VIVEKANANDHA

COLLEGE OF ARTS AND SCIENCES FOR WOMEN

ELAYAMPALAYAM, TIRUCHENGODE Tk, NAMAKKAL Dt – 637 205

(Affiliated to Periyar University, Approved by AICTE, Re-accredited with 'A+' Grade by NAAC)Recognized under section 2(f) & 12 (B) of UGC ACT 1956,

An ISO 9001:2015 Certificate Institution

DEPARTMENT OF NUTRITION AND DIETETICS

B.SC. NUTRITION AND DIETETICS

SYLLABUS & REGULATIONS

FOR THE STUDENTS ADMITTED DURING THE ACADEMIC YEAR 2024-2025 ONWARDS

UNDER AUTONOMOUS AND CBCS PATTERN

OUTCOME BASED EDUCATION

VIVEKANANDHA EDUCATIONAL INSTITUTIONS

ANGAMMAL EDUCATIONAL TRUST

ELAYAMPALAYAM, TIRUCHENGODE Tk, NAMAKKAL Dt – 637 205

A U T O N O M O U S

B.Sc., Nutrition and Dietetics

1. SCOPE OF THE COURSE

The course of Nutrition and Dietetics is intended to prepare the students not only to be knowledgeable in the science of Nutrition and Dietetics, but also to be useful in the upliftment of the social and economic well-being. Courses offered cover all areas of basic and applied areas and these prepare students for a Bachelor of Science degree in Nutrition and Dietetics.

The degree is a three-year full-time programme. The programme is not only a specialist programme, but it is also designed to be relevant to the social and economic needs of the nation. In reflection to the specialized nature of the programme, emphasis is given to practical and acquisition ofpractical skills.

The Programme has been involved in teaching basic and applied Nutrition as well as making findings on local problems of Nutrition and Dietetics interest. The vision of the programme is therefore, to produce graduates who are not only knowledgeable in the science of Nutrition and Dietetics, but who can make significant contributions to the development the human society.

The programme is aimed at training undergraduate graduate students who would have adequate background knowledge and practical skills for application in postgraduate research, teaching, industrial production, medical, hospital and environmental management.

2. SALIENT FEATURES

- Course is specially designed for a higher-level career placement.
- Special guest lecture from industries will be arranged.
- Enables students to gain a job-oriented degree.
- Special industry orientations and training are parts of the degree course.

3. OBJECTIVES OF THE COURSE

The specific objectives of the programme are:

- To equip the undergraduate students with a sound knowledge of the fundamental principles involved in the study of Nutrition and Dietetics.

- To produce graduates who would create an impact in the diverse fields of human endeavor

considering the ubiquitous nature of food and the wide – ranging applications of the knowledgeof Nutrition and Dietetics.

- ❖ To provide focus for a career in various fields of applied science including Food Industries, Medical Coding, Research Institution, Hospital Administration, Food Service Sectors, Free Lancing, Health Sectors, Quality Control, Biotechnology, Government and Non-Government agencies.

4. ELIGIBILITY FOR ADMISSION

Candidates seeking admission to the first-year degree course for **B.Sc., Nutrition and Dietetics** shall berequired to have passed

a) Higher secondary examination with biology as major subjects conducted by the Government of Tamil Nadu.

b) These regulations shall take effect from the academic year 2020-2023 i.e. for the students who are to be admitted to the first year of the course during the academic year 2020-2023 andthereafter.

c) Any examination with biology, chemistry, pure science and home science as major subjects ofany other Board accepted asequivalent there to by Periyar University.

d) Vocational stream candidates are also eligible.

5. DURATION OF THE COURSE

- The course shall extend over a period of three academic years consisting of six semesters. Each academic year will be divided into two semesters. The first semester will consist of the periodfrom July to November and the second semester from December to March.
- The subjects of the study shall be in accordance with the syllabus prescribed from time to time by the Board of Studies of Vivekanandha College of Arts and Sciences for Women (Autonomous) with the approval of Periyar University.
- Each subject will have six hours of lecture per week apart from practicals for all semesters.

6. CONTINUOUS INTERNAL ASSESSMENT

The performance of the students will be assessed continuously and theInternal Assessment Marks will be as under:

Theory

1. Average of Two test - 15 Marks
2. Assignment - 5 Marks
3. Attendance - 5 Marks

Total - 25 Marks

Practical

1. Average of Two test - 30 Marks
2. Observation Note - 5 Marks
3. Attendance - 5 Marks

Total - 40 Marks

Break-up Details for Attendance	
Below 75%	- No Marks
76 to 80%	- 1 Mark
81 to 85%	- 2 Marks
86 to 90%	- 3 Marks
91 to 95%	- 4 Marks
96 to 100%	- 5 Marks

PASSING MINIMUM

Internal – The passing minimum shall be 40% out of 25 Marks i.e., 10 Marks for Internals.

External – In the end semester examinations. The passing minimum shall be 40% out of 75 Marks i.e., 30 Marks.

Extension Activities – All students should enroll in Extension Activities throughout the III year of the course.

Medium of Instruction and Examination – For paper under Part I and II are language concerned and for Part III and IV the medium of Instruction and Examination shall be English.

7. ELIGIBILITY FOR EXAMINATION

A candidate will be permitted to appear for the end semester examination only on earning 75 % of attendance and only when his/her conduct has been satisfactory. It shall be open to grant exemption to a candidate for valid reasons subject to conditions prescribed.

8. CLASSIFICATION OF SUCCESSFUL CANDIDATES

Successful candidates passing the examination of language, core, allied, elective, skill basedelective and non-major elective courses and securing marks

a) 75% and above shall be declared to have passed the examination in first class with Distinction provided they pass all the examinations prescribed for the course at first appearance itself.
b) 60% and above but below 75% shall be declared to have passed the examinations in first class without distinction.
c) 50% and above but below 60% shall be declared to have passed the examinations in second class.
d) All the remaining successful candidates shall be declared to have passed the examinations in third class.
e) Candidates who pass all the examinations prescribed for the course at the first appearance itself and within a period of three consecutive academic years from the year of admission only will be eligible for university rank.

9. ELIGIBILITY FOR AWARD OF THE DEGREE

A candidate shall be eligible for the award of the degree only if she has undergone the above degree for a period of not less than three academic years comprising of six semesters and passedthe examinations prescribed and fulfilled such conditions has have been prescribed therefore.

10. PATTERN OF QUESTION PAPER

Part A (Objective)	Answer all the Questions	20 X 1 = 20 Marks
Part B (500 Words)	Answer all the Questions (either or)	5 X 5 = 25 Marks
Part C (1000 Words)	Answer any 3 Questions (3 Out of 5)	3 X 10= 30 Marks

11. PROCEDURE IN THE EVENT OF FAILURE

If a candidate fails in a particular subject, she may reappear for the University examination inthe concerned subject in subsequent semesters and shall pass the examination.

12. COMMENCEMENT OF THESE REGULATIONS

These regulations shall take effect from the academic year 2020 - 2023 i.e. for the students whoare to be admitted to the first year of the course during the academic year 2020 - 2023 and thereafter.

13. TRANSITORY PROVISION

Candidates who were admitted to the UG course of Nutrition and Dietetics before 2020 – 2023shall be permitted to appear for the examinations under those regulations for a period of three years *i.e.*, up to and inclusive of the examination of April/May 2023. Thereafter, they will be permitted to appear for the examination only under the regulations then in force.

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN

VISION

To empower women by imparting Quality Education, Skill Development and Value Based Education and to make them self- reliant, competent and socially responsible.

MISSION

- To impart higher education to Women Students from rural areas
- To provide the student community with holistic learning opportunity
- To provide an atmosphere with academic excellence to equip the women students with ethical values and technical knowledge
- To endow an amicable ambience with all the resources to develop personality, employability, entrepreneurship and globally competent.

B.Sc., NUTRITION AND DIETETICS

VISION

To reinforce, empower and integrate academic excellence among the students in food, nutrition and health challenges using translational approaches and training through a value-based education.

MISSION

- To prepare the students for successful careers in food, nutrition and dietetics by providing quality education.
- To prepare for professional competency and nurturing traditional food culture practices.
- To sensitize and equip the students with knowledge and skills to evolve technologies for improving the food nutrition and health scenario of the community.
- To provide integrated teaching, with life skills, technologies, research and outreach programmes to improve the scenario of nutrition and health of the individual, family and the community.
- To impart advanced knowledge on nutrition and nurture technically to create innovators and entrepreneurs in nutrition

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PEO's	PROGRAMME EDUCATIONAL OBJECTIVES (PEO)
PEO 1	To furnish the graduates with the ability to prepare to a varying situation by gaining strength to learn and apply the recent skills with competency.
PEO 2	To train the basic and vital knowledge in the field of Nutrition and Dietetics both practically and theoretically with the team setup with proper ethical practices.
PEO 3	To create the graduates to extend the spirit of empathy, humanity and commitment for National development.

PROGRAMME SPECIFIC OUTCOME (PSO)

PSO's	PROGRAMME SPECIFIC OUTCOME (PSO)
PSO 1	This program provides comprehensive knowledge and practical training in the human physiology, food science, nutrition & dietetics, biochemistry.
PSO 2	Students will acquire laboratory skills applicable to Nutrition research, Nutrient analysis, food quality control.
PSO 3	Students will lend in achieving sustainable development goals (SDG).
PSO 4	They will demonstrate their dietetics skill by analyzing disease condition and prescribe diet.
PSO 5	Students will showcase expertise food standardization, formulation and sensory evaluation.
PSO 6	Students gain the knowledge of principles and practices in the main applications of various fields of nutrition and dietetics and to the industrial production of foods, clinical experience in hospitals, other useful products, including the use of modified nutrition and enriched and fortified food products.

PROGRAMME OUTCOME(PO)

On successful completion of B.Sc., Nutrition & Dietetics programme, Students should be able to

POS	OUTCOME	CPD
PO-1	**Academic Excellence:** Develop professional skills in the areas of food, nutrition, human physiology, nutritional biochemistry, and the manufacturing of food products.	K2
PO-2	**Scientific Knowledge:** Apply both physical and biological knowledge to better understand the significance of food and nutrients in the process of disease and health.	K2
PO-3	**Analyzing Skills:** Understand and analyse the impact that interdisciplinary sciences make to the growth and welfare of people as individuals, families, and communities.	K4
PO-4	**Thinking Skills:** Have the ability to critically analyze, evaluate, and develop new knowledge and skills in various fields such as food processing, food preservation, packaging, community nutrition, among others.	K6
PO-5	**Modern Tool Usage:** Create, Select and apply appropriate techniques resources and modern technology in the field of health, community and food manufacturing industries.	K3
PO-6	**Communicative Skills:** Effective communication in the area of food science & Technology activities with society and the ability to produce good reports and documentation, as well as participate in public debate on various issues.	K1
PO-7	**Life Long Learning:** Identify the need and ability to learn and relearn knowledge in the framework of technological change.	K3
PO-8	**Social Responsibility:** Ability to function as a dietitian to formulate their own personalized product, as a public educator and also as a freelancer.	K6
PO-9	**Professional Development:** The programme is intended to give a basic understanding of the relationship between food and health as well as its role. specific diseased conditions.	K2
PO-10	**Quality Research:** Ability to design and conduct independent research, stay up to date on current research trends, and assess the impact of research.	K6

LIST OF CORE PAPERS

- Food Science
- Human Physiology
- Principles of Human Nutrition
- Food Processing
- Food Microbiology
- Nutrition Through Life Cycle
- Nutritional Biochemistry
- Dietetics – I
- Community Nutrition
- Food Preservation
- Dietetics – II
- Food Safety and Quality Control

LIST OF PRACTICAL PAPERS

- Food Science Practical
- Human Physiology Practical
- Nutrition and Biochemistry Practical
- Nutrition Through Life Cycle Practical
- Food Preservation Practical
- Community Nutrition & Nutrition Education Practical
- Dietetics Practical

LIST OF DISCIPLINE SPECIFIC ELECTIVE PAPERS

- Food as Medicine
- Bakery and Confectionery Products
- Entrepreneurship in Nutrition and Dietetics
- Functional Foods
- Institutional Food Service Management
- Sports Nutrition
- Food Adulteration
- Food Product Development and Marketing
- Food Evaluation
- Nutrition for Women
- Food Packaging and Labelling
- Nutritional Screening and Diet Counselling

LIST OF NON-MAJOR ELECTIVE PAPERS

- Basic Food Science

LIST OF SKILL BASED ELECTIVE PAPER

- Cyber Security and Ethical hacking / Professional Ethics
- Academic Writing and Academic Portfolio

LIST OF ALLIED COURSES

- Chemistry for Biological sciences I
- Chemistry Practicals for Physical and Biological Sciences I
- Chemistry for Biological sciences II
- Chemistry Practicals for Physical and Biological Sciences II

BLOOM'S TAXONOMY

BLOOM'S TAXONOMY BASED ASSESSMENT PATTERN		
KL	**CPD**	**DESCRIPTION**
K1	Remember	Retrieving, recognizing and recalling knowledge from long-term memory
K2	Understand	Constructing meaning from oral, written and graphic messages through interpreting
K3	Apply	Carrying out or using a procedure through executing or implementing
K4	Analyze	Breaking material into constituent parts, determining how the parts relate to one another and to an overall structure orpurpose through differentiating, organizing and attributing
K5	Evaluate	Making judgments based on criteria and standards through checking and critiquing
K6	Create	Putting elements to form a coherent or functional hole,reorganizing elements into a new pattern or structure through generating, planning or producing
Note: **KL: K**nowledge **L**evel**; CPD: C**ognitive **P**rocess **D**imension		

BLOOM'S TAXONOMY BASED INTERNAL ASSESSMENTPATTERN FOR MODEL AND SEMESTER EXAMINATION

SECTION	CPD/GRADE	MARKS	CONTENT	CUMULATIVE
A: 20 X 1	K1 & K2	20	Multiple choice questions	75
B: 1 out of 2 (5 X 5) Either or choice	K2, K3, K5 & K6	25	Short notes	
C: 3 out of 5 X 10	K3, K4, K6	30	Essay type descriptive	

BLOOM'S TAXONOMY BASED INTERNAL ASSESSMENTPATTERN FOR CIA I & II EXAMINATIONS

SECTION	CPD/GRADE	MARKS	CONTENT	CUMULATIVE
A: 10 X 1	K1 & K2	10	Multiple choice questions	25
B: 1 out of 2 (1 X 5)	K2, K3, K5 & K6	5	Short notes	
C: 1 out of 2 (1 X 10)	K3, K4, K6	10	Essay type descriptive	

SCHEME OF CURRICULUM – B.Sc., NUTRITION AND DIETETICS

(For the Students admitted during the academic year 2024 – 2025 onwards)

Part	Paper Code	Subject Title	Hours / Week	Credits	University Examination			Exam Hours
					Internal	External	Total	
SEMESTER I								
I	23U1LT01	Foundation Tamil - I	6	3	25	75	100	3
II	23U1LE01	English - I	5	3	25	75	100	3
III	23U1NDC01	Food Science	5	5	25	75	100	3
III	23U1NDCP01	Food Science Practical	3	3	40	60	100	3
III	23U1CHGE01	Chemistry for Biological Sciences - I	4	3	25	75	100	3
III	23U1CHGEP1	Chemistry Practical for Physical and Biological Sciences - I	3	2	40	60	100	3
IV	23U1VE01	Health, Human Values and Yoga	2	2	25	75	100	3
IV	23U1ENAC01	Soft Skills for Effective Communication	2	2	25	75	100	3
		Total	30Hrs	23			800	
SEMESTER II								
I	23U2LT02	Foundation Tamil - II	6	3	25	75	100	3
II	23U2LE02	English - II	6	3	25	75	100	3
III	23U2NDC02	Human Physiology	5	5	25	75	100	3
III	23U2NDCP02	Human Physiology Practical	3	2	40	60	100	3
III	23U2CHGE02	Chemistry for Biological Sciences - II	4	3	25	75	100	3
III	23U2CHGEP2	Chemistry Practical for Physical and Biological Sciences - II	3	2	40	60	100	3
IV	23U2EVS01	Environmental Studies	1	2	25	75	100	3
IV	23U2CSAC02	Office Automation	2	2	25	75	100	3
		Total	30Hrs	22			800	

Part	Paper Code	Subject Title	Hours / Week	Credits	University Examination			Exam Hours
					Internal	External	Total	
SEMESTER III								
I	23U3LT03	Foundation Tamil – III	5	3	25	75	100	3
II	23U3LE03	English – III	5	3	25	75	100	3
III	23U3NDC03	Principles of Human Nutrition	4	4	25	75	100	3
III	23U3NDC04	Food Processing	4	4	25	75	100	3
III	23U3NDC05	Food Microbiology	4	4	25	75	100	3
III	23U3NDDE01 / 23U3NDDE02	Food as Medicine / Bakery & Confectionery	3	3	25	75	100	3
IV	23U3NDN01	NMEC – I Basic Food Science	2	2	25	75	100	3
III	23U3NDCP03	Nutrition and Biochemistry Practical	3	2	40	60	100	3
		Total	30Hrs	25			800	
SEMESTER IV								
I	23U4LT04	Foundation Tamil – IV	5	3	25	75	100	3
II	23U4LE04	English – IV	5	3	25	75	100	3
III	23U4NDC06	Nutrition Through Life Cycle	6	5	25	75	100	3
III	23U4NDC07	Nutritional Biochemistry	6	5	25	75	100	3
III	23U4NDDE03 / 23U4NDDE04	Entrepreneurship in Nutrition and Dietetics / Functional Foods	3	3	25	75	100	3
IV		NMEC - II	2	2	25	75	100	3
III	23U4NDCP04	Nutrition Through Life Cycle Practical	3	2	40	60	100	3
		Total	30Hrs	23			700	

Part	Paper Code	Subject Title	Hours / Week	Credits	University Examination			Exam Hours
					Internal	External	Total	
SEMESTER V								
III	23U5NDC08	Dietetics – I	6	4	25	75	100	3
III	23U5NDC09	Community Nutrition	5	4	25	75	100	3
III	23U5NDC10	Food Preservation	5	4	25	75	100	3
III	23U5NDDE05/ 23U5NDDE06	Institutional Food Service Management / Sports Nutrition	3	3	25	75	100	3
III	23U5NDDE07/ 23U5NDDE08	Food Adulteration / Food Product Development and Marketing	3	3	25	75	100	3
III	23U5NDCP05	Food Preservation Practical	3	2	40	60	100	3
III	23U5NDCP06	Community Nutrition and Nutrition Education Practical	3	2	40	60	100	3
IV		SBEC - I	2	2	25	75	100	3
IV	23U5NDIN01	Internship	-	1	-	-	-	-
		Total	30Hrs	25			800	
SEMESTER VI								
III	23U6NDC11	Dietetics - II	6	4	25	75	100	3
III	23U6NDC12	Food Safety and Quality Control	6	4	25	75	100	3
III	23U6NDDE09/ 23U6NDDE10	Food Evaluation / Nutrition for Women	4	3	25	75	100	3
III	23U6NDDE11/ 23U6NDDE12	Food Packaging and Labelling / Nutritional Screening and Diet Counselling	4	3	25	75	100	3
III	23U6NDCP07	Dietetics Practical	3	2	40	60	100	3
III	23U6NDPR01	Project	5	3	40	60	100	3
IV		SBEC - II	2	2	25	75	100	3
V	23U6NDEX01	Extension Activities	-	1	-	-	-	-
		Total	30Hrs	22			700	

SEMESTER – I

FOOD SCIENCE

23U1NDC01 SEMESTER I

No. of Credits: 5 Hours of Instruction / Week: 5

OBJECTIVES:

To enable the students to,

- Understand the science of food and factors that affect its quality, Nutritive value and shelf life.
- Gain Knowledge on the Composition and Nutritive Value of various foods and their uses.
- Apply knowledge of foods in planning diets and preparing meals that are safe, nutritious and

Palatable.

COURSE OUTCOMES:

CO1	Understand the Food Groups and their Functions	**K2**
CO2	Acquire knowledge on nutritive value, storage and preservation of foods.	**K2**
CO3	Explain changes in food due to cooking, processing and factors that affect palatability, acceptability, and nutritive value.	**K3**
CO4	Compare different methods of cooking and select best method suited for cooking different foods.	**K4**
CO5	Identify and Control Adulterants in various foods and evaluate Food Quality	**K5**

UNIT	CONTENT	HOURS
I	**Food Groups:** Basic 5 Food Groups. Classification and Functions of each Food Groups. Different Methods of Cooking food and their Advantages and Disadvantages. My Plate by NIN. **Cereals:** Structure, Composition and Nutritive Value of Rice, wheat and Millets. Parboiling and their advantage and disadvantage. Principles of Millet Cooking, Factors Affecting Starch Cookery – Gelatinization and Retrogradation. **Sugars:** Types of Sugars, Stages of Sugar Cookery, Crystallization meaning and Factors affecting of Crystallization.	**15**

II	**Pulses:** Definition of Pulses and Legumes. Composition and Nutritive Value of Pulses. Pulses processing – Decortification, Soaking, Germination and, Fermentation, Advantages of Pulse Processing. **Nuts and Oil Seeds:** Composition and Nutritive Value. Nuts and Oil Seeds – Almond, Coconut, Groundnut, Flaxseed, Pumpkin Seeds, Sunflower Seeds. Role of Nuts and oil Seeds in Cookery.	**15**
III	**Milk:** Composition and Nutritive Value, Physical Properties, Types of Milk, Milk Processing of Clarification, Pasteurization, Homogenisation and Freezing. Role of Milk and Milk Product in Indian Cookery. **Egg:** Structure, Composition and Nutritive Value, Quality of Egg, Egg Cookery: Effects of Heat and Factors Affecting Coagulation of Egg Protein, Egg Foam. Role of Egg in Indian Cookery. **Fleshy Foods:** Classification, Composition and Nutritive Value, Post-Mortem Changes, Ageing and Tenderising, Cuts and Grades, Changes During Cooking of Dry heat and Moist heat. **Poultry:** Classification, Composition and Nutritive Value, Cuts and Grades, Changes During Cooking. **Sea Foods:** Classification of Fish, Composition and Nutritive Value, Selection and Fish Cookery.	**15**
IV	**Fruits:** Classification, Composition and Nutritive Value, Ripening of Fruits, Enzymatic Browning and Non-Enzymatic Browning. **Vegetables:** Classification, Composition and Nutritive Value, Classification of Pigments. Selection of Vegetable. Role of Vegetables in Cookery. **Spices and Condiments:** Definition of Spices and Condiments. Varieties, Active Components, Medicinal Properties of Spices – Ajwain, Aniseed, Bay Leaves, Cardamom, Cinnamon, Clove, Saffron, Star Anise, Vanilla. **Beverages:** Classification of Beverages – Fruit-based beverages, milk-based beverages, alcoholic beverages, Specific of Tea – Black tea, Green tea, Oolong Tea, Coffee and cocoa, malted beverages. Sources, Manufacture, processing and service; methods of preparation of coffee and tea. **Activity:** Market survey of processed beverages	**15**

V	**Fats and Oils:** Composition and Nutritive Value - Lard, Butter, Margarine, Groundnut Oil, Olive oil, Rice Bran oil, Sesame Oil). Effect of Heating – Smoke point, Flash point and Fire Point. Factors Affecting Fat Absorption. **Food Adjunct and Food Additives:** Leavening agents, stabilizers, thickeners, anticaking agents, enzymes, shortenings, stabilizers, flavouring agents, colouring agents, sweeteners – use and abuse. **Food Adulteration:** Definition, common adulterants in food. **Activity:** A survey of processed forms of cereals, pulses, dairy/meat products available in themarket Comparison of convenience foods and natural/whole foods.	**15**
	Total Lecture Hours	**75**

Text Books:

1. Srilakshmi. B (2024) Food Science- 8th Multi Colour Edition, New Age International Publishers, New Delhi.

2. Elizabeth W. Christian and Vickie A. Vaclavik (2014), Essentials of Food Science – 4th Edition, Springer New York Heidelberg Dordrechr Publisher, London.

3. Usha Chandrasekhar, (2002) Food Science and Application in Indian Cookery., Phoenix Publishing house P Ltd, New Delhi.

Reference Books:

1. Brow, A., (2000) Understanding of foods, Thomson Learning Publications, Wadsworth.

2. Mehas, K.Y and Rodgers, S.L., (2000), Food science and you, Mc Millia Mc Graw Company New York.

3. Parker, R., (2000)., Introduction to food science, Delmer, Thomson Learning Co., Delma.

Web Reference:

1. https://guides.librariespsu.edu/food science

2. https://www.nal.usda.gov/fnic/food-science-and-technology

3. https://foodinfo.ifis.org

Course Mapping – PO and CO

Mapping	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	2	2	3	2
CO 2	3	3	2	3	3	2	2	2	3	2
CO 3	3	3	3	3	3	2	2	2	2	2
CO 4	3	2	2	3	3	2	2	2	3	2
CO 5	3	2	3	2	3	3	2	2	3	3

FOOD SCIENCE PRACTICAL

23U1NDCP01 SEMESTER I

No. of Credits: 3 Hours of Instruction / Week: 3

OBJECTIVES:

To enable the students

- Different types of cereals, pulses, vegetables, fruits and nuts and oil seeds-observation
- Be familiar with various cookery terms, and use of different ingredients & recipes.
- Guidelines to be followed by laboratory.
- Methods of measuring ingredients. Know the preparation of different recipes.

COURSE OUTCOME:

CO1	Demonstrate skills on determination of edible portion, effect of cooking on volume and weight.	**K1**
CO2	Choose appropriate cooking method to conserve nutrients.	**K2**
CO3	Apply skills on different methods of cooking	**K3**
CO4	Understand and apply experimental cookery on different foods.	**K3, K4**
CO5	Develop recipes by applying knowledge on cooking methods and properties of food	**K3**

S.No	Contents	Hours
1	**Food Groups** Grouping of foods and discussion on nutritive values.	3
2	**Measuring Ingredients** • Methods of measuring different types of foods – Course and fine flours, solids and liquid food items.	3
3	**Cereals**	6

	• Microscopic examination of starch molecules • Gelatinization, Dextrinization. • Method of cooking cereals and factors influencing texture and nutritive value- cooking rice boiling and straining, absorption method, steaming, pressure cooking, microwave cooking • Preparation of recipes using cereals and millets	
4	**Pulses** • Factors influencing texture, digestibility and nutritive value of whole gram/legumes and pulses -soaking, addition of soda bicarbonate, addition of salt, water quality- hard and softwater, pressure cooking, boiling and straining • Common preparations with pulses	3
5	**Milk** • Curdling of milk using lime juice, tomato juice. • Common preparations with milk.	3
6	**Vegetable and Fruits** • Changes in colour, texture and nutritive value of vegetables due to different methods of cooking, cooking medium and addition of acid/alkali. • Common preparations with vegetables. • Enzymatic browning in fruits and methods to prevent it. • Common preparations with fruits	6
7	**Eggs** • Experimental cookery (Boiled egg- Timing experiment, scrambled and poached egg) • Factors affecting whipping quality of egg white – effect of salt, sugar, vinegar, fat and milk. • Common preparations with eggs.	3
8	**Sugar Cookery** • Stages of sugar cookery and uses. • Preparations of sweets using different stages of sugar cookery	3
9	**Fats and Oils**	3

	• Emulsions- definition, Preparation of mayonnaise • Effect of temperature of oil on texture and palatability of foods- Frying pooris at different temperatures • Smoking point of oil	
10	**Meat Cookery** • Methods of tenderizing meat-Pounding, mincing addition of acids like curd/lime juice in marinade, addition of proteolytic enzymes-raw papaya • Common preparations with meat products.	6
11	**Preprocessing Techniques** • Malting • Germination • Fermentation	6
	Total Practical Hours	**45**

References:

1. Basic food preparation - A Complcte manual by Department of Foods and Nitntia LadyInvin college, New Delhi, Orient Longman, 1995.
2. The Delights of Vegetarian Cooking, Tarla Dalal, Vakils, Feffer & Simm 1994
3. Encylopedia of Creative cooking Vots 6,16,17 & 18, Bay Books SydneY.
4. Hawkins Pressure Cookery and Instructions Book.

Web References:

1. https://ia801408.us.archive.org/20/items/textbookoffoodsc0000khad/textbookoffoodsc00 00khad.pdf
2. https://egyankosh.ac.in/handle/123456789/32947
3. https://unacademy.com/content/kerala-psc/study-material/basic-food-science/

Course Mapping – PO and CO

Mapping	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	3	2	2	3	2	3	2
CO 2	3	3	2	3	3	2	3	3	3	2
CO 3	3	2	2	3	3	2	3	3	3	2
CO 4	3	3	2	3	3	2	3	2	2	2
CO 5	3	3	2	3	3	3	3	2	3	3

SEMESTER – II

HUMAN PHYSIOLOGY

23U2NDC02 SEMESTER II

No. of Credits: 5 Hours of Instruction / Week: 5

OBJECTIVES:

To enable the students to,

- Gain basic understanding of human anatomy and physiology.
- Learn the integrated functioning of cells, tissues, organs and systems.

COURSE OUTCOMES:

CO1	Understand and Distinguish the Functions of Organs and Systems in the Body	**K2**
CO2	Explain the interrelationship between systems for maintenance of equilibrium.	**K1**
CO3	Evaluate the role of nervous and endocrine system in regulating the activities of other systems.	**K5**
CO4	Identify the structures of basic tissues, able to label the parts of physiological systems.	**K4**
CO5	Perform haematological study of blood such as blood smear, blood count and blood grouping, record pulse and blood pressure.	**K4**

UNIT	CONTENT	HOURS
I	**Cell:** Definition, Structure and Functions. Cell Division of Mitosis and Meiosis **Tissues:** Classification, Structure and Functions of Tissues. **Blood:** Composition, Functions, Coagulation, Plasma Protein, Blood Components of RBC, WBC and Platelets. Blood Groups, Blood Volume **Immune System:** Definition of Immune system and its Types. **Activity:** Microscopic study of different tissues: epithelial, connective, muscular and nervous tissue.	**12**

II	**Circulatory system:** Structure of Heart and Blood Vessels, Cardiac Cycle, Cardiac Output, Heat Rate and Electro Cardio Graphic– ECG **Respiratory system:** Structure of Respiratory tract, Mechanism of Respiratory – Gaseous exchange in Lungs and Tissues, Anoxia and Hypoxia. **Activity:** Recording the Blood Pressure.	**12**
III	**Digestive System:** Structure of Digestive tract, Functions of Gastric Juice and saliva, Movement of Alimentary Tract – Swallowing, Peristaltic Movement and Movement of Intestine. Digestion and Absorption **Excretory System:** Structure of Kidney, Nephron, Mechanism of Formation of urine and Micturition **Activity:** Study of structure of liver, pancreas and stomach using charts and videos.	**12**
IV	**Nervous System:** Structure of Nervous tissue and Neuron. Reflex Action, Reflex Arc and synapse Definition only. Structure and Functions of Cerebrum, Cerebellum, Medulla Oblongata and Hypothalamus. **Sensory Organs:** Structure of Eye, Tounge, Nose and Ear. Physiology of hearing, smell and Taste.	**12**
V	**Endocrine System:** Anatomy and Functions of Pituitary, Thyroid, Parathyroid, Adrenal and Pancreas **Reproductive System:** Anatomy of Male and Female reproductive organs, Menstrual Cycle	**12**
	Total Lecture Hours	**60**

Text Book:

1. Sembulingam. K and Prema Sembulingam (2019), Essential of Medical Physiology – 8th Edition, Jaypee Brothers Medical Publisher.

2. Chatterjee. C.C., (2004)., Human Physiology Volume I, II, Medical Allied Agency, Kolkata.
3. Beck, W.S. (1971) Human Design. Harcourt Brace Jovanovich Inc., New York.

Reference:

1. Anil Baran Singha Mahapatra (1998), Medical physiology, 1st edition, Current books International, Calcutta.
2. Mary Brown Merki & Don Merki (1994), Glencoe health-A guide to wellness, 4th edition, McWilliams Hill Company, New York.
3. Best and Taylor (1958), Living Body - A Text Book of Human Physiology, 4th edition, Chapman and Hall publishing, London.

Web References:

1. https://youtu.be/uFf0zxQ3rBU
2. http://epgp.inflibnet.ac.in/Home/Download

Course Mapping – PO and CO

Mapping	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	2	2	2	2
CO 2	3	3	3	2	2	2	3	3	3	2
CO 3	3	3	3	2	2	2	2	2	2	2
CO 4	3	3	2	2	2	3	3	3	3	2
CO 5	3	3	3	3	3	2	2	2	2	3

HUMAN PHYSIOLOGY PRACTICAL

23U2NDCP02 SEMESTER II

No. of Credits: 2 Hours of Instruction / Week: 3

OBJECTIVES:

To enable the students to

- To learn dietary guidelines to promote optimum health and nutritional needs of different age groups.
- To plan a menu, prepare and calculate nutrients during different stages of life.

COURSE OUTCOMES:

CO1	Identify the different types of tissues.	**K4**
CO2	Determine the bleeding time and clotting time	**K5**
CO3	Identify the blood grouping of the individuals	**K4**
CO4	Measure the hemoglobin level, blood pressure and calculate the pulse rate	**K4**
CO5	Measure the height and weight and calculate the BMI of individuals and to do the physical fitness tests.	**K5**

S.No	Contents	Hours
1.	Histology of Tissues – Columnar, ciliated, squamous and stratified squamous (observation with the help of permanent slide).	3
2.	Histology of muscles – Cardiac, Skeletal and smooth (observation with the help of permanent slide).	3
3.	Identification of blood groups using blood grouping kit.	3
4.	Determination of bleeding time.	3
5.	Determination of clotting time.	3
6.	Recording of blood pressure using sphygmomanometer and pulse rate.	3

7.	Estimation of Haemoglobin by Sahli's method.	3
8.	Test for body flexibility, muscle endurance and Physical fitness test (Harvard step test)	6
9.	Demonstration of RBC and WBC counting.	3
10.	Visit to Clinical laboratory.	-
	TOTAL PRACTICAL HOURS	**30**

Textbook References:

1. Chatterjee C. C (2016). Human Physiology, Medical Allied Agency. 11th edition. Kolkata.
2. Sembulingam K. (2012). Essentials of Medical Physiology. Jaypee Brothers Medical Publishing (P) Ltd. 6th edition. New Delhi.
3. Waugh A and Grant A. (2012) Ross and Wilson Anatomy and Physiology inHealth and Illness. 11th ed. Churchill and Livingston, Elsevier

Reference Books:

1. Wilson, K. J. W. (1987) Anatomy and Physiology in Health and Illness.6th ed.ELBS, Churchill Livingstone, London.
2. Best and Taylor, (2011) 13th Edition The Physiological Basis of Medical Practice, Saunders Company.
3. Chaudhri, K. (2016) Concise Medical Physiology, 7th Edition, New Central Book Agency (Parentral) Ltd., Calcutta Fox.

Web References:

1. https://youtu.be/IYQsinv938g
2. microbenotes.com/category/human-physiology
3. www.longdom.org/scholarly/human-physiology...

Course Mapping – PO and CO

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

SEMESTER – III

PRINCIPLES OF HUMAN NUTRITION

23U3NDC03 SEMESTER III

No. of Credits: 4 Hours of Instruction / Week: 4

OBJECTIVES:

To enable the students to,

- Understand the importance of various nutrients in relation to health.
- Highlight dietary guidelines for various nutrients and contribute towards a better lifestyle for prevention of diseases.

COURSE OUTCOMES:

CO1	To know about nutrition and gain idea on carbohydrate and energy	**K1**
CO2	Understand the role of food and nutrients in health and disease prevention	**K2**
CO3	Evaluate nutrition information based on scientific reasoning for clinical and community application	**K5**
CO4	To analyze conceptualize, implement and evaluate the functions, metabolism, requirement and effects of deficiency of nutrients.	**K4**
CO5	To apply knowledge on functions, distribution of water and regulation of water balance and electrolyte balance.	**K3**

Unit	Content	Hours
I	**Nutrition** – Definition of Health, Nutrition, Definition of Nutrient, balanced diet, Malnutrition (under nutrition and over nutrition). Nutritional Assessment – Anthropometry, Biochemical, Clinical signs and Dietary methods (Basics only). RDA – Definition, methods used for deriving RDA. **Carbohydrates** – Definition, Classification, Digestion, Absorption and Metabolism, Functions, Sources and Requirements. Glycemic Index of Foods. Dietary Fibre – Definition, classification, Sources, Role of fibre in human health. **Activity:** Record the height, weight and body weight and calculate the BMI in a small sample.	10
II	**Proteins, Lipids and Water:**	10

	Proteins – Nutritional Classification of proteins and amino acids, Functions, Sources, Requirements, Digestion, Absorption and utilization. Novel Protein. Protein Quality Evaluation – PER, BV, NPU, NPR and Chemical scores. Protein Energy malnutrition Lipids – Classification, Functions, Sources, Requirements, Digestion and absorption. Essential Fatty Acids – Functions, Sources, Requirements. Deficiency of EFA in humans. Water – Importance, Functions, Sources and requirements. Distribution of water in the body, Water balance and its regulation. Water in toxicity. **Activity:** A survey on Protein supplements available in the market.	
III	**Energy:** Energy – definition. Units of measurement – calorie and joule. Measurement of calorific value of foods using Bomb calorimeter. Physiological fuel value of foods. Methods of determination of Energy Expenditure – Direct and Indirect calorimetry. (Atwater and rosa respiratory chamber, Benedict's Roth apparatus) Basal Metabolism – Definition, factors affecting BMR. Specific Dynamic action of foods – Definition and factors affecting thermogenesis of food. **Activity:** Learn to estimate BMR.	15
IV	**Macro and Micro minerals:** Macro minerals – Calcium Phosphorous, Magnesium, Potassium, Sodium and Chloride – Distribution in the body, functions, sources, requirements, effects of deficiency and toxicity. Micro/Trace minerals – Iron, Zinc, Copper, Iodine, Selenium, Fluoride - Distribution in the body, functions, sources, requirements, effects of deficiency and toxicity.	13
V	**Vitamins:** Fat soluble Vitamins – Vitamin A, D, E and K – Functions, Sources, requirements, effects of deficiency and Hypervitaminosis. Water soluble Vitamins – B complex vitamins and Vitamin c –Functions, Sources, requirements, effects of deficiency.	12
Total Lecture Hours		**60**

Text Books:

1. Srilakshmi B., (2017). Nutrition Science. New Age International Pvt Ltd., New Delhi.
2. Mahtab S, Bamji *et al.,* (2015). Text book of Human Nutrition. 3rd Edition. Oxford and IBH publishing Co. P. Ltd., New Delhi.
3. Swaminathan, M., (2012). Advanced Text book on Food and Nutrition. Vol 1, 2nd edition. Bangalore Printing and Publishing Co, Ltd., Bangalore.

Reference Books:

1. Joshi.A.S, (2010). Nutrition & Dietetics, Tata McGraw Hill Education Pvt. Ltd., New Delhi, Third Edition,
2. Dieatary Guidelines for Indians, (2013) ICMR, National Institute of Nutrition, Hyderabad.
3. Krause, M.V. and Hunesher, M.A (2013). Food, Nutrition and Diet therapy, 14th Edition, W. B. Sanders company, London.

Web resources:

1. www.epgpathshala.com
2. www.ecoursesonline.com

Course Mapping – PO and CO

Mapping	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	2	2	2	2
CO 2	3	3	3	3	2	2	2	2	2	2
CO 3	3	3	3	3	2	2	2	2	2	2
CO 4	3	3	2	2	3	2	2	2	2	2
CO 5	3	3	3	2	3	2	2	3	2	3

FOOD PROCESSING

23U3NDC04 SEMESTER III

No. of Credits: 4 Hours of Instruction / Week: 4

OBJECTIVES:

To enable the students to,

- Learn about the technology of cereal and pulse processing
- Know the byproducts of cereals, technology of oil extraction, fish and algae cultivation processing

COURSE OUTCOMES:

CO1	Learn the recent concepts of food processing	**K1**
CO2	Relate the theoretical knowledge of processing technique with food products development	**K1**
CO3	Choose appropriate foods processing	**K3**
CO4	Understand the relevance of processing for various food commodities	**K2**
CO5	To understand the process of fortification and enrichment of food products	**K2**

Unit	Content	Hours
I	**Processing of Rice**: Milling of Rice-Parboiled rice, raw rice, By-products of rice milling and their utilization. Manufacturing of certain breakfast cereals - puffed rice, rice flakes. macaroni, noodles and pasta, instant rice. **Processing of Millets**: Ragi, Corn **Processing of Wheat:** Milling of wheat, By-products of wheat milling. **Fortification and Enrichment:** Meaning, Benefits, Fortification and enrichment of cereals and baked products	12
II	**Processing of Legumes:** Methods of dhal milling- Traditional method, Improved method of pulse **processing** **Processing of Nuts and Oil seeds:** Methods of oil extraction- Mechanical press, Solvent extraction, Refining and Hydrogenation **Processing of Oil Seeds as Protein concentrates and Isolates:** Processing of soybean and peanut. **Fortification and Enrichment**: Fats and oils	12

III	**Processing of Meat foods:** Processing of Poultry and Lamb. **Processing of Sea foods:** Fish processing - fish oil, fish protein concentrate, fish meal.	12
IV	**Processing of Algae:** Algae as food - Common types of algae used as protein source, cultivation, harvesting, processing, drying, storage and nutritional significance. **Mushroom** - types of edible mushroom, cultivation, harvesting and processing.	12
V	**Sugar Processing** – Steps in processing **Cocoa Processing -** Processing of cocoa, milk and plain chocolate. **Coffee Processing** - Chemical constituents of coffee, Processing - dry and wet method, Types of coffee- instant coffee and de-caffeinated coffee. **Tea Processing** – Chemical constituents of tea, Processing- method, Types of tea- instant tea, ginger tea and herbal tea.	12
	Total Lecture Hours	**60**

TEXT BOOKS:

1. Sivasankar, B. (2013) Food Processing and preservation 2nd edition, prentice Hall, Pvt,
Ltd.

2. Srilakshmi, N., Food Science, New Age International Private Ltd., New Delhi, 2002.

3. Swaminathan, M., Food Science, Chemistry and Experimental Foods, Bappco Publishers,
Bangalore, 2004.

4. Chandrasekhar, U, Food Science and Applications in Indian Cookery, Phoenix Publishing House Private Ltd., New Delhi, 2002.

REFERENCE BOOKS

1. Adams, M.R. and Moss, M.O., Food Microbiology, New Age International (P) Ltd., New Delhi, 2005.

2. Fellow, P., Food Processing Technology – Principles and Practices, 2nd Edition, CRC Press Woodland Publishers, England, 2000.

3. Sommers, C.H. and Xveteng Fan, Food Irradiation Research and Technology, Blackwell
Publishing, 2006

WEB REFERENCES:

1. www.uoguelbhca.in
2. https://ifst.onlinelibrarywily.com
3. www.sanfoundary.co

Course Mapping – PO and CO

Mapping	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	3	3	2	2	2	3	2
CO 2	3	3	3	3	3	2	2	2	3	2
CO 3	3	3	2	3	3	2	2	2	3	2
CO 4	3	3	3	3	2	2	2	2	3	2
CO 5	3	3	3	3	3	2	3	2	3	3

FOOD MICROBIOLOGY

23U3NDC05 SEMESTER III

No. of Credits: 4 Hours of Instruction / Week: 4

OBJECTIVES:

To enable the students to,

- Learn about morphology and life cycle of different microorganisms.
- To know the food spoilage caused by various microorganisms.
- To know about the various types of poisoning and infections caused by microorganisms and to Study the preventive measures.

COURSE OUTCOMES:

CO1	Acquire the knowledge on the basic concepts of microbes in the food and human welfare.	**K2**
CO2	Relate the theoretical knowledge with microbes in environment	**K4**
CO3	Comprehend the knowledge gained on the characteristics of the microorganisms in food	**K2**
CO4	Understand the relevance of microbial spoilage of various foods and its intoxications	**K2**
CO5	Provide frame work on the concepts of quality control activities	**K3**

Unit	Content	Hours
I	**Classification of microorganisms**, differences between eukaryotic and prokaryotic. General characteristics of Bacteria, Virus, Fungi, Protozoa and Algae. **Fundamentals of control of microorganisms in food** – extrinsic and intrinsic growth factors Instrumentation in Microbiology laboratory and their function – Demonstration/ Hands-on practice	06
II	**Bacteria and Virus -** occurrence, morphology, Reproduction**.** **Mold** - morphology, classification, reproduction, physiology and nutrition, genera of molds important in foods	12

	Yeast - morphology, classification, physiology and nutrition, process of hybridization andimportance of yeast in foods **Algae** - occurrence, morphology, classification, Reproduction and economic importance of Algae. Preparation of Culture Media, Pure Culture techniques (Spread plate, Streak plate, Pour Plate) - Practical	
III	**Definition and types** - Water activity and food spoilage **Food spoilage –** Contamination of cereals and cereal products, Contamination of vegetables and fruits,Contamination of egg, Contamination of milk and milk products. Contamination of meat and meat products, Contamination of fish, Contamination of poultry,contamination of sugar and sugar products. **Canned foods –** Definition, objectives and Contamination of Canned foods. Microbiological evaluation of Milk and Milk Products - Practical	15
IV	**Fermentation** – Definition, types, microorganisms used in food fermentations **Fermented foods** – Types, methods of manufacture for vinegar, sauerkraut, temph, beer and wine. **Food borne infection and in toxification** – Definition and Types. **Food poisoning by fungal toxins** - Aspergillus, Penicillium, Fusarium Isolation of spoilage organisms from different food commodities - Practical	12
V	**Definition, symptoms and prevention** - Staphylococcus, clostridium, Salmonella,Shigella and Campylobacter foods involved, incubation period. **Sewage** - composition of sewage, typical organism in sewage (only). BOD definition and determination. **Sterilization and disinfection** – Definition and methods. Microbiological Analysis of Water and Air - Practical	15
	Total Lecture Hours	**60**

TEXT BOOKS:

1. M.R Adams., M.O. Moss., (2018)., Food Microbiology., New age international privatelimited
2. Bibek ray., Arun Bhunia., (2019)., Fundamentals of food microbiology (4^{TH} edition) Taylor and Francis Ltd
3. William C Frazier., (2017)., Dennis C Westhoff., Food Microbiology (5^{th} edition) McGraw Hill Education

REFERENCE BOOKS:

1. MR Adams, MO Moss, (1996), Food Microbiology, New Age International(P) Limited.
2. Micheal P. Doyle & Larry R. Beuchot, 3rd Edition, ASM Press, 2007.
3. Burton J. Bogitsh. Thomas C. Cheng, Human Parasitology, 2nd Edition, Academic Press.

WEB REFERENCES:

1. https://www.frontiersin.org
2. https://www.mdpi.com
3. https://onlinecourses,swayam2.ac.in

Course Mapping – PO and CO

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

FOOD AS MEDICINE

23U3NDDE01 SEMESTER III

No. of Credits: 3 Hours of Instruction / Week: 3

OBJECTIVES:

To enable the students to,

- Introduce the basic concepts of Ayurveda.
- Understand the various components of dietary treatment.
- Learn the review of various spices and herbs.

COURSE OUTCOMES:

CO1	To understand flavors, seasons and climate in ayurveda	**K2**
CO2	To learn about various diets, cookware and preparation methods.	**K1**
CO3	Apply the theory of fasting in dietary habits	**K3**
CO4	Understand about different food components and good bacteria ‘s role in health	**K2**
CO5	Analyze the different spices used in food preparations	**K4**

Unit	Content	Hours
I	**Evolution of Diets:** Definition, strategies, advantages and disadvantages - Palaeolithic diet, ayurvedic diet, vegetarian diet and vegan diet. Traditional cookware and preparation methods – Benefits. Six flavours – therapeutic uses **Fasting:** Definition, Physiology of fasting, General principles in fasting, role in health. Side effects of fasting. **Activity** – Case study on various cook wares used in households.	**9**
II	**Introduction to Ayurveda:** Overview and comparison of Western and Eastern healing Traditions. The Development of Ayurvedic Medicine.	9

	What is food? Five elements and three doshas – definition, importance, functions and imbalance of doshas. Basic Principles in Ayurvedic Diet. Lifestyle management with Dincharya and Ritucharya **Activity -** Visit to a local market and classify the available foods according to sattvic, rajas and tamasic foods.	
III	**Bioactive Foods:** Definition of bioactive foods, its action in human body. Bioactive food derived components in disease prevention – carotenoids, flavonoids, isothiocyanates and glucosinolates, phenolic acids, organosulfur compounds – definition, food sources, functions in human body. **Activity** –Select any one herbal food supplements available in the market and explain how it heals our body from a disease condition.	9
IV	**Microbiome Diet:** Microbiome – Definition, relationship between the microbiome and health. Microbiome and Brain – A connection. Summary of Gut microbial products and its potential functions. **Activity** – Visit a market, websites or vlogs on different types of honey and its therapeutic role in health. Select any one food product that enhances the growth of good bacteria and explain how it heals our body therapeutically.	9
V	**Spices are Kitchen Pharmacy:** Review of different herbs and spices used in kitchen, Therapeutic use of spices and herbs in human's health. **Activity** – Conduct a study on usage of spices in daily life of the individuals.	9
	Total Lecture Hours	**45**

Text Book Reference:

1. Rastogi S {2014) Ayurvedic Science of Food and Nutrition. ASIN: BOOHWMV094, Springer: ISBN-13:978-1461496274
2. "The Complete Book of Ayurvedic Home Remedies "by Vasant Lad
3. Smith V A. Ayurvedic Nutrition, Motilal Banarsidass, New Delhi. 2011.
4. Achaya K T. Indian Food-A Historical Companion, Oxford University Press, New Delhi. 1998.

References:

1. Alina Maria Olban and Alexandru Mihai, Handbook of Food Bioengineering, Volume 11, Elsevier Publications.
2. Laid Boukraa, Honey in Traditional and Modern Medicine, CRC Press

Web References:

1. http://www.pdfdrive.com
2. www.reviewofspices.com

Course Mapping – PO and CO

Mapping	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	3	2	2	3	2	3	2
CO 2	3	3	2	2	3	2	3	2	3	2
CO 3	3	3	3	3	2	2	3	2	2	2
CO 4	3	3	2	3	3	2	3	2	2	2
CO 5	3	3	3	3	3	2	3	2	2	2

BAKERY AND CONFECTIONERY

23U3NDDE02 SEMESTER III

No. of Credits: 3 Hours of Instruction / Week: 3

OBJECTIVES:

To enable the students to,

- Understand the importance of baking and confectionery.
- Understand the principles, role of various food components involved in baking and confectionery.
- Develop skills and responsibility for setting up bakery and confectionery units.

COURSE OUTCOMES:

CO1	To know about the structure and composition of wheat	**K1**
CO2	To know about the baking ingredient and their process.	**K1**
CO3	To know about the baking units and equipment.	**K2**
CO4	To develop a skill about preparation and decoration of bread and their sensory evaluation.	**K4**
CO5	To know about the confectionary process.	**K4**

Unit	Content	Hours
I	Introduction to bakery- baking industry in India. Principles of baking, Structure and composition of the wheat kernel, Classification of baked products	09
II	Baking ingredients-- Role of Ingredients – Flour, Water, Yeast, Sugar, Shortening, Milk, Egg, Butter, Salt, Leavening Agents, Spices, Flavourings, Fruits and Nuts, Food Colours, Setting materials, Cocoa and Chocolate	09
III	Preparation and Decoration of Baked Foods- Bread making – Ingredients used, Steps and Methods, Qualities of a Good Loaf, Bread Faults Cake making – Ingredients used, Cake mixing methods, Types of cakes, Cake faults and remedies. Biscuit and Cookies Making- Ingredients used and steps involved for making biscuits, Pastry –Types, Icing- Types	09

IV	**Bakery Organisation and Equipment –**Organisational hierarchy of bakery, Layout, Duties and responsibilities of bakery personnel **Bakery Equipment—**Smaller and Larger equipment used in bakery units, Factors for selection of equipment, Care and maintenance	09
V	Confectionery- Ingredients used, Making of Toffee, Chocolates, Fruit drops, Hard boiled candies, soft candies, Chewing gums, **RELATED EXPERIENCE** Visit to Bakery units and Bakery outlets.	09
	Total Lecture Hours	**45**

Text books:

1. Dubey, S.C. (2002), Basic Baking IV Edition, The Society of Indian Bakers, New Delhi.

2. Bakers Handbook on Practical Baking (1998) Compiled and Published by US Wheat Associates, New Delhi.

3. NIR Board, The Complete Technology Book on Bakery Products, National Institute of Industrial Research, New Delhi.

Reference books:

1. Neelam Khetarpaul, Raj Bala Grewal and Sudesh Jood,(2013), "Bakery science and cereal technology", Daya publishing house.

2. Avantina Sharma, (2006), "Text Book of Food Science and Technology", International Book Distributing Co., Chaman Studio Building, Charbagh, Lucknow, UP.

3. John Kingslee, (2014), "A professional text to Bakery and Confectionary", New Age International Publisher.

Course Mapping – PO and CO

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

NMEC – I BASIC FOOD SCIENCE

23U3NDN01 SEMESTER III

No. of Credits: 2 Hours of Instruction / Week: 2

OBJECTIVES:

To enable the students to,

- Know the composition of various foods.
- Understand the effects of cooking on nutritive value.

COURSE OUTCOMES:

CO1	Understand the food groups and their functions	**K2**
CO2	Learn the composition of various food	**K2**
CO3	To gain knowledge of nutrients and nutritive value	**K3**
CO4	Understand the principles of food science	**K2**
CO5	Acquire knowledge on different methods of cooking	**K4**

Unit	Content	Hours
I	**Introduction to Food Science-** Functions of food; Basic food groups, My plate by NIN, Food pyramid. Cooking – objectives and methods.	06
II	**Cereals-** Composition and nutritive value of rice and wheat., loss of nutrients during cooking; Parboiling –Advantages and disadvantages	06
III	**Pulses** - Composition, nutritive value, best method of cooking, loss of nutrients during cooking, germination and its advantages.	06
IV	**Vegetables –** Classification, nutritive value, loss of nutrients during cooking and methods of reducing nutrient loss during cooking**.** **Fruits-** Classification, nutritive value and changes during ripening.	06
V	**Fleshy foods-** Meat, Poultry fish, egg and milk: Nutritive value and composition.	06
	Total Lecture Hours	**30**

TEXT BOOKS:

1. Srilakshmi. B (2018). , Food Science- 7th Edition, New Age International Publishers, New Delhi.

2. Elizabeth W. Christian and Vickie A. Vaclavik (2014), Essentials of Food Science – 4th Edition, Springer New York Heidelberg Dordrechr Publisher, London.

3. Usha Chandrasekhar, (2002) Food Science and Application in Indian Cookery., Phoenix Publishing house P Ltd, New Delhi.

REFERENCE BOOKS:

1. Brow, A., (2000) Understanding of foods, Thomson Learning Publications, Wadsworth.

2. Mehas, K.Y and Rodgers, S.L., (2000), Food science and you, McMillia McGraw Company New York.

3. Parker, R., (2000)., Introduction to food science, Delmer, Thomson Learning Co., Delma.

WEB REFERENCE:

1. https://guides.librariespsu.edu/food science

2. https://www.nal.usda.gov/fnic/food-science-and-technology

3. https://foodinfo.ifis.

Course Mapping – PO and CO

Mapping	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	2	2	2	2
CO 2	3	3	2	3	2	2	2	2	2	2
CO 3	3	3	2	2	2	2	2	2	2	2
CO 4	3	3	2	3	3	2	2	2	2	2
CO 5	3	3	2	3	3	2	2	2	3	2

NUTRITION AND BIOCHEMISTRY PRACTICAL

23U3NDCP03 SEMESTER III

No. of Credits: 2 Hours of Instruction / Week: 3

OBJECTIVES:

To enable the students to

- To learn analytical tests in foods.
- To acquire skills to analyse nutritional constituents of foods.
- To gain knowledge on the energy value of foods and energy requirements of individual.

COURSE OUTCOMES:

CO1	To ensure students to understand and gain practical knowledge.	**K2**
CO2	Experiment the preparation of ash samples	**K4**
CO3	Determine the iron and ascorbic acid in food sample	**K4**
CO4	Estimate the iron and hemoglobin level in blood	**K5**
CO5	Estimate the Urea present in Urine sample	**K5**

S.No	Contents	Hours
1.	Qualitative tests for Sugars – Glucose, Fructose, Galactose, Lactose, Maltose and Sucrose	3
2.	Qualitative tests for Amino acids – Cysteine, Methionine, Arginine, Histidine, Tyrosine.	3
3.	Determination of Moisture content of food.	3
4.	Determination of Ash content of food.	3
5.	Quantitative estimation of Iron.	3
6.	Quantitative estimation of Ascorbic Acid.	3
7.	Estimation of titratable acidity in liquid-based foods.	3
8.	Estimation of Urinary Urea.	3
9.	Estimation of Iron and Haemoglobin in Blood	3

10.	Demonstrate –Estimation of fat (Soxhlet method)	3
11.	Visit to a Food Analysis laboratory	-
	TOTAL PRACTICAL HOURS	**30**

Text Book References:

1. Sadasivam, S. and Manickam, A. (2022). Biochemical Method, New Age International P. Ltd., Publishers, New Delhi, Fourth Edition.
2. Raghuramulu, N., Madhavannair, K. and Kalyana Sundaram, National Institute of Nutrition, (2013). A Manual of Laboratory Techniques, Hyderabad.

Reference Books:

1. Suzanne Nielson S. Food Analysis Laboratory Manual, Springer, London, Second Edition, 2015.

Web References:

1. https://vlab.amrita.edu/?sub=2&brch=191&sim=692&cnt=2
2. https://www.fsis.usda.gov/sites/default/files/media_file/2020-11/CLG_FAT_03.pdf
3. https://aquadocs.org/mapping/26801/1/A-2.pdf

Course Mapping – PO and CO

Mapping	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	3	2	2	3	3	3	3
CO 2	3	3	3	2	3	2	3	3	3	3
CO 3	3	3	3	2	3	2	3	3	3	3
CO 4	3	3	3	2	3	2	3	3	3	3
CO 5	3	3	3	2	3	2	3	3	3	3

SEMESTER – IV

NUTRITION THROUGH LIFE CYCLE

23U4NDC06 SEMESTER IV

No. of Credits: 5 Hours of Instruction / Week: 6

OBJECTIVES:

To enable the students to,

- Understand the nutritional demands in various stages of life cycle.
- Acquires skills in planning adequate meals in different stages of life cycle.
- To determine physiological changes at different stage of life span.

COURSE OUTCOMES:

CO1	Understand the dietary guidelines in meal planning for all age groups.	**K2**
CO2	Identify nutrition-related problems in pregnancy and lactation and describe their nutritional requirements.	**K4**
CO3	Explain the benefits of breast milk and nutrition programs for preschool children	**K3**
CO4	Organize the nutrition and diet towards promotion of health and nutritional well-being of school going children and adolescence.	**K4**
CO5	Assess the psychological and socio-economic aspects influencing nutritional intake during ageing.	**K5**

Unit	Content	Hours
I	**Menu Planning:** Balanced Diet – definition, importance. RDA. Factors influencing nutritional requirements for all age groups. Meal planning – definition, Principles of meal planning – steps involved in planning a diet. My plate by NIN. Food Exchange lists. Estimated average requirements. **Nutrition for Adult:** Nutritional needs of adults (men and women) – in relation to occupation. Reference man and woman. Planning a balanced diet for adults. Nutrition in menopausal women. Nutrition related problems.	18
II	**Pregnancy and lactation:** Importance of food and nutritional care during pre-pregnancy and pregnancy. Physiological changes occurring during pregnancy. General dietary problems – Morning sickness, heart burn, PICA. Complications – Anaemia, Gestational	18

	Diabetes, Constipation, Hypertension. Nutritional requirements and Dietary guidelines. Physiology of lactation and roles of hormones in milk production. Breast milk – composition, importance. Factors affecting the volume and composition of breast milk. Nutrition and food requirements of a nursing mother. Importance of post-natal care.	
III	**Nutrition during Infancy:** Growth and development. Breast milk – Colostrum, Transition milk, Fore milk and Hind milk. Advantages of breast milk for lactating mother and infant. Bottle feeding. Comparison of human milk vs cow's milk. Weaning foods – Types, weaning problems. Preterm infants and Low birth weight babies – Feeding and Nutritional problems and care to be taken. Commercial fortified infant formula.	18
IV	**Nutrition during Childhood:** Preschool Children – Growth and development. Food and nutritional requirements. Dietary guidelines. Nutrition related problems – PEM, Vitamin A Deficiency and their dietary intervention. School going Children - Growth and development. Food and nutritional requirements. Dietary guidelines. Nutritional problems – Underweight, obesity, Constipation, Dental caries. Importance of breakfast, packed lunch, Mid-day meal programme.	18
V	**Nutrition during Adolescent and Old Age;** Growth and development - Physical and psychological changes, growth spurt. Food and nutritional requirements. Dietary guidelines. Nutritional problems – obesity, underweight, anaemia, food habits. eating disorders – Binge eating, anorexia nervosa, bulimia nervosa. Geriatrics – definition. Process of ageing. Changes occur during old age – body composition, physiological, psychological and socio-economic factors in relation to food intake. Food and Nutritional requirements. Diet modification. nutritional problems in old age.	18
	Total Lecture Hours	**90**

Text Books:

1. Srilakshmi B., (2017). Nutrition Science. New Age International Pvt Ltd., New Delhi.

2. Srilakshmi B., (2010). Dietetics. New Age International Pvt Ltd., New Delhi.
3. Mahtab S, Bamji *et al.,* (2015). Text book of Human Nutrition. 3rd Edition. Oxford and IBH publishing Co. P. Ltd., New Delhi.
4. Swaminathan, M., (2012). Advanced Text book on Food and Nutrition. Vol 1, 2nd edition. Bangalore Printing and Publishing Co, Ltd., Bangalore.

Reference Books:

1. Dieatary Guidelines for Indians, (2013) ICMR, National Institute of Nutrition, Hyderabad.
2. Krause, M.V. and Hunesher, M.A (2013). Food, Nutrition and Diet therapy, 14th Edition, W. B. Sanders company, London.
3. Gopala. C. Rama Sastri B.V. and Balasubramanian, (2014). Nutritive Value of Indian Foods, NIN, ICMR, Hyderabad.

Web resources:

1. www.epgpathshala.com
2. www.ecoursesonline.com

Course Mapping – PO and CO

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

NUTRITIONAL BIOCHEMISTRY

23U4NDC07 SEMESTER IV

No. of Credits: 5 Hours of Instruction / Week: 6

OBJECTIVES:

To enable the students to

- To learn the metabolism of proximate principles.
- To know the role of other nutrients in metabolism.
- To get a better knowledge on energy capture during metabolic processes.

COURSE OUTCOMES:

CO1	Demonstrate the chemical and physiological role of carbohydrate metabolism.	**K1**
CO2	Understand the protein metabolism and its inborn errors.	**K2**
CO3	Organise the metabolism of lipids and Lipoproteins – types and disorders	**K3**
CO4	Learn about life regulating nucleotides and nucleosides in humans.	**K2**
CO5	Appraise the role of enzymes and hormones in metabolic pathways	**K5**

Unit	Content	Hours
I	Definition of Biochemistry and its relation to Nutrition. **Carbohydrate Metabolism:** Classification, properties of mono, di and polysaccharides. Metabolism of Carbohydrate – Glycolysis, Glycogenesis, Glycogenolysis, TCA cycle, HMP shunt, Gluconeogenesis. Inborn error of metabolism: Glycosuria, Fructosuria, Galactosemia. Case Studies on Inborn error of metabolism of Carbohydrate.	18
II	**Lipid Metabolism:** Composition, Classification and properties of lipids. Metabolism of Lipid – Beta Oxidation of Fatty acid. Biosynthesis of triglycerides and Cholesterol. Plasma Lipoproteins – Functions and metabolism of lipoproteins.	18

	Disorders of lipoproteins – Hyperlipoproteinemia and hypolipoproteinaemia. Case Studies on disorders of lipoproteins.	
III	**Protein Metabolism:** Classification of proteins based on solubility, composition, functions and shape and nutritive value. Structure of Proteins. Amino acids – classification based on nutritive value. Metabolism: Anabolism of protein – protein turn over, Catabolism of protein-Oxidative deamination, Transamination, Urea cycle. Inborn error of metabolism: Cystinuria, Alcaptonuria, Wilson's disease. Case Studies on Inborn error of metabolism of proteins	18
IV	**Nucleotides and Nucleosides:** Purine and Pyrimidine bases – structure. Structure of Nucleotides. Structure and functions of DNA and RNA, Types of RNA, Perception in brief - Xenobiotics, Nutrigenomics.	18
V	**Enzymes, Coenzymes and Hormones:** Enzymes and Coenzymes - Definition and mechanism of action. Factors influencing enzyme action. B Vitamins role as coenzyme in brief. Role of hormones in metabolism: Insulin, Glucagon, Thyroxine, Estrogen and progesterone.	18
	Total Lecture Hours	**90**

Text Books:

1. Satyanarayana, U. Chakrapani (2013) - Fundamentals of Biochemistry, 4th edition, Elsevier Pvt. Ltd., Calcutta.
2. Ambiga Shanınugam, (2016)., Fundamentals of Biochemistry for Medical Students, 8thedition, Wolters Kluwer (India) pvt Ltd., New Delhi.

Reference Books:

1. Champe, P. C., Harvey, R. A., & Ferrier, D. R. (2005). Biochemistry. Lippincott Williams & Wilkins, 6th Edition, Wolters Kluwer, London.
2. Chatterjea M.N. and Shinde R., (2016) -Textbook of Medical Biochemistry, 8th edition – Jaypee Brothers Medical Publishers (P) Ltd. New Delhi.
3. Swaminathan M (1981). Biochemistry for Medical Students, Geetha Book house, Mysore.

4. Deb, A. C. (1999). Fundamentals of Biochemistry, New Central Book Agency (P) Ltd., Calcutta.

Web resources:

1. www.epgpathshala.com
2. www.ecoursesonline.com

Course Mapping – PO and CO

Mapping	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	3	3	2	2	2	3	3
CO 2	2	3	2	3	3	2	2	2	2	3
CO 3	2	3	2	3	3	2	2	2	2	3
CO 4	2	3	2	3	3	2	2	2	3	3
CO 5	2	3	2	3	3	2	2	2	3	3

ENTREPRENEURSHIP IN NUTRITION AND DIETETICS

23U4NDDE03 SEMESTER IV

No. of Credits: 3 Hours of Instruction / Week: 3

OBJECTIVES:

To enable the students to,

- The basic concepts of Entrepreneurship and business opportunities
- The emerging trends in Entrepreneurship
- The idea about starting a new venture

COURSE OUTCOMES:

CO1	To identify, the nature of entrepreneurship and the meaning of entrepreneur.	**K1**
CO2	To Analyze different types of business, frame a business plan	**K2**
CO3	To understand the concept of E-Cell and the activities carried out by them	**K3**
CO4	To know the operations of E-commerce	**K3**
CO5	To identify the agencies that assist entrepreneurs	**K3**

Unit	Content	Hours
I	Entrepreneur - Definition, Entrepreneurship – Meaning, Types, Traits of Entrepreneurship, Factors affecting entrepreneurship, Barriers to Entrepreneurship, stages in Entrepreneurial process, SWOT Analysis, Emerging trends in Entrepreneurship (Technopreneurship, netpreneurs, Agripreneurs, Women entrepreneurship, Portfolio Entrepreneurship, Franchising)	09
II	Importance of business plan, purpose, contents, and benefits of a business plan; business plan creation process, preparation of sample business plan, Business ethics and etiquette.	09
III	Meaning and concept of E-cells, advantages to join E-cell, significance of E-cell, various activities conducted by E-cell	09
IV	Defining E-Commerce: The scope of E-commerce, Benefits and limitations of E-Commerce, E-Retailing: Traditional retailing and e-retailing, Benefits of e-retailing.	09

V	Institutions assisting Entrepreneurs – SIDCO, NSIC, SSIC, SISI, SIPCOT, TIIC, IIC, KVIC, Commercial banks, and other Entrepreneurial Development agencies.	09
	Total Lecture Hours	**45**

TEXT BOOKS:

1. Reddy, Entrepreneurship: Text & Cases - Cengage, New Delhi.

2. Kuratko/rao, Entrepreneurship: a south Asian perspective.- Cengage, New Delhi.

3. Leach/Melicher, Entrepreneurial Finance – Cengage. , New Delhi.

4. K.Sundar – Entrepreneurship Development – Vijay Nicole Imprints private Limited

5. Khanka S.S., Entrepreneurial Development, S.Chand & Co. Ltd., New Delhi, 2001.

REFERENCE BOOKS:

1. Barringer, B., Entrepreneurship: Successfully Launching New Ventures, 3rd Edition,Pearson, 2011.

2. Bessant, J., and Tidd, J., Innovation and Entrepreneurship, 2nd Edition, John Wiley &Sons,2011.

3. Desai, V., Small Scale Industries and Entrepreneurship, Himalaya Publishing House, 2011.

4. Donald, F.K., Entrepreneurship- Theory, Process and Practice, 9th Edition, Cengage Learning, 2014.

E-RESOURCES:

1. http://inventors.about.com/od/entrepreneur/

2. http://learnthat.com/tag/entrepreneurship/

3. www.managementstudyguide.com

4. www.quintcareers.com

Course Mapping – PO and CO

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

FUNCTIONAL FOODS

23U4NDDE04 SEMESTER IV

No. of Credits: 3 Hours of Instruction / Week: 3

OBJECTIVES:

To enable the students to,

- Understand what are functional foods and classify functional foods.
- Acquires knowledge on role of functional foods in health.
- Learn more about Pro and pre biotics, phytochemicals and antioxidants as nutraceuticals.

COURSE OUTCOMES:

CO1	Understand basics of functional foods and nutraceuticals.	**K2**
CO2	Understand the health benefits of prebiotics	**K2**
CO3	Apply the knowledge of functions of nutraceuticals.	**K3**
CO4	Analyze the effects of bioactive compounds and cite the role of functional components and antioxidants	**K4**
CO5	Evaluate the role of functional foods in the prevention and management of CVD, Cancer and Diabetes	**K5**

Unit	Content	Hours
I	**Functional Foods:** Functional Foods and Nutraceuticals - Definition, History, Health benefits of Functional foods and nutraceuticals. Mechanism of action of Nutraceuticals. Regulations of Functional foods and nutraceuticals in India.	7
II	**Probiotics and Prebiotics:** Probiotics – Definition, features of probiotic micro-organisms, sources of probiotics, Health benefits of probiotics. Prebiotics – Definition, sources of prebiotics, health benefits. Synbiotics - Definition, sources, health benefits. Case study on consumer preference among various probiotic foods.	8
III	**Bioactive components:** Phytochemicals – carotene, lycopene, lutein, zeaxanthin - sources and health benefits.	10

	Polyphenols – flavonoids, curcumin, lignin, resveratrol, gingerol, allicin – sources and health benefits. Omega fatty acids, linoleic acids – sources and health benefits. Case study on bioactive components used in kitchen.	
IV	**Antioxidants as Nutraceuticals:** Free radicals – definition, harmful effects of free radicals in humans. Antioxidants – definition, mechanism of action, types, role of antioxidants in human health. Case study on various antioxidants used in food industry.	10
V	**Functional foods for Cancer:** Turmeric, honey, garlic, ginger, cumin seeds, black pepper, cinnamon, cloves. **Functional foods for Diabetes:** Fenugreek, bitter gourd, Jamun, onion, garlic, curry leaves. **Functional Foods for Heart:** Cinnamon, clove, coriander seeds, fennel seeds, parsley herb, peppermint.	10
	Total Lecture Hours	**45**

Text Books:

1. Gupta, R. C. (2016). Nutraceuticals: Efficacy, Safety and Toxicity. Academic Press ltd., New York.
2. Wildman, R.E.C. ed. (2000) Handbook of Nutraceuticals and Functional Foods, CRC Press, Boca Raton.
3. Salminen, S. A. Von Wright (eds) (1998): Lactic acid bacteria: microbiology and functional aspects, 2nd edition, Marcell Dekker Inc. New York.
4. Krause, Hunseher, M. A, (2020), Food and Nutrition Therapy, 12th edition, Saunders Elsevier company, London, UK.

Reference Books:

1. Michael.Z, (2010), Hand book of Nutrition, Thime Medical and Scientific Publishers Pvt. Ltd, India.
2. Carroll Lutz and Przytulski (2010), Nutrition and Diet Therapy, 5thedition, Jaypee Brothers Medical publishers, New Delhi.

Web resources:

1. www.epgpathshala.com

2. Journal of functional foods
3. Journal of free radical research

Functional Foods

Course Mapping – PO and CO

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

NUTRITION THROUGH LIFE CYCLE PRACTICAL

23U4NDCP04 SEMESTER IV

No. of Credits: 2 Hours of Instruction / Week: 3

OBJECTIVES:

To enable the students to

- To plan, prepare a diet for a family.
- To calculate nutritive value for the prepared diet.

COURSE OUTCOMES:

CO1	Remember the principles of menu planning for different age groups.	**K1**
CO2	Understand the nutrient need for different age group.	**K2**
CO3	Practice the whole day menu for different age group.	**K3**
CO4	Evaluate the nutritive value of menus and compare with RDA.	**K4**
CO5	Assess the Anganwadi services.	**K5**

S.No	Contents	Hours
1.	Planning, preparing a whole day menu and calculate the nutritive value for Pregnant mother.	3
2.	Planning, preparing a whole day menu and calculate the nutritive value for Lactating women.	3
3.	Planning, preparing a whole day menu and calculate the nutritive value for infants (weaning foods).	3
4.	Planning, preparing a whole day menu and calculate the nutritive value for preschool child.	3
5.	Planning, preparing a whole day menu and calculate the nutritive value for school going children.	3
6.	Planning, preparing a whole day menu and calculate the nutritive value for Adolescents.	6
7.	Planning, preparing a whole day menu and calculate the nutritive value for adults based on activity	6
8.	Planning, preparing a whole day menu and calculate the nutritive value for elderly.	3
9.	Visit an Anganwadi centre.	-
	TOTAL PRACTICAL HOURS	**30**

Text Book References:

1. Dietary Guidelines for Indians, (2013) ICMR, National Institute of Nutrition, Hyderabad.
2. Srilakshmi B., (2010). Dietetics. New Age International Pvt Ltd., New Delhi.
3. Swaminathan, M., (2012). Advanced Text book on Food and Nutrition. Vol 1, 2nd edition. Bangalore Printing and Publishing Co, Ltd., Bangalore.

Reference Books:

1. MahtabS.Bamji, Prasad Rao, N.Vinodini Reddy. Textbook of Human Nutrition, Oxford and IBH Publishing Co. Pvt .Ltd, Second Edition, 2003.
2. Judith Brown, Nutrition Through the Life Cycle, Cengage Learning, Seventh edition, (2020).
3. Prakash Shetty, Nutrition through Life Cycle, Leatherhead Publishing, First edition, (2002).

Web References:

1. https://www.tarladalal.com/recipes-for-weaning-for-6-to-7-months-357
2. .https://www.hopkinsmedicine.org/health/wellness-and-prevention/nutrition-during-pregnancy

Nutrition Through Life Cycle Practical

Course Mapping – PO and CO

Mapping	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	2	2	2	2
CO 2	2	3	2	3	2	3	3	3	2	2
CO 3	3	2	2	2	3	3	3	3	2	2
CO 4	2	2	3	3	2	3	3	3	3	2
CO 5	2	2	2	2	2	3	3	3	3	3

SEMESTER – V

DIETETICS - I

23U5NDC08 SEMESTER V

No. of Credits: 4 Hours of Instruction / Week: 6

OBJECTIVES:

To enable the students to,

- Describe the roles and responsibilities of a dietitian in a hospital
- Plan and prepare therapeutic diets for patients
- Organize diet counselling to patients and family

COURSE OUTCOMES:

CO1	Comprehend the feeding techniques and familiarize the routine hospital diets.	**K1**
CO2	Learn the causes, symptoms, and treatment of various disease conditions.	**K2**
CO3	Gain knowledge about the role of nutrition in disease condition	**K3**
CO4	Develop appropriate dietary modifications for various disease conditions based on the pathophysiology	**K3**
CO5	Develop skills and techniques in the planning and preparation of therapeutic diets	**K3**

Unit	Content	Hours
I	**Definition of dietetics** - Purpose and principles of therapeutic diets. Factors considered in planning therapeutic diets. Classification and Roles of dietitians. Organisation and job description of dietitians. **Special feeding methods** - Tube feeding, Parental feeding - advantages and disadvantages. **Routine Hospital diets** - Clear fluid diet, full fluid diet - soft diet, regular normal diet - pre-operative diet, post-operative diet.	18
II	**Febrile diseases** - Causes, symptoms and dietary management of Febrile diseases - Acute: Typhoid, influenza, Malaria. Chronic: Tuberculosis, HIV infection.	18

III	**Gastro intestinal diseases** - Causes, symptoms and dietary management of Gastro intestinal diseases – Diarrhea, dysentery and constipation,Peptic ulcer, Ulcerative colitis, Crohn's diseases, irritable bowel syndrome.	18
IV	Types, causes, symptoms, diagnosis, dietary management and use of exchange list for **Obesity and leanness, Diabetes mellitus**	18
V	**Diet in Allergy** - Definition, Classification, Food allergens, test for allergy dietary¬ treatment. Dietary recommendations for Lactose intolerance, Celiac disease, Gluten intolerance.	18
	Total Lecture Hours	**90**

Text Books:

1. Srilakshmi. B., (2019)., "Dietetics",. Eight Edition.,New Age International (P) Ltd., Chennai.
2. Williams. S.R. (2001) Basic Nutrition&Diet Therapy, 11th Edition., Mosby. Inc., St.Louis.
3. Brown. J.E. (2002) Nutrition Now, 3"& Edition. Wordsworth Thomson Learning. Inc. Canada.

Reference Book:

1. Garg. M., (2006), Diet Nutrition and Health, ABD Publishers.
2. Krause. M.V and Mahan. L.K., (2019), "Food Nutrition and Diet Therapy", 9th Edition, W.B. Sauders Company, Philadelphia.
3. Brown. J., (2014), "Nutrition now", 7th Edition, Wadsworth, USA.

Web Reference:

1. https://www.dietitianreference.com
2. https://eatright.org

Course Mapping – PO and CO

Mapping	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	3	2	2	2	2
CO 2	3	3	3	2	2	2	2	2	3	2
CO 3	3	3	3	2	2	2	3	2	3	3
CO 4	3	3	3	3	3	2	2	2	3	3
CO 5	3	3	3	3	3	3	2	3	3	3

COMMUNITY NUTRITION

23U5NDC09 SEMESTER - V

No. of Credits: 4 Hours of Instruction / Week: 5

OBJECTIVES:

To enable the students to,

- To know the importance and Needs for Community Nutrition
- To gain Knowledge on the various aspects of Malnutrition, Nutrition Educational and Nutritional Status Assessment
- To know about Intervention Programs Available

COURSE OUTCOMES:

CO1	Understand the factors influencing health of a community	**K2**
CO2	Analyze nutritional problems, policies, programs and agencies involved in combating malnutrition.	**K4**
CO3	Organizing nutrition education program for the community	**K3**
CO4	Evaluate nutritional status of the community	**K5**
CO5	Outline the various agencies in combating malnutrition	**K2**

UNIT	CONTENT	HOURS
I	**Background –** Concept and scope of Community Nutrition and multidisciplinary nature of public nutrition. Malnutrition - Definition of Malnutrition (Under Nutrition – PEM, Wasting, Stunting and Over Nutrition). Prevalence of Malnutrition in India. Vicious Cycle of Malnutrition. **Food and Nutrition Security** – Definition and Importance of Food Security, Factors affecting Food and Nutrition Security, Different levels/ dimensions of food security.	**15**
II	**Nutritional Deficiency Diseases –** Prevalence, Aetiology, Signs, Symptoms and prevention of Anaemia, Osteoporosis and Osteomalacia, Protein Energy Malnutrition, Vitamin A, Iodine and Fluorine deficiency.	**15**

	Communicable Disease – Definition, Causative Organism, Mode of Transport, Signs and Symptoms, Treatment, Prevention, Immunization and Vaccination of the following – Polio, COVID – 19, Diphtheria, Diarrhoea, Tetanus, Measles. Immunization and its importance. Indian Immunization Schedule.	
III	**Community Nutritional assessment -** Definition and Importance of Nutritional assessment. Methods of Nutritional Assessments – Direct Method and Indirect Method **Nutrition Education –** Definition, Objectives, Principles and scope of nutrition and health education. Methods of imparting nutrition education, their advantages and disadvantages.	**15**
IV	**International Organization of Nutrition:** Co-operative America Relief Everywhere (CARE)**,** World Health Organization (WHO), Food and Agricultural Organization (FAO), United Nations International Children Emergency Fund (UNICEF)	**15**
V	**National Organization of Nutrition: –**Integrated Child Development Scheme (ICDS)**,** National Nutrition Surveillance system**,** ICMR, CFTRI, NIN, FNB, NetProFaN, Eat right movement, Fit India movement – Roles, policies and Programs **Nutrition policy and programs –** National Nutrition Policy, Midday Meal Program, National Programs for the prevention of anaemia, Vitamin A deficiency and Iodine deficiency disorders.	**15**
	Total Lecture Hours	**75**

Extension Activity – Socio Economic Survey of a community, Diet Survey, Nutrition and Health Assessment and Nutrition Education

Text Book:

1. Suryakantha A H., (2010)., Community Medicine with recent Advances, Jaypees brother medical publishers.
2. Shubhangini A Joshi., (2002)., Nutritional and Dietetics., 2 Edition., Tata Mc Graw-Hill publishing company limited., New Delhi.
3. Besavanathappa (2000), Community health Nursing, Jaypee Brother Medical Publishers Ltd., New Delhi

Reference Books:

1. Brahman, G.N.V., Lakshmaiah, A., Rao, M. and Reddy, G.(2005) Methodology on Assessment of Diet and nutritional Status of Community, National Institute of nutrition, Hyderabad.
2. Reports of National Family Health Survey, International Institute for Population Science, Mumbai.
3. WHO (2006). Child Growth Standards: Methods and development: height-for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age (http://www.who.int/childgrowth/standards/en/).

Web References:

1. https://www.ncbi.nlm.nih.gov-nutritionalassessment
2. https://www.medicalnewstoday.com-anemia
3. ttps://www.nhp.gov.in/national-vitamin-a-prophylaxis-program-pg

Course Mapping – PO and CO

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

FOOD PRESERVATION

23U5NDC10 SEMESTER V

No. of Credits: 4 Hours of Instruction / Week: 5

OBJECTIVES:

To enable the students to,

- Know the principles of preservation
- Understand the various methods of preserving foods.
- Get an idea about the various processed foods available in the market.

COURSE OUTCOMES:

CO1	Understand the role microorganisms in food spoilage	**K2**
CO2	Learn the concept of preservation	**K2**
CO3	Understand the ambient temperature processing	**K2**
CO4	Classify the various types of food spoilage	**K4**
CO5	Apply the knowledge to develop new products with minimal processing for better of essential nutrients	**K3**

Unit	Content	Hours
I	**Food Spoilage** Definition, causes, microorganisms involved in spoilage of bread, fruits and vegetables, meat, fish, egg, milk, juices and pickles. **Food Preservation** Definition, principles and importance of preservation. Classification – bactericidal and bacteriostatic methods. **Activity -** Group discussion to understand the prices of commercial and home scale food products	15
II	**Preservation by use of high temperatures** Blanching, pasteurization, sterilization and UHT processing, canning, extraction cooking, dielectric heating, Dehydration. **Canning process** – Steps and Spoilage of canned foods, Advantages and disadvantages **Bottling process** –Steps. Advantages and disadvantages	15

	Pasteurization--- Types, Advantages and disadvantages **Activity -** Preparation of jams, jellies and squashes using seasonal fruits and vegetables.	
III	**Preservation by use of low temperature** **Refrigeration** - Principles and methods, defects of cold storage. **Freezing --** Principles, Methods –Advantages and disadvantages **Preservation by drying and dehydration** Principles and methods- Solar drying and mechanical drying-- cabinet, drum, spray and vacuum drying. Advantages and disadvantages	15
IV	**Preservation with chemicals and radiation** Preservatives: Organic and inorganic preservatives, antibiotics, mold inhibitors and antioxidants -Sources of radiation, units of radiation, mode of action of radiation, Preservation of intermediate moist foods **Activity -** Preparation of sauce and ketchup	15
V	**Preservation with fermentation** Principles, Manufacturing of fermented beverages -Wine, beer. Manufacturing of cheese and yoghurt. **Activity -** Preparation of pickles using fruits and vegetables. Preparation of different flavoured yoghurt. Visits to food processing industries to observe preparation of jam, pickles, juices etc.,	15
	Total Lecture Hours	**75**

Text Books:

1. Fellow, P., (2009) Food Processing Technology – Principles and Practices, 3rd Edition, CRC Press Woodland Publishers, England.
2. Dhir singh and Dheer singh (2021), Food processing and preservation, Sri Publisher, New Delhi.

Reference:

1. Adams, M.R. and Moss, M.O., (2005), Food Microbiology, New Age International (P) Ltd., New Delhi.
2. Arthey, D and Ashurst, P.R (1996), Fruit processing, Blackie academic and professional. London.

3. Sommers, C.H. and Xveteng Fan, (2006), Food Irradiation Research and Technology, Blackwell Publishing.
4. Subalakshmi. G and Shobha Udibi, (2006), Technology of Food Processing and Preservation, New age international publisher., New delhi.

Web Reference:

1. https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/food- spoilage.
2. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=111436
3. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=111435
4. http://www.homepreservingbible.com/2247-an-introduction-to-the-drying-food-preservation-method/

Course Mapping – PO and CO

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

INSTITUTIONAL FOOD SERVICE MANAGEMENT

23U5NDDE05 SEMESTER V

No. of Credits: 3 Hours of Instruction / Week: 3

OBJECTIVES:

To enable the students to,

- Understand the principles of planning, organizing and controlling in food service institutions.
- Understand the management aspects of food service.
- Develop managerial skills among the students.

COURSE OUTCOMES:

CO1	To gain knowledge about various types of food service	**K1**
CO2	To know about the menu planning and Quantity food production	**K2**
CO3	To gain knowledge about the principles and functions of food service management	**K2**
CO4	To understand about Personnel Management and Financial Management	**K4**
CO5	To realize the Importance of Art, Sanitation and Hygiene in Food service Institutions.	**K3**

Unit	Content	Hours
I	**Food Service Operation-** Definition, Types of catering-Hotels, motel, restaurant, cafeteria, chain hotels **Classification based on Function –** Profit oriented or commercial sector, Service oriented or welfare sector **Food service-** Types- conventional, commissary, ready- prepared and assembly service, Styles- Waiter, self-service, venting, contract catering	09
II	**Kitchen –** Types and Layout of kitchen in food service establishments **Equipment-** Classification, Factors involved in selection, Methods of purchasing, Care and maintenance, **Menu -** Origin, importance, types of menu-Tables d'hôtel and A'la carte. Factors affecting menu planning	09

III	**Organization-** Definition, Types, Principles, Organizational structure **Management –** Definition, Functions, Principles, Tools of management **Leadership-** Styles of Leadership and Qualities of a Good Leader.	09
IV	**Personnel Management** -Definition, Scope, Functions of a personnel management, Job description and job specification, Process of selection, Orientation and Training. **Financial Management –** Costing-concept, components, Concept of Break-Even Point, Balance sheet, Cost control-food cost, labor cost, overhead cost, Budgeting-Meaning, Types, Preparation of budget, Inventory	09
V	**Art in food service** - Elements of design, Principles of design, Table setting-steps. Flower arrangement-Types and Styles, Application of art principles in arranging flowers, Napkin folding. **Hygiene and sanitation** - Personal hygiene, Types and sources of contamination, prevention and safety measures, Methods of waste disposal.	09
	Total Lecture Hours	**45**

Textbook:

1. Mohini Sethi (2020), "Institutional Food Management", II Edition, New Age International.
2. Mohini Sethi, Surjeet Mathan, (2015), "Catering Management An Integrated Approach", New Age International.

Reference books:

1. Earl R. Palan and Judity A. Stadler (1986) Preparing for the food service Industry, AVI Publishing& co
2. West B.B. Wood L. Harger V.P. (1966) Food Service in institutions John Willey And sons, Inc., New York.
3. J.M. Diwan (1997) Catering and food service Management, Common Wealth publishers.

Course Mapping – PO and CO

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

SPORTS NUTRITION

23U5NDDE06 SEMESTER V

No. of Credits: 3 Hours of Instruction / Week: 3

OBJECTIVES:

To enable the students to,

- Gain knowledge on the concept of sports, exercise, and fitness.
- Understand the metabolism of macro and micronutrients during performance
- Explain the Nutritional needs of sportsperson

COURSE OUTCOMES:

CO1	To understand the concepts of Fitness, Sports, and Exercise	**K1**
CO2	To analyze the body composition of Athletes	**K4**
CO3	To analyze the nutritional considerations of sportsperson	**K4**
CO4	To analyze the micronutrient needs during the performance	**K4**
CO5	To apply the concepts and suggest a menu for sportsperson	**K3**

Unit	Content	Hours
I	**Fitness -** Definition, parameters of fitness, cardiovascular endurance, muscular strength, muscular endurance, physical fitness tests- for flexibility. **Sports and Exercise** – Classification of Sports- power events, non-power events, and skilled sports, Definition and examples of types of Sports- Endurance trained, intermittent strength and power. Types of Exercise – Aerobic and Anaerobic exercise, fuel for exercise, glycogen load.	09
II	Human body composition, Factors affecting body composition- Age, Body Weight, Physical Activity, Methods of Assessment: Nutritional Anthropometry, BOD, POD, Bioelectric impedance, DEXA	09
III	**Nutritional Consideration for Sports person: Carbohydrates-** Fuel for aerobic and anaerobic metabolism, Glycogen re-synthesis, Carbohydrate loading, **Protein –** Protein metabolism, Protein turnover, and factors affecting	09

	it, **Fat-** factors affecting fat oxidation (Intensity, duration, training status, CHO feeding)	
IV	**Fluids –** balance, importance, symptoms and prevention of dehydration. **Micronutrients –** Influence of exercise on vitamins, Vitamin Restoration and Supplementation. **Dietary supplements –** Ergogenic aids- Nutritional, psychological and physiological. **Warm Up Exercises & Basic Asanas** - Simplified physical exercises and body stretching practices. Basic asanas, Surya namaskar, breathing exercise-pranayama.	09
V	**Principles of Diet planning –** Pre game meals, post-game meals, On-season meals and Off-season meals; liquid meals, high energy meal, Protein rich meals, Sports bar, MCT diet, Antioxidant rich diet. **Special Nutrition** - Basic knowledge on sports nutrition, special nutritional needs for sea voyage, military and space [basic only]	09
	Total Lecture Hours	**45**

Text Book:

1. Louise Burke, Greg Cox (2010) The Complete Guide to Food for Sports Performance, III Edition, National Library of Australia.
2. Fred Bronus, Cerestar Cargill (2022) Essential of Sports Nutrition, II Edition, John Wiley & Sons.
3. Dr.Balbinder singh (2020), Sports Nutrition and Weight Management, I Edition, Friends Publication.

REFERENCE:

1. Werner W. K Hoejer (2022), Life time Physical Fitness and Wellness, XVI Edition, Morton Publishing Company, Colorado.

2. Mishra, S. C (2005) Physiology in Sports. Sports Publication, New Delhi

3. Swaminathan T, (2008) Essentials of Food and Nutrition Bangalore Printing Publishing Co.

WEB REFERENCE:

1.https://www.nin.res.in

2.https://www.intechopen.com

Course Mapping – PO and CO

Mapping	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	3	2	2	2	2	3	3
CO 2	2	3	3	2	3	3	2	2	3	2
CO 3	3	3	3	2	3	2	3	2	3	2
CO 4	2	3	3	2	2	2	2	3	3	3
CO 5	2	3	3	3	3	3	2	3	3	2

FOOD ADULTERATION

23U5NDDE07 SEMESTER V

No. of Credits: 3 Hours of Instruction / Week: 3

OBJECTIVES:

To enable the students to,

- To know about the concept of food adulteration
- To be able to conduct basic tests to detect food adulterants in common foods
- To understand basic laws regarding food adulteration and common protection

COURSE OUTCOMES:

CO1	To get basic knowledge on various foods and about adulteration	**K2**
CO2	To understand the methods of adulteration, Adulteration of common foods and their health effects	**K3**
CO3	To comprehend the skills of detecting adulteration of common foods	**K4**
CO4	To know basic laws regarding food adulteration and consumer protection	**K3**
CO5	Familiarize with the consumer protection against adulteration	**K3**

Unit	Content	Hours
I	Adulteration – Definition, Types, Poisonous substances, foreign matter, Cheap substitutes, Spoiled parts, Adulteration – Intentional, Incidental, General impact on human health	09
II	Nature of Adulterants, Methods of evaluation of food adulteration and toxic constituents in foods, Common food Adulterants & their detection on various foods like Milk, Oils & fats, Spices, Wheat and flours, Sugars, Fruit & Vegetables, Beverages Practical Experience: Collection of information on adulteration of some common foods from local market Demonstration of Adulteration detection methods for a common food	09

III	Food Additives – Definition. Classification, Antioxidants, Preservatives, Nutrient supplements, emulsifiers, thickening agents, sweeteners, colouring and flavouring agents, Permissible limits, Adverse effects of food additives.	09
IV	Food laws and regulation – Prevention of Food Adulteration act, Food safety and standards act, Food safety and Standards authority of India (FSSAI), BIS, FPO, APEDA, AGMARK, ISI.	09
V	Consumer education, Consumer's problems rights and responsibilities, Quality control laboratories, Private testing laboratories, COPRA 2019 – Offenses and penalties – Procedures to complain – Compensation to Victims.	09
	Total Lecture Hours	**45**

Textbooks:

1. Warner. J.M 1976, Principles of Dairy Processing, Wiley Eastern Ltd, New Delhi
2. Srilakshmi, Food Science, New Age International Pvt. Ltd, New Delhi, 1997
3. Manay, Food, facts and principles, New Age International Pvt .Ltd, New Delhi 2000

Reference Books:

1. Frazier, Food Microbiology, McGraw Hill, New York, 2008
2. Egan, Kiv, Sawyer, Pearson's Chemical Anlaysis of Foods, Addison Wesley England, 2001
3. Jacob, Chemical methods in food analysis, CBS Publications and Distributors, Delhi, 2009

WEB REFERENCES:

1. http://www.fssai.gov.in/
2. http://indianlegalsolution.com/laws-on-food-adulteration/
3. http://fssai.gov.in/dart/

Course Mapping – PO and CO

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

FOOD PRODUCT DEVELOPMENT AND MARKETING

23U5NDDE08 SEMESTER V

No. of Credits: 3 Hours of Instruction / Week: 3

OBJECTIVES:

To enable the students to,

- Understand and know various aspects of food product development including Food Science and Technology
- Develop new marketable, nutritionally and economically viable food products
- Develop entrepreneurship skills for setting up small scale food industries

COURSE OUTCOMES:

CO1	The students could gain knowledge in Phases of Food product development.	**K2**
CO2	The students could understand the concept of Idea generation.	**K2**
CO3	The students could gain knowledge On New product screening techniques.	**K3**
CO4	The students could understand the development process.	**K2**
CO5	The students could analyze the market trends and sustainability of the developed product.	**K4**

Unit	Content	Hours
I	**Food Product Development:** Introduction, New Product Development, Stages in Product Development, Steps in Consumer Oriented Approach and Stages in Food Product Formulation, Development of Idea in Product Development, New Product Launch.	09
II	**Determinants of Food Choices:** Trends in Social Change, Factors Affecting Food Choices – Physiological, Biological, Psychological, Economic and Social. **Food Consumption Trends:** Introduction, Needs of Food Consumption Trends, Types – Demographic, Food groups, Sociological Dimensions, Anthropological Dimensions, Psychological Dimensions, Economic Dimensions, Food Consumption Trends in India and Global	09

III	**Traditional Foods:** Introduction, Typical Cuisines of India, Shifting Trends in Traditional Food Consumption in India. Nutrition Traditional Model and its Causes **Convenience Foods:** Introduction, Classification, Advantage and Disadvantage, Environment and Concerns. **Quick Cooking Products:** Introduction, Types – Instant Oats, Instant Breakfast, Instant Rice, Instant Noodles, Instant Soup, Instant Mashed Potatoes - Advantages and Disadvantages	09
IV	**Standardization of Recipes:** Definition, Benefits, Merits and Demerits of Standardization of Recipes. Standard Elements in Standard Recipe, Recommended Standard Recipe Element to Add. Phases of Recipe Standardization - Recipe Verification, Product Evaluation and Quantity Adjustment. Steps in Recipe Standardization	09
V	**Marketing:** Definition, Objectives, Importance, Features, Role of Marketing in Economic Development and Business **Consumer Behaviour:** Meaning, Major Factors Influencing Consumer Behaviour, Buying Motives – Meaning and Importance, Types Of Buying Behaviour, Consumer Satisfaction – Reasons for the Purchase, Distinct Motives for the Purchase – Economical and Rational	09
	Total Lecture Hours	**45**

Textbooks

1. Sudhir Gupta (2007) Handbook of Packaging Technology, Engineers India Research Institute, New Delhi
2. Khanaka, S.S., Entrepreneurial Development, S. Chand and Company Ltd, New Delhi, 2006.
3. Avantina Sharma., (2005)., "New food Product Development", CBS publisher and Distribution Press, Florida.
4. Kathiresan, Marketing, Revised Edition (2016).

Reference Books:

1. Suja, R. Nair (2004) Consumer Behaviour and Marketing Research, 1st Edition, Himalaya Publishers.
2. Hmacfie, (2007) Consumer led Food Product Development, Weedhead Publishing Ltd., UK
3. Fuller, Gordon, W (2005) New Food Product Development, 2nd Edition, CRC Press, Boca Raton, Florida,

4. Schaffner D, J, Schroder, W.R.(2000) Food Marketing and International Perspectives, Web/McGraw Hill Publication

Course Mapping – PO and CO

Mapping	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	3	2	3	2	3	3	2
CO 2	3	2	2	3	2	3	3	2	3	3
CO 3	3	3	3	3	3	2	3	2	3	2
CO 4	3	3	3	3	3	2	2	3	3	2
CO 5	3	2	3	3	3	3	2	3	3	3

FOOD PRESERVATION PRACTICAL

23U5NDCP05 SEMESTER V

No. of Credits: 2 Hours of Instruction / Week: 3

OBJECTIVES:

To enable the students to

- Prepare a pickle, jam jelly using fruits and vegetables.
- Apply skills learnt to develop preserved food products.

COURSE OUTCOMES:

CO1	Apply the various techniques of food preservation to preserve different foods.	**K3**
CO2	Analyze on various techniques used to increase the shelf life of food	**K4**
CO3	To make it attractive for the consumers.	**K3**
CO4	Analyze on fermentation processes used in food preparation	**K4**
CO5	Evaluate the prepared products by using sensory analysis	**K5**

S.No	Contents	Hours
1.	Prepare Jam and jelly using fruits	9
2.	Prepare different types of sauces – red sauce, white sauce, tomato ketchup	3
3.	Prepare foods based on drying and dehydration	3
4.	Prepare pickles using fruits and vegetables	3
5.	Prepare a squash using fruits.	3
6.	Prepare a marmalade using fruits	3
7.	Prepare a fermented food product	3
8.	Sensory analysis of preserved foods	3
9.	Visit a food processing industry	
	TOTAL PRACTICAL HOURS	**30**

Text book References:

1. Rahman M S (2020) Handbook of Food Preservation CRC Press, USA
2. Sivasankar, B. (2013) Food Processing and preservation 2 nd edition, prentice Hall, Pvt, Ltd.
3. Swaminathan, M. (2014) Food Science, Chemistry and Experimental Foods, Bappco Publishers, Bangalore.

References:

1. Chandrasekhar, U (2012) Food Science and Applications in Indian Cookery, Phoenix Publishing House Private Ltd., New Delhi
2. Fellow, P., (2010) Food Processing Technology – Principles and Practices, 3rd Edition, CRC Press Woodland Publishers, England.
3. Sommers, C.H. and Xveteng Fan (2016) Food Irradiation Research and Technology, Blackwell Publishing.

Web References:

1. https://edblog.hkedcity.netpdf- food preservation and method
2. https://www.eufic.org/en/whats- in- food/article
3. https://youtu.be/-F311eYU5QI

Course Mapping – PO and CO

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

COMMUNITY NUTRITION AND NUTRITION EDUCATION PRACTICAL

23U5NDCP06 SEMESTER V

No. of Credits: 2 Hours of Instruction / Week: 3

OBJECTIVES:

To enable the students to

- Gain knowledge on different methods in Nutritional Assessment.
- Apply skills learnt to take a survey in community.

COURSE OUTCOMES:

CO1	Apply the various techniques of Nutritional Assessment.	**K3**
CO2	Apply the various techniques used in anthropometry	**K3**
CO3	To develop a skill to take survey in the community	**K3**
CO4	Compare the different types of Nutrition Education aids used in educating or creating the awareness to the community.	**K4**
CO5	Justify the use of various Nutrition Education aids	**K5**

S.No	Contents	Hours
1.	Planning a low-cost nutritious recipe for infants.	3
2.	Planning a low-cost nutritious recipe for Pregnant Women	3
3.	Planning a low-cost nutritious recipe for Lactating Women	3
4.	Assessment of nutritional status by Anthropometric methods.	3
5.	Identification of clinical signs of common nutritional disorders.	3
6.	Dietary Assessment 1. 24 hours recall 2. Food Frequency Questionnaire 3. Diet Diversity Score	12
7.	Prepare a different nutrition educating aids for Community Nutrition – Pamphlets, video, drama, etc.,	3
8	Visit to community health centres	3
	TOTAL PRACTICAL HOURS	**30**

Text Book References:

1. Jellife DB, Jellife ERP, Zerfas A and Neumann CG (1989). Communitynutritional assessment with special reference to less technically developed countries. Oxford University Press. Oxford.
2. Park K (2011). Park's Textbook of Preventive and Social Medicine, 21st Edition. M/s Banarasidas Bhanot Publishers, Jabalpur, India.
3. Wadhwa A and Sharma S (2003). Nutrition in the Community-Atextbook. ElitePublishing House Pvt. Ltd. New Delhi.

References Books:

1. Brahman, G.N.V., Lakshmaiah, A., Rao, M. and Reddy, G.(2005) Methodology on Assessment of Diet and nutritional Status of Community, National Institute of nutrition, Hyderabad.
2. Reports of National Family Health Survey, International Institute for Population
3. Science, Mumbai.
4. WHO (2006). Child Growth Standards: Methods and development: height-for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age (http://www.who.int/childgrowth/standards/en/).

Web References:

1. https://books.google.co.in/books?id=o5CxDAAAQBAJ&printsec=frontcover #v=onep age&q&f=false
2. https://nces.ed.gov/pubs/96852.pdf-
3. http://www.fao.org/docrep/017/i3235e/i3235e.pdf
4. http://www.fns.usda.gov/sites/default/files/NutritionEdRTC.pdf
5. content/uploads/2010/10/providing_nutrition_education_aftersc hool.pdf

Course Mapping – PO and CO

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

INTERNSHIP

23U5NDIN01 SEMESTER V

No. of Credits: 1

OBJECTIVES:

To enable the students to

- Learn about the various disease conditions and diet prescribed by the Doctors and Dieticians to individuals.

COURSE OUTCOMES:

CO1	Learns the functions of the Dietary Department / Health care facility/ Fitness Centre	**K2**
CO2	Gets acquainted with the role and responsibilities of a Dietitian/ Nutritionistin the respective facility	**K2**
CO3	Apply skills in nutrition screening and assessment of patient/ client	**K3**
CO4	Acquires training in nutritional diagnoses of each patient/client	**K4**
CO5	Demonstrates the ability to implement nutrition care plans; document nutrition care provided, maintain internship logbook and monitor outcomes of the nutritionplan	**K5**

Internship:

- One month Dietetics Internship.
- Internship can be done in any Multi Speciality Hospitals located all over India.
- At least 10 case studies per student must be allocated to the students during the Internship period.
- A Internship report about the hospital, Dietary kitchen layout, procedures followed in dietary area and case studies taken and suggested menu plan with nutritive value calculation must be submitted at the end of the Internship.

Course Mapping – PO and CO

Mapping	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	3	3	3	2	2	2	2
CO 2	2	2	2	3	3	3	3	3	2	2
CO 3	2	2	3	3	3	2	2	2	2	2
CO 4	2	2	2	3	3	2	2	2	3	2
CO 5	2	2	2	3	2	3	2	2	2	3

SEMESTER – VI

DIETETICS - II

23U6NDC11 SEMESTER VI

No. of Credits: 4 Hours of Instruction / Week: 6

OBJECTIVES:

To enable the students to,

- Describe the roles and responsibilities of a dietitian in a hospital.
- Plan and prepare therapeutic diets for patients.
- Organize diet counselling for patients and families.

COURSE OUTCOMES:

CO1	Comprehend the feeding techniques and familiarize the routine hospital diets.	**K1**
CO2	Learn the causes, symptoms, and treatment of various disease conditions.	**K2**
CO3	Gain knowledge about the role of nutrition in disease condition	**K3**
CO4	Develop appropriate dietary modifications for various disease conditions based on the pathophysiology	**K3**
CO5	Develop skills and techniques in the planning and preparation of therapeutic diets	**K3**

Unit	Content	Hours
I	**Cardio Vascular Diseases -** Causes, Risk Factor, Dietary management of Atherosclerosis, Hypercholesterolemia, Hypertension, Role of Fat in development of Atherosclerosis, DASH Diet.	18
II	**Liver Diseases -** Causes, Types, Symptoms, Dietary Management of Liver Diseases – Hepatitis, Cirrhosis, Gall Bladder Diseases – Cholecystitis and Cholethiasis, Pancreatic Diseases – Acute and Chronic Pancreatitis	18
III	**Kidney Disorders -** Causes, Types, Symptoms, Risk factor, Dietary management of Nephritis, Nephrosis, Urinary Calculi, Renal Failure, Dialysis	18
IV	**Cancer -** Causes, Symptoms, Classification, Mechanism of Cancer Formation, Dietary management in Cancer, Role of Food in Prevention of Cancer	18
V	**Inborn Errors of Metabolism -** Nutritional Care for patients with inborn errors of Metabolism – Prognosis, Symptoms, Dietary Management	18
	Total Lecture Hours	**90**

Text Books:

1. Srilakshmi. B., (2019)., "Dietetics",. Eight Edition.,New Age International (P) Ltd., Chennai.
2. Williams. S.R. (2001) Basic Nutrition&Diet Therapy, 11th Edition., Mosby. Inc., St.Louis.
3. Brown. J.E. (2002) Nutrition Now, 3"& Edition. Wordsworth Thomson Learning. Inc. Canada.

Reference Book:

1. Garg. M., (2006), Diet Nutrition and Health, ABD Publishers.
2. Krause. M.V and Mahan. L.K., (2019), "Food Nutrition and Diet Therapy", 9th Edition, W.B. Sauders Company, Philadelphia.
3. Brown. J., (2014), "Nutrition now", 7th Edition, Wadsworth, USA.

Web Reference:

1. https://www.dietitianreference.com
2. https://eatright.org

Course Mapping – PO and CO

Mapping	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	3	2	2	2	2
CO 2	3	3	3	2	2	2	2	2	3	2
CO 3	3	3	3	2	2	2	3	2	3	3
CO 4	3	3	3	3	3	2	2	2	3	3
CO 5	3	3	3	3	3	3	2	3	3	3

FOOD SAFETY AND QUALITY CONTROL

23U6NDC12 SEMESTER VI

No. of Credits: 4 Hours of Instruction / Week: 6

OBJECTIVES:

To enable the students to,

- understand the principles and application of food quality.
- communicate about the safe and quality food production
- know about the sensory evaluation.

COURSE OUTCOMES:

CO1	To gain knowledge about physio-chemical changes in foods.	**K1**
CO2	To gain knowledge on sources, uses, properties and changes in starches sugars, proteins and browning reactions.	**K1**
CO3	To gain knowledge about protein in foods and sensory evaluation	**K2**
CO4	To know about the quality evaluation of foods	**K4**
CO5	To gain knowledge about common food adulterants and toxins and enzymes.	**K4**

Unit	Content	Hours
I	**Principles of Quality Control** Food Quality – Introduction, Meaning, Importance, Quality parameters, Indicators of quality in different foods. Quality Control – Meaning, Objectives, Importance, Stages of quality control in food industry Food Specification –Meaning, Objectives, Importance, Types	18
II	**Quality control Measure** a) Food specifications for various food products – Cereals, Pulses, Milk and milk products, Fruit and Vegetables, Fats and oils, Spices and condiments, Fleshy foods b) Food Additives & their specifications: -Classification of food additives, usages and optimal level recommended for usage as specification –Food colors, leavening agents, preservatives.	18
III	**Quality evaluation of food**	18

	a) Subjective Evaluation: Sensory characters of food, Organs involved in assessment, Types of sensory tests, Requirements to conduct sensory evaluation, Defects in sensory evaluation-panel member, essential qualities of a panel member, procedure of sensory evaluation. b) Objective Evaluation: Advantages, Types – Chemical methods, Physio-chemical methods, microscopic methods and Physical methods. Texture analysis	
IV	**Food contaminants and Adulterants** a. Food Toxins –Mycotoxins –aflatoxins, aspergillus and penicillium species. Mushroom poisoning, Sea food toxins. b. Food Hazards—Physical, chemical, biological hazards c. Food adulteration and Food standards; Adulteration –Definition, Common food adulterants; Tests for detecting food adulterants, Contamination with toxic metals, pesticides and insecticides; Effects of food adulteration, Measures to control food adulteration - Prevention of Food Adulteration Act 1954	18
V	a. International Agencies: Codex Alimentarius Commission, FAO, WHO, FDA b. National- FSSAI, AGMARK, BIS- Role and Functions c. Consumer- Definitions, Consumer Rights, Consumer Protection Act, Machinery for Redressal of Consumer grievances. d. Intellectual Property Rights- Definition, Importance, Patent law in India. e. Food Safety Assurance- GAP, GHP, ISO 22000 and ISO 9001.	18
	Total Lecture Hours	**90**

Text book

1. Swaminathan. M.,(2000).,Hand book of food science and experimental foods, Bangalore.
2. Swaminathan. M.,(2010)., Essentials of food and Nutrition.,Volume II., Bangalore.
3. Srilakshmi.B.,(2010)., Food science, New Age International publishers, New Delhi.

Reference book

1. Potter.N and Hotchkiss J.H.,(2000)., Food Science., 6th Edition., CBS Publication and Distribution, New delhi.
2. Eillian H.Mayer.,(2011)., Food chemistry., Affiliated East West Press pvt, Ltd, New Delhi.
3. Prabodh Halde and Sanjeev kumar.,(2013).,Objective food science and standards., Jain brother.

Course Mapping – PO and CO

Mapping	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	3	2	2	3	3	2	2
CO 2	3	3	2	3	2	3	3	2	3	2
CO 3	3	3	3	3	3	2	2	3	2	3
CO 4	3	3	3	3	3	2	2	2	3	3
CO 5	3	3	3	2	3	3	3	2	2	3

FOOD EVALUATION

23U6NDDE09 SEMESTER VI

No. of Credits: 3 Hours of Instruction / Week: 4

OBJECTIVES:

To enable the students to,

- Understand the concepts of Food Evaluation
- Evaluate the products by appearances example evaluation of package products
- Carry out sensory evaluation by various tests

COURSE OUTCOMES:

CO1	To understand different aspects of sensory science and its application	**K1**
CO2	To assess the quality of food based on taste, colour, flavor, texture	**K1**
CO3	To know the methods involved in setting up testing lab and selection panellists.	**K4**
CO4	To conduct different types of sensory test	**K4**
CO5	To know the scientific method used to evoke, measure, analyze and interpret those responses to products	**K5**

Unit	Content	Hours
I	Definitions of sensory evaluation, Importance of sensory evaluation, Factors affecting food acceptance, Terminology related to Sensory Evaluation, sensory evaluation in food product development, sensory evaluation in quality control	12
II	Basic principles: Senses and sensory perception, Physiology of sensory organs, Classification of tastes and Odors, threshold value, factors affecting senses, visual, auditory, tactile, and other responses. E-Nose, E - Tongue	12
III	Testing area, testing setup, Lighting, testing schedule, Preparation of samples, Order of Presentation, Selection & Training of panellists, Types of Panels – consumer & trained panels, Factors influencing sensory measurements	12
IV	Discrimination Tests, Procedure: Types of tests – difference tests\ (Paired comparison, due-trio, triangle) ranking, scoring, Hedonic scale and descriptive tests, Farinograph, Colour analysis – Hunters method	12

V	Types or questionnaires, development of questionnaires, comparison of laboratory testing and Consumers studies, limitations, Data analysis – Concept of mean, mode, median & Standard Deviation.	12
	Total Lecture Hours	**60**

TEXTBOOKS:

1. Brich G; Brennan J., & Parker K.J.(1977) " Sensory Properties of Foods " applied Science publisher
2. Charley H., 'Food Science'; Mcmillan Publishing Company.
3. Lawlers H.T., & Heymann . 'Evalution of food principle & Practice'. Chapman & Hall.
4. Mahony M., Sensory Evaluation of food, Statistical methods & procedure.
5. Srilakhshmi B.,(2000) 'Food Science' New Age International (p) Ltd. Publishers.

REFERENCE BOOKS:

1. Amerine, M.A., Pangborn, R.M. and Rossles, E.B. 1965. Principles of Sensory Evaluation of Food. Academic Press, London.
2. Jellinek, G. 1985. Sensory Evaluation of Food - Theory and Practice. Ellis Horwood.
3. Lawless, H.T. and Klein, B.P. 1991. Sensory Science Theory and Applicatons in Foods. Marcel Dekker.
4. Piggot, J.R. 1984. Sensory Evaluation of Foods. Elbview Applied Science Publ.

WEBLINKS:

1. http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=6035
2. http://www.contractlaboratory.com/labclass/industries/consumer_products.cfm

Course Mapping – PO and CO

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

NUTRITION FOR WOMEN

23U6NDDE10 SEMESTER VI

No. of Credits: 3 Hours of Instruction / Week: 4

OBJECTIVES:

To enable the students to,

- Understand the diverse factors that has a bearing on women's health.
- Highlight factors that contribute to a healthy lifestyle among women across the globe.
- **COURSE OUTCOMES:**

CO1	Recall the role of nutrients in women's health	**K1**
CO2	Interpret the nutritional needs during pregnancy and lactation	**K2**
CO3	Discuss the need for right nutrition, exercises and skills needed for the overall well- being of women	**K2**
CO4	Analyze the skills and techniques used for maintain Physical, mental and social health of women	**K4**
CO5	Recommend simple measures for a healthy lifestyle and evaluate the health status	**K5**

Unit	Content	Hours
I	**Nutrition for Girls and women:** Physiological and Psychological changes of adolescent girls. Nutritional needs for adolescents, pregnant lactating and older women with special focus on protein, Iron, Calcium, Vitamin C, Folic Acid. Effects of those nutrient deficiency. Eating disorders in young women. Practical: Case studies on Women in different ages	10
II	**Reproductive Health:** Menstrual cycle – stages, Pre-menstrual Syndrome – signs and symptoms, management. Safe and hygienic practices to be followed, Pre- and Post-Menopausal concerns- preventive measures. Practical: Preparing any one of the visual aids like pamphlet, slides, diagrammatic representation or chart on any one of the above topics to create health awareness among women Case study on PCOS	15

III	**Mental Health** - Common mental health problems - Depression, Anxiety and coping with Stress, Strategies to improve mental health- learning new skills and hobbies. Practical: Practice stress management/mental health promotion techniques. Attempt effective use of social media in communicating health and wellness message.	15
IV	**Social Health** - Balancing home and career, strengthening relationships, enhancing communication skills, and leadership skills. Practical: Practice self-improvement techniques to enhance one's personality health and wellness	10
V	**Physical Health** - Significance of body weight and body composition parameters, Benefits of aerobic, flexibility and strength training. Yoga and Fitness practices for regulating menstrual cycle and for general reproductive health.	10
	Total Lecture Hours	**60**

Text Book Reference:

1. Minkin M. J. and Wright C. V. (2003) The Yale Guide to Women's Reproductive Health from menarche to menopause. Yale University Press, London
2. Krause, Hunseher, M. A, (2020), Food and Nutrition Therapy, 12th edition, Saunders Elsevier company, London, UK.
3. Mahan K and Sylvia E. Stump (2000) Krause's Food Nutrition and Diet Therapy, Saunders, USA.
4. Lanza di Scalea T, Matthews KA, Avis NE, et al. (2012) Role stress, role reward, and mental health in a multiethnic sample of midlife women: results from the Study of Women's Health Across the Nation (SWAN). J Women's Health; 21(5):481-489.

Reference books:

1. Sperry L. (2016) Mental Health and Mental Disorders. ABC-Clio, Californi
2. Williams M.H., Anderson D.E., Rawson E.S. (2013) Nutrition for Health, Fitness and Sport. McGraw Hill, New York.
3. Wrzus C, Hänel M, Wagner J, Neyer FJ. (2013) Social network changes and life events across the life span: a meta-analysis. Psychol Bull;139(1):53-80.

Web resources:

- https://www.nhp.gov.in/social-health_pg
- https://ncert.nic.in/textbook/pdf/jehp112.pdf
- https://ncert.nic.in/textbook/pdf/iehp113.pdf
- https://ncert.nic.in/textbook/pdf/lebo104.pdf
- https://www.nih.gov/health-information/social-wellness-toolkit
- https://www.cdc.gov/reproductivehealth/womensrh/index.htm
- https://www.nimh.nih.gov/health/topics/caring-for-your-mental-health
- https://www.who.int/news-room/fact-sheets/detail/mental-healthstrengthening-
- our- response
- https://www.cdc.gov/mentalhealth/learn/index.htm

Course Mapping – PO and CO

Mapping	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	3	3	2	3
CO 2	3	3	3	2	3	2	2	3	3	3
CO 3	2	3	2	2	2	3	3	3	2	2
CO 4	3	3	3	3	3	2	2	3	3	2
CO 5	2	3	3	3	3	3	2	3	2	3

FOOD PACKAGING AND LABELLING

23U6NDDE11 SEMESTER - VI

No. of Credits: 3 Hours of Instruction / Week:4

OBJECTIVES:

To enable the students to,

- Understand the Basic Concepts of Food Packaging
- Understand the Various Properties of Food Packaging materials
- To Impart knowledge and Skills related to designing packaging system in Food Products

COURSE OUTCOMES:

CO1	The students will be able to acquaint with various Food packaging materials	**K1**
CO2	The students learn Standards of Food Packaging materials	**K2**
CO3	The students Understand process involved in food Packaging methods	**K3**
CO4	The students could gain knowledge on testing on Food Packaging	**K4**
CO5	The students could understand the packaging of different Food Products	**K5**

UNIT	CONTENT	HOURS
I	**Food Packaging** – Definition, Functions, Requirements, Characteristics, Levels of Packaging Materials – Primary, Secondary and Tertiary Packaging. **Food Packaging Materials and their Properties:** Glass, Paper and paper board, Corrugated fibre board (CFB), Metal containers: Tin Plate and Aluminium, Collapsible tubes, Metalized films, Co extruded films – Advantage and Disadvantage.	12
II	**Methods of packaging** - Vacuum packaging, controlled atmospheric packaging, Modified atmospheric packaging, Aseptic packaging, Biodegradable packaging, Active and Intelligent packaging. Recent Development in Packaging.	12

III	**Packaging of Specific Foods:** Cereals and Pulses, Fruits & Vegetables, Fleshy Foods, Poultry, Egg, Fish, Packaging of dairy products, Dehydrated and frozen Foods	12
IV	**Standards & Testing of Food Packaging:** Laws and Regulation. Testing of Food Packaging Materials, Testing of Package Performance. Possible Interaction of Between Food, Package and Environment. Total Package Performance Testing, Package Testing Programme.	12
V	**Food Labelling:** Definition, Standards and Purpose, Importance Food Labelling, Types of Labels, Content of Labelling, Health Claims. **Nutritional Labelling:** Meaning, Principles and Codex Guidelines of Nutritional Labelling, Labelling Provision in Existing Food Laws.	12
	Total Lecture Hours	**60**

Text Book

1. Robertson GL (2013). Food Packaging: Principles and Practice, 3rd Edition, CRC press, US
2. Richard Coles, Mark J. Kirwan (2011), Food and Beverages Packaging Technology, (2nd Edition), Wiley-Blackwell
3. Gordon L. Robertson (2012), Food Packaging: Principles and Practice (3rd Edition)

Reference:

1. Modern packaging industries, Hand book, 2004, NIIR Board, New Delhi.
2. Food packaging technology, Hand book, 2004, NIIR Board, New Delhi.
3. Sacharow, S. Hand book of packaging materials, A VI Publishing company, West Port.
4. Gosby, N.T.2001. Food packaging materials, Applied Science Publication
5. Francis Pub
6. Sacharow S (1976) Handbook of packaging materials. Avi Pub Co. Westport.
7. Crosby NT (1981) Food packaging materials. Applied Science pub Ltd. London.
8. Paine FA (1977) The packaging media. Blackie & Sons Ltd. London.
9. NIIR (2012) Food packaging technology Handbook, Delhi.

Course Mapping – PO and CO

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

NUTRITIONAL SCREENING AND DIET COUNSELLING

23U6NDDE12 SEMESTER - VI

No. of Credits: 3 Hours of Instruction / Week: 4

OBJECTIVES:

To enable the students to,

- Understand the various assessment tools.
- Learn the basics in diet counselling.
- Understand hospital and community level counselling.

- **COURSE OUTCOMES:**

CO1	Demonstrate familiarity in the use of various nutrition screening and assessment tools.	**K2**
CO2	Apply skills in preparation of nutrition education materials.	**K3**
CO3	Expertise in nutritional counselling of patients.	**K4**
CO4	Analyse practical considerations while prescribing dietary advice and counselling.	**K4**
CO5	Develop into a health care professional.	**K5**

Unit	Content	Hours
I	**Nutrition Care Process:** Definition of Nutrition care Process, steps of Nutrition care Process. How to write a problem, aetiology, signs and symptoms (PESS) statement. Practical: Case study based on PESS statement writing. Nutrition intervention – definition and objectives.	10
II	**Introduction to Nutrition screening and Assessment tools:** Nutrition screening and assessment – Definition and its role in diagnosing various deficiencies and disease conditions. Introduction to screening tools – Malnutrition Universal Screening Tool (MUST), Nutrition Risk Screening (NRS – 2002), Mini Nutritional Assessment (MNA), Subjective Global Assessment (SGA), Global leadership Initiative for Malnutrition.	15

III	**Dietician** – Classification, code of ethics, roles and responsibilities. Indian Dietetic Association. Teaching aids used by dieticians – charts, leaflets, posters, etc., Practical – Prepare teaching material for patients (at least 3 teaching aids for any 6 disease conditions to be prepared by each student)	10
IV	**Nutrition Counselling** – Definition, expectations, goal, scope and limits. Skills and attributes of nutrition education counsellor. Communication process in counselling. Communication objectives. Practical - Practice diet counselling techniques using different teaching aids prepared, among students.	10
V	Consideration of behaviour modification; Motivation. Counselling and educating the patient. Counselling skills for behaviour change, developing behaviour changes through models. Choosing focus area, counselling approaches after the assessment, resistance behaviour and strategies to modify them, ready to change counselling sessions and evaluation of effectiveness.	15
	Total Lecture Hours	**60**

Text book Reference:

1. Mahan, L.K., Raymond, J. L., (2017), Krause's Food and the Nutrition care process, 14th Edition, Elsevier Publication
2. Sumati R. Mudambi, M.V. Rajagopal., (2015), Fundamental of food, nutrition and diet therapy. New age international publishers, New Delhi.
3. Antia F.P. (2008), Clinical dietetics and nutrition., Oxford University Press, New Delhi.
4. Gandy, J., (2014), Manual of dietetics practice, 5th edition, John Wiley & Sons, Ltd.
5. Snetselaar, Linda G., (2009), Nutrition counselling for the nutrition care process, 4th edition, Jones and Barlette Publishers.

Reference Books:

1. Prochaska, K.L., The Transtheoretical Model of Behavioural Change, Shumaker SA(Eds).
2. Kathleen Bauer, Doreen Liou, (2020), Nutrition Counselling and Education Skill Development, 4th Edition,Brooks/Cole Publishers.
3. Designing health messages: Approaches from Communication Theory and Public Health Practice. Editors: Edward Maibach and Roxanne Louiselle Parrott © 1995 by Sage Publications, Inc.

Journals

1. Nutrition Update Series
2. World Review of Nutrition and Dietetics
3. Journal of the American Dietetic Association
4. American Journal of Clinical Nutrition
5. European Journal of Clinical Nutrition
6. Nutrition Review

Web references:

1. https://www.bcmj.org/cohp/practical-tips-nutritional-counseling
2. http://idaindia.com/
3. https://www.internationaldietetics.org/NDAs/India.aspx
4. http://www.nutritionsocietyindia.org/
5. http://count-what-you-eat.ninindia.org
6. https://vikaspedia.in/health/nutrition

Course Mapping – PO and CO

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

DIETETICS PRACTICAL

23U6NDCP07 SEMESTER VI

No. of Credits: 2 Hours of Instruction / Week: 3

OBJECTIVES:

To enable the students to

- To plan and prepare a diet for different diseases.
- To calculate nutritive value and compare with RDA.

COURSE OUTCOMES:

CO1	Develops the ability to plan a diet for disease condition.	**K3**
CO2	Appraise the diet principles in the management of disease condition.	**K5**
CO3	Apply the skills in imparting diet counselling for the treatment of the disease conditions.	**K3**
CO4	Focusing on the knowledge about the food to be included and avoided according to the deficiency diseases.	**K4**
CO5	Interpret the modification of diet for various disease conditions.	**K2**

S.No	Contents	Hours
1.	Planning and Preparation of Therapeutic diets — soft diet, clear and full liquid diet.	3
2.	Planning and Preparation of diet for fevers of short (Typhoid) and long duration (Tuberculosis)	3
3.	Planning and Preparation of diet for Gastro intestinal diseases – Diarrhoea, dysentery and constipation, Peptic ulcer, Ulcerative colitis, Crohn's diseases, irritable bowel syndrome.	6
4.	Planning and Preparation of diet for Obesity, Underweight and Diabetes Mellitus	3
5.	Planning and Preparation of diet for Allergies - Lactose intolerance, Celiac disease, Gluten intolerance.	3
6.	Planning and Preparation of diet for heart diseases – Atherosclerosis, Hypertension, Hypercholesterolemia	3

7	Planning and Preparation of diet for liver diseases – Hepatitis, Cirrhosis, Pancreatitis	3
8	Planning and Preparation of diet for kidney diseases – Nephritis, Nephrosis, Urinary Calculi	3
9	Planning and Preparation of diet for Cancer and Inborn Errors	3
10.	Visit to a hospital	-
	TOTAL PRACTICAL HOURS	**30**

Text Book References:

1. Srilakshmi.B, Dietetics, New Age International (P) Ltd. Publishers, Chennai, 9th edition, 2023.
2. Krause and Mahan's, Food & Nutrition Care Process, W.B Saunder, 16th edition, 2022.
3. Shubhangini A. Joshi, Nutrition and Dietetics, Tata Mc.Graw Hill Publication, 4th edition, 2017.

References:

1. Dieatary Guidelines for Indians, (2024) ICMR, National Institute of Nutrition, Hyderabad.
2. Vimala V., (2010), "Advance in Diet therapy- Practical Manual., New Age International Publisher.
3. Indian Food Composition Table, National Institute of Nutrition, ICMR, Hyderabad. 2020.

Web References:

1. www.idaindia.com
2. https://www.kidney.org/sites/default/files/11-50-0114_docsnutrikidfail_stage1-4.pdf
3. https://www.rdehospital.nhs.uk/docs/trust/foi/foi_responses/2015/december/Enteral_f eed ing_guideline~version_Jan_201411.pdf
4. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5038894/

Course Mapping – PO and CO

Mapping	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	3	2	2	3	2	2
CO 2	3	3	3	3	3	3	3	3	2	3
CO 3	2	3	3	3	3	3	2	3	2	2
CO 4	3	3	3	3	3	2	3	3	2	2
CO 5	2	3	3	3	3	3	3	3	2	3

PROJECT

23U6NDPR01 SEMESTER VI

No. of Credits: 3 Hours of Instruction / Week: 5

OBJECTIVES:

To enable the students to

- Get deeper insights into current research and work.
- Draw ancillary knowledge of methods in the major field of study.

COURSE OUTCOMES:

CO1	Gain insight on community and experimental nutrition research	**K2**
CO2	Develop a research design on a topic relevant to their field	**K1, K2, K3, K4, K5, K6**
CO3	Prepare a systematic literature review on the topic selected	**K2, K3, K4, K5**
CO4	Select and execute the most appropriate methodology for the study and provide justification for the choice made.	**K2, K3, K4, K5, K6**
CO5	Acquire skill in collecting, analysing, presenting and interpreting the data accurately.	**K3, K4, K5, K6**

Course Outline:

The structure of the dissertation / Project Thesis includes

Chapter 1: Introduction

Chapter 2: Review of Literature

Chapter 3: Methodology

Chapter 4: Results and Discussion

Chapter 5: Summary and Conclusion

Chapter 6: Bibliography

Course Mapping – PO and CO

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

END