO 3	2	3	3	3	3	2	2	3	1	1
CO 4	3	3	3	3	3	3	3	3	3	2
CO 5	2	3	3	3	3	3	2	3	2	2
CO 6	2	3	3	3	3	3	2	3	2	2

S- Strong (3) M-Medium (2) L-Low (1)

Code:

**FUNDAMENTALS OF
BIOCHEMISTRY AND FOOD
PROCESSING AND PRESERVATION
(Practical)**

Credits 4

COURSE OBJECTIVES:

To enable the students to

- Gain knowledge about the preparation of some basic food products.
- Understand to utilize the processed food products to start a small-scale processing modules

PRACTICALS

1. Preparation of jam, jelly, marmalades, preserves, candies, Tutti fruity, Glazed, Crystallized fruits, Toffees
2. Preparation of squash, fruit juice concentrate and Ready to Serve (RTS) foods
3. Preparation of Tomato sauce, Tomato ketchup.
4. Preparation of pickles (oil, vinegar and salt based)
5. Preparation of salted, dehydrated, vegetables preserves (vathals)
6. Preparation of dehydrated cereal products (vadams) -Rice, Sago, Rice flakes.
7. Preparation and preservation of any product using chemical preservation
8. Vegetable based dehydrated powders
9. Spice based dehydrated powders
10. Fermented pickle

TEXTBOOK:

1. Niir Board (2012), Modern Technology on Food Preservation, Asia Pacific Business Press, New Delhi

COURSE OUTCOMES: (With Mapping)

CO1	Plan and prepare routine hospital diets such as clear fluid, full fluid and soft diets.
CO2	Design therapeutic diets for deficiency diseases including PEM and anaemia.
CO3	Apply dietary modifications for gastrointestinal disorders such as constipation, diarrhoea and peptic ulcer.
CO4	Demonstrate skills in nutritional assessment, diet history collection, and preparation of patient-specific diet plans during hospital internship.
CO5	Plan appropriate diets for lifestyle and renal disorders including obesity, diabetes, hypertension and CRF.
CO6	Calculate nutritive values and assess therapeutic diets for special conditions such as autism and nephrotic disorders.

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	3	2	2	3	2	2	3	-	1
CO 2	2	3	3	3	3	2	2	3	1	1
CO 3	2	3	3	3	3	2	2	3	1	1
CO 4	3	3	3	3	3	3	3	3	3	2
CO 5	2	3	3	3	3	3	2	3	2	2
CO 6	2	3	3	3	3	3	2	3	2	2

S- Strong (3) M-Medium (2) L-Low (1)

Code:

**SPORTS NUTRITION
(Theory)**

Credits 2

COURSE OBJECTIVES:

To enable the students to

- Explore the nutritional requirements of individuals participating in sports activities.
- Understand and address nutritional challenges faced by athletes.
- Acquire insights into the metabolism of various nutrients during exercise.

UNIT – I INTRODUCTION TO SPORTS NUTRITION

Definition, scope of sports nutrition, Organization working for sports nutrition, Importance of sports Nutrition, Physiology of Exercise - Fuels for Exercise - Carbohydrates -Fats – Proteins. Classification of Sports, Sports and energy drinks, Nutrition for Ironman, Triathlon and Ultrathon, Nutritional risks among Adolescent Athletes with Eating disorder, Use of steroids and their harmful effects.

UNIT – II NUTRIENTS METABOLISM AND PERFORMANCE ENHANCEMENT

Role of macronutrient and micronutrient on exercise and sports performance. Hydration assessment - Pre competition Hydration, The Week before, the day before, on the day.

UNIT – III BALANCED DIET

Balanced diet for athletes Determinants of food choice, Balanced diet, Vegetarian diet, food guide pyramid.

UNIT – IV NUTRITIONAL PROBLEMS OF SPORTS PERSON

The female athlete triad, amenorrhea, osteoporosis, anemia, cramps, - effect on sports performance, treatment and prevention.

UNIT – V DIETARY SUPPLEMENTS FOR SPORTS NUTRITION

Dietary supplements for sports nutrition Dietary supplements for sports nutrition and their classification, Macronutrient supplements- Protein supplements, Branched chain Amino Acids, amino acid supplements, carbohydrates, Micronutrient supplements- vitamins, mineral supplements.

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only):

Prepare pyramid model for dietary supplements, case studies on types of athlete and nutrient needs.

Text Books:

1. B. Srilalakshmi, V. Suganthi, C. kalavani Ashok.(2017). Exercise Physiology fitness and sports nutrition. New Age International, India

2. Vijaya lakshmi. (2007). Sports Nutrition, khel sahitya kendra, India.

REFERENCE BOOKS:

1. Jose Antonio et al (2009) Essentials of Sports Nutrition and Supplements, Humana Press.
2. Asker Jeukendrup, Michael Gleeson 2019 Sport Nutrition Human Kinetics, United States.
3. Wener W.K. Hoeger, Sharon (2012), Lifetime Physical Fitness and Wellness: A. Personalized Program, Cengage Learning, United States
4. Benardot, Dan. (2000). Advanced Sports Nutrition.(3rd ed.), Human Kinetics Bourns,
5. Fred. (2002). Essentials of Sports Nutrition.(2nd edition.), United States
6. Greenwood, M., Cooke, M.B., Ziegenfuss, T., Kalman, D.S., Antonio, J (2015). Nutritional Supplements in Sports and Exercise.(3rd ed.,).USA.

Web links

1. <https://www.nal.usda.gov/fnic/fitness-and-sports-nutrition>
2. <https://www.ncbi.nlm.nih.gov/pmc/articles>
3. <https://jissn.biomedcentral.com/articles>

Journals

1. International Journal of Sport Nutrition and Exercise Metabolism (IJSNEM), United States.
2. Journal of the International Society of Sports Nutrition (JISSN), United States.
3. Journal of the American College of Nutrition (JACN), United States.
4. European Journal of Sport Science, United States of America
5. Journal of Sports Sciences, United States of America.

COURSE OUTCOMES: (With Mapping)

CO1	Classify the sports person based on their endurance
CO2	Relate the role of balanced diets in sports persons
CO3	Infer the nutrition problems of sports person
CO4	Evaluate the nutrition demand for sports person
CO5	Suggest dietary supplements for sports person
CO6	Illustrate the performance of athletes

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	3	2	2	3	2	2	3	-	1
CO 2	2	3	3	3	3	2	2	3	1	1
CO 3	2	3	3	3	3	2	2	3	1	1
CO 4	3	3	3	3	3	3	3	3	3	2
CO 5	2	3	3	3	3	3	2	3	2	2
CO 6	2	3	3	3	3	3	2	3	2	2

S- Strong (3) M-Medium (2) L-Low (1)

Code:

BAKERY AND CONFECTIONARY
(Theory)

Credits 4

COURSE OBJECTIVES:

To enable the students to

- Understand the principles & methods of baking.
- Acquire basic skills in baking and confectionery.
- Understand the role of various food component sin baking and the interaction of the elements used for baking.

UNIT - I BASIC BAKING & EQUIPMENTS:

Baking: Meaning, process and scientific principles involved. Classification of baked products. Basic plan and layout of a bakery unit. **Equipments used in bakery:** Large and small equipments and tools; types of ovens Nutritional as pects of bakery products Storage and evaluation (objective and subjective methods) of baked products.

UNIT- II BAKING IN GREDIENTS:

Ingredients used in bakery: Functional classification of ingredients-structure builders, tenderizers, moisteners, driers and flavors. Flour: Composition, types and quality characteristics. Sugar. Fats: Fats used as shortenings - Butter, margarine, emulsified fats and flavored oils; properties and uses of shortenings. Leavening agents: Definition and classification - physical; chemical – baking powder and its types, baking soda; biological – yeast –types and role in baking.; Moisturizing agents: Egg, water and milk – their role in baking.

UNIT – III BREAD & CAKES:

Bread: Ingredients used, steps in bread making process, processing methods, characteristics of good bread (external and internal). **Cakes:** Ingredients, types, cake making methods, test for doneness, characteristics of good cake (external and internal), cake faults and remedies. Icing: Meaning, types, ingredients used and preparation guidelines.

UNIT – IV COOKIES&PASTRIES

Cookies: Characteristics, preparation methods and problems in cooking making. **Biscuits:** Steps involved in biscuit making. Pastries: Types and method of preparation.

UNIT – V SUGAR CONFECTIONARIES:

Sugar confectionery – Types, role of sugar in preparation, Candies – Fondant like toffee, fudge, marshmallows, gums, jellies, chocolates–properties of these candies.

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only):

Visit to a bakery unit. Identify Faults in cakes, bread

TEXT BOOKS:

1. Avantina Sharma. 2019. Textbook of Food Science and Technology. 3rd edition. CBS publishers, ISBN-10:9789386478009, ISBN-13:978-9386478009.
2. Dubey S C. 2002. Basic Baking. Society of Indian Bakers, New Delhi.
3. John Kingslee. 2006. A professional textbook to Bakery and Confectionary. New Age International Pvt Limited Publisher, New Delhi.
4. Uttam K. Singh. 2011. Theory of Bakery and Confectionary An operational approach. Kanishka Publishers and Distributors, New Delhi.
5. Yogambal Ashokkumar. 2012. Bakery and Confectionary. PHI publication.
6. John Kingslee. 2014. A professional text to Bakery and Confectionary. New Age International (P)Limited.

REFERENCE BOOKS:

1. Lilian Hiagl and Meyer. 2004. Food chemistry. CBS publishers and Distributors.
2. Shakunthala Manay N and Shadaksharaswamy M. 2005. Food Facts and Principles, New Age International(P)Ltd Publishers.

E-Resources:

1. <https://guides.baker.edu/>
2. <https://www.nipabooks.com/>
3. <https://library.rrc.ca/>
4. <https://nios.ac.in/>

COURSE OUTCOMES: (With Mapping)

CO1	Explain the properties and functions of various ingredients in bakery science.
CO2	Understand the role and use of equipment in the production of baked foods.
CO3	Apply the principles of different mixing methods and baking techniques.
CO4	Classify the basic confectionary products.
CO5	Infer knowledge on role of sugar in confectionaries
CO6	Explain the properties and functions of various ingredients in bakery science.

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	3	2	2	3	2	2	3	-	1
CO 2	2	3	3	3	3	2	2	3	1	1
CO 3	2	3	3	3	3	2	2	3	1	1
CO 4	3	3	3	3	3	3	3	3	3	2
CO 5	2	3	3	3	3	3	2	3	2	2
CO 6	2	3	3	3	3	3	2	3	2	2

S- Strong (3) M-Medium (2) L-Low (1)

Code:

**FOOD SERVICE MANAGEMENT
(Theory)**

Credits 4

COURSE OBJECTIVES:

To enable the students to

- Know the functioning of different types of food service institutions.
- Understand the types of kitchen and kitchen layout
- Comprehend the space allocation and arrangement of food service units.
- Develop skills on the concept of quantity food cookery
- Utilize resources effectively in food service industry.

UNIT – I FOOD SERVICE INDUSTRY:

Food Service Industry- history and development Sectors of Food Service Industry Types of Food Service Institutions - Commercial and Non-commercial Definition, objectives and functions of Hotel, Motel, Restaurant, Cafeteria and chain hotels.

Welfare – Hospital, School lunch, Residential establishment and Industrial catering.

Transport – Air, Rail, Sea and Space, Miscellaneous – Contract and outdoor.

UNIT – II FOOD PRODUCTION AND SERVICE:

Food Production: Importance, Principles of Menu Planning in Food Service Institutions, Type of Menu, Techniques of Menu Writing. Quality standards and control Standardization of Recipe, Portion Control, Utilization of left over foods in food service institutions. Food cost control. Book of accounts

Food Service: Formal and Informal types, Styles of Food Services, Centralized and Decentralized System of Service

UNIT – III MANAGEMENT AND ORGANIZATION:

Management: Principles, Functions and Tools of Management, Tangible Tools of Management: Computer applications in menu planning.

Organization – Organizing -present and future trends. Process of organization. Principles of organization, types of organization, tools of management. Definition, theories and types.

Personnel Management: Recruitment, Selection, Induction, Training, Motivation and Leadership, Wages and other welfare benefits for personnel Laws Governing Food Service Establishment pertaining to employees –Labour laws.

UNIT – IV PHYSICAL PLANT, EQUIPMENT AND FOOD PURCHASE:

Layout of kitchens, types of kitchens – Planning, Receiving and storage space of foods, table setting, Dishwashing.

Equipment - Classification, traditional and modern equipment, factors

involved in selection, use and care of major equipment's

Food Purchase- Procedures and Factors involved in the selection of food

UNIT – V HYGIENE, SANITATION AND SAFETY IN FOOD SERVICE INSTITUTIONS:

Definition, importance, environmental hygiene and sanitation; hygiene in food handling, importance of pest and rodent control in food services. Safety in disposal of food waste. Sustainable food services practices, Accidents in food service and safety procedure, legal responsibilities of food service manager FSSAI (Food safety standard authority of India), Procedures to apply for FSSAI in Tamil Nadu. Entrepreneurship in catering.

UNIT – VI CURRENT CONTOURS (Self-directed learning activities for Continuous Internal Assessments Only):

Application of principles of sanitation in college laboratory and hostel. Visit to catering institutions to know about organization pattern and personnel Management. Cost comparison of different types of fuel. Explore the different traditional and modern equipment's used in food service. Eco kitchen / green kitchen concepts

TEXTBOOKS:

1. Kinton.R And Ceserani, V. 1992.The Theory of Catering. ELBS Publishers.
2. T. Ramaswamy. Principles of Management Himalaya Publication.
3. Subba Rao, P. 2014 Management Theory and Practice, Himalaya publication
4. Swaminathan, M.1979, Food Service and Experimental Foods, Ganesh & Co., Madras
5. Mohini Sethi and Surjeet Malhan, "Catering Management – an integrated approach", 2nd edition, Wiley Eastern Limited, New Delhi, Reprint 2007.

REFERENCE BOOKS:

1. West, B.B. and Wood, L. 1979. Food Service in Institutions, John Wiley, New York.
2. Mary, B. Gregoire, Marian, C. Spears. (2007). Food Service Organizations. United States Pearson Prentice Hall.
3. Jyoti, S. Sharma. (2006). Food Service Modern Technique and Practices. New Delhi: Akansha Publishing House.
4. Roday, S. (2017). Food Hygiene and Sanitation. (2nd ed.). India: McGraw-Hill Education (India) Pvt Limited.

E-Reference:

1. <https://www.ccohs.ca/oshanswers/hsprograms>
2. <https://www.eatrightpro.org/practice/practice-resources>
3. <https://www.ers.usda.gov/topics/food-markets-prices/food-service-industry.aspx>
4. <https://theicn.org/>
5. www.fssai.gov.in

COURSE OUTCOMES: (With Mapping)

CO1	Remember and explain the structure, scope, functions, and types of food service institutions and sectors in the food service industry.
CO2	Understand and describe the principles of food production, menu planning, food cost control, and styles of food service systems.
CO3	Analyze the principles of management, organizational structures, personnel management practices, and labour laws related to food service establishments.
CO4	Examine and evaluate the planning of kitchen layouts, equipment selection, food purchasing procedures, and storage systems in food service institutions.
CO5	Evaluate hygiene, sanitation, safety measures, legal regulations, and sustainable practices followed in food service operations.
CO6	Apply managerial and entrepreneurial skills for effective operation and administration of food service and catering establishments.

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	3	1	1	-	2	1	-	-	1
CO 2	2	3	2	2	2	2	1	2	1	1
CO 3	2	3	3	3	2	2	2	2	1	1
CO 4	2	3	3	3	3	2	2	3	2	1
CO 5	2	3	3	3	3	3	2	3	2	1
CO 6	3	3	3	3	3	3	3	3	2	1

S- Strong (3) M-Medium (2) L-Low (1)

Code:

**FUNDAMENTALS OF
RESEARCH METHODOLOGY
AND STATISTICS
(Theory)**

Credits 4

COURSE OBJECTIVES:

To enable the students to

- Understand the basic concepts, types, and significance of research.
- Develop skills in formulating research problems, objectives, and hypotheses.
- Gain knowledge of data collection methods and research design.
- Apply basic statistical tools for data analysis and interpretation.
- Develop competence in report writing and presentation of research findings.

UNIT – I INTRODUCTION TO RESEARCH:

Meaning, objectives, and significance of research, Types of research: Basic, Applied, Qualitative, Quantitative. Research process and steps, Identification and formulation of research problem. Variables- Types and concepts

UNIT – II RESEARCH DESIGN AND SAMPLING:

Research design- Meaning and types (Exploratory, Descriptive, Experimental). Sampling- Meaning, need, and types. Probability sampling (simple random, stratified) Non-probability sampling (convenience, purposive). Sample size determination. Pilot study

UNIT – III DATA COLLECTION METHODS:

Types of data - Primary and Secondary. Methods of data collection- Observation, Interview, Questionnaire and Schedule, Scaling techniques (Likert, rating scales). Reliability and validity.

UNIT – IV STATISTICAL ANALYSIS:

Classification and tabulation of data. Measures of central tendency- Mean, Median, Mode. Measures of dispersion - Range, Standard Deviation. Graphical representation - Bar diagram, Pie chart, Histogram. Introduction to inferential statistics - Chi-square test, t-test, ANOVA (basic concept).

UNIT –V RESEARCH REPORT AND INTERPRETATION:

Interpretation of data. Structure of research report - Introduction, Methodology, Review of Literature, Results and discussion. Conclusion and recommendations. Referencing styles (APA/MLA). Ethical issues in research.

UNIT – VI CURRENT CONTOURS (Self-directed learning activities for Continuous Internal Assessments Only):

Hypothesis and its types, calculate sample size using unknown population size formula, Difference between Questionnaire and Interview schedule, Bibliography formats and styles (APA, Chicago, MLA, ASA), Use of computer applications in data processing.

TEXTBOOKS:

1. Kothari G.R.(2004).Research Methodology. New Age International (P) Ltd
2. Dr. Rajamohan.S. and Thilagaraj A.(2010).Introduction to Statistics (2nd ed) Learn tech Press
3. Saravanel P. (2013). Research Methodology. Kitab Mahal Allahabad
4. Vijayalakshmi G. and Sivapragasam .C. (2008).Research Methodology. MJP Publishers

REFERENCE BOOKS:

1. Borse. M. N. (2004). Hand Book of Research Methodology. Shree Niwas Publications, Jaipur (India).
2. Grumani N. (2014). Research Methodology for Biological Sciences. MJP Publishers
3. Ramadas. R. and Wilson. A. (2014). Research and Writing. MJP Publishers.
4. Gupta S. P. (2002). Statistical Methods. Sultan Chand & Sons, New Delhi.

E-Reference:

1. https://www.google.co.in/books/edition/Fundamental_of_Research_Methodology_and/zrFwbtpKIC?hl=en&gbpv=1&dq=research+methodology+books+pdf&p.
2. https://www.google.co.in/books/edition/Research_Methodology/k6pMrsB5T_oC?hl=en&gbpv=1&dq=research+methodology+books+pdf&printsec=frontcover&bshv=rimg
3. <https://egyankosh.ac.in/bitstream/123456789/11204/1/Unit-1.pdf>
4. <https://egyankosh.ac.in/bitstream/123456789/8380/1/Unit-10.pdf>
5. <https://www.ignouhelp.in/ignou-mlie-102-study-material/>

COURSE OUTCOMES: (With Mapping)

CO1	Explain the steps involved in research process
CO2	Describe the methods of sampling and its characteristics
CO3	Classify the sources of data collection
CO4	Interpret the significance of statistical methods
CO5	Review the research reports and its ethics
CO6	Infer the types of hypothesis

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	3	2	2	1	2	1	1	2	1
CO 2	2	3	3	3	2	3	1	2	3	1
CO 3	2	3	3	3	2	3	2	2	3	1
CO 4	1	3	3	3	3	3	2	3	3	1
CO 5	1	3	3	3	2	3	2	2	3	1
CO 6	3	3	2	2	2	3	2	2	3	2

S- Strong (3) M-Medium (2) L-Low (1)

Code:

**COMMUNITY NUTRITION
(Theory)**

Credits 4

COURSE OBJECTIVES:

To enable students to

- Understand national nutritional problems and their implications.
- Familiarize with nutrition intervention programmes.
- Know the importance of nutrition education.

UNIT – I CONCEPT AND SCOPE OF PUBLIC NUTRITION:

Definition, concept, scope and multidisciplinary nature of public nutrition. Nutritional problems affecting the community- Etiology, prevalence, clinical features and preventive strategies for malnutrition related problem and deficiency disorders- Protein energy malnutrition, Obesity, Nutritional anemia, Vitamin A deficiency, Iodine deficiency disorders, Fluorosis, Intra burden, Double burden, Triple burden.

UNIT – II COMMUNITY ASSESSMENT IN PUBLIC HEALTH:

Community assessment models, methods of data collection, Basic needs of assessment, Skills in assessment. Assessment of nutritional status- Objectives and importance, Methods of assessment: Direct -Clinical signs, anthropometry, biochemical tests, biophysical tests; Indirect -Diet surveys, 24-hour dietary recall, food frequency questionnaire, diet history, dietary record, vital statistics.

UNIT – III NATIONAL INTERVENTION PROGRAMMES:

National nutritional policy - Integrated child development scheme (ICDS), Midday Meal Program, Public Distribution System (PDS), National programs for the prevention of anemia , National Prophylaxis Programme against Vitamin A Deficiency Diseases, Goitre Control Programme, National Nutrition Policy and Food Security, Poshan Abhiyan 2.0, Annapoorna Scheme.

UNIT – IV NATIONAL AND INTERNATIONAL AGENCIES IN COMBATING MALNUTRITION:

National Organization concerned with food and nutrition – Indian Council of Medical Research (ICMR), National Institute of Nutrition (NIN), National Nutrition Monitoring Bureau (NNMB), Central Food Technological Research Institute (CFTRI), Defence Food Research Laboratory (DFRL), and National Institute of Public Cooperation and Child Development (NIPCCD), Food and Nutrition Board (FNB). International Organization concerned with Food and Nutrition- Food and Agricultural Organization (FAO), United Nations International Children's Emergency Fund (UNICEF), World Bank, World Health Organization (WHO) - Sustainable development goals.

UNIT – V NUTRITION EDUCATION:

Objectives, principles and scope of nutrition and health education and promotion. Role of audio-visual aids in nutrition education- Information Electronics Communication Technology. Organization of nutrition education programmes,

principles of planning, executing and evaluating nutrition education programmes, problems encountered in conducting nutrition education programmes.

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only):

Nutritional status assessment of self and peer group: 24 hour dietary recall, anthropometry, clinical assessment. Prepare flyers on awareness of any one community related nutritional problem.

TEXT BOOKS:

1. Bamji .M.S, Prahlad Rao. N, Reddy V (2016). Textbook of Human Nutrition. Oxford and PBH Publishing Co. Pvt. Ltd, New Delhi.
2. Park K (2011). Park's Textbook of Preventive and Social Medicine, 21st Edition. M/s Banarasidas Bhanot Publishers. Jabalpur. India
3. Wadhwa A and Sharma S (2003). Nutrition in the Community- A textbook. Elite Publishing House Pvt. Ltd. New Delhi.
4. Park K (2011). Park's Textbook of Preventive and Social Medicine, 21st Edition. M/s Banarasidas Bhanot Publishers. Jabalpur. India.
5. WHO (2006). Child Growth Standards: Methods and development: height-for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age

REFERENCE BOOKS:

1. M. Margaret Barth Ronny A Bell Karen Grimmer (2021). Public Health Nutrition, Rural Urban and Global based practice. Springer Publishing Company.
2. Bamji .M.S, Prahlad Rao.N, Reddy V (2016).Textbook of Human Nutrition. Oxford and PBH Publishing Co. Pvt. Ltd, New Delhi.
3. Swaminathan. M. (2014). Advanced Textbook of Food and Nutrition. The Bangalore Printing and Publishing Co. Ltd. Bangalore.

E-REFERENCE:

1. <https://www.nhp.gov.in/healthprogramme/national-health-programmes>
2. https://www.nhp.gov.in/integrated-child-development-services-icds_pg
3. https://www.nhp.gov.in/national-iron-plus-initiative-for-anemia-control_pg
4. <https://apps.who.int/iris/bitstream/handle/10665/255413/WHO-NMH-NHD-17.3-eng.pdf>

COURSE OUTCOMES: (With Mapping)

At the end of the course, the students will have the ability to	
CO1	Identify ecological factors leading to malnutrition
CO2	Explain nutritional problems of the community
CO3	Interpret nutritional status of the community
CO4	Apply nutrition education programme and create nutrition awareness.
CO5	Describe role of nutrition intervention programmes
CO6	Integrate the sustainable development goals to improve the health status

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	3	1	1	-	2	1	-	-	1
CO 2	2	3	2	2	2	2	1	2	1	1
CO 3	2	3	3	3	2	2	2	2	1	1
CO 4	2	3	3	3	3	2	2	3	2	1
CO 5	2	3	3	3	3	3	2	3	2	1
CO 6	3	3	3	3	3	3	3	3	2	1

S- Strong (3) M-Medium (2) L-Low (1)

Code:**FOOD SERVICE MANAGEMENT
(Practical)****Credits 4****COURSE OBJECTIVES:**

To Enable the Students To

- Learn the skills in planning the design for food service units.
- Gain practical knowledge on pricing of menus.
- Acquire knowledge on food service establishments to become entrepreneur.

List of practicals:

1. Identification of commercial and non-commercial food service establishments
2. Classification and uses of different types of fuel
3. Standardisation of recipes
4. Standardization of five selected quantity recipes in relation to cost, time and equipment
5. Plan a cyclic menu for non commercial food service establishments
6. Preparation of ala carte menu card for commercial food service establishment
7. Preparation of check list for performance appraisal-check list method and Ranking method
8. Laying a table and waiting at a table for different styles of food service

Text Books:

1. Sethi M. and Malhan S.M. (20018). Catering Management- An Integrated Approach. 3rd ed. Wiley Eastern Limited, Mumbai.
2. Sethi M, (2015). Institutional Food Management, 3rd edition, New age international publishers, New Delhi.
3. Singaravelavan R. (2018). Food & Beverage Service. Oxford University press. New Delhi.

Reference Books

1. George B and Chatterjee. S.(2010) Food and beverage Service and Management, JAICO.
2. West, B.B., Wood, L. etal. (1987). Food Services in institutions, John Wiley and Sons, New York.
3. Bhushan, V.K. (1973). Business Organization and Management, Sultan Chand & Co.,

Web Resources:

- <https://www.pearsonhighered.com>
- <https://ebooks.inflibnet.ac.in>
- [hsp06/chapter/equipment-for-quantity-food-production](https://www.fssai.gov.in)
- <https://www.fssai.gov.in>

COURSE OUTCOMES: (WITH Mapping)

At the end of the course, the students will have the ability to	
CO1	Identify the different types of food service institutions etiquettes
CO2	Describe the selection and handling of equipment, standardization of recipes and different styles of food service procedures
CO3	Explain layout, napkin folding, laying of table
CO4	Infer the skills in documentation of commercial and non commercial
CO5	Ascertain components of hygiene and sanitation in food service institutions
CO6	Plan and design the food service outlet

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	3	1	1	-	2	1	-	-	1
CO 2	2	3	2	2	2	2	1	2	1	1
CO 3	2	3	3	3	2	2	2	2	1	1
CO 4	2	3	3	3	3	2	2	3	2	1
CO 5	2	3	3	3	3	3	2	3	2	1
CO 6	3	3	3	3	3	3	3	3	2	1

S- Strong (3) M-Medium (2) L-Low (1)

DIETARY INTERNSHIP

Hospital internship UG- multispecialty reputed hospital for three weeks:

1. Observe different sections in the dietary department
2. Observe and prepare organization set up
3. Prepare a layout of the dietary department
4. Take up hospital rounds with the senior dietitian to assist patient dietary requirement
1. Read and comprehend case sheets of patients in critical care, paediatric care, diabetes care, dialysis ward, CVD ward, maternity ward etc.
6. Screening of patients for nutritional status & take diet history of patients
7. Prepare a diet and calculate nutritive value
8. Develop normal dietary approaches considering the nutraceutical properties of food groups
9. Setting up diet tray in the dietary kitchen department
10. Follow up of patient's case sheet and diet history
11. Experience and practice outpatient diet counselling and group counselling
12. Preparation of diet counselling materials like charts PowerPoint models and videos
13. Maintenance of dietary internship logbook & Internship report writing
14. Student feed back

COURSE OUTCOMES (With Mapping)	
CO1	Explain the organization, functions and workflow of hospital dietary departments.
CO2	Assess nutritional status and obtain diet history of patients in different clinical wards.
CO3	Plan therapeutic diets and calculate nutritive values according to patient requirements.
CO4	Apply nutraceutical concepts and dietary modifications in patient care and diet tray preparation.
CO5	Demonstrate counselling skills through outpatient and group diet counselling activities.
CO6	Prepare counselling materials, maintain internship logbooks and develop internship reports professionally.

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	3	1	2	1	2	1	1	-	1
CO 2	3	3	3	3	2	2	2	3	2	1
CO 3	2	3	3	3	3	2	2	3	2	1
CO 4	2	3	3	3	3	2	2	3	2	1
CO 5	3	3	3	2	2	3	3	2	1	2
CO 6	3	3	2	2	2	3	2	2	3	2

S- Strong (3) M-Medium (2) L-Low (1)

**Code: PERSPECTIVES IN HOME SCIENCE
(Theory)****Credits 4****COURSE OBJECTIVES:**

To Enable the Students To

- Understand the components of home science.
- Learn the principles of food service management, food science and nutrition.
- Analyse the process of human development.

UNIT – I TEXTILE, CLOTHING AND INTERIOR DESIGN

Textiles and clothing Fiber-classification (natural, synthetic), Yarn-definition, types. Fabric- construction method- weaving, knitting nonwovens. Clothing-clothing theory, selection of clothing, Cloth finishing-dyeing, embroidery. Interior Design Types, elements, principles, Colour scheme, dimensions of colour. Flower arrangement - principles, requirement, types and style. Furniture-selection, arrangement principles and furnishing materials

UNIT – II FOOD SERVICE MANAGEMENT

Principles, functions and tools of management. Management of resources. Organization of spaces-kitchen, storage and service. Personnel management-Recruitment, selection and training.

UNIT – III Food Science and Nutrition

Basic five food groups, my plate, nutritional composition of food groups. Definition of nutrition, balanced diet, classification and functions of nutrients. Principles of meal planning, RDA and nutritional requirements of different age groups.

UNIT – IV Human Development

Growth and development of Pre - natal Neonate, Infancy, Pre-school, School going and adolescence. Theories of human development and behavior.

UNIT – V Extension education

Definition, objectives, principles of extension education. Role of home science extension in rural and national development- Welfare Programme- National Social Assistance Programme (NSAP), Mahatma Gandhi National Rural Employment Guarantee Act, Pradhan Mantri Gram Sadak Yojana, Annapoorna Scheme, Women's Voluntary Service (WVS), Swarna Jayanthi Gram Swarozgar Yojana (SGSY).

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only):

Assignment on Types of embroidery, Methods of cost control in food service establishment, Assessment of nutritional status Difference between growth and development, Objectives of Training of Rural Youth for Self Employment (TRYSEM).

COURSE OUTCOMES: (With Mapping)

At the end of the course, the students will have the ability to	
CO1	Label different food groups and its composition
CO2	Summarize principles of management and organization
CO3	Apply supportive services and extension education programmes for national development
CO4	Infer the growth and development in different stages of human life cycle
CO5	Illustrate role of fibers and yarns in textiles and clothing
CO6	Infer the impact of extension education programmes

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	3	1	1	-	2	1	-	-	1
CO 2	2	3	2	2	2	2	1	2	1	1
CO 3	2	3	3	3	2	2	2	2	1	1
CO 4	2	3	3	3	3	2	2	3	2	1
CO 5	2	3	3	3	3	3	2	3	2	1
CO 6	3	3	3	3	3	3	3	3	2	1

S- Strong (3) M-Medium (2) L-Low (1)

Objectives:

To enable the students to

- Understand the basic concepts involved in the standard and quality factors of food.
- Educate types of evaluations involved in food
- Gain knowledge on food safety and food laws.
- Study about quality control and common food standards.
- Aware about the importance of quality assurance in food industries.

UNIT-I FOOD STANDARDS AND SAFETY

Introduction, Food standard: Meaning, importance in food industry. Food safety and standards authority of India (FSSAI): Introduction, highlights, legislation-Prevention of food adulteration act (PFA), Fruit products order (FPO), Meat product order (MPO), Milk and milk product regulation (MMP), Food safety and standard act regulations. Food standards with legal aspects: Bureau of Indian standards, Agriculture marketing (AGMARK), Export inspection council, Consumer protection act. Patent: Definition, requirements, advantages.

UNIT-II QUALITY CONTROL

Quality control: Definition of quality control, principles of quality control, quality control departments. Hazards Analysis critical control point (HACCP)-principles, steps in hazard analysis, identification and establishment of critical control points, monitoring procedure, verification, record keeping. Quality systems - BS5750 and ISO9000series. Food adulteration: Definition, adulterants, types of adulterants-intentional, incidental, other incidental and new adulterants; adverse effects of adulterants on health.

UNIT-III QUALITY FACTORS OF FOODS

Appearance factors: size, shape, colour, gloss. Textural factors: brittleness, tenderness, consistency, astringency. Flavour: sensation of flavor, taste, odour, feel; flavor intensifiers-mono sodium glutamate; flavouring extracts-vanilla.

UNIT-IV SENSORY EVALUATION

Criteria's for sensory tests: Reasons for testing food quality, trained panel members-selection of panel, types of panels, testing laboratory, preparation of samples, evaluation card. Types of Sensory tests: a) Difference tests- paired comparison test, duo-trio- test. b) Rating tests-Ranking test, single sample (monadic) test, two-sample difference test, multiple sample difference test, hedonic rating test, numerical scoring test, composite scoring test. c) Sensitivity test-sensitivity-threshold test, Dilution test. d) Descriptive flavor profile method. Limitations of sensory evaluation.

UNIT-V Objective evaluation

Definition, advantages, disadvantages, basic guidelines. Tests a) chemical b) physico-chemical tests -pH, percentage of salt, concentration of sugar, analysis of sugar, butyrometer. Microscopic examination c) physical methods-weight, volume, specific volume, index to volume, specific gravity, moisture, wettability, cell structure, measurement of colour. Textural evaluation-percent sag a) Instruments used for liquids and semi-solids, viscometer, Penetrometer b) Instruments used for solids-pressure tester, Succulometer, Tenderometer, Fibrometer, Shortometer, Texturometer.

TEXT BOOKS:

1. M. R. Adams and M. O. Moss, Food microbiology, New Age International Publishers ,New Delhi ,2003.
2. B. Srilakshmi , Food Science, New Age International Publishers, New Delhi ,2010.
3. Lillian Hoagland Mayer, Food Chemistry, Affiliated East West press Pvt. Ltd., New Delhi, 2002
4. Norman.N. Potter and Joseph. H. Hotchkiss, Food Science - CBS Publishers, 1996.
5. Desrosier and Desrosier, Technology of food preservation - CBS Publishers, Fourth edition, 1999.

REFERENCE BOOKS:

1. A.Y.Sathe, A first course in food analysis - New Age Publications, 1999.
2. Ranganna S, Handbook of Analysis and Quality Control for Fruit and Vegetable products. 2nd Ed. Tata-McGraw-Hill, 2001.

COURSE OUTCOMES: (With Mapping)

At the end of the course, the students will have the ability to	
CO1	Explain the principles of food standards, food safety regulations, food laws, and the role of regulatory agencies such as FSSAI, BIS, AGMARK, and consumer protection systems in ensuring food quality and safety.
CO2	Apply quality control principles, HACCP methodology, quality management systems (ISO 9000, BS 5750), and identify various food adulterants and their health implications.
CO3	Analyze the physical, textural, and flavor characteristics of foods and evaluate the factors influencing food quality.
CO4	Demonstrate the principles and techniques of sensory evaluation by selecting appropriate sensory tests, organizing sensory panels, and interpreting sensory evaluation results.
CO5	Perform objective methods of food quality evaluation using chemical, physico-chemical, microscopic, physical, and instrumental techniques to assess food quality and ensure compliance with quality standards.
CO6	Evaluate the quality of the food

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	3	1	1	-	2	1	-	-	1
CO 2	2	3	2	2	2	2	1	2	1	1
CO 3	2	3	3	3	2	2	2	2	1	1
CO 4	2	3	3	3	3	2	2	3	2	1
CO 5	2	3	3	3	3	3	2	3	2	1
CO 6	3	3	3	3	3	3	3	3	2	1

S- Strong (3) M-Medium (2) L-Low (1)

COURSE OBJECTIVES: To enable the students to

- Understand the basics of functional foods and nutraceuticals
- Infer the role of functional foods, nutraceuticals and dietary supplements in health and disease
- Analyze the role of phytochemicals and antioxidants in combating oxidative stress and preventing chronic diseases.
- Aware about the safety issues and consumer acceptance of functional foods and nutraceuticals

UNIT – I INTRODUCTION TO FUNCTIONAL FOODS

Evolution and definition of functional foods. Types of functional foods-whole foods, fortified foods, enhanced foods. Significance and relevance of functional foods in the management of disease and disorders – CVD, cancer, diabetes, obesity and immune enhancement.

UNIT – II INTRODUCTION TO NUTRACEUTICALS

Definition and Classification of nutraceuticals based on food source, chemical nature and mechanism of action. Significance and relevance of nutraceuticals in the management of disease and disorders – CVD, cancer, diabetes, obesity, cognitive and immune enhancement.

UNIT – III

Probiotics, Prebiotics and Synbiotics a) Probiotics – definition, sources, types, health benefits. b) Prebiotics – definition, types, health benefits of prebiotics. c) Synbiotics - definition, types and health benefits

UNIT – IV

Phytochemicals and Antioxidants a) Free radicals – definition, types, formation – exogenous and endogenous, ill effects caused by free radicals. b) Phytochemicals- definition, classification of phytochemicals: Terpenoids, Carotenoids, Polyphenols. c) Antioxidants- definition and mechanism of action, classification of antioxidants- endogenous and exogenous.

UNIT – V

Regulatory aspects of functional foods and nutraceuticals Regulatory aspects - Regulations of nutraceutical in India (FSSAI), regulatory requirements in India, registration process in India

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only):

Importance of functional foods on health. International regulatory guidelines for nutraceuticals. Research frontiers in functional foods. Nutrigenomics concept of personalized nutrition. Recent developments in the delivery of phytochemicals.

Text Books:

1. Agarwal A., (2014)., Textbook of human nutrition Jaypee Brothers Medical Publishers (P) Ltd.
2. Edward.R. Farnwort., (2008). Handbook of Fermented functional foods. CRC Press.
3. Susan Sungsoo Cho, Mark L. Dreher. (2019) Handbook of Dietary fibre. CRC Press.
4. Rotimi E. Aluko., (2012). Functional Foods & Nutraceuticals. Springer Publications.

Reference Book:

1. Nicola Graimes. (1999). The practical Encyclopedia of whole foods. Anness Publishing Ltd
2. Hari Niwas Mishra, Rajesh Kapur, Navneet Singh Deora, Aastha Deswal. (2016). Functional foods. New India Publishing Agency. New Delhi
3. Debasis Bagchi. (2014). Nutraceutical and functional food regulations in the United States and around the world. Elsevier, USA.
4. Bamji (2003), Textbook of Human Nutrition, 3rd edition, Oxford & IBH Publishing Co Pvt Ltd, New Delhi

Web Resource:

1. <https://www.tandfonline.com/toc/ijds19/1/1><https://foodrevolution.org/blog/probiotics-and-prebiotics/>
2. <https://www.eatright.org/health/wellness/healthful-habits/functional-foods>
3. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9559824/>
4. <https://egyankosh.ac.in/handle/123456789/62098>
5. <https://www.pediatriconcall.com/articles/nutrition/synbiotics/synbiotics-introduction>

Journals:

1. Functional Foods in Health and Disease, Functional Food Center, Inc, United States.
2. Journal of Functional Foods, Elsevier, United States
3. The Pharma Innovation Journal, Akinik Publications, New Delhi
4. International Journal on Nutraceuticals, Functional Foods and Novel Foods from Research to Industrial Applications, NIH, United States

COURSE OUTCOMES: (With Mapping)

CO1	Define and classify functional foods and explain their significance in the prevention and management of chronic diseases
CO2	Classify nutraceuticals based on food source, chemical nature, and mechanism of action, and evaluate their role in promoting health and disease management.
CO3	Explain the concepts, sources, types, and health benefits of probiotics, prebiotics, and synbiotics and their applications in improving gut and overall health.

CO4	Describe free radicals, phytochemicals, and antioxidants, and analyze their mechanisms of action in reducing oxidative stress and supporting health.
CO5	Demonstrate knowledge of the regulatory requirements, safety standards, and registration procedures for functional foods and nutraceuticals in India.
CO6	Evaluate current research trends in functional foods

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	3	2	2	3	2	2	3	-	1
CO 2	2	3	3	3	3	2	2	3	1	1
CO 3	2	3	3	3	3	2	2	3	1	1
CO 4	3	3	3	3	3	3	3	3	3	2
CO 5	2	3	3	3	3	3	2	3	2	2
CO 6	2	3	3	3	3	3	2	3	2	2

S- Strong (3) M-Medium (2) L-Low (1)

Code:

**PROJECT WORK
(WITH VIVA VOCE)**

Credits 4

COURSE OBJECTIVES:

To enable the students to

- Carry out their own topic of interest in the field of home science and Nutrition
- Acquire experience on the topic chosen
- Familiar with the process of documentation

PROJECT TITLES:**Specific themes can be selected in the broad areas suggested below**

Food Science and Nutrition

Food Service Management

Food product Development

Textiles and clothing, Home Science Extension

INSTRUCTIONS

- The topic of the project and the supervisor under which the student has to complete the project shall be decided by Lottery Draw method in the beginning of the final year.
- Project components should be decided uniformly for all the students by the respective Heads
- The supervisor is advised to check for the documentation, progress, formatting of the data, conducts mock presentation. Regular review of the progress to be monitored by the supervisor.
- The student shall submit two copies of the report along with soft copies to the University through the Head of the Department on or before the date fixed by the University.
- The last date of submission would be before final semester examination.
- The Project will be evaluated by an internal and an external examiner nominated by the University. The candidate concerned will have to defend his/her Project through a Viva-voce.

ASSESSMENT/EVALUATION/VIVA VOCE:

1. PROJECT REPORT EVALUATION (Both Internal & External)

- Plan of the Project - 20 marks
- Execution of the Plan/collection of Data / Organisation of Materials / Hypothesis, Testing etc. and presentation of the report. - 45 marks
- Individual initiative - 15 marks

2. Viva-Voce / Internal & External - 20 marks

TOTAL - 100 marks**PASSING MINIMUM:**

	Vivo-Voce 20 Marks	Dissertation 80 Marks
Project	40% out of 20 Marks (i.e. 8 Marks)	40% out of 80 marks (i.e. 32 marks)

A candidate who gets less than 40% in the Project must resubmit the Project Report. Such candidates need to defend the resubmitted Project at the Viva-voce within a month. A maximum of 2 chances will be given to the candidate.

Project Report Description:

- Page Limit Cover to Cover - 30 Pages
- Font size 12, Times New Roman, 1.5 spacing
- Inclusive of Tables, graphs and limit to 10 each
- Bibliography APA style
- Soft Binding and duly attested by guide and certified by Head of the Department

COURSE OUTCOMES (With Mapping)	
CO1	Identify and formulate a research problem related to Nutrition and Dietetics.
CO2	Apply appropriate research methodology and tools for data collection and analysis.
CO3	Assess nutritional, dietary or health-related issues using scientific methods.
CO4	Analyze and interpret research findings related to food, nutrition and health.
CO5	Develop practical recommendations or interventions based on the research outcomes.
CO6	Prepare and present a scientific project report following ethical and academic standards.

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	3	3	3	2	2	2	2	3	1
CO 2	2	3	3	3	3	2	2	3	3	1
CO 3	2	3	3	3	3	2	2	3	3	1
CO 4	2	3	3	3	3	2	2	3	3	1
CO 5	2	3	3	3	3	3	2	3	3	2
CO 6	3	3	2	2	2	3	2	2	3	2

S- Strong (3) M-Medium (2) L-Low (1)

Code:**HYGIENE AND SANITATION
(Theory)****Credits 2****COURSE OBJECTIVES:** To enable the students to

1. Develop correct habits of personal and environmental hygiene.
2. Aware about the safe handling of food and ensure complete safety of raw and processed foods.

UNIT – I Hygiene

Definition of hygiene-its application to everyday life.

UNIT – II Personal Hygiene

Personal hygiene Care of skin, hair, hands, feet, teeth; use of cosmetics and jewellery.

UNIT-III Safe handling of food

Personal hygiene including uniform, medical check-up, good food handling habits and training. Control and eradication of flies, cockroaches rodents and other pests.

UNIT-IV Disinfections

Definition of disinfectant, sanitizer, antiseptic and germicide. Common disinfectants Use in case of working surfaces, kitchen equipment, dish washing, hand washing etc. Sterilization of kitchen and service equipment. Sanitizing of watering equipment.

UNIT-V Care and maintenance

Care of Premises and equipment Impervious washable floors and walls. Table tops, floor etc. Good ventilation and lighting. Care of dark corner, crevices and cracks. Garbage disposal –collection, storage and proper disposal from the premises.

UNIT – VI CURRENT CONTOURS (Self-directed learning activities for Continuous Internal Assessments Only):

Chart out the personal hygiene practices. Prepare posters on safe handling of foods

TEXT BOOKS

1. David Foskett, Victor Ceserani and Rohald kinton, The Theory of Catering, Book Power Publication, Tenth Edition (2003).
2. P.S. Bali, Food Production Operation, Oxford University Press Seventh Edition (2012).

REFERENCE BOOKS

1. M. MacWilliams, Food: Experimental Perspectives, Second Edition, MacMillan Publishing Co, (1989).
2. H. Charley, Food Science, Second Edition, John Wiley & Sons, (1982).
3. N.N. Potter and J.H. Hotchkiss, Food Science, Fifth Edition, CBS Publishers and Distributors, Delhi, (1996).

COURSE OUTCOMES (With Mapping)

At the end of the course, the students will have the ability to	
CO1	Define and explain its importance of hygiene in everyday life
CO2	Demonstrate proper care of personal hygiene
CO3	Apply the principles of handling safe foods
CO4	Distinguish between disinfectants and sterilisation
CO5	Develop skills in maintaining equipment and premises
CO6	Emphasis the need of hygiene practices in food service

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	2	1	1	1	2	1	2	2	1
CO 2	2	2	2	2	2	2	1	1	1	1
CO 3	2	3	2	3	2	2	2	2	1	1
CO 4	3	2	3	2	2	2	2	3	1	1
CO 5	3	2	2	3	1	3	2	2	2	1
CO 6	3	2	3	3	2	3	3	3	2	2

S- Strong (3) M-Medium(2) L-Low(1)

Code:

**EARLY CHILDHOOD CARE AND
EDUCATION
(Theory)**

Credits 2

COURSE OBJECTIVES:

To enable the students to

- Understand the significance of early childhood years and intervention programs for early childhood development
- Develop insight in to the current programs and policies in ECCE.
- Acquaint with indigenous (Indian) models of Early Childhood Education and know the current early childhood issues.
- To learn about different curriculum models and pedagogical approaches in early childhood education.

UNIT – I CONCEPT AND SIGNIFICANCE OF ECCE:

Early Childhood Care and Education (ECCE)- Meaning for “Child”, “Childhood”, “Early Childhood Care and Education”, importance, significance and objectives of ECCE, types of ECCE programmes- play centres, day care, Montessori, kindergarten, balwadi, anganwadi, mobile crèche and play group.

UNIT – II POLICIES AND PROGRAMMES IN ECCE IN INDIA:

ECCE Policy Framework: National Policy on Education (2020), Article 45 in Indian Constitution and 86th Amendment, National Curriculum Framework (2020), and ECCE in Right to Education (2010). India New born Action Plan (INAP), 2014, Integrated Child Development Services (ICDS), Rashtriya Bal Swasthya Karyakram (RBSK), Commitment to International Convention- Education for All (EFA), Sustainable Development Goals (SDGs), and National Policy on ECCE (2013); Programmes and provisions in ECCE in Indian: Public Sector- ICDS, Rajiv Gandhi Crèche Scheme.

UNIT – III PHYSICAL ARRANGEMENTS AND MATERIAL MANAGEMENT:

Physical arrangements needed for an ideal ECCE centre– Place/Building/Space– indoor and outdoor, amenities and facilities for indoor and outdoor, garden, play ground, storage. Equipments and materials required for play and learning-

UNIT – IV ACTIVITIES FOR YOUNG CHILDREN IN ECCE:

Age/developmentally appropriate activities, art and creative activities, music and rhythmic activities, mathematic, language and communication activities, nature and science activities, 3R's- reading readiness, writing readiness and readiness for arithmetic, literature for children, indoor and outdoor play activities- role of teacher in planning and implementing the activities.

UNIT – V ORGANIZATIONAL MANAGEMENT AND COMMUNITY INVOLVEMENT EVALUATION OF ECCE PROGRAMMES:

Infrastructure, safety, ECCE professionals- competence, skill, methodology, working with parents and community for continuity of home-school interactions and evaluation of pre-school participation.

UNIT – VI CURRENT CONTOURS (Self-directed learning activities for Continuous Internal Assessments Only):

Identification techniques of developmental delays in children.

Recommended Books:

1. Jagannath Mohanthy and Bhagyadhar Mohanthy,(2000),“ Early Childhood Care and Education”, Deep and Deep Publications PVT limited, New Delhi
2. Billman, J., & Sherman, J.A. (1996). Observation & Participation in Early Childhood Settings, A Practicum Guide. New York: Allyn & Bacon, A simon& Schuster Company.
3. Aggarwal, J. C. (2007). Early Childhood Care and Education: Principles and Practices. Shipra: New Delhi.

Reference:

1. Arni, K. and Wolf G. (1999). Child Art with Everyday Materials. TARA Publishing.
2. Muralidharan, R. and Banerji.V. (1989) A Guide Booklet of Nursery Teachers, New Delhi : NCERT.
3. Morrison, G. S. (2003). Fundamentals of early childhood education. Merrill/Prentice Hall:
4. Virginia Singh, A. (1995). Playing to Learn: A training manual for Early Childhood Education. M. S. Swaminathan Research Foundation.
- Swaminathan, M. (1998). The First five Years. Sage Publications

E-Reference:

1. https://wcd.nic.in/sites/default/files/national_ecce_curr_framework_final_03022014%20%282%29.pdf
2. https://www.education.gov.in/shikshakparv/Infographics/ECCE_en.pdf
3. https://onlinecourses.swayam2.ac.in/cec19_mg34/preview
4. <https://digital.nios.ac.in/content/376en/4.pdf>

COURSE OUTCOMES (With Mapping)

At the end of the course, the students will have the ability to	
CO1	Explain the concept, significance, objectives, and different types of Early Childhood Care and Education (ECCE) programmes.
CO2	Describe national policies, constitutional provisions, and programmes related to ECCE in India.
CO3	Discuss the physical arrangements, learning environment, and material management required for an ECCE Centre.
CO4	Plan and implement age-appropriate activities for promoting holistic development of young children.
CO5	Explain organizational management, professional competencies, parent-community involvement, and evaluation of ECCE programmes.
CO6	Apply principles of ECCE in planning, organizing, and managing child-centered early learning environments.

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	3	1	1	1	2	1	2	2	1
CO 2	2	3	2	2	2	2	1	1	1	1
CO 3	2	3	2	3	2	2	2	2	1	1
CO 4	3	3	3	2	2	2	2	3	1	1
CO 5	3	3	2	3	1	3	2	2	2	1
CO 6	3	3	3	3	2	3	3	3	2	2

S- Strong (3) M-Medium (2) L-Low (1)

Code:

**PALLIATIVE CARE
(Theory)**

Credits 2

OBJECTIVES:

To enable the students to

- Understand the principles, philosophy, and models of palliative care in clinical practice.
- Develop knowledge of pain mechanisms and evidence-based pain management strategies.
- Recognize and manage physical symptoms associated with terminal and chronic illnesses.
- Understand psychosocial, emotional, and spiritual aspects of patient and family care.
- Build communication skills and ethical decision-making abilities in palliative care settings.

UNIT – I PRINCIPLES AND PRACTICE OF PALLIATIVE CARE:

Definitions, need for palliative care, goals of palliative care, palliative care and suffering; inter-professional care, multidisciplinary and inter-professional teams, principles of palliative care, communication with patients, advance care planning, models of care, integration of palliative care into clinical care, barriers to palliative care; types – respite, hospice.

UNIT – II PAIN AND ITS MANAGEMENT:

Definition, nature of pain, concept of total pain, causes and types of pain, pain assessment; Pain management - explanation, raising pain threshold, modification of life style, pain perception and pathological process, physical therapies for pain, psychosocial aspects of pain control, anticancer therapy for pain.

UNIT – III PHYSICAL SYMPTOMS AND ITS MANAGEMENT:

Respiratory symptoms and management – Breathlessness, cough, terminal respiratory congestion; Gastrointestinal symptoms and management – nausea, vomiting, bowel obstruction and constipation; Constitutional symptoms and management – anorexia, weight loss, cachexia, weakness and fatigue; Neurological and management - acute confusion, delirium and terminal restlessness.

UNIT – IV PSYCHOSOCIAL SYMPTOMS AND ITS MANAGEMENT:

Psychosocial distress – factors predisposing to psychological stress, depression, anxiety, spiritual and existential distress, caring for family and friends; Management of psychosocial symptoms

UNIT – V COMMUNICATION AND ETHICAL ISSUES IN PALLIATIVE CARE:

Communication- definition, need for good communication, barriers to communication – lack of time, lack of privacy, uncertainty, embarrassment, collusion; Problems in interprofessional communication, ways to improve

communication. Ethical Issues- Principles of medical ethics, communication and disclosure, withholding and withdrawing treatments, artificial nutrition, artificial hydration, euthanasia and physician-assisted suicide, ethics in research.

UNIT – VI CURRENT CONTOURS (Self-directed learning activities for Continuous Internal Assessments only):

Palliative care services in India and other countries. Visit to a Palliative Care Centre

TEXT BOOKS:

1. Russell K. Portenoy, David C. Currow, et al (2019), **Oxford Textbook of Palliative Medicine** Oxford University Press
2. Betty R. Ferrell, Nessa Coyle, (2021), **Textbook of Palliative Nursing**, Oxford University Press
Palliative Care Nursing: Quality Care to the End of Life
 Editors: Marianne Matzo, Deborah Witt Sherman
Publisher: Springer
Year of Publication: 2019

COURSE OUTCOMES: (With Mapping)

CO 1	Explain the principles, philosophy, goals, and models of palliative care and its integration into clinical practice.
CO 2	Analyze the nature, types, and assessment of pain and apply appropriate pain management strategies.
CO 3	Evaluate physical symptoms such as respiratory, gastrointestinal, neurological, and constitutional issues and their management approaches.
CO 4	Assess psychosocial, emotional, and spiritual distress in patients and apply appropriate supportive care strategies for patients and families.
CO 5	Examine communication skills and ethical issues in palliative care including disclosure, decision-making, and end-of-life care.
CO6	Apply interdisciplinary palliative care approaches in case-based scenarios demonstrating holistic patient management.

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	1	1	1	1	1	1	1	1	1
CO 2	3	3	1	1	1	1	1	1	1	1
CO 3	3	3	2	1	1	1	1	1	1	1
CO 4	2	2	1	2	1	1	1	2	2	1
CO 5	3	1	1	1	1	1	1	2	3	2
CO 6	1	2	3	1	2	1	2	3	1	1

S- Strong (3) M-Medium (2) L-Low (1)

COURSE OBJECTIVES:

To enable the students to

- Understand the concept of Communication and its role in exchange of information
- Examine the models and barriers to communication
- Learn about the concept of extension, extension approaches and models
- Enhance the students in the selection and use of media in different socio-cultural environment

UNIT – I CONCEPT OF EXTENSION EDUCATION:

Meaning, objectives and principles of Extension Education and Home Science Extension Education; Role of home science in developing a community. Historical review of extension education in India and abroad; Role and qualities of an Extension worker; Role and Functions of Extension Educator; Qualities of extension educator; Role of Home Science in National Development.

UNIT – II COMMUNICATION CONCEPT AND MODELS:

Meaning, definition, nature, scope and importance of communication Functions of communication – information function, command or instructive function, influence or persuasive function and integrative function. Elements of communication - three elements- source, message, receiver; four elements- encoding, decoding, sender and receiver; five elements- communicator, communicate, message, channel and feedback. Means of communication- oral, written, sign/signal, action, object; types of communication - formal and informal communication; pattern - one way, two way, circular; communication media- print and electronic media; advantages and disadvantages of communication media. Models of communication- Aristotle model, Shanon-Weaver mode, Berlo model and Scharmm model.

UNIT – III EFFECTIVE COMMUNICATION:

Characteristics of effective communication- clear, correct, complete and precise message, reliability, consideration of the recipient; skills- observance, clarity and brevity, listening and understanding, self-efficacy and self confidence; significance- team work, team building, Barriers to communication- semantic, psychological, organizational and personal.

UNIT – IV COMMUNICATION AND EXTENSION:

Communication and Extension - concept, need, functions, principles and scope of extension; steps in extension teaching; elements of extension communication system; communication methods in extension- group method, mass method and individual method; pros and cons of communication and extension.

UNIT – V EXTENSION MODELS AND APPROACHES:

Models- Innovation transfer model, Social education model, Indigenization model, Social action/Conscientiation models, Empowerment participation model, Combination models.

UNIT – VI CURRENT CONTOURS (Self-directed learning activities for Continuous Internal Assessments Only):

Learning Current Government programs for families in urban or rural area

Recommended Books:

1. Dahama, O.P. and Bhatnagar, O.P. (1987). Education and Communication for Development. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Gupta, D. (2007). Development Communication in Rural Sector. New Delhi: Mukhopadhyay, Abhijeet Publication.
3. Nisha, M. (2006). Understanding Extension Education. New Delhi: Kalpay Publications.
4. Reddy, A. (2010). Extension Education. Sree Lakshmi Press, Bapatla.

References:

1. Joshi Uma (1997). Text Book of Mass Communication and Media. Anmol Publications: New Delhi.
2. Ray, G.L. (2013). Extension communication and Management, Kalyani Publications, India
3. Rogers Everett, M. (2003). Diffusion of Innovations, 5th Ed. New York: The Free Press
4. Singh, U.K and Nayak, A.K. (2007). Extension Education. New Delhi: Common Wealth, Publishers.
5. Wilson, M.C., and Gallup, G. (1955). Extension Teaching Methods. Washington: US Department of Agriculture.
6. Nair, R.(1993). Perspective in Development communication, Sage Publications, New Delhi.
7. Pankajam, G (2000). Extension- Third Dimension of Education, Gyan Publishing House, New Delhi.

E-Reference:

1. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=8x0nJkh/R0vHkX1U70Z/CQ==>
2. https://onlinecourses.swayam2.ac.in/cec19_mg32/preview
3. <http://ecoursesonline.iasri.res.in/course/view.php?id=243>

COURSE OUTCOMES (With Mapping)

CO1	Outline the concept, objectives, principles, and significance of extension education and home science extension.
CO2	Illustrate the concepts, elements, functions, media, and models of communication.
CO3	Differentiate the characteristics, skills, significance, and barriers of effective communication.
CO4	Examine the principles, methods, and functions of communication in extension education.
CO5	Assess different extension models and approaches used in community development Programmes.

CO6	Demonstrate communication and extension methods in planning and implementing extension activities for community development.
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Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	1	1	-	2	1	-	1	1
CO 2	3	3	2	2	-	2	1	1	1	1
CO 3	3	3	2	2	1	2	2	1	1	1
CO 4	3	3	3	3	1	2	2	2	1	1
CO 5	3	3	3	3	1	2	2	2	2	
CO 6	3	3	3	3	2	3	2	3	2	2

S- Strong (3) M-Medium (2) L-Low (1)

Code:

**CONSUMER EDUCATION
(Theory)**

Credits 2

COURSE OBJECTIVES:

To enable the students to

- Introduce the concept of consumerism and consumer roles in the economy.
- Develop understanding of human wants, demand, supply, and income concepts.
- Impart knowledge on markets, marketing systems, and consumer behavior.
- Familiarize students with quality standards and certification marks.
- Create awareness about consumer rights, protection laws, and decision-making.

Unit – I CONSUMERISM AND CONSUMER BUYING PROBLEM:

Definition and the concept of consumerism – consumer, producer and market. Characteristics of consumers, role of consumers in the Indian economy. Malpractices – Incorrect weights and measures. Misleading Advertisement and Misbranding.

Unit – II HUMAN WANTS, DEMAND AND SUPPLY:

Definition, classification of human wants – necessities, comfort and luxuries. Meaning of demand and supply. Relation between utility, demand and supply. Factors influencing demand and supply. Types of income - Real, money, psychic, relationship of GNP, national income, personal income, disposable income.

UNIT – III MARKETS AND MARKETING:

Basic Concept, Classification and functions of Markets, Types of Market. Channels of Distribution: Meaning, types and their advantages and disadvantages. Consumer in the market - Consumer buying habits, buying motives and buying problems. Consumer Aids a. Brand – Different types and its importance. Labels – Importance, Merits and demerits. Importance of Packaging and Advertising.

UNIT – IV QUALITY ASSESSMENT OF PRODUCTS:

Definition – Standards and standardization and its Importance. Quality Seal – BIS, ISI, AGMARK, ISO, HALL MARK, BEE LABEL and FPO.

UNIT – V CONSUMER DECISION MAKING PROCESS:

Types of consumer decisions, process of decision making, factors determining and influencing consumer behavior, guidelines for wise buying practices. Consumer Protective Services - Consumer Protection Act, Food Adulteration Act – FSSAI. Quality control and inspection Act. Consumer Rights and consumer responsibilities.

UNIT – VI CURRENT CONTOURS (Self-directed learning activities for Continuous Internal Assessments Only):

Prepare a scrapbook on misleading advertisements collected from newspapers, television or social media.

Collect products carrying quality seals such as ISI, AGMARK, FPO and BIS and prepare a comparison chart.
Collect labels and packages of food and household products and evaluate their usefulness to consumers.

Recommended Books:

1. Gupta, C.B. and Nair, R.N (2004). Marketing Management: Sultan Chand and Sons,
2. Juliana, M (2011). Green consumerism, United States: SAGE Publishers.
3. Kathiresan, S. Radha, V (2004), Marketing: Chennai, Prasanna Publisher.
4. Kumar, N., (1999), Consumer Protection in India, Delhi, Himalaya Publishing House.

Reference:

2. Pattanchetti, C.C. and Reddy, 2002). Principles of Marketing, Coimbatore: Rainbow Publishers, India.
3. Seetharaman, P. and Sethi, M. (2001). Consumerism: Strategies and Tactics, CBS Publishers and Distributors, New Delhi.
4. Steven, D.S, (2016). Consumer Economics: A Practical Overview”, New York: Routledge Taylor and Francis group.
5. Suja Nair (2002). Consumer Behaviour: New Delhi. Sultan Chand and Sons.

E- Reference:

1. <https://consumeraffairs.nic.in/>
2. <https://ncdrc.nic.in/>
3. <https://www.bis.gov.in/>
4. <https://www.sebi.gov.in/>
5. <https://www.legalservicesindia.com/>
6. <https://www.consumerinternational.org/>
7. <https://ndl.iitkgp.ac.in/>
8. <https://www.inflibnet.ac.in/>

COURSE OUTCOMES (With Mapping)

At the end of the course, the students will have the ability to	
CO1	Explain the concepts of consumerism, consumer characteristics, and consumer buying problems.
CO2	Describe human wants, demand, supply, utility, and different types of income influencing consumer behavior.
CO3	Discuss the functions of markets, marketing systems, distribution channels, and consumer aids such as branding, labeling, packaging, and advertising.
CO4	Identify quality standards, certification marks, and standardization procedures used for consumer products.
CO5	Explain the consumer decision-making process and factors influencing consumer behavior.
CO6	Apply knowledge of consumer rights, responsibilities, and consumer protection laws for wise buying practices and consumer welfare.

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	2	1	1	1	2	-	1	1	2
CO 2	3	3	2	1	1	2	1	2	2	1
CO 3	3	3	2	2	1	2	1	2	1	1
CO 4	3	3	2	2	2	3	1	1	1	1
CO 5	3	3	2	2	1	2	2	1	2	1
CO 6	3	3	3	2	2	3	2	1	3	2

S- Strong (3) M-Medium (2) L-Low (1)

COURSE OBJECTIVES:

To enable the students to

- Apply portioning, shaping, lamination, and decoration techniques to achieve professional appearance and sensory quality.
- Adapt formulas to special ingredients (millets, spices, fruit) and dietary preferences while maintaining texture and flavor.
- Implement food safety, allergen awareness, cost control, and basic production planning for small-scale bakery operations.

LIST OF PRACTICALS

1. Bread - Plain Bread , Fruit Bread.
2. Buns - Sweet Bun and Spice Bun.
3. Cakes - Sponge Cake , Eggless Cake and Multi Millet Cake .
4. Pastry - Puff Pastry , Danish Pastry ,Muffins , Millet Pizza and Millet Burger .
5. Biscuits - Ginger Biscuits , Millet Biscuits and Salt Biscuits .
6. Cookies - Butter Cookies , Melting Moments and Dutch Cookies.
7. Chocolate - Milk Chocolate , Pomegranate
8. Icing - Butter Icing , Chocolate Icing and Royal Icing .
9. Casting Mold - Candy mold and Fruit strapes mold .

TEXT BOOKS:

1. Yogambal Ashok Kumar,” Theory of Bakery and Confectionery”, PHI Learning private Limited, New Delhi,(2009).
2. Bakery - I Students handbook and practical manual, First edition (October 2013). 3.Bhuvaneswari. D and Kavitha.V, “Easy to Bake” Divakar Publications, Trichy, (2017).

COURSE OUTCOMES (With Mapping)	
CO1	Aware about the principles of Baking
CO2	Prepare plain and fruit breads using correct mixing, gluten development, fermentation, proofing, and baking parameters.
CO3	Produce millet based cakes and basics preparation of cakes
CO4	Prepare different types of cookies
CO5	Display the different types of icing
CO6	Evaluate the characteristics of different types of bakery products

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	3	2	2	1	3	2	2	-	1
CO 2	2	3	2	2	1	3	2	2	1	1
CO 3	2	3	3	3	2	2	2	3	1	1
CO 4	1	3	2	2	1	2	2	1	-	1
CO 5	1	3	2	3	1	3	3	2	1	1
CO 6	2	3	3	3	2	3	3	3	2	2

S- Strong (3) M-Medium (2) L-Low (1)

COURSE OBJECTIVES:

To enable the students to

- Develop understanding of personal values, goal setting and time management practices.
- Identify community and natural resources and their effective utilization in family living.
- Apply principles of budgeting and resource management in family situations.
- Demonstrate knowledge of elements and principles of design in interior decoration.
- Create decorative designs and apply colour concepts in interior arrangements.
- Evaluate household arrangements, space utilization and aesthetic aspects of interiors.

PRACTICALS:

1. Identification of Personal Values and Goal Setting
2. Preparation of Time Plans
3. Identification of Community and Natural Resources
4. Drafting Family Budget
5. Illustration and understanding of Elements and Principles of Design
6. Illustration of Decorative Designs -Drawing and classification of decorative designs: Naturalistic, Stylized, Geometric, Abstract
7. Application of Design in Interiors
8. Application of Colour in Interiors
9. Flower Arrangement Practice -Practice of different styles of flower arrangement. -Familiarization with flower holding containers and accessories.
10. Arranging furniture using cut-outs.
11. House Visit – Kitchen Observation
12. Evaluation of Room Arrangement
13. Assessment of room layout, space utilization, and interior arrangement.

COURSE OUTCOMES (With Mapping)	
CO1	Identify personal values, set goals and prepare effective time plans for daily activities.
CO2	Recognize community and natural resources and utilize them efficiently for family welfare.
CO3	Draft family budgets and apply principles of resource management in household situations.
CO4	Illustrate elements, principles and types of decorative designs used in interiors.
CO5	Apply colour schemes, flower arrangements and furniture layouts for aesthetic interior decoration.

CO6	Evaluate room arrangements, kitchen layouts and space utilization based on functional and aesthetic principles.
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Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	3	2	2	1	3	2	2	-	1
CO 2	2	3	2	2	1	3	2	2	1	1
CO 3	2	3	3	3	2	2	2	3	1	1
CO 4	1	3	2	2	1	2	2	1	-	1
CO 5	1	3	2	3	1	3	3	2	1	1
CO 6	2	3	3	3	2	3	3	3	2	2

S- Strong (3) M-Medium (2) L-Low (1)