BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI-620024

B.SC. HOME SCIENCE, 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-I (AP-I)	Human Physiology and Food Chemistry (P)	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 (AP-1)	Human Physiology and Food Chemistry (P)	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
		InterdisciplinaryCourse–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
		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
	III	Allied Course–3 (AC-3)	Food Microbiology	4	4	3	30	70	100
		Allied Course Practical-2 (AP-2)	Food Microbiology and Nutritional Biochemistry (P)	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) $$	One Course from Outside Department	2	2	3	30	70	100
		Health&Wellness @		--	1	--			100
	Total			**30**	**23**	--	--	--	**800**
IV	I	Ability Enhancement Course – VII (AEC - VII)	(Tamil $/Other Languages +,#)	6	3	3	30	70	100
	II	Ability Enhancement Course – VIII (AEC - VIII)	English Course-IV	6	3	3	30	70	100
	III	Core Course-4 (CC-4)	Dietetics	4	4	3	30	70	100
		Core Practical-4 (CP-4)	Dietetics (P)	4	4	3	40	60	100
		Allied Course–4 (AC-4)	Nutritional Biochemistry	4	4	3	30	70	100
		Allied Course Practical-2 (AP-2)	Food Microbiology and Nutritional Biochemistry (P)	2	4	3	40	60	100
	IV	Skill Enhancement Course-3 (SEC - 3) ##	Naan Mudhalvan Course/SEC(List enclosed)	2	2	3	30	70	100
		Interdisciplinary Course–4 (IDC - 4) $$	One Course from Outside Department	2	2	3	30	70	100
	Total			**30**	**26**	--	--	--	**800**
	SummerInternship/IndustrialActivityduringtheSummerVacationafterII Year								

V	III	Core Course-5 (CC-5)	Food Processing and Preservation	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)	Textile Science	5	4	3	30	70	100
		Core Course-8 (CC-8)	Fundamentals of Research Methodology and Statistics	5	4	3	30	70	100
		Core Practical-5 (CP-5)	Food Processing and Preservation (P)	5	4	3	40	60	100
	IV	Skill Enhancement Course-4 (SEC - 4)	Home Science Extension and Communication	2	2	3	30	70	100
		Skill Enhancement Course-5 (SEC-5) ##	Naan Mudhalvan Course/SEC(List enclosed)	2	2	3	30	70	100
		IntroductiontoDisaster Management		2	2	3	30	70	100
		Summer Internship / IndustrialActivity@@	(withViva-Voce)	--	2	--	20	80	100
	Total			**30**	**28**	--	--	--	**900**
VI	III	Core Course-9 (CC-9)	Human Development	4	4	3	30	70	100
		Core Course-10 (CC-10)	Principles of Resource Management and Interior Design	5	4	3	30	70	100
		Core Course-11 (CC-11)	Community Nutrition	5	4	3	30	70	100
		Core Project Work (CPW) @@	Project Work (withViva-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)	Principles of Resource Management and Interior Design (P)	2	2	3	40	60	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**

ALLIEDCOURSE

First Year	Second Year
1. Human Physiology (AC-I)	5. Food Microbiology (AC-III)
2. Human Physiology and Food Chemistry Practical (AP-I)	6. Food Microbiology and Nutritional Biochemistry Practical (AP-II)
3. Food Chemistry (AC-2)	7. Nutritional Biochemistry
4. Human Physiology and Food Chemistry Practical (AC-I)	8. Food Microbiology and Nutritional Biochemistry Practical (AC-II)

SKILL ENHANCEMENT COURSE (SEC)			
Sl. No.	**Title of paper**	**Sl. No.**	**MANDATORY Naan Mudhalvan Scheme##**
1.	Family Dynamics	1.	2nd Semester:
2.	Food Hygiene and Sanitation		
3.	Gender Sensitization for Empowerment	2.	3rd Semester:
4.	Pediatric Nutrition		
5.	Palliative Care	3.	4th Semester:
6.	Home Science Extension and Communication		
7.	Principles of Resource Management and 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)	
1st Semester	Consumer Education
2nd Semester	Food Product Development
3rd Semester	Early Childhood Care and Education
4th Semester	Family Studies

INTERDISCIPLINARY COURSE (IDC)# FOR WHO HAVE NOT OPT TAMIL AS PART-I		
Those who have studied Tamil upto 10th+2 but opt for other languages in degree	1st Semester	Special Tamil-I
	2nd Semester	Special Tamil-II
Those who have not studied Tamil in school level	1st Semester	Basic Tamil-I
	2nd 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 3rdSemester:	NCC Course is a Compulsory Course for the NCC Cadets in the 4thSemester:
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 1st and 2nd Semester from Outside his/her department.	

SUMMARY OF CURRICULUMSTRUCTURE 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.		EXTENSION ACTIVITIES (NCC / NSS/SPORTS/ANTIDRUG CELL/YRC & Any Other Activities	--	1	1	--
Total			49	-	150	4900

$	For those who have studied Tamil upto10th+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 has to be assessed by the Physical Director with a 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 should be conducted by the college and Marks should 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 the instruction hours.

PROGRAM OUTCOME

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.

Year: First **CORE COURSE 1** **Semester: I**

Code : **Credits: 4**

FOOD SCIENCE
(Theory)

COURSE OBJECTIVES:

To enable the students to

- Impart knowledge on basic concepts of food science, nutrition, and cooking methods.
- Understand the composition, nutritional significance, and processing techniques of cereals, pulses, and nuts.
- Provide knowledge on nutritive value and cooking changes in vegetables, fruits, and milk.
- Explain composition, structure, and processing of egg and flesh foods.
- Familiarize students with properties and uses of fats, sugars, and spices.

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 and solar cooking. Recent methods of cooking–Ohmic cooking and Induction cooking –merits and demerits.

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; Malting of cereals. Cooking of starches- Dextrinization and gelatinization, retrogradation and resistant starch.

Pulses - Nutritive value, factors affecting cooking quality of pulses, germination – process, advantages. Toxic constituents present in pulses,

Nuts - Composition and nutritive value, roasting, steaming of nuts, uses in sweets, 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, browning – enzymatic and non - enzymatic reaction, prevention and storage.

Milk and Milk Products - Composition and Nutritive value, Different types of milk pasteurization homogenization, coagulation and fermentation 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, storage of meat.

Poultry- composition and classification.

Fish- structure, composition, nutritive value, selection of fish.

UNIT - V FATS, SUGARS AND SPICES:

Fats and oils- Types, sources - animal and vegetable fats, composition, processing and refining of fats, refined oils, plasticity, hydrogenation, winterization. Smoking point, factors that lower smoking point, absorption of fat during cooking. Harmful effects of reheated oils

Sugar- nutritive value, sugar related products, stages of sugar cookery, caramelization crystallization, factors affecting crystallization.

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

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

Browse material related to effect of cooking on the nutritive value of different foods.

Food Sample Booklet (Millets, pulses, spices and Nuts).

Prepare an album in millet and Nuts cookery.

Develop games on food and nutrients.

Recommended Books:

1. Srilakshmi, B., (2010), Food Science, 8th 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.
5. Shakuntala, M. and Shadaksharaswamy. M., (2000), 2nd Edition, Foods, Facts and Principles, New Age International Pvt. Ltd., Publishers, New Delhi.

Reference:

1. Brow, A., (2000), Understanding Food, Thomson Learning Publications,
2. Parker, R. (2000), Introduction to food Science, Delmer, Thomson Learning Co., Delma.
3. Mehas, K.Y. and Rodgers, S.L. Food Science and You, McMillanMcGraw Company, New York, 2000.
4. Peckham.G.C.1994.Foundations in food preparation. Mac Millian.Co,New York.
5. Krishna.A 2005, Theory of Cookery, Frank Bros. & Co, New Delhi.

E-Reference:

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 Explain the basic concepts of food science, nutrients, balanced diet, food groups, and various methods of cooking.

CO2 Describe the structure, nutritive value, processing, and cooking characteristics of cereals, pulses, and nuts.

CO3 Analyze the nutritive value, selection, cooking changes, and preservation of vegetables, fruits, milk, and milk products.

CO4 Explain the composition, nutritive value, processing, and storage of egg, meat, poultry, and fish.

CO5 Describe the composition, processing, and cooking properties of fats, oils, sugars, spices, and condiments.

CO6 Apply principles of food science in food preparation, nutrient preservation, and healthy cooking 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

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

Year: First **CORE PRACTICAL 1** **Semester: I**

Code : **Credits: 4**

FOOD SCIENCE
(Practical)

COURSE OBJECTIVES:

To enable the students to

- Provide knowledge on basic laboratory rules, safety, and proper use of kitchen equipment.
- Develop skills in measuring ingredients and applying different cooking methods for cereals, pulses, vegetables, fruits, milk, and eggs.
- Enhance culinary techniques in preparing a variety of traditional and modern dishes.
- Understand factors influencing cooking quality of foods such as pulses, cereals, and fats.
- Promote sensory evaluation skills for assessing food quality using score cards.
- Encourage creativity in food preparation and presentation.

PRACTICALS:

1. Introduction to Laboratory:
   (a) Laboratory rules
   (b) Familiarizing with laboratory equipment's,
   (c) Measuring ingredients -Methods of measuring different types of foods – grains, flours & liquids
2. Cereals – Preparation of rice by steaming, absorption method, Straining and Pressure cooking. Preparation of Batters and dough. Preparation of idli, millet upma, chapathi, poori, fried rice, briyani, bisibelabath string hoppers, puttu, and Millet based variety rice.
3. Pulses – Factors affecting the cooking quality of pulses. Preparation of sambar, sundal, bholi, mysore-pak, vada, channa masala, thuvaiyal, green gram payasam, sprouted salad and koottu.
4. Vegetables – Selecting, cleaning, coring, pitting and chopping of fruits and vegetables. Avial, porriyal, pugath, stew, kuruma, podimas, pachadi, stuffed chapathi, cauliflower manchurian, vegetable kofta, stuffed capsicum, baked vegetables.
5. Fruits – Fritters, halwa, salad, stuffed items, payasam, panchamirtham
6. Milk – Cottage Cheese, paneer, phirnee, payasam, ice cream, kova, buttermilk curry, basanthi and jamun, sweet lassi, shrikand.
7. Egg – Boiled, scrambled, poached, curry, masala, omelette.
8. Fats and oils - Preparation- shallow fry- vegetable cutlet and deep fry; banana chips, vadai, diamond cuts.
9. Stages of sugar cookery.
10. Score card preparation and sensory evaluation

COURSE OUTCOMES (With Mapping)

At the end of the course, the students will have the ability to	
CO1	Demonstrate knowledge of laboratory rules, safety practices, measuring techniques, and use of food laboratory equipment.
CO2	Prepare and evaluate cereal- and pulse-based food products using appropriate cooking methods and processing techniques.
CO3	Apply suitable methods for preparation and processing of vegetables, fruits, milk, and milk products while preserving nutrient quality.
CO4	Demonstrate skills in preparation and evaluation of egg, fat, and oil-based food products using appropriate cooking techniques.
CO5	Analyze stages of sugar cookery and perform sensory evaluation using score cards for food quality assessment.
CO6	Apply principles of food science, hygiene, and nutrient conservation in practical food preparation and evaluation.

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	2	1	1	2	1	-	1	1
CO 2	3	3	3	2	2	2	-	2	1	1
CO 3	3	3	3	2	2	3	2	1	1	1
CO 4	3	3	3	2	2	3	1	1	1	1
CO 5	3	2	2	3	2	2	1	2	2	2
CO 6	3	3	3	2	2	3	2	1	2	2

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

Year: First **ALLIED COURSE 1** **Semester: I**

Code : **Credits: 4**

HUMAN PHYSIOLOGY
(Theory)

COURSE OBJECTIVES:
To enable the students to

- Provide fundamental knowledge of cell structure, tissues, and blood composition.
- Develop understanding of cardiovascular and respiratory system functions.
- Explain the structure and physiology of digestive and excretory systems.
- Impart knowledge of endocrine glands and reproductive processes.
- Familiarize students with nervous system and sense organs.

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, extrinsic and intrinsic pathway, blood groups, Haemoglobin – Structure and functions; erythropoiesis, Blood coagulation, Reticulo- Endothelial System – Definition and functions, Lymphatic System.

UNIT - II CARDIOVASCULAR 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.
Basic anatomy of respiratory system, mechanism of respiration, lung volume -tidal volume, vital capacity and lung capacity, transport and exchange of gases in the lungs

UNIT - III DIGESTIVE AND EXCRETORY SYSTEM:
Digestive System - General Anatomy; Digestion in the mouth, stomach and intestines. Movements of the intestine; Role of Liver, gall bladder 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. Regulation of body temperature.

UNIT - IV ENDOCRINE AND REPRODUCTIVE SYSTEM:
Endocrine System - Structure and functions of Hypothalamus, 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. Functions of autonomic nervous system.
Sense Organs - Structure and function of eye, ear, physiology of taste and smell.

UNIT - VI CURRENT CONTOURS (Self-directed learning activities for Continuous Internal Assessments Only):
Write an assignment on Artificial respiration and ECG.
Develop E content on Structure and physiological functions of any one organ.
Prepare a Pamphlet on menstrual disorder.

Recommended Books:

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.

Reference:

1. Gillian Pocock, Christopher D. Richards, David A. Richards (2018). Human Physiology. oxford University Press.(5th ed).
2. Lauralee Sherwood (2015). Human Physiology: Cells to systems. Cengage Learning.
3. 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.
4. Guyton and Hall (2000). Textbook of Medical Physiology. Saunders. States of America.
5. Wilson, Ross (2014). Anatomy and Physiology in Health and Illness. Reed Elsevier India Private Limited. NewDelhi.
6. Murugesh.N(2011). Anatomy and Physiology. Sathya Publishers. Madurai.
7. Chaudhri, K. (1993). Concise Medical Physiology, New Central Book Agency Ltd., Calcutta.

E-Reference:

1. https://egyankosh.ac.in/handle/123456789/81726
2. https://tripurauniv.ac.in/
3. https://nwtc.libguides.com/
4. https://palmbeachstate.libguides.com/

COURSE OUTCOMES (With Mapping)

At the end of the course, the students will have the ability to	
CO1	Describe the structure and functions of cells, tissues, blood constituents, lymphatic system, and blood coagulation mechanisms.
CO2	Explain the anatomy and physiology of the cardiovascular and respiratory systems and their role in body functions.
CO3	Illustrate the structure and functions of the digestive, excretory, and integumentary systems.
CO4	Discuss the structure and functions of endocrine glands and reproductive systems including pregnancy and parturition.
CO5	Analyze the organization and functions of the nervous system and sense organs.
CO6	Apply the knowledge of human anatomy and physiology to interpret normal body functions and health-related conditions.

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	2	2	-	1	2	2
CO 2	3	3	2	1	2	2	2	1	2	2
CO 3	3	3	2	2	1	2	1	1	1	2
CO 4	3	3	2	2	1	3	2	2	1	2
CO 5	3	2	2	2	1	2	2	1	2	2
CO 6	3	3	3	2	2	3	2	2	3	2

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

Year: First **ALLIED COURSE PRACTICAL 1** **Semester: I**

Code : **Credits:**

HUMAN PHYSIOLOGY AND FOOD CHEMISTRY
(Theory)

COURSE OBJECTIVES:

To enable the students to

- Provide knowledge on histological structure of tissues, organs, and endocrine glands.
- Develop skills in microscopic identification of tissues and muscles.
- Train students in basic hematological laboratory techniques.
- Enable measurement of physiological parameters like blood pressure and pulse rate.
- Build competency in blood analysis procedures and laboratory practices.

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. Microscopic structure of endocrine glands-thyroid, pituitary and adrenal.
4. Histology of muscles – cardiac, striated, non –striated
5. Estimation of Hemoglobin.
6. Measurement of Blood pressure using Sphygmomanometer.
7. Determination of Pulse rate using Pulse oximeter.
8. Blood smear preparation and staining procedure
9. Determination of Blood group and Rh factor.
10. Determination of bleeding time (Duke method) and coagulation time (Capillary tube method)
11. Enumeration of Red blood cells.
12. Enumeration of White blood cells.
13. Demonstration of differential count of leucocyte.

Reference:

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. SaradhaSubrahmanyam and K. Madhavankutty (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.

E-Reference:

1. https://www.khanacademy.org/science/health-and-medicine/human-anatomy-andphysiology
2. https://www.biologyonline.com/tutorials/the-human-physiology
3. https://digitaleditions.library.dal.ca/intropsychneuro/chapter/hunger-and-eating/
4. https://epgp.inflibnet.ac.in/

COURSE OUTCOMES (With Mapping)

At the end of the course,the students will have the ability to	
CO1	Identify and differentiate various tissues, muscles, organs, and endocrine glands through microscopic examination.
CO2	Demonstrate laboratory techniques for estimation of haemoglobin,blood pressure, and pulse rate.
CO3	Perform blood smear preparation, staining procedures, and blood grouping techniques accurately.
CO4	Analyze bleeding time, coagulation time, and hematological parameters using standard laboratory methods.
CO5	Enumerate red blood cells and white blood cells and interpret differential leucocyte count results.
CO6	Apply knowledge of anatomy, physiology, and hematology in practical laboratory investigations and health assessment.

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	2	2	3	2	1	1	2
CO 3	3	3	3	2	2	3	1	1	1	1
CO 4	3	3	2	2	2	3	2	1	1	1
CO 5	3	2	3	2	2	3	2	1	2	2
CO 6	3	3	3	2	2	3	2	2	2	2

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

Year: First **INTERDISCIPLINARY COURSE 1** **Semester: I**

Code : **Credits: 2**

CONSUMER EDUCATION
(Theory)

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 Chandand 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:

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

E- Reference:

- https://consumeraffairs.nic.in/
- https://ncdrc.nic.in/
- https://www.bis.gov.in/
- https://www.sebi.gov.in/
- https://www.legalservicesindia.com/
- https://www.consumerinternational.org/
- https://ndl.iitkgp.ac.in/
- 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)

Year: First **CORE COURSE 2** **Semester: II**

Code : **Credits: 4**

PRINCIPLES OF NUTRITION
(Theory)

COURSE OBJECTIVES:

To enable the students to

- Understand the role of macro and micronutrients in human health.
- Gain knowledge on the composition and classification of various food groups.
- Comprehend physiological functions, requirements, and deficiency disorders of nutrients.
- Learn methods to calculate energy expenditure and requirements.
- Understand the importance of water and electrolyte balance in maintaining homeostasis.

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, methods for determination of energy expenditure-direct and indirect colorimetry, 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). Nutritional problems due to excess and deficit intake of protein.

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. Role of n-3, n-6 fatty acids in health and disease.

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, waterbalance, maintenance of water balance, distribution of electrolytes, maintenance of electrolyte balance. Macronutrients and vitamin interrelationship

UNIT – VI CURRENT CONTOURS (Self-directed learning activities for Continuous Internal Assessments Only):
Determine energy requirements of any five individuals by factorial approach method. Record clinical symptoms of any one vitamin deficiency among the community.

Recommended Books:

1. Raheena Begum M (2009). Textbook of FoodsNutrition and Dietetics, Sterling Publishers, New Delhi
2. Mahtab S. Bamji (2017). Textbook of Human Nutrition. Oxford & IBH Publishing Co Pvt Ltd
3. Srilakshmi (2017). Nutrition Science. 8thedition,New Age International Pvt. Ltd, NewDelhi
4. M. Swaminathan (1993). Principles of Nutrition and Dietetics. Bappco 88. Mysore Road. Bangalore.

Reference:

1. Bogert, J.G.V. Briggs, D.H. Calloway (1985). Nutrition and physical fitness. (11th ed) W.B. Saunders Co., Philadelphia. London. Toranto
2. Wardlaw, G.M. Insel, P.H. (1990) Perspectives in Nutrition. Times Mirror / Mosby College Publishing Co. St. Louis. Toronto. Boston.
3. William, S.R. (1985). Nutrition and Diet Therapy. (5th ed) Mosbey Co. St. Louis.
4. 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.
5. Martin Eastwood (2013). Principles of Human Nutrition Wiley Publishin
6. Mahan Kathleen L, Sylvia Escott Stump (2001). Krause's, Food nutrition and Therapy,W.B.Saunders Co.

E-Reference:

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)

At the end of the course, the students will have the ability to	
CO1	Explain the concepts of nutrition, health, nutritional status, malnutrition, and Recommended Dietary Allowances (RDA).
CO2	Describe the classification, functions, sources, requirements, and deficiency disorders of carbohydrates and dietary fibre, and explain energy metabolism.
CO3	Discuss the nutritional significance, functions, requirements, and metabolism-related aspects of proteins and lipids.
CO4	Explain the functions, sources, requirements, deficiency, and excess effects of vitamins and minerals.
CO5	Describe water balance, electrolyte balance, and interrelationship among nutrients in maintaining health.
CO6	Apply the principles of nutrition in understanding nutrient requirements, deficiency conditions, and maintenance of 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	2	1	1	1	2	1	-	1	1
CO 2	3	3	2	2	1	2	1	1	2	2
CO 3	3	3	2	2	1	2	1	1	1	1
CO 4	3	3	2	2	1	3	2	1	1	1
CO 5	3	2	2	2	2	3	2	1	1	1
CO 6	3	3	3	3	2	3	2	1	2	2

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

Year: First **CORE PRACTICAL 2** **Semester: II**

Code : **Credits: 4**

PRINCIPLES OF NUTRITION
(Practical)

COURSE OBJECTIVES:

To enable the students to

- Develop skills in planning and preparation of nutrient-specific dishes for one serving.
- Understand the composition and dietary importance of macro and micronutrients.
- Gain practical knowledge in calculating nutrient content of prepared foods.
- Apply principles of nutrition in selecting foods rich in specific 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, Phosphorus, 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

References:

1. Gopalan.C, Rama Sastri.V.B and Balasuramanian.S.C (2016). Nutritive Value of Indian

COURSE OUTCOMES (With Mapping)

At the end of the course, the students will have the ability to	
CO1	Plan and prepare macro nutrient rich dishes based on energy, carbohydrate, protein, fat, and dietary fibre requirements.
CO2	Calculate the nutrient content of prepared dishes using standard food composition tables.
CO3	Prepare and evaluate vitamin-rich dishes to meet specific micronutrient requirements.
CO4	Prepare and assess mineral-rich dishes for improving nutritional quality and health.

CO5	Demonstrate methods for estimation of nitrogen and fat content in foods using Kjeldahl and Soxhlet methods.
CO6	Apply principles of nutrition and nutrient analysis in meal planning and food evaluation.

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	2	2	3	2	2	2	1	1
CO 2	1	3	3	3	2	2	1	3	1	2
CO 3	2	3	2	2	3	2	2	2	1	2
CO 4	3	3	2	2	3	2	2	2	1	1
CO 5	1	3	2	2	3	3	3	2	1	2
CO 6	3	3	3	3	3	3	2	3	3	2

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

Year: First **ALLIED COURSE 2** **Semester: II**

Code : **Credits: 4**

FOOD CHEMISTRY
(Theory)

COURSE OBJECTIVES:

To enable the students to

- Understand the scope, principles, and importance of food chemistry.
- Gain knowledge on physicochemical properties of food components.
- Comprehend the chemistry of carbohydrates, proteins, and lipids in foods.
- Understand reactions and changes occurring during food processing and storage.
- Learn the role of enzymes, pigments, and flavors in food quality and acceptability.

UNIT – I PHYSICOCHEMICAL PROPERTIES OF FOOD:

Definition, scope, and importance of food chemistry. Historical development of food chemistry. Role of food chemist in food industry; Physicochemical properties of foods - physical properties of water and ice; 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, caramelization, Crystallization and factors affecting it.

Chemistry of Milk Sugar

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. Action of heat, acid, and alkali on vegetable and animal protein.

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- Reichertmeissel value, Polenske value, iodine value, peroxide value, saponification value; Changes in fats and oils- rancidity, lipolysis, flavor reversion, Changes in Fats and Oils during Heating.

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 (Self-directed learning activities for Continuous Internal Assessments Only):

Prepare e-content for stages of sugar cookery.

Visit to oil mills and prepare a report for processing of fat.

Prepare a pamphlet - Uses of Leavening agents.

Recommended Books:

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, NewDelhi.
3. Iqbal, Syed Aftab, 2011. Advanced Food Chemistry, Discovery Publishing House, New Delhi.
4. ShakuntalaManay,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, McGraw Hill Education(India), Pvt., Ltd, New Delhi.
7. Iqbal, Syed Aftab. (2011). Advanced Food Chemistry. Discovery Publishing House, New Delhi

E-Reference:

1. https://libraryguides.mcgill.ca/
2. https://ipa-pasca.unpak.ac.id/
3. http://ecoursesonline.iasri.res.in/
4. https://link.springer.com/
5. https://www.eolss.net/sample-chapters/c10/e5-08-07-00.pdf

COURSE OUTCOMES (With Mapping)

At the end of the course, the students will have the ability to		
CO1	Explain the scope, importance, and physicochemical properties of food and water in food systems.	LO1
CO2	Describe the chemistry and functional properties of starches, sugars, and polysaccharides in food preparation and processing	LO4
CO3	Discuss the structure, classification, and functional properties of proteins and the effect of processing on proteins.	LO5
CO4	Explain the classification, properties, and chemical changes occurring in fats and oils during processing and storage.	LO7, LO13
CO5	Describe the role of enzymes, pigments, and flavours in food quality, processing, and sensory characteristics.	LO10, LO11
CO6	Apply principles of food chemistry in understanding food composition, stability, processing, and quality evaluation.	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	2	1	2	-	1	1	1
CO 2	2	3	2	2	2	2	1	1	-	2
CO 3	3	3	2	3	2	2	2	2	1	2
CO 4	2	3	2	3	3	3	2	2	1	1
CO 5	3	3	2	2	3	2	2	2	2	2
CO 6	3	3	3	3	3	3	2	3	2	2

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

Year: First **ALLIED COURSE PRACTICAL 1** **Semester: II**

Code : **Credits: 4**

HUMAN PHYSIOLOGY AND FOOD CHEMISTRY
(Practical)

COURSE OBJECTIVES:

To enable the students to

- Understand the chemical properties and behavior of major food components such as carbohydrates, proteins, and fats.
- Observe and analyze physical and chemical changes occurring in foods during processing and cooking.
- Develop practical skills in preparation of food products demonstrating concepts like gelatinization, coagulation, fermentation, and sugar cookery.
- Gain knowledge on factors affecting texture, color, flavor, and acceptability of foods.
- Understand the role of food additives, preservatives, and raising agents in food preparation and preservation.

PRACTICAL:

1. Chemistry of Starch
   a) Gelatinization of Starch, Microscopic Examination of uncooked and gelatinized Starch.
   b) Retrogradation and Syneresis
   c) Effect of different methods of making dough with other flour mixtures Preparation of Chappathi, phulka
   d) Stages of Sugar Cookery, Preparation of Fondant, Fudge, and Toffee, Scum formation in milk.
2. Chemistry of Proteins

a) Gluten Formation

b) Effect of time, temperature and water required for sprouting whole pulses and legumes-Green gram, Bengal gram, cow pea and horse gram

c) Factors affecting cooking quality of pulses-Green gram dhal

d) Coagulation of egg white and egg yolk

e) Effect of cooking time on the colour, texture and acceptability of whole egg; Formation of ferrous sulphide in boiling egg and its preventive measures.

f) Boiled Egg, Poached Egg, Omlettes, Custards and Mayonnaise

g) Coagulation and precipitation of milk proteins.

h) 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 Plant Pigments - Changes in colour and texture of vegetables due to different methods of cooking, cooking medium and addition of acid/alkali on water-soluble and fat soluble pigments, enzymatic browning in apples, banana, brinjal and raw banana and its preventive measures.
5. Food additives and Raising agents - Role of MSG (Mono Sodium Glutamate), sodium benzoate and KMS (Potassium bi sulphate) in food preparation and preservation, use of baking soda, baking powder, yeast in baking and food preparation- prepare one dish with each of these, uses of herbs and spices to enhance flavour.

COURSE OUTCOMES (With Mapping)

At the end of the course, the students will have the ability to	
CO1	Demonstrate the physicochemical changes occurring in starch and sugar during food preparation and processing.
CO2	Perform experiments related to protein chemistry and evaluate the effect of processing on protein-rich foods.
CO3	Analyze the factors affecting sprouting, cooking quality, coagulation, and texture of different food products.
CO4	Evaluate the physical and chemical changes occurring in fats, oils, pigments, and food products during cooking.
CO5	Demonstrate the role of food additives, raising agents, herbs, and spices in food preparation and preservation.
CO6	Apply principles of food chemistry in preparation, processing, preservation, and quality evaluation of 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	1	3	2	2	3	2	2	1	1	1
CO 2	1	3	2	3	3	2	3	2	2	1
CO 3	2	3	3	3	3	3	2	3	2	1
CO 4	2	3	3	3	3	3	2	2	2	1
CO 5	2	3	2	2	3	2	2	2	1	1
CO 6	3	3	3	3	3	3	3	3	2	2

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

Year: First **INTERDISCIPLINARY COURSE 2** **Semester: II**

Code : **Credits: 2**

FOOD PRODUCT DEVELOPMENT
(Theory)

COURSE OBJECTIVES:

To enable the students to

- Understand the concept, need, and scope of new food product development.
- Gain knowledge on stages and processes involved in developing new food products.
- Learn methods of product evaluation, quality control, and sensory analysis
- Understand food safety standards, regulations, and quality management systems
- Acquire knowledge on packaging, labeling, and marketing strategies for food products.

UNIT – I INTRODUCTION TO NEW FOOD PRODUCT DEVELOPMENT:

Food products, definition, Classification, Characterization Reasons for new food product Development. Factors shaping new product development-Social concerns, health concerns, impact of technology and marketplace influence. Utilizing traditional foods, unconventional sources, functional, nutraceuticals foods for new product development.

UNIT – II PRODUCT DEVELOPMENT:

a. New Product Development Team
b. Sources of New Product ideas
c. Designing new product and Stages of product development
d. Types of sensory tests (hedonic rating, triangle test, ranking test)
e. Causes of product failure/ success in product development

UNIT – III PRODUCT EVALUATION AND QUALITY CONTROL:

Quality attributes – physical, chemical, nutritional, microbial, and sensory indicators Principles and types of assessment of quality. Subjective and objective methods of evaluation of product quality.

Role of sensory evaluation in consumer product acceptance; requirements for sensory analysis - Sensory panel Evaluation of New Product.Nutritional evaluation (estimation of relevant parameters) Evaluation of shelf-life of the product.

Food safety standards and regulations: Role and functions of Food Safety and Standards Authority of India Domestic regulations FSSAI, AGMARK, BIS Quality management systems in India; (ISO9001, ISO22000); Global Food safety Initiative; International food standards.

UNIT – IV PACKAGING AND LABELLING:

Packaging Material-types; factors affecting type of packaging material used; Aseptic packaging, modified atmosphere packaging, Controlled Atmosphere Packaging and

active packaging. Eco-friendly and biodegradable packaging materials. Packaging and Labelling of the product – Packaging design, graphics and labelling – FSSAI regulations for food labelling.

UNIT – V MARKETING THE PRODUCT:
Principles of food product advertising-Product life cycle- Costing the product and determining the sales price Advertising and test marketing the product.

UNIT – VI CURRENT CONTOURS (Self-directed learning activities for Continuous Internal Assessments Only):
Prepare a marketing strategy for a newly developed food product.
Collect and classify different innovative food products available in the market.

Recommended Books:

1. Paine FA, Paine HY (Eds.) (1992), A handbook of Food Packaging, CRC press, 2 nd edition. Blackie Academic and professional.
2. Lawless H.T and Kelin B.P (1991), Sensory Science Theory and applications in foods, Marcel Dekker Inc
3. Sharma.A (2018), Food product development, CBS Publishers & Distributers Pvt Ltd

References:

1. Earle M., Earle RL. and Anderson A.(2001) Food Product Development: Maximizing success, Wood headpublishing Ltd, Food series.
2. Moskowitz HR, Saguy IS and Straus T, (2009), An Integrated approach to New Food
3. Product Development, New York, NY
4. Fuller G.W (2005), New Food product Development – from concept to market place, CRC Press, Tayor&Frnacis Inc., USA.

E- Reference:

1. https://epgp.inflibnet.ac.in/
2. https://www.ift.org/
3. https://www.niftem.ac.in/
4. https://www.fao.org/

COURSE OUTCOMES (With Mapping)

At the end of the course, the students will have the ability to	
CO1	Explain the concepts, importance, and factors influencing new food product development.
CO2	Describe the stages involved in product development, sensory evaluation methods, and factors influencing product success or failure.
CO3	Evaluate food products using physical, chemical, nutritional, microbial, and sensory quality assessment methods.

CO4	Explain food safety standards, quality control systems, and national and international food regulations related to food products.
CO5	Discuss packaging materials, labelling regulations, product costing, advertising, and marketing strategies for food products.
CO6	Apply principles of food product development, quality assurance, packaging, and marketing in developing consumer-oriented food 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	1	2	1	2	1	-	-	2
CO 2	2	3	2	3	2	2	2	1	2	1
CO 3	1	3	3	3	3	2	2	2	2	2
CO 4	2	3	2	3	3	2	2	1	2	1
CO 5	3	3	2	2	2	2	1	2	1	2
CO 6	3	3	3	3	3	3	3	3	2	2

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

Year: Second **CORE COURSE 3** **Semester: III**

Code : **Credits: 4**

NUTRITION THROUGH LIFE CYCLE
(Theory)

COURSE OBJECTIVES:
To enable the students to

- Understand principles of meal planning and recommended dietary allowances (RDA).
- Gain knowledge on maternal nutrition and its impact on infant health.
- Identify common nutritional problems in childhood.
- Gain knowledge on physiological, psychological, and socio-economic factors affecting nutrition.
- Develop dietary modifications for adolescents and elderly individuals

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. Use of traditional foods
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. Postnatal dietary practices: Lactation-promoting foods (galactagogues) like fenugreek, cumin, garlic.

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, -Use of natural, homemade complementary 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, lowcost supplementary foods, Balanced diet based on (six tastes): Sweet, sour, salty, bitter, pungent, astringent, 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. Avoidance of processed foods
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 (Self-directed learning for Continuous Internal Assessments Only):

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

Recommended Books:

1. Mahtab, S., Bamji, Krishnasamy, K., Brahmam, 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-Hill Publishing Company Limited, New Delhi.
5. Krishnasamy, K. and Sesikeran, B., (2013), Dietary Guidelines for Indians, National Institute of Nutrition, ICMR, Hyderabad.
6. Gopalan, C. Rama Sastri, B.V. and Balasubramanian, (2014), Nutritive Value of Indian Foods, NIN, ICMR, Hyderabad.
7. Longvah, T., Ananthan, R., Baskarachary, K. andVenkaiah, K., (2017), Indian FoodComposition Table, NIN, ICMR, Hyderabad.
8. Antia, F.P. (2005): Clinical Nutrition and Dietetics, Oxford University Press, Delhi.

References:

1. Wardlaw, G.M., Hampi, J.S., DiSilvestro, R.A., (2004), Perspectives in Nutrition, 6th edition, McGraw Hill, New York.
2. Chadha, R. and Mathur, P., (2015), Nutrition: A Lifecycle Approach, Orient Blackswan, New Delhi.
3. Krause, M.V. and Hunscher, M.A., (2000) Food, Nutrition and Diet Therapy, 14th Edition, W.B. Saunders, London.

e-Reference:

1. https://www.pdfdrive.com/nutrition-through-the-life-cycle-e187862410.html
2. https://ocw.ui.ac.id/pluginfile.php/12209/mod_resource/content/1/Nutrition%20Th
3. http://www.freebookcentre.net/medical_text_books_journals/nutrition_ebooks_onlinetexts_download.html

COURSE OUTCOMES (With Mapping)	
At the end of the course, the students will have the ability to	
CO1	Explain the principles of meal planning and nutritional requirements for adults based on age, gender, and socio-economic status.
CO2	Describe the nutritional needs, physiological changes, and dietary management during pregnancy and lactation.
CO3	Discuss infant nutrition, breastfeeding, weaning practices, supplementary feeding, and feeding of preterm infants.
CO4	Explain the nutritional requirements, meal planning, and nutrition-related problems of preschool and school-age children.
CO5	Describe the nutritional needs, eating disorders, and dietary modifications during adolescence and old age.
CO6	Apply principles of nutrition education and meal planning for different age groups to promote health and well-being.

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	2	2	2	3	1	1	1	1
CO 2	3	3	2	2	2	3	1	1	2	1
CO 3	2	3	2	2	2	3	2	1	1	1
CO 4	3	3	2	2	2	3	2	2	2	1
CO 5	2	3	3	2	2	1	2	2	1	1
CO 6	3	3	3	3	2	1	3	3	2	3

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

Year: Second **CORE PRACTICAL 3** **Semester: III**

Code : **Credits: 4**

NUTRITION THROUGH LIFE CYCLE (Practical)

COURSE OBJECTIVES:

To enable the students to

- Illustrate the food and nutritional requirements for specific groups of people based on their age and food habits.
- Explain the nutrition related problems common in different stages of life cycle and its impact on health.
- Recommend specific nutrients and foods for various age groups quantitatively and qualitatively.

PRACTICALS:

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

1. Adult man belonging to low, Middle, high socio-economic group.
2. Adult Woman belonging to low, middle, high socio-economic group.
3. Pregnant Woman.(3 trimesters)
4. Lactating woman.
5. Liquid supplementary food.
6. Semisolid supplementary food.
7. Solid supplementary food.
8. Preschool child.
9. School going child.
10. Adolescent boy.
11. Adolescent girl.
12. Elderly.
13. Demonstration of Diet Software

References:

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	Plan and prepare balanced meals for adult men and women belonging to different socio-economic groups.
CO2	Calculate nutritive values and prepare appropriate diets for pregnant and lactating women.
CO3	Prepare liquid, semisolid, and solid supplementary foods suitable for different physiological needs.
CO4	Plan and prepare nutritionally adequate meals for preschool children, school-going children, and adolescents.

CO5	Prepare suitable meal plans for elderly individuals and demonstrate the use of diet software in nutritional assessment.
CO6	Apply principles of meal planning and nutrient calculation for different age groups and physiological conditions.

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	2	-	1
CO 2	2	3	3	3	3	2	2	3	2	2
CO 3	2	3	2	2	3	2	2	3	1	2
CO 4	2	3	3	2	3	2	2	3	2	1
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)

Year: Second **ALLIED COURSE 3** **Semester: III**

Code : **Credits: 4**

FOOD MICROBIOLOGY
(Theory)

COURSE OBJECTIVES:

To enable the students to

- Understand 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
- Comprehend 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 of microbiology - History and Development of Food Microbiology.Definition and Scope of food microbiology; Classification and nomenclature of microorganisms, General characteristics of bacteria, fungi, virus, protozoa, and algae.

UNIT – II CULTIVATION OF MICRO-ORGANISMS:

Methods of isolation and cultivation, Serial dilution method, Pure culture technique; Microbial Growth in Food: Bacterial growth curve and microbial growth in food with human health impact. Factors affecting the growth of microorganisms in food, effect of environmental factors in growth of microorganism - pH, water activity, oxygen availability, temperature and others.

UNIT – III MICROBIAL FOOD SPOILAGE:

Sources of Microorganisms in foods. Some important food spoilage microorganisms. Spoilage of specific food –cereal, pulses, milk, egg, fish, meat and poultry; fruits and vegetables and canned & baked products. Factors responsible for food spoilage.

UNIT – IV FOOD BORNE DISEASES:

Microbial intoxication and infections: Sources of contamination of food, Types of food borne infections, food borne intoxications, symptoms and method of control-clinical features and association with food. Toxins in foods – bacterial and mycotoxin- Health effects

UNIT – V WATER BORNE DISEASES:

Sources of contamination of water, epidemiology Microbiology of fresh water and wastewater, Types – water borne infections – cholera amoebiasis, giardiasis, Pathophysiology, symptoms, Prevention treatment and method of control.

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

Visiting a food microbiology analytical lab & Observation in college canteen to record the route of contamination.

Preparation of any common and recent outbreak of Food borne diseases– Newspaper clips.

Recommended Books:

1. MO Moss & MR Adams Food Microbiology (2008) New Age Publishers
2. Ramesh Singh Food Microbiology (2021) MJP Publishers
3. FOSTER W.M Food Microbiology (2020) CBS Publisher
4. Frazier William C and Westhoff, Dennis C. Food Microbiology, McGraw Hill Education; Fifth edition 2017 ISBN 9781259062513

Reference:

1. Jay, James M. Modern Food Microbiology, CBS Publication, New Delhi, 2000
2. Garbutt, John. Essentials of Food Microbiology, Arnold, London, 1997.
3. Banwartt: Food Microbiology
4. Pelczar MJ, Chan E.C.S and Krieg, Noel R. Microbiology, 5th Ed., TMH, New Delhi, 1993.

e-Reference:

1. https://www.frontiersin.org/journals/microbiology/sections/food-microbiology
2. https://microbiologysociety.org/publication/past-issues/food-microbiology.html
3. https://www.longdom.org/foodmicrobiology-safety-hygiene.html
4. https://en.vikaspedia.in/viewcontent/health/nutrition/food-borne-diseases-or-food-poisoning

COURSE OUTCOMES (With Mapping)

At the end of the course, the students will have the ability to	
CO1	Explain the history, scope, classification, and characteristics of microorganisms related to food microbiology.
CO2	Describe methods of isolation, cultivation, and factors affecting the growth of microorganisms in foods.
CO3	Discuss the sources, types, and factors responsible for microbial spoilage of different food products.
CO4	Explain food borne infections, intoxications, microbial toxins, their symptoms, and preventive measures.
CO5	Describe the sources, epidemiology, symptoms, prevention, and control of water borne diseases.
CO6	Apply principles of food microbiology in food safety, hygiene, spoilage prevention, and public health 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	2	3	1	1	1	2	1	-	-	1
CO 2	2	3	2	2	3	2	2	1	1	1
CO 3	2	3	2	3	2	2	2	2	1	1
CO 4	2	3	3	3	2	3	2	2	1	1
CO 5	2	3	2	3	2	3	2	2	1	1
CO 6	2	3	3	3	3	3	3	3	2	2

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

Year: Second **ALLIED COURSE PRACTICAL 2** **Semester: III**

Code : **FOOD MICROBIOLOGY AND NUTRITIONAL BIOCHEMISTRY (Practical)** **Credits:**

COURSE OBJECTIVES:

To enable the students to

- Understand basic microbiology laboratory practices, equipment, and safety procedures.
- Develop skills in sterilization techniques and preparation of culture media under aseptic conditions.
- Acquire practical knowledge in staining, identification, and cultivation of microorganisms using various culture techniques.
- Evaluate microbial growth and food quality using standard microbiological tests and study the effect of environmental factors.

PRACTICAL:

1. Introduction to Basic Microbiology Laboratory Practices and Equipment
2. Microbial slides - Gram positive cocci: staphylococcus, streptococcus, Gram Positive cocci: Neisseria; Gram Positive Bacilli: Corynebacterium, Bacillus, Clostridium Gram Negative Bacilli: Enterobacteriaceae, Pseudomonas Mycobacterium: Mycobacterium tuberculosis, Mycobacterium leprae; Spirochetes; Mycoplasma
3. Cleaning,sterilizationtechniques,sterilization-equipmentglassware
4. Preparationandsterilizationofnutrientbroth
5. Preparationofslant,stabandplatesusingnutrientagar
6. Preparationofbacterialsmear&Gramstaining.
7. Culturetechniques-Pour,spread&streak
8. Hangingdropmethodfortestingmotilityofbacteria.
9. MethyleneBlueReductionteston Milk
10. AntibioticassayandDiscsensitivityonmicrobes- Demonstration
11. Effectoftemperatureonthegrowthofmicrobes–Demonstration

COURSE OUTCOMES (With Mapping)

At the end of the course, the students will have the ability to	
CO1	Demonstrate basic microbiology laboratory practices, safety measures, and handling of laboratory equipment.
CO2	Identify and differentiate important microorganisms through microscopic observation and staining techniques.
CO3	Perform sterilization procedures, preparation of culture media, and maintenance of aseptic conditions in the laboratory.

CO4	Demonstrate microbial culture techniques such as pour plate, spread plate, streak culture, and motility testing methods.
CO5	Conduct microbiological tests including methylene blue reduction test and demonstration of antibiotic sensitivity assays.
CO6	Apply microbiological techniques for studying microbial growth, food quality, and laboratory analysis.

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	1	3	1	1	3	2	2	1	1	1
CO 2	1	3	2	2	3	2	2	1	2	1
CO 3	1	3	2	2	3	2	3	2	2	1
CO 4	1	3	3	3	3	2	3	2	3	1
CO 5	1	3	3	3	3	2	3	2	3	1
CO 6	2	3	3	3	3	3	3	3	3	2

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

Year: Second **INTERDISCIPLINARY COURSE 3** **Semester: III**

Code : **Credits: 2**

EARLY CHILDHOOD CARE AND EDUCATION
(Theory)

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 playgroup.

UNIT – II POLICIES AND PROGRAMMES IN ECCE IN INDIA:

ECCE Policy Framework: National Policy on Education (2020), Article 45 in Indian Constitution and 86thAmendment, National Curriculum Framework (2020), and ECCE in Right to Education (2010). India Newborn 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, 3'R'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_0302 2014 %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	-	2	1	-	2	1
CO 2	2	3	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)

Year: Second **CORE COURSE 4** **Semester: IV**

Code : **Credits: 4**

DIETETICS
(Theory)

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 Cirrohosis, 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.

Recommended 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
4. Meenakshi Bajaj (2019) Diet Metrics: Hand Book of Food Exchanges, Notion Press Media Pvt Ltd,
5. Shubhangini A Joshi (2021) Nutrition and Dietetics, McGraw Hill
6. Sheila John, Jasmine Devaselvam (2016) Essentials of Nutrition and Dietetics for Nursing, Wolters Kluwer India Pvt. Ltd

References:

1. Davidson and Passmore, Human Nutrition and Dietetics, Churchill Livingstone publication.
2. Sue Rodwell Williams, Basic Nutrition and Diet Theraphy, 2000 Mosby publication.
3. Garrow J.S, James W. P.T, (2000), Human Nutrition and Dietetics, 10th edition, Churchill Livingston, London.
4. Guthrie H. A, Picciano M. F (1995), Human Nutrition, Mosby, St. Louis Missorie.
5. Mohan K.L,Krause M.V (2002),Food,nutrition and DietTherapy, W.B.Saunders Co, Philadelphia.
6. Robinson C.H., Lawler M.R, Cheweth W.L; and Gaswick A.E, Normal and Therapeutic Nutrition ,17 th edition, Mac Milan Publishers.

E-Reference:

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)

At the end of the course, the students will have the ability to	
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.

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)

Year: Second **CORE PRACTICAL 4** **Semester: IV**

Code : **Credits: 4**

DIETETICS
(Practical)

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)

At the end of the course, the students will have the ability to	
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)

Year: Second **ALLIED COURSE 4** **Semester: IV**

Code : **Credits: 4**

NUTRITIONAL BIOCHEMISTRY
(Theory)

COURSE OBJECTIVES:

To enable the students to

- Understand the classification, structure, and biological significance of carbohydrates, proteins, and lipids.
- Gain knowledge on metabolic pathways of carbohydrates, proteins, and lipids.
- Comprehend the role of organs such as liver and kidney in metabolism and their functional assessment.
- Learn biochemical changes and disorders associated with metabolism.
- Understand inborn errors of metabolism and their clinical implications.

UNIT-I CARBOHYDRATE METABOLISM:

Carbohydrate – Classification. biological significance, Metabolism of Carbohydrate, Glycolysis,
Glycogenesis, glycogenolysis, Tricarboxylic acid Cycle (TCA cycle), Hexose Monophosphate Shunt, Gluconeogenesis.. Role of liver in Carbohydrates Metabolism.

UNIT-II PROTEIN METABOLISM:

Protein - Classification. Metabolism of Protein - General pathway of Protein metabolism. Amino acids - classification, structure Metabolism of amino acid – Deamination, Transamination, Decarboxylation, Urea Cycle, Fate of deaminated amino acids. Disorder of Protein metabolism**.**

UNIT-III LIPID METABOLISM:

Classification, structure, properties; biological significance, Metabolism of Lipid-Beta Oxidation of Fatty acid, Synthesis of Triglycerides, Fatty acids and Cholesterol. Plasma Lipoproteins: Functions and metabolism of Lipoprotein. Disorder of Lipoproteins- Hyperlipoproteinemias and Hypolipoproteinemias.

UNIT-IV LIVER AND KIDNEY FUNCTION TEST:

Formation of Bile acid-Formation and functions of Bile acids and bile salts – bilepigments. Jaundice. Liver Function Test- Test for bile pigment and bile salts in blood and urine-Van den Bergh reaction, Serum alkaline phosphatase estimation, Fouchet's test, Hay's test. Test for Urobilinogen- Schlesinger's test. Test for altered protein fraction production- Cephalin – cholesterol flocculation test and Thymol turbidity test. Renal Function Tests: Inulin clearance test, Urea Clearance test, Endogenous creatinine Clearance, Concentration test, Addis test, Mosenthal test, Urea concentration Text and Dye test.

UNIT-V INBORN ERROR OF CARBOHYDRATES, PROTEIN AND LIPID METABOLISM:

Inborn errors of Carbohydrates metabolism-Essential pentosuria, Fructosuria, Galactosemia, Von Gierke's disease. Inborn errors of amino acid metabolism-Albinism, Phenylketonuria, Hurtnup Disease, Cystinuria, Homoystinuria, histidinuria and Maple syrup disease. Inborn errors of fat metabolism-Wolman's disease, Gaucher's disease, Niemann- pick Disease and Tay–Sachs disease.

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

Review recent research articles related to metabolic diseases and biochemical investigations.

Collect and analyze case studies related to metabolic disorders and inborn errors of metabolism.

Recommended Books:

1. AmbikaShanmugam, Fundamentals of Biochemistry for Medical Students, Seventh Edition, New Age Publishing Pvt.Ltd, New Delhi (1986).
2. A.C. Deb, Fundamentals of Bio chemistry, FifthEdition, New Central Book Agency(P)td. (1992).
3. U. Sathyanarayana and U. Chakrapani, Textbook of Biochemistry, Third Edition, Books and Allied (P) Ltd, Kolkata (2010).

Reference:

1. E.S. WestTod, W.R. Mason and J.T. Van Bruggen, Text book of Biochemistry, Fourth Edition, Amerind Publishing Co Pvt Ltd., (1974).
2. T.M. Devlin, Text Book of Biochemistry (with Clinical corrections), Second Edition, John Wiley and sons (1986).
3. Ramakrishnan, K.G. Prassanan and R. Rajan, Text book of Medical Biochemistry, Second Edition, Orient Longman limited (1989).

E-Reference:

1. https://agrimoon.com/fundamentals-of-biochemistry-pdf-book/
2. https://biochem.oregonstate.edu/undergraduate/educational-resources
3. https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=MNhNzp1RQlU+6LM40KjY1Q==

COURSE OUTCOMES (With Mapping)

At the end of the course, the students will have the ability to

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	2	2	1	1	-	1
CO 2	2	3	2	3	2	2	1	1	-	1
CO 3	2	3	2	3	3	2	1	1	1	1
CO 4	2	3	3	3	3	2	2	2	1	1
CO 5	2	3	3	3	2	3	2	2	1	1
CO 6	2	3	3	3	3	3	2	3	1	2

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

Year: Second **ALLIED COURSE PRACTICAL 2** **Semester: IV**

Code : **FOOD MICROBIOLOGY AND NUTRITIONAL BIOCHEMISTRY (Practical)** **Credits: 4**

COURSE OBJECTIVES:

To enable the students to

- Understand the principles and procedures of biochemical analysis of urine and blood.
- Develop skills in qualitative and quantitative estimation of biochemical constituents.
- Gain knowledge of normal and abnormal levels of glucose, urea, and cholesterol.

PRACTICALS:

1. Qualitative analysis of Urine for Sugar, Protein, Bile salts & Bile pigments
2. Estimation of Urine Glucose (Benedict's Method)
3. Estimation of Urine Urea (DAM Method)
4. Estimation of Blood Glucose (Benedict's Method)
5. Estimation of Blood Urea (DAM Method)
6. Estimation of serum cholesterol (Zak's Method)

References:

1. Practical Biochemistry(Laboratory manual) for pharmacy students, RituMahajan, Vayu education of India, New Delhi, First Edition,2009.
2. Biochemistry& Clinical pathology (Theory & Practical), K.K.Pillai&J.S.Qadry, CBS Publishers& Distributors, New Delhi, First edition(Reprint)(2008).
3. Varley's Practical Biochemistry, Alan H Gowenlock, CBS Publishers& Distributors, New Delhi, Sixth edition(2008).

COURSE OUTCOMES (With Mapping)

At the end of the course, the students will have the ability to		
CO1	Perform qualitative analysis of urine for sugar, protein, bile salts, and bile pigments.	LO1
CO2	Estimate urine glucose and urine urea using standard biochemical methods.	LO4
CO3	Perform estimation of blood glucose and blood urea using biochemical techniques.	LO5
CO4	Estimate serum cholesterol and interpret the significance of biochemical parameters in health assessment.	LO7, LO13
CO5	Demonstrate laboratory skills in handling biological samples and biochemical analysis procedures.	LO10, LO11

CO6	Apply biochemical principles and laboratory techniques in the assessment of metabolic and clinical conditions.	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	1	3	2	2	3	2	2	1	2	1
CO 2	1	3	2	3	3	2	2	2	3	1
CO 3	1	3	3	3	3	2	2	2	3	1
CO 4	1	3	3	3	3	2	2	3	3	1
CO 5	1	3	2	2	3	2	3	2	3	1
CO 6	2	3	3	3	3	3	3	3	3	2

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

Year: Second **INTERDISCIPLINARY COURSE 4** **Semester: IV**

Code : **Credits: 2**

FAMILY STUDIES
(Theory)

COURSE OBJECTIVES:
To enable the students to

- Understand the concepts of self, personality and interpersonal relationships.
- Explain the institution of marriage, mate selection and marital adjustment.
- Analyze family structure, functions and family life cycle stages.
- Develop awareness on roles, responsibilities and communication within the family.
- Identify various forms of family crisis and their impact on family wellbeing.

UNIT – I UNDERSTANDING THE SELF:
Self-identity— Identifying one's own philosophy and goals of life (influenced by personal history, socialization and context) -Personality—factors that shape one's personality and its influence on behavior and interpersonal communications, Self with family/parents/siblings, peers, social/professional organizations- The impact of media on the self.

UNIT – II MARRIAGE:
Marriage as an institution: goals, rituals, functions, changes and challenges -Mate Selection; considerations of exogamy and endogamy. Preparation for marriage – Pre-marital guidance, Factors associated with success in Marriage- Marital Counselling – Need, importance and types.

UNIT – III: THE FAMILY:
Definitions, functions, types Family Life cycle – stages and sub-stages (beginning, expanding, contracting). Alternate forms of family – Single parent, female headed, migrant, dual earner, reconstituted, surrogate.

UNIT – IV: INTERPERSONAL RELATIONSHIPS WITHIN THE FAMILY:
Individual roles, rights and responsibilities within the family - Family Interaction and communication – importance and methods of improvement.

UNIT – V: FAMILY CRISIS:
Family Crisis – Meaning, Forms of family crisis: Marriage, divorce/separation, remarriage, financial instability, poor work-family balance, illness, death, childlessness, addiction, rape, suicide, unemployment, natural disasters– Strategies for managing family crisis.

UNIT – VI CURRENT CONTOURS (Self-directed learning activities for Continuous Internal Assessments Only):
Collect newspaper articles or case reports related to family crises and analyze coping

strategies adopted
Prepare a case study on different forms of families such as single-parent, dual-earner or reconstituted families.

Recommended Books:

1. Augustine,J.N(Ed).(1982).TheFamily in Transition,NewDelhi. Vikapublishinghouse
2. Bushan,V(2003).An Introduction to Sociology, KitabMahal, NewDelhi
3. Chaudhary, N., &Shukla, S. (2019). Family, identity, and the individual in India. In G. Misra (Ed.), Psychology: Volume 2: Individual and the social: Processes and issues (pp.143-189). New Delhi, India: Oxford University Press.

Reference:

1. Rao,N. (1997).Counselling and Guidance. New Delhi:TataMcgraw Hill publishing company ltd.
2. RatraAmiteshwar et al. (2006). Marriage and Family: In Diverse changing Scenario, Deep and Deep Publications Pvt. Ltd. New Delhi.

E-Reference:

1. https://epgp.inflibnet.ac.in
2. https://swayam.gov.in
3. https://ndl.iitkgp.ac.in
4. https://www.unicef.org/india
5. https://www.who.int
6. https://www.unfpa.org

COURSE OUTCOMES (With Mapping)

At the end of the course, the students will have the ability to		
CO1	Explain self-identity, personality development, and the influence of family, peers, and media on individual behavior.	LO1
CO2	Describe marriage as a social institution, factors influencing marital success, and the importance of marital counselling.	LO4
CO3	Discuss the structure, functions, life cycle, and alternate forms of families in contemporary society.	LO5
CO4	Explain interpersonal relationships, communication patterns, and roles and responsibilities within the family.	LO7, LO13
CO5	Describe various forms of family crisis and strategies for coping and managing family-related challenges.	LO10, LO11
CO6	Apply principles of family interaction, communication, and counselling to promote healthy family relationships and well-being.	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	2	2	-	2	2	1	1	1
CO 2	3	3	2	2	1	2	2	1	-	1
CO 3	2	3	2	2	1	2	2	1	1	2
CO 4	3	3	3	2	1	3	2	2	2	1
CO 5	2	3	3	3	2	3	2	3	1	2
CO 6	3	3	3	3	3	3	3	3	2	2

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

Year: Third **CORE COURSE 5** **Semester: V**

Code : **Credits: 4**

FOOD PROCESSING AND PRESERVATION
(Theory)

COURSE OBJECTIVES:

To enable the students to

- Acquire knowledge of food preservation and preservation technique.
- Know the importance and basic principles of food preservation
- Understand the principles behind the various methods of food preservation.
- Know how to use these principles to preserve different types of foods.
- Study the method of action of different preservatives.

UNIT – I PROCESSING AND PRESERVATION OF CEREALS & PULSES:

Definition of Cereal Processing and Importance of Preservation Processing of Cereals (Rice, Wheat & Millets) - Pre-processing, Milling, Cooking, Fermentation, Extrusion.

Processing of Pulse products-Pre-processing, De hulling, cooking, Fermentation, Sprouting. Fumigation of Pulses.

Preservation Techniques- Drying, Canning, Freezing, Vacuum packing, High Pressure Processing (HPP) Cold plasma technology. Fortification of Cereals and Pulses.

UNIT – II PROCESSING AND PRESERVATION OF MEAT AND POULTRY:

Meat: Quality standardization of meat of processing. Processed meat products- sausages, burger, patties.

Poultry: Quality standardization of fresh produce. Steps involved in Slaughtering, Poultry products. Sanitation & hygiene practices followed in Slaughter houses.

Egg: Quality standardization of raw materials. Processed products- pickled eggs and egg based sauces. Fish: Quality standardization of raw materials. Fish processing methods, Processed fish product- canned fish. Sustainable fisheries and aquaculture practices

UNIT – III PROCESSING AND PRESERVATION OF FRUITS & VEGETABLES:

Quality standards for raw materials used in processing. - Standardization of raw material, primary processing-grading, sorting, cleaning, washing, peeling, slicing and blanching.

Preservation of fruits and vegetables – Canning, Food Irradiation, Modified Atmosphere Packaging (MAP)

Types of drying and dryers utilized- Tray dryers, Freeze dryers, Spray dryers. General principles and manufacturing processes of preserves, candied fruits, glazed fruits, crystallized fruits.

UNIT – IV PROCESSING AND STORAGE OF SPICES AND OILSEEDS:

Types of Spices grown in India. Pre and Post-harvest problems during processing,

properties, drying, storage..
Manufacturing process of Indian spice powder and pastes- processing, quality standard, storage.
Types of oil extraction: Mechanical and Solvent extraction methods. Cold pressing of oils Steps followed in Oil refining, Hydrogenation, Utilization of de-oiled cake, Quality Control and Testing of oils.

UNIT – V PACKAGING SOLUTIONS FOR PROCESSED & PRESERVED FOODS:
Definition: Understanding the role of packaging in food processing and marketing.
Functions: Key functions of packaging – sustainability, protection, containment, and convenience.
Materials: Overview of different packaging materials, such as paper, and glass, and their specific applications in perishable products. Barrier Properties of Packaging Materials

UNIT – VI CURRENT CONTOURS (Self-directed learning activities for Continuous Internal Assessments 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.

Recommended Books:

1. Manay, N.S. Shadaksharaswamy, M. (2004), "Foods- Facts and Principles", New age international publishers, New Delhi.
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)
6. Gopala Rao, Chandra. "Essentials of Food Process Engineering". B.S. Publications, 2006.

Reference:

1. Desrosier N. W. The Technology of Food Preservation, BS Publishers & Distributors Pvt Ltd, India; 4th edition (1 January 2004)
2. Gould, G. W. (2012), "New Methods of food preservation", Springer Science & Business Media.
3. Ramaswamy H and Marcott M. Food Processing Principles and Applications. CRC Press, 2005
4. Norman N Potter and Joseph H. Food Science by Hotchkiss, CBS Publishers and Distributors.

5. Barbosa-Canovas, Tapia & Cano Novel Food Processing Technologies by CRC Press, 2004.
6. Mc Willims and Paine : Modern Food Preservation, Surjeet Publication.
7. Zeuthen, Peter and Bogh-Sarensen, Leif. "Food Preservation Techniques". CRC / Wood Head Publishing, 2003.

E-Reference:

1. http://nchfp.uga.edu/
2. http://mofpi.nic.in/

COURSE OUTCOMES (With Mapping)	
CO1	Explain the principles and methods involved in processing and preservation of cereals and pulses.
CO2	Describe the processing techniques, quality standards, and preservation methods used for meat, poultry, egg, and fish products.
CO3	Analyze the processing, drying, and preservation methods employed for fruits, vegetables, spices, and oilseeds.
CO4	Examine the quality control measures, storage practices, and modern technologies used in food processing industries.
CO5	Evaluate the functions, materials, and barrier properties of food packaging systems for processed and preserved foods.
CO6	Apply appropriate food processing, preservation, and packaging techniques to enhance food quality, safety,

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	2	2	1	1	-	1
CO 2	2	3	2	2	3	2	1	1	1	1
CO 3	2	3	3	3	3	2	2	2	1	2
CO 4	2	3	3	3	3	2	2	2	2	1
CO 5	2	3	3	3	3	2	2	2	2	2
CO 6	2	3	3	3	3	3	3	3	2	1

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

Year: Third **CORE COURSE 6** **Semester: V**

Code : **Credits: 4**

FOOD SERVICE MANAGEMENT
(Theory)

COURSE OBJECTIVES:
To enable the students to

- Know the functioning of different types of food service institutions.
- Understand the type sofkitchen and kitchen layout
- Comprehend the space allocation and arrangement of food service units.
- Develop skills on the concept of quantity food cookery
- Utilizere sources 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

Recommended Books:

1. Kinton.RAndCeserani,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 Sethiand Surjeet Malhan, "Catering Management–an integrated approach", 2nd edition, Wiley Eastern Limited, New Delhi, Reprint 2007.
6. Suganthi,V and Premakumari,C.(2017). Food Service Management. Chennai: Dipti Press (OPC) Pvt.LTD.

Reference:

1. West,B.B. and Wood,L. 1979. Food Service in Institutions, JohnWiley, New York.
2. Mary, B.Gregoire, Marian, C.Spears. (2007). Food Service

Organizations.UnitedStates 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. (2nded.). India: Mc Graw-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)

At the end of the course, the students will have the ability to	
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)

Year: Third **CORE COURSE 7** **Semester: V**

Code : **Credits: 4**

TEXTILE SCIENCE
(Theory)

COURSE OBJECTIVES:

To enable the students to

- Obtain a broad understanding of textiles and technical terms involved in textiles.
- Get acquainted with the properties and uses of various textile fibers.
- Develop the skills for identification of fibers and fabrics(yarns, weaves and finishes)
- Develop skills in making wise selection of textiles and acquire knowledge on laundry and stain removal.
- Learn the methods of dyeing, printing, and finishing of fabrics.

UNIT – I TEXTILE FIBER& YARN:

Fiber – Definition, Classification of Fiber. Introduction to Textile Fibres – Classification of Textile Fibres: Natural fibres – Cotton – Jute – Wool – Silk Fibres – Physical and Chemical Properties of Fibres – Uses of the above fibres. Man Made fibre – Nylon fibre – Polyester fibre – Properties of fibres – Uses of the above fibres Yarn –Types and characteristics of yarns – ply yarns, cable yarns, double yarns and novelty yarns and its types.

UNIT – II YARN MANUFACTURING:

Conventional ring spinning method, Modern spinning methods – Passage of material through open end spinning, Friction spinning, Airjet spinning, Twistless spinning. Filament yarn spinning methods wet spinning, dry spinning, and melt spinning.

UNIT – III WEAVING:

Preparation for weaving (warping, sizing, looming) Basic loom structure. Weaving Definition, Primary motion – shedding – Definition and a brief explanation, picking, beating up. Secondary motion – Definition and Ancillary motion. Types of sleeveedge's. Construction of cloth designs - Design, draft and peg plan. Classification of weaves – plain weave, twill, Satin, sateen& Crepe, dobby (Climax) and Jacquard (single lift single cylinder) Identification of woven fabric defects.

UNIT – IV KNITTING:

Knitting – Definition, Comparison between woven fabrics and knitted fabric.

Classification of knitted fabrics weft knitting – plain knit stitch, Rib stitch, Warp knitting - Tricot knit, Raschel Knit (Jacquard knit, pile knit, Terry knit, velour knit) Identification of knitted fabric defects.

UNIT – V FELTED AND NON-WOVEN FABRICS:

Felted fabrics – Felting process. Types of felt, properties and uses of felt. Nonwoven – Definition, classification of non-woven fabrics, web forming techniques, bonding techniques, and finishing techniques. Characteristics of non-woven, uses of non-woven fabrics.

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

Blended fabric, Natural dyes – scrap book.

Collect and classify different natural and man-made textile fibres based on their properties and uses.

Collect fabric samples and identify common woven and knitted fabric defects.

Recommended Books:

1. Corbman, B. P and Potter, M. D. (1983) Textiles fiber to fabric, International Edition, McGraw hill book Co, New York.
2. Dantyagi, S. (1996).Fundamentals of Textiles and their Care. India: Orient Black swan Private Limited.
3. DeepaliRastogi and Sheetal Chopra (2017) Textiles Science, Direct Black swan private ltd, Hyderabad.
4. Practical Clothing Construction – Part I and II, Mary Mathews, Cosmic Press, Chennai (1986)
5. Holman, Gillian. (1997), Pattern Cutting Made Easy, BSP.

Reference:

1. Booth, J.E. (1996). Principles of Textile Testing. New Delhi: CBS Publishers & Distributors Pvt. Ltd.
2. Hollen, R. N., Saddler, J., & Langford, A. (1979).Textiles. Macmillan Publishers.
3. Joseph, M. (1992), Introductory Textile Science. Sixth edition, California: Harcourt College, Publishers.
4. Madhulika, P. (2013). Weaving. New Delhi: Random Publishing.
5. Needles, L.H. (1986). Textile Fibers, Dyes, Finishes, and Processes. USA, New Jersey: Noyes publications.
6. Rastogi, D., & Chopra, S. (2017). Textile Science. India: Orient Blackswan Private Limited.
7. Sekhri, S. (2011).Textbook of Fabric Science: Fundamentals to Finishing. India: PHI Learning Pvt. Ltd.
8. Tyagi, A. (2016).Handbook of Fashion and Textile Design. New Delhi: Sonali publication.
9. Cream, Penelope, (1996), The Complete Book of Sewing - A Practical Step by Step Guide to Sewing Techniques, DK Publishing Book, New York.

E-Reference:

1. https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=8x0nJkh/R0vHkX1U70Z/CQ=
2. https://www.gutenberg.org/ebooks/21534
3. https://textilestudycenter.com/textile-books-free-donwload/

COURSE OUTCOMES (With Mapping)

At the end of the course, the students will have the ability to		
CO1	Explain the classification, properties, and uses of natural and man-made textile fibres and yarns.	LO1
CO2	Describe conventional and modern yarn manufacturing methods and filament spinning techniques.	LO4
CO3	Analyze the processes involved in weaving, fabric construction, and identification of woven fabric defects.	LO5
CO4	Examine different knitting techniques, knitted fabrics, and defects in knitted materials.	LO7, LO13
CO5	Evaluate the manufacturing process, properties, and applications of felted and non-woven fabrics.	LO10, LO11
CO6	Apply knowledge of textile fibres, yarns, weaving, knitting, and non-woven technologies in textile and fabric analysis.	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	1	3	2	2	2	2	1	1	-	1
CO 2	1	3	2	2	3	2	1	1	1	1
CO 3	1	3	3	3	3	2	2	2	1	1
CO 4	1	3	3	3	3	2	2	2	1	1
CO 5	1	3	3	3	3	2	2	2	1	2
CO 6	2	3	3	3	3	3	2	3	2	2

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

Year: Third **CORE COURSE 8** **Semester: V**

Code : **FUNDAMENTALS OF RESEARCH METHODOLOGY AND STATISTICS** **Credits: 4**

(Theory)

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.

Recommended Books:

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) Learntech Press
3. Saravanavel P. (2013).Research Methodology. Kitab Mahal Allahabad
4. VijayalakshmiG. andSivapragasam .C. (2008).Research Methodology. MJP Publishers

Reference:

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&bshm=rimc
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 meaning, objectives, significance and types of research and identify research problems and variables.
CO2	Describe different research designs, sampling methods and pilot study procedures used in research.
CO3	Apply appropriate methods and tools for collection of primary and secondary data.
CO4	Analyze and interpret data using statistical tools, measures and graphical representations.
CO5	Demonstrate understanding of inferential statistics such as Chi-square test, t-test and ANOVA.

CO6	Prepare research reports using appropriate referencing styles and ethical research 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	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)

Year: Third **CORE PRACTICAL 5** **Semester: V**

Code : **Credits: 4**

FOOD PROCESSING AND PRESERVATION (Practical)

COURSE OBJECTIVES:

To enable the students to

- Gain knowledge about the preparation of some basic food products
- Use the processes studied in food Processing and preservation course
- Prepare different food products
- Understand how these can be utilized to start a small-scale processing Module.
- Helps the students to gain not only theoretical but also practical knowledge

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 preserve (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. Preparation of solar-dried food products (fruits/vegetables) using eco-friendly drying methods
11. Fermented pickle

Reference:

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

COURSE OUTCOMES (With Mapping)	
CO1	Prepare and preserve fruit-based products such as jam, jelly, marmalade, preserves, candies, and toffees using appropriate preservation techniques.
CO2	Demonstrate the preparation of beverages and processed products including squash, fruit juice concentrates, RTS foods, tomato sauce, and ketchup.
CO3	Apply suitable preservation methods for preparing pickles, salted products, dehydrated vegetables, and cereal-based preserved foods.
CO4	Analyze the role of dehydration and chemical preservation techniques in extending shelf life of food products.
CO5	Evaluate the preparation and quality of dehydrated vegetable powders, spice powders, solar-dried foods, and fermented pickles.

CO6	Apply principles of food processing and preservation for developing safe, acceptable, and shelf-stable food 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	1	3	2	2	3	2	2	2	1	1
CO 2	1	3	2	2	3	2	2	2	1	1
CO 3	1	3	3	3	3	2	2	3	1	1
CO 4	1	3	3	3	3	2	2	3	2	1
CO 5	1	3	3	3	3	2	3	3	2	1
CO 6	2	3	3	3	3	3	3	3	2	2

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

Year: Third **SKILL ENHANCEMENT COURSE 4** **Semester: V**

Code : **HOME SCIENCE EXTENSION AND COMMUNICATION (Theory)** **Credits: 2**

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/Conscientation 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.

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)

Year: Third **SUMMER INTERNSHIP / INDUSTRIAL ACTIVITY (WITH VIVA VOCE)** **Semester: V**

Code : **Credits: 2**

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
5. 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)

Year: Third **CORE COURSE 9** **Semester: VI**

Code : **Credits: 4**

HUMAN DEVELOPMENT
(Theory)

COURSE OBJECTIVES:

To enable the students to

- Understand the principles, stages, and factors influencing human growth and development from conception to old age.
- Gain knowledge on prenatal development, maternal health, labour, and neonatal care.
- Learn the physical, emotional, social, cognitive, and language development during infancy and childhood.
- Understand developmental characteristics, behavioral problems, and special needs of children and adolescents.
- Acquire knowledge on developmental tasks, adjustment issues, and challenges during adulthood and old age.

UNIT-I CHILD DEVELOPMENT AND MATERNAL PRENATAL HEALTH:

Principles and Stages – Continuous development – Development is sequential – Stages of growth and development – Maturation and learning – Direction of growth. **Prenatal development** –signs of pregnancy, conception, Stages of prenatal development, periods of prenatal development, test tube baby, management of normal pregnancy – hygiene. Factors influencing prenatal development diet and medical supervision and hazards during pregnancy.

UNIT-II LABOUR AND NEONATE:

Labour- signs of labour, stages of labour, types of birth, multiple pregnancy, pain management in labour, prevention of gynecological problems.

Neonate - Adjustment of the newborn to temperature, breathing, APGAR Score feeding and elimination.

UNIT-III INFANCY:

Infancy (birth to 2 years) – Development – physiological and motor, social, emotional cognitive and language, Growth Monitoring, minor ailments.

Effect of stimulation – care of infants, feeding, toilet training, bathing, clothing, sleep, immunization, prevention of accidents-importance of psychological needs.

UNIT-IV EARLY AND LATE CHILDHOOD:

Early childhood (preschool stage 2-6 years) – physiological and motor development, emotional, social, cognitive and language development, creativity, importance of play, importance of family relationship, behavior problems – causes and treatment. Developmental tasks. Habit Formation

Late childhood (elementary school period 6-12 years) developments –

physiological, social, emotional, cognitive and language. Developmental tasks. Habit Formation

Children with special needs – identification and rehabilitation.

UNIT-V ADOLESCENCE, ADULTHOOD AND OLD AGE:

Adolescence (12 – 18 years) – physiological, emotional, intellectual and motor development, personal adjustment and maladjustment. Prepubertal growth-changes in primary and secondary sexual characteristics in boys and girls Juvenile Delinquency – causes, prevention and rehabilitation. Drug addiction and alcoholism – rehabilitation. Sex education.

Adulthood (18-60 years) – characteristics and development tasks. All aspects of development and vocational development.

Old age (60 years and above) – physiological and psychological changes, problems of the aged, family attitude towards the aged, place of the aged in Indian society.

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

Observation and reporting of services provided by Anganwadi Centres, Child Care Centres or Old Age Homes.

Develop a portfolio on government programmes and services for maternal, child and elderly welfare

Recommended Books:

1. Sushilasrivastava and K. Sudha Rani, Text Book of Human development A life span developmental approach, First Edition, S. Chand & company pvt(2014).
2. A.C.Harris, Child development. St. Paul: West Pub. (1986)
3. R.M. Lerner, and F. Hultsch, Human development: A life-span perspective (pp.247-253), New York: McGraw Hill Book Co. unit VI, Unit VII (1983).
4. P. Mussen, J.J. Conger, J.Kagan, and A.C. Huston, Child Development and Personality. New York: Harper and Row. Unit I pp 12-18 (1990).

Reference:

1. Sushilasrivastava and K. Sudha Rani, Text Book of Human development A life span developmental approach, First Edition, S. Chand & company pvt(2014).
2. Anne Anastasi & Susana Urbin. (2022). Psychological testing 7th edition, Pearson India Education Services Pvt. Ltd, Chennai.
3. Berk,L.E.(2017).Child development(9thed.).New Delhi: Prentice Hall
4. Santrock, J. (2017). A topical approach to life span development (9th ed.). New NY.: Mcgraw-Hill Higher Education.
5. Hockenberry, Marilyn J., Wilson, David, & Rodgers, Cheryl C. (2022). *Wong's Essentials of Pediatric Nursing* (12th Edition),St. Louis: Elsevier.

E-Reference:

1. https://epgp.inflibnet.ac.in
2. https://swayam.gov.in
3. https://ndl.iitkgp.ac.in
4. https://www.unicef.org

5. https://www.who.int
6. https://wcd.gov.in

COURSE OUTCOMES (With Mapping)	
CO1	Explain the principles, stages, and factors influencing child development and prenatal growth.
CO2	Describe the stages of labour, neonatal adjustment, and care during the prenatal and postnatal period.
CO3	Discuss the physical, cognitive, emotional, social, and language development during infancy and childhood.
CO4	Analyze developmental tasks, behaviour problems, and rehabilitation needs of children with special needs.
CO5	Evaluate the developmental changes, adjustment problems, and challenges during adolescence, adulthood, and old age.
CO6	Apply developmental principles and care practices across different stages of the lifespan.

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	1
CO 2	2	3	2	2	1	2	1	1	1	1
CO 3	2	3	2	2	1	2	2	1	-	1
CO 4	2	3	3	3	2	2	2	3	2	1
CO 5	2	3	3	3	2	3	2	3	2	1
CO 6	2	3	3	3	2	3	3	3	2	2

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

Year: Third **CORE COURSE 10** **Semester: VI**

Code : **PRINCIPLES OF RESOURCE MANAGEMENT AND INTERIOR DESIGN (Theory)** **Credits: 4**

COURSE OBJECTIVS:

To enable the students to

- Enable the students to understand concepts and principles and functions of management.
- Recognize the importance of wise use of resources to achieve ones goal.
- Acquire the knowledge of various elements and principles of art in interior.
- Learn skills in using the basic principles of art at home in commercial situations and other occasions.
- Apply theoretical knowledge of interior decoration to practical situations

UNIT-I RESOURCE MANAGEMENT:

Understanding, meaning, classification and characteristics of resources, factors affecting utilization of resources. Maximizing use of resources and resource conservation. Availability and management of specific resources by an individual / family –money, time, energy, space. Functions of management: Decision making, planning, supervising, controlling, organizing, . Goals and values – Their relation to decision making

UNIT-II DESIGN AND GOOD TASTE:

Interior Decoration – Place of art in everyday life. Good taste and the consumer. Objectives of aesthetic planning, beauty, expressiveness, functionalism. Concept of design, purpose of design, elements of design, types of design, structural design, and decorative design.

Colour: Sources of colour- dimension of colour (hue, value, intensity / chroma). The prang colour system (primary, secondary, intermediate hue, tertiary and quaternary colour) Procedure for making a colour scheme for a room: factors affecting the use of colour scheme for room (the room, mood, style, fashion, personality, possessions). Application of art principle in the use of colours for a room (balance, proportion, harmony, rhythm, emphasis).

UNIT-III LIGHTING:

Sources of light (natural, artificial light). Types of Lighting: General / ambient lighting, task lighting, accent lighting. Requirements of an Ideal Lighting Installation- Steadiness of the source of light, elimination of glare, avoidance of shadows, sufficient illumination to suit the nature of the visual task, nonproduction of excessive heat, minimum consumption of oxygen from the air.

UNIT-IV FURNITURE:
Requirement and arrangement in the home, materials used in furnishing items. Furnishing: Different types of furnishing, factors considered in the selection of furnishing. Floor Coverings: Factors for selecting floor coverings, salient features of carpet, types, use and care of floor coverings.

UNIT-V ACCESSORIES:
Selection, types, use and care of accessories, Traditional and Modern: Art objects, pictures Flower Arrangement: Principles, types and steps in preparing flower arrangement.

UNIT–VI CURRENT CONTOURS (Self-directed learning activities for Continuous Internal Assessments Only):
Visit a furniture showroom or interior design studio and submit an observation report.
Develop a colour scheme and mood board for a selected room using design principles.

Recommended Books:

1. Graig. H.T., And Rush, C.H. "Homes with Character", D.C. Health and Company, Boston, 1965.
2. Alexander, M.J., "Designing Interior Environment", Har court Brace Jauaroui Inc., New York. 1972.
3. Sherwood, R.F. "Homes Today and Tomorrow": Chart Bannet, Co., Inc., PEORIC, Illinois, 1972
4. Premavathy Seetharaman and Parveenbanu "Interior Design and Decoration" CBS Publishers, New Delhi, 2007.

Reference:

1. Nickell.P. and Dorsey. J.M. – "Management in Family Living", John Wiley and Sons, Inc, New York, 1960.
2. Goldstein. H and Goldstein. V. "Art in Everyday Life", Macmillan and Company, New York, 1966.
3. Rutt, A.H., "Home Furnishings", John Wiley and Sons, New York, 1961
4. Roy Day, "All about Decorating Your Home" Hamlyn, London", 1976
5. Stepot, D.D. Introduction to Home Furnishing. The Macmillan Co., New York. 1979.
6. Laver, D.A.Design Basies., Holt Rinchart Winston, New York, 1979.
7. Evans, H.M., Man the Designer, The Macmillian Co., New York, 1976.
8. Sulahria, J. and Diamond.R. Inside Design creating your environment, Carfield Press, Sanfrancisco, 1977.
9. Faulkner, R. and Faulkner.S., Inside Today's Home, Hold, Rinchart and Winston.

E-Reference:
1. https://epgp.inflibnet.ac.in

2. https://ndl.iitkgp.ac.in
3. https://www.nios.ac.in
4. https://www.nid.edu

COURSE OUTCOMES (With Mapping)	
CO1	Explain the concept, classification, and management of resources and their role in family decision making.
CO2	Describe the principles of design,colour schemes, and application of art principles in interior decoration.
CO3	Discuss the sources, types, and requirements of lighting for functional and aesthetic home interiors.
CO4	Analyze the selection, arrangement, and maintenance of furniture, furnishings, and floor coverings in home management.
CO5	Evaluate the selection, care, and arrangement of accessories and flower arrangements for interior enhancement.
CO6	Apply principles of resource management and interior decoration in planning functional and aesthetic living spaces.

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	2	2	1	-	1
CO 3	2	3	2	3	2	2	2	2	1	1
CO 4	1	3	3	3	2	2	2	3	1	1
CO 5	1	3	3	3	1	2	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)

Year: Third **CORE COURSE 11** **Semester: VI**

Code : **Credits: 4**

COMMUNITY NUTRITION
(Theory)

COURSE OBJECTIVES:

To enable the students to

- Gain insight into the national nutritional problems and their implications
- Gain knowledge about methods of nutritional assessment and modes of extending nutrition knowledge to community.
- Appreciate the national and international contribution towards nutrition improvement.
- Develop skills in organizing and evaluating nutrition projects in the community

UNIT–I NUTRITIONALDEFICIENCYDISEASESININDIA:

Definition – Health, Nutrition, Malnutrition- Under nutrition and Over nutrition, Effect of malnutrition on human development Prevalence of Macronutrient deficiency diseases - PEM, Micro nutrient deficiency diseases-Vitamin A deficiency diseases, anaemia, fluorosis, Goiter in India. Causes of malnutrition in India: i) Socio-economic factors - poverty, population explosion, unemployment and under employment, illiteracy, family planning, food production, food insecurity, Public Distribution System (ii) Cultural factors – food habits, attitudes, taboos; food fads and fallacies.

UNIT–II ASSESSMENT OF NUTRITIONAL STATUS:

Importance and objectives of assessing nutritional status of a community. Methods - Direct assessment- Nutritional anthropometry - Height, weight- Indices used to measure malnutrition; MUAC, Chest circumference, Head circumference, skin fold thickness, Waist and hip circumference and wais thipratio ii)Clinical examination iii)Biochemical methods iv)Diet Survey Indirect Assessment – Vital statistics–IMR, MMR, PNMR, NNMR

UNIT–III
NATIONALANDINTERNATIONALNUTRITIONALORGANISATIONS:

National organisations – Objectives and functions of ICMR, NNMB, NIN, NFI, NSI, FNB. National Nutrition Policy – Aim, Direct - short term nutrition intervention, Indirect – long term nutrition intervention. International organizations - Objectives and functions of WHO, FAO, UNICEF, World Bank; Contribution towards national development.

UNIT–IV NUTRITIONINTERVENTIONPROGRAMMES:
Integrated Child Development Services – Objectives, beneficiaries, components and challenges in providing services. Chief Minister's Nutritious Noon Meal Programme - Objectives, beneficiaries, components and challenges in providing services. National Prophylaxis Programmes - Objectives, Beneficiaries and Components of National Anaemia Prophylaxis Programme- Long term and short term strategies; National Goiter Prophylaxis Programme; National Vitamin A Deficiency Diseases Prophylaxis Programme – Long term and short term strategies.

UNIT–V NUTRITIONEDUCATION:
Definition, Need, Objectives, Implementation, Importance of Nutrition Education for the Community. Methods of Nutrition Education-Audio Visual Aids–Projected and non-projected. Nutrition Education Programme - planning, execution and evaluation. Concepts and purpose of KAP study; Use of computers to impart nutrition education – power point presentation, preparation of e-learning module.

UNIT–VI CURRENT CONTOURS (Self-directed learning activities for Continuous Internal Assessments Only):
Prepare different types of visual aid for the nutrition education.
Nutritional status assessment for self and peers.
Spot study-ICDS and Noon meal functioning.

Recommended Books:

1. Swaminathan, M.,(2007), Essentials of Food and Nutrition, An Advanced Textbook Vol.I, The Bangalore Printing and Publishing Co. Ltd, Bangalore.
2. Srilakshmi,B.,(2008), Nutrition Science, New Age International publishers(P),Ltd, Chennai.
3. Joshi,S.A.,(2007), Nutrition and Dietetics, IIEdition, Tata Mc Graw-Hill Publishing Company Ltd., India.

Reference:

1. Reddy, R.S., (1997), Nutrition and Health Education, Commonwealth publishers, New Delhi.
2. Mishra,R.C.,(2005), Health and Nutrition Education, A.P.HPublishing Corporation, New Delhi.
3. Gibney,M.J.,Margetts,B.M.,Kearney,J.M.,Arab,L.,M.J.,(2005),Public Health, Nutrition, Blackwell Publishing Company, UK.

E-Reference:

1. https://www.academia.edu/43641174/Community_nutrition_a_handbook_ for_health_and_development_workers
2. https://ujlink.uj.ac.za/
3. www.worldcat.org
4. www.nal.usda.gov/legacy/fnic/life-stage-nutrition

5. https://www.medicosrepublic.com/community-nutrition-pdf-free-download/

COURSE OUTCOMES (With Mapping)	
CO1	Explain the causes, prevalence and consequences of nutritional deficiency diseases in India.
CO2	Assess nutritional status using anthropometric, clinical, biochemical and dietary assessment methods.
CO3	Describe the role and functions of national and international nutrition organizations and policies.
CO4	Analyze the implementation and impact of national nutrition intervention programmes.
CO5	Plan and conduct nutrition education programmes using suitable teaching methods and audio-visual aids.
CO6	Apply computer-based tools and communication strategies for effective nutrition education and community awareness.

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	-	1
CO 2	2	3	3	3	3	2	2	3	2	1
CO 3	2	3	2	2	1	2	1	1	1	1
CO 4	2	3	3	3	2	2	2	3	2	1
CO 5	3	3	3	2	2	3	2	2	1	2
CO 6	3	3	3	3	2	3	2	3	2	2

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

Year: Third **CORE PROJECT WORK** **Semester: VI**

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
Human development, Interior Decoration
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 decide 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)
   I. Plan of the Project -20 marks
   II. Execution of the Plan/collection of - 45 marks Data / Organisation of Materials / Hypothesis, Testing etc. and presentation of the report.
   III. Individual initiative - 15 marks
2. Viva-Voce / Internal & External - 20 marks

TOTAL - 100 marks

PASSING MINIMUM:

Project	**Vivo-Voce 20 Marks** 40% out of 20 Marks (i.e. 8 Marks)	**Dissertation 80 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 size12, 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)

Year: Third **SKILL ENHANCEMENT COURSE 6** **Semester: VI**

Code : **PRINCIPLES OF RESOURCE MANAGEMENT AND INTERIOR DESIGN** **Credits: 2**

(Theory)

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.

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)