

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 of practical 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 that would make impact in the diverse fields of human endeavor considering the ubiquitous nature of food and the wide – ranging applications of the knowledge of Nutrition and Dietetics.
- ❖ To provide focus for a career in various fields of applied science including medicine, pharmacy, bio-mining, biotechnology, industrial production, environmental manage teaching, industrial production, medical, hospital and environmental management, agriculture.

4. ELIGIBILITY FOR ADMISSION

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

- a) Higher secondary examination with biology as major subjects conducted by the Government of Tamil Nadu (or)
- b) These regulations shall take effect from the academic year 2017-2018 i.e. for the students who are to be admitted to the first year of the course during the academic year 2017-2018 and thereafter
- c) Any examination with biology as major subjects of any other University or Board accepted as equivalent there to by Periyar University.
- d) Academic and vocational stream candidates are 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 period from 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 practical at the end of even semester.

6. CONTINUOUS INTERNAL ASSESSMENT

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

Theory

1. Average of two tests	-	15 Marks
2. Assignment	-	5 Marks
3. Attendance	-	5 Marks
Total		25 Marks

Practical

1. Practical best average of two tests	-	30 Marks
2. Attendance	-	5 Marks
3. Observation note	-	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

There shall be no passing minimum for internal

EXTERNAL

In the end semester examinations, the passing minimum shall be 40 % out of 75 Marks (30 Marks)

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 based elective 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 passed the examinations prescribed and fulfilled such conditions has have been prescribed therefore.

10. PATTERN OF QUESTION PAPER

PART- A (Objective) Answer all Questions 20 x 1 = 20 Marks

PART- B (500 words) Answer all 5 Questions (either or type) 5 x 5 = 25 Marks

PART - C (1000 words) Answer any 3 Questions (three out of five) 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 in the concerned subject in subsequent semesters and shall pass the examination.

12. COMMENCEMENT OF THESE REGULATIONS

These regulations shall take effect from the academic year 2017 - 2018 i.e. for the students who are to be admitted to the first year of the course during the academic year 2017 -2018 and thereafter.

13. TRANSITORY PROVISION

Candidates who were admitted to the UG course of Nutrition and Dietetics before 2020 – 2021 shall 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 2021. Thereafter, they will be permitted to appear for the examination only under the regulations then in force.

B.Sc., NUTRITION AND DIETETICS

VISION

Empowerment through scientific and value based education for a quality life, Exemplary education for robust living and nurturing research pursuit and social commitment

MISSION

Transforming academic inputs to social benefits, nurturing the students for a holistic development, Extending community outreach for social upliftment, Facilitating academia/clinical/Industrial collaboration.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

1. To furnish the graduates with the ability to prepare to a varying situations by gaining strength to learn and apply the recent skills with competency.
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.
3. To create the graduates to extend the spirit of empathy, humanity and commitment for Nation development.

PROGRAMME SPECIFIC OUTCOME (PSO)

B.Sc., NUTRITION AND DIETETICS

1. This program provides comprehensive knowledge and practical training in the human physiology, food science, basic nutrition, dietetics and basic biochemistry, disease and public health. **K2**
2. Students will acquire and demonstrate competency in laboratory safety and in routine to improve the personal and community health status to aware the disease condition and to gain knowledge about the diet prescribed as per disease condition.
3. Laboratory skills applicable to Nutritional research or clinical methods, including accurately reporting observations and analysis. **K3**
4. 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 **K3**

PROGRAMME OUTCOME (PO)

B.Sc., NUTRITION AND DIETETICS

Pos	OUTCOME	CPD
PO-1	Students shall develop the ability of understanding the basic concepts and inter relating them within diverse life science domains for developing competitive skill metrics (CSM's)	K2
PO-2	Students shall able to comprehend the assorted knowledge of various streams of life science by revealing their views and suggestions with the impartment (or) exchange and explore in precise manner with life science professionals and public	K1
PO-3	Students shall develop the capability of decisive/crucial thoughts by forming experimental ideas and assessing them to meet out specific competences and expectations in different biological sectors	K3
PO-4	Students shall able to explain by effectively observing the condition and challenges existing in different biological systems	K4
PO-5	Students shall perform well consistently by evaluating various challenges, arguments and ending up with right and accurate decision by integrating clinical, immunological, pharmaceutical domains	K5
PO-6	Students shall able to define problems, formulate & test the hypotheses, analyse and interpret the data related to plant, animal, microbial and biochemical systems	K4
PO-7	Students shall map out the tasks of fellow mates, directing them to formulate the vision of life science by improvising their managerial skill set	K5
PO-8	Students shall develop the ability to explain and conclude by critically exploring the views and ideas with qualitative and quantitative biological data for developing logical and convincing arguments	K4
PO-9	Students shall develop an acute perception of a situation and knowledge values of multiple domains of life science with the capability of effective engagement in a multicultural society	K2
PO-10	Students shall able to work effectively and access the utility of ICT with biologically diversified teams with assistance, especially by complying readily and effectively use the relevant information resources for the knowledge	K3
PO-11	Students shall develop the habit of individual working environment and able to promote confidence level for executing, managing and completing a biological assignment with effective and reproducible solutions	K6
PO-12	Students shall able to meet out their own learning needs by appreciating environment and sustainability from a range of current research and development in all aspects of work	K5
PO-13	Students shall develop the habit of avoiding unethical behaviour in terms of misinterpretation of project/research data derived, committing plagiarism, non-	K5

	adherence of Intellectual Property Rights (IPR) that are related to product development and marketing	
PO-14	Students shall apply the knowledge of basic life science and its specific transferable skills for identifying the issues and solving them with well defined solutions	K6
PO-15	Students shall able to acquire knowledge and technical skill set throughout their life by developing execution skills that meet outs the social, economic and cultural objectives which are relevant to life science related job trades	K6

(For the candidates admitted during the academic year 2021– 2022 onwards)

S.No	Subject code	Part	Course	Subjects	Hrs/Week	Credits	Int. Marks	Ext. Marks	Tot. Marks
I	21U1LT01	I	Language – I	Tamil – I	6	3	25	75	100
	21U1LH01			Hindi – I					
	21U1LM01			Malayalam – I					
	21U1LE01B	II	English – I		6	3	25	75	100
	21U1NDC01	III	Core – I	Food Science	5	5	25	75	100
	21U1NDCP01			Major Practical – I	4	3	40	60	100
	21U1NDA01	III	Allied – I	Chemistry	4	4	25	75	100
	21U1NDAP01			Allied Practical – I	3	2	40	60	100
	21U1VE01	IV		Value education – (Yoga)	2	2	25	75	100
				Total	30	22	205	495	700
II	21U2LT02	I	Language – II	Tamil – II	6	3	25	75	100
	21U2LH02			Hindi – II					
	21U2LM02			Malayalam – II					
	21U2LE02B	II	English – II		6	3	25	75	100
	21U2NDC02	III	Core – II	Human Physiology	4	4	25	75	100
	21U2NDCP02			Major Practical – II	3	2	40	60	100
	21U2NDA02	III	Allied – II	Chemistry	4	4	25	75	100
	21U2NDAP02			Allied Practical – II	3	2	40	60	100
	21U2ES01	IV		Environmental studies	4	4	25	75	100
				Total	30	22	205	495	700
III	20U3LT03	I	Language – III	Tamil – III	6	3	25	75	100
	20U3LH03			Hindi – III					
	20U3LM03			Malayalam – III					
	20U3LE03B	II	English – III		6	3	25	75	100
	20U3NDC03	III	Core – III	Nutritional Biochemistry	4	4	25	75	100
	20U3NDCP03			Major Practical – III	3	2	40	60	100
	20U3NDA03	III	Allied – III	Computer Science	4	4	25	75	100
	20U3NDAP03			Allied Practical – III	3	2	40	60	100
	20U3NDN01	IV	NMEC – I	Elected by students	2	2	25	75	100
20U3NDS01	IV	SBEC – I	Food Processing	2	2	25	75	100	
				Total	30	22	230	570	800
IV	20U4LT04	I	Language – IV	Tamil – IV	6	3	25	75	100
	20U4LH04			Hindi – IV					
	20U4LM04			Malayalam – IV					
	20U4LE04B	II	English – IV		6	3	25	75	100
	20U4NDC04	III	Core – IV	Nutrition through life cycle	4	4	25	75	100
	20U4NDCP04			Major Practical – IV	3	2	40	60	100
	20U4NDA04	III	Allied – IV	Food microbiology	4	4	25	75	100
	20U4NDAP04			Allied Practical – IV	3	2	40	60	100
	20U4NDN02	IV	NMEC – II	Elected by Students	2	2	25	75	100
20U4NDS02	IV	SBEC – II	Food Preservation	2	2	25	75	100	
				Total	30	22	230	570	800
Overall Total					120	88	870	2130	3000

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	Analyse	Breaking material into constituent parts, determining how the parts relate to one another and to an overall structure or purpose 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 whole, reorganizing elements into a new pattern or structure through generating, planning or producing

Note: **KL: Knowledge Level; CPD: Cognitive Process Dimension**

**BLOOM'S TAXONOMY BASED INTERNAL ASSESSMENT
PATTERN 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	25	Short notes	
C: 3 out of 5 X 10	K3, K4,	30	Essay type descriptive	

**BLOOM'S TAXONOMY BASED INTERNAL ASSESSMENT
PATTERN 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	

LIST OF NON MAJOR ELECTIVE COURSES (NMEC) OFFERED BY THE BOARD OF NUTRITION AND DIETETICS/ HOME SCIENCE TO OTHER MAJOR STUDENTS

- I. Basic Food Science
- II. Basic Nutrition

SEMESTER -I

SEMESTER – I
21U1NDC01
Credits - 5

CORE - I
Total Number of Hours: 60
5 Hours/ Week

FOOD SCIENCE

OBJECTIVES:

To enable the students to:

- Understand the classification of food
- Gain knowledge on the composition and nutritive value of foods
- Know the basic methods of cooking and changes observed on cooking foods.
- Obtain knowledge about the nutrients present in the foods.

COURSE OUTCOME:

CO1	Understand the food groups and their functions	K2
CO2	Acquire knowledge on different methods of cooking	K2
CO3	Apply process of different foods	K3
CO4	Use combination of foods in the development of food products.	K4
CO5	Identify and control adulterants in various foods and evaluate food quality.	K5

UNIT – I

No. of Hours: 12

Food groups – Basic 5 food groups. The classification and functions of each food groups. Different methods of cooking food and their advantages and disadvantages. Effect of cooking on the different nutrients. Cereals: Structure, composition and nutritive value of rice and wheat. Effect of cooking parboiled, raw and aged rice. Principles of starch cookery - Gelatinization, retrogradation, dextrinisation and factors affecting gelatinization. Sugar and confectionery Types of sugar, caramelization, hydrolysis and crystallization, factors affecting crystallization, crystalline and non crystalline candies.

UNIT II

No. of Hours: 12

Flour - Types, rheological properties, formation of dough & batter, hydration, development of gluten, leavening agents. Preparation of yeast bread - Role of ingredients in baking. Cakes – Types, role of ingredients, types of icing. Pulses & gram - composition, nutritive value, cooking principles, and factors affecting cooking quality of pulses, germination and its effects, Anti-Nutritional factors (list only).

UNIT III

No. of Hours: 12

Milk & milk products - Composition, nutritive value, kinds of milk, changes in milk on heating; Cream, Butter, Yoghurt, Cheeses and Curd-nutritive value and composition only.

Preparation of ice cream. Egg - Nutritive value, structure, composition, egg quality, effect of cooking, uses of egg in cooking, egg foam and factors affecting foam formation.

UNIT IV

No. of Hours: 12

Meat - Structure, composition, classes of meat, cuts of meat, post-mortem changes in meat, cooking of meat, changes on cooking meat, tenderization and factors affecting tenderization of meat. Poultry -- Classification, composition, nutritive value. Methods of cooking poultry and effects. Sea foods - Types of fish, composition, nutritive value, selection of fish, cooking principles of fish and changes on cooking fish. Nuts as food - Types of nuts and their nutritional importance. Fats and oils - their functions in food, smoking point and factors affecting smoking point of oil, factors affecting absorption of oil on cooking.

UNIT V

No. of Hours: 12

Vegetables - Classification, composition, nutritive value, vegetable pigments and changes on cooking, selection of vegetables, cooking principle and methods of cooking vegetables and their advantages and disadvantages. Fruits - Classification, composition, nutritive value, changes during ripening of fruits, selection of fruits. Spices & condiments - Varieties, active components; uses and abuse of spices and condiments.

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](https://guides.librariespsu.edu/food%20science)
2. <https://www.nal.usda.gov/fnic/food-science-and-technology>
3. <https://foodinfo.ifis.org>

SEMESTER – I
21U1NDCP01
Credits - 3

CORE PRACTICAL - I
Total Number of Hours: 35
03 Hours/ Week

FOOD SCIENCE PRACTICAL

OBJECTIVES:

To enable the students

- 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	Acquire skills on different methods of cooking	K3
CO4	Understand experimental cookery	K2 &K4
CO5	Develop recipes by applying knowledge on cooking methods and properties of food	K3

PRACTICALS:

1. Food Groups:

Grouping of foods according to Basic IV

2. Weights and Volumes of raw and cooked foods:

3. Cereal cookery - 1

a. Cooking quality of aged and new rice - raw and parboiled rice,

4. Cereal cookery II

I. Factors affecting preparation of chapattis.

II. Factors affecting preparation of pooris

5. Starch cookery:

- a. Factors affecting gelatinization of starch
- b. Factors affecting preparation of soup

6. Fine and coarse cereal cookery:

- (i) Factors affecting cooking of pulses and legumes
- (ii) Effects of soaking and germination on cooking quality
- (iii) Preparation using the best method

8. Fats and oils:

- (i) Determination of smoking point of fat
- (ii) Factors affecting absorption of fat in the preparation of recipes

9. Vegetable and Fruit cookery:

- i) Effects of acid and alkali on green leafy vegetables
- ii) Browning reaction and prevention of browning in vegetables.
- iii) Preparation of vegetable and fruits sales
- (iv) Preparation of recipes

10. Milk cookery:

- (i) Preparation of recipes

11. Egg cookery:

- (i) Stages of boiling
- (ii) Preparation of recipes

12. Meat cookery:

- (i) Effect of different cooking methods on meat fish and poultry

- (ii) Preparation using the best method for meat and fish

13. Sugar cookery:

- (i) Stages of sugar cookery
- (ii) Preparation of sugar product recipes:

REFERENCES:

1. Basic food preparation - A Complete manual by Department of Foods and Nutrition Lady Invin college, New Delhi, Orient Longman, 1995.
2. The Delights of Vegetarian Cooking, Tarla Dalal, Vakils, Feffer & Simm 1994
3. Encyclopedia of Creative cooking Vols 6,16,17 & 18, Bay Books Sydney

SEMESTER –II

SEMESTER – II
21U2NDC02
Credits - 5

CORE – II
Total Number of Hours: 60
5 Hours/ Week

HUMAN PHYSIOLOGY

OBJECTIVES

To enables the students to:

- Understand the functioning of the various systems of the human body
- Gain knowledge on the parts of the different physiological systems.

COURSE OBJECTIVES:

CO1	Understand and distinguish the functions of organs in the body.	K2
CO2	Comprehension the anatomy of the various organs.	K1
CO3	Illustrate the processes of the respective system	K2
CO4	Get sensitized about reproductive system and functions	K2
CO5	Elaborate the regulation of body fluids and blood parameters.	K4

UNIT I

No. of hours: 12

Cell: Structure and Functions of Epithelial, Connective, Muscle and Bone

Blood: Composition, functions, coagulation, plasma proteins, formation of RBC, blood groups, blood volume and functions of tissue fluid.

Immune System:-Components of immune system

UNIT II

No. of Hours: 12

Heart and Circulation: Structure of heart and blood vessels , cardiac cycle, cardiac output, heart rate, origin and conduction of heart beat. ECG-electro cardio graphic leads.

Respiratory System: Structure of respiratory tract, mechanism of respiration – muscles of respiration, gaseous exchange in lungs and tissues, anoxia.

UNIT III

No. of Hours: 12

Digestive System - Anatomy of the alimentary canal including liver and pancreas, functions of saliva and gastric juices. Movement of alimentary tract – swallowing, peristaltic movement and movements of intestine.

Excretory system _Structure of kidney, nephron; mechanism of formation of urine and Skin.

UNIT IV

No. of Hours: 12

Nervous Systems - Structure of nervous tissue and neuron. Reflex action, reflex arc and synapse definition only. Structure and functions of cerebrum, cerebellum, medulla oblongata and hypothalamus.

Sense Organs -- Structure of eye, ear, tongue and nose. Rhodopsin cycle, Eye refractive errors and accommodation, ear - mechanism of equilibrium, physiology of hearing, smell and taste.

UNIT V

No. of Hours: 12

Endocrine system - Basic anatomy and functions of pituitary, thyroid, parathyroid, adrenals and pancreas.

Reproductive system Anatomy of female and male reproductive organs, development of graffian follicle, corpus luteum, menstrual cycle.

TEXT REFERENCE:

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.

REFERENCES:

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 REFERENCE:

<https://openstax.org>

<https://open.umn.edu>

<https://guides.emich.edu>

SEMESTER – II
21U2NDCP02
Credits - 3

CORE PRACTICAL - II
Total Number of Hours: 35
3 Hours/ Week

HUMAN PHYSIOLOGY PRACTICALS

OBJECTIVES:

To enable the students:

- To identify structure and functioning of the various systems of the human body
- Gain knowledge on the parts of the different physiological systems and recognize them.

COURSE OUTCOME:

CO1	Have an enhanced knowledge and appreciation of human physiology	K3
CO2	Understand the functions of important physiological systems including the cardio-respiratory, renal, reproductive and metabolic systems	K2
CO3	Understand how these separate systems interact to yield integrated physiological responses to challenges such as exercise, fasting and ascent to high altitude	K2
CO4	Be able to perform, analyze and report on experiments and observations in physiology	K4&K5
CO5	Be able to recognise and identify principal tissue structures.	K4

1. Determination of pulse rate
2. Microscopic examination of various tissues and blood vessels
3. Determination of clotting time
4. Determination of bleeding time
5. Recording normal body temperature
6. Determination of blood groups and Rh factor
7. Measurement of height and weight and body mass index
8. Demonstration of RBC and WBC counting

- 9, Estimation of hemoglobin using haemoglobinometer
10. Test for body flexibility
11. Test for muscle endurance
12. Physical fitness test (Harvard step test)
13. Measurement of blood pressure
14. Packed cell volume- demonstration
15. Visit to a Clinical laboratory.

REFERENCES:

1. Elaine N. Marieb, Pub. Dorling Kindersley, India, Essentials of Human Anatomy & Physiology
2. Anna B. Diankontides & Majori A. Miller, Lutie C. Lenvell , Anatomy & Physiology Work Book & Laboratory Manual, Pub: Mac Miller Publishing House, NY
3. Applied Physiology – S. Wright.
4. Manual of practical physiology-A.K.Jain, Mittal books
5. Stirling William- outline of practical physiology

SEMESTER -III

SEMESTER – III
20U3NDC03
Credits - 5

CORE - III
Total Number of Hours: 60
5 Hours/ Week

NUTRITIONAL BIOCHEMISTRY

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 OBJECTIVES:

CO1	To ensure students to understand and gain theory and practical knowledge.	K2
CO2	Different food groups and their nutritive value, biological cycles involved in metabolism.	K2
CO3	Importance of biochemistry in cell like role enzyme hormones and water balance.	K4
CO4	Life regulation based on micro and macro elements,	K2
CO5	Role of vitamins in our daily diet	K2

UNIT I

No. of Hours: 12

a. Carbohydrates: Classification (Self study) –Monosaccharide- nomenclatures, structures, chemical properties; Disaccharides – structure and properties; Polysaccharides - Starch, glycogen - structure and properties.

b. Metabolism of Carbohydrates: Glycolysis; glycogenesis, glycogenolysis, gluconeogenesis and HMP shunt.

c. Interrelationship between fat, carbohydrates and protein metabolism, TCA cycle.

UNIT II

No. of Hours: 12

a. Lipids: Composition, properties (SS) classification of lipids. Phospholipids – structure of

lecithin and cephalin only, triglycerides, lipoprotein (classification only).

b. Fat Metabolism: Oxidation of saturated and unsaturated fatty acid. Biosynthesis and catabolism of cholesterol.

c. Respiratory chain: biological oxidation and oxidative phosphorylation.

UNIT III

No. of Hours: 12

a. Protein: Classification based on composition and solubility. Amino acid classification based on R group reactions. Physical and chemical properties of amino acids (not for individual amino acids). Proteins structure. Denaturation of proteins

b. Protein Metabolism: transamination and decarboxylation, Urea cycle, transportation of ammonia, fate of de-aminated amino acids (carbon skeleton- outline only).

c. Protein biosynthesis - Diagrammatic scheme and summary only.

UNIT IV

No. of Hours: 12

a. Nucleotides and nucleosides - Purine and pyrimidine bases - structure. Structure of nucleotides. Structure and functions of ATP.

b. Nucleic Acids: DNA – structure, properties and functions. RNA - structure, types and Functions.

c. Hemoglobin -- synthesis and catabolism.

UNIT V

No. of Hours: 12

a. Enzymes - Definition, classification, action, factors influencing rate of enzyme action. Michaelis-menton equation and Line weaver-Burke plot.

b. Co-Enzymes: Co-enzymic role of B vitamins in the metabolism of carbohydrates, proteins and fat.

c. Detoxification Reactions (examples only) – oxidation, reduction, hydrolysis and conjugation.

d. Paper Chromatography - Principle, Technique and Application

TEXT BOOK

1. Satyanarayana, U .Chakrapani (2008) - Fundamentals of Biochemistry, Books & Allied publishers, Calcutta
2. Alistair F.Smith, Geoffrey J.Beckett, Simon W.Walker, Peter W.H.Rae (2005), Clinical Biochemistry, 6th edition, Replika Press pvt Ltd, India.
3. AmbigaShaninugam, (2012)., Fundamentals of Biochemistry for Medical Students, 4th edition, Wolters Kluwer (India), New Delhi.

REFERENCES

1. Harold A Harper, Victor W Rodwell and Peter A Mayes (1939) - Review of Physiological Chemistry, Large Medical Publications, California.
2. Swaminathan M (1981) - Biochemistry for Medical Students, Geetha book house, Mysore
3. Deb, A.C. 1999, Fundamentals of Biochemistry, New Central Book Agency (P) Ltd., Calcutta.

WEB REFERENCE:

1. www.anme.com.mx/libro/principlesofnutrition.pdf
2. <https://2012books.lardbucket.org/pdfs/an-introduction-to-nutritional.pdf>
3. Krishikosh.egranth.ac.in

SEMESTER – III
20U3NDC03
Credits - 3

CORE PRACTICAL - III
Total Number of Hours: 40
3 Hours/ Week

NUTRITIONAL BIOCHEMISTRY PRACTICAL

OBJECTIVES:

To enable the students to

- Get training on analysis of blood for various parameters
- Understand the reactions of carbohydrates

COURSE OBJECTIVES:

CO1	To ensure students to understand and gain theory and practical knowledge.	K2
CO2	To provide practical laboratory training in the estimation of various nutritional parameters in blood and urine.	K3
CO3	To acquires skills in using laboratory instruments.	K1
CO4	To contrast the values of estimation with normal condition	K5
CO5	To apply the principles to estimate various parameters in blood and urine	K3

PRACTICALS

1. Estimation of urinary creatinine
2. Estimation of urinary urea- diacetyl monoxime method.
3. Estimation of serum protein Biruet method.
4. Estimation of iron and haemoglobin
5. Reactions of glucose
6. Reactions of fructose
7. Reactions of galactose
8. Reactions of maltose

9. Reactions of lactose
10. Reactions of sucrose
11. Analysis of unknown sugar – I and II
12. Quantitative Estimation of Calcium
13. Quantitative Estimation of Iron
15. Quantitative Estimation of Ascorbic acid

REFERENCE:

1. Voet and prat (2004)., Fundamental of Biochemistry, 8th edition, John Wiley& sons
2. Conn, stumpt, (2001), Outline of Biochemistry, 5th edition, John Wiley & sons
3. CHAD cox, (2005), Nutritional Biochemistry, Taylor and francis group, Canada.

SEMESTER – III
20U3NDS01
Credits - 2

SBEC -1
Total Number of Hours: 45
02 Hours/ Week

SKILL BASED ELECTIVE- FOOD PROCESSING

OBJECTIVES:

To enable the students to

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

COURSE OUTCOME:

CO1	Know the recent concepts of food processing	K1
CO2	Relate the theoretical knowledge of processing technique with food products development	K2
CO3	Choose appropriate foods processing	K6
CO4	Understand the relevance of processing for various food commodities	K2
CO5	To understand the process of fortification and enrichment of food products	K2&K7

UNIT I

No. of Hours: 09

Technology of Rice Processing: Milling of Rice-Parboiled rice, raw rice, by-products of rice milling and their utilization. Manufacture of certain breakfast cereals - puffed rice, rice flakes. macroni , noodles and pasta, instant rice. **Processing of Millets:** Com, Ragi, Sorghum

UNIT II

No. of Hours: 09

Technology of Wheat Processing: Milling - Cleaning, Methods of conditioning, Milling -break system, scratch system and reduction system, by-products of wheat milling.
Fortification and Enrichment: Cereals, baked products, confectioneries

UNIT III

No. of Hours: 09

Processing of Legumes: Methods of dhal milling- traditional method, improved method of pulse processing

Technology of Edible Fats and Oils: Methods of oil extraction- Mechanical press, solvent extraction, refining and hydrogenation

Processing of Oil Seeds as Protein concentrates and Isolates: Processing of soybean, sunflower, and peanut. **Fortification and Enrichment:** Fats and oils

UNIT IV

No. of Hours: 09

Processing of Fish and Algae: Fish processing - fish oil, fish protein concentrate, fish meal. Algae as food - Common types of algae used as protein source, cultivation, harvesting, processing, and drying storage and nutritional significance. Mushroom - types of edible mushroom, cultivation, harvesting and processing.

UNIT V

No. of Hours: 09

Sugar Processing - Extraction and refining process.

Cocoa Processing - Composition of cocoa, processing of milk and plain chocolate.

Coffee Processing - chemical constituents of coffee, processing - dry and wet process, roasting and grinding, instant coffee and de-caffeinated coffee.

Tea Processing - chemical constituents of tea, fermentation, drying, roasting and grinding, instant tea and herbal tea. **Fortification and Enrichment:** Sugar and salt

REFERENCE:

1. Agricultural 1. V. Pingale, (1976), Handling and Storage of Food Grains, Indian Council of Research, New Delhi.
2. N. L. Kent, Technology of Cereals (Special reference of wheat) 2nd edition, Ergamon Press Oxford.
3. S. C. Presscot & B. T. Proctor: Food Technology
4. Alfred 1: Integrated Food Science and Technology for the Topics, Maximillan Pub, Ilong Kony

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.com

SEMESTER – IV

SEMESTER – IV
20U4NDC04
Credits - 5

CORE - IV
Total Number of Hours: 60
5 Hours/ Week

NUTRITION THROUGH LIFE CYCLE

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 OBJECTIVES:

CO1	To define the nutritional needs of each age groups.	K1
CO2	To understand the importance of nutrition and health.	K2
CO3	To co-relate the physiological and psychological changes adhering to all the age groups.	K4
CO4	To interpret the nutritional problems pertaining to different age groups.	K4
CO5	To infer the appropriate theories to distinguish the development milestones	K4

UNIT-1

BASIC PRINCIPLES OF MEALS PLANNING

No of Hours: 12

Definition, principles involved in meals planning and factors affecting meals planning. Recommended allowances RDA for Indians, basis for requirements, energy allowance for various activities. General concepts about growth and development through different stages of life.

UNIT-2

PREGNANCY AND LACTATION

No of Hours: 12

Nutrition during Pregnancy - Weight gain, physiological changes, nutritional requirements, complications and nutritional problems in pregnancy.

Nutrition during Lactation - physiology of lactation, hormonal control. Milk output and factors affecting it, nutritional components of colostrums and mature milk. Nutritional requirement of lactating women

UNIT -3

INFANCY

No of Hours: 12

Nutrition During Infancy - Growth and development, factor influencing growth, advantages of breast feeding, breast feeding vs bottle feeding, factor to be considered in bottle feeding. Weaning foods – Weaning foods and commercial baby foods. Nutritional requirements of infants, problems in feeding normal and premature infants.

UNIT-4

PRESCHOOL AND SCHOOL GOING CHILDREN

No of Hours: 12

Nutritional needs of pre-school children (1-5 years) – Nutritional and food requirements of preschool children. Factors to be considered while planning meals for pre-school children. Eating problems of children and their management, preparation of supplementary foods using available low cost foods.

Nutrition for School children: Nutritional requirements, meals planning for school children, dental caries and packed lunch.

UNIT – 5

No of Hours: 12

ADOLESCENCE, ADULTHOOD AND GERIATRIC NUTRITION

Nutrition during Adolescence- Physical growth and nutritional requirements, Nutritional problems in adolescence- Iron deficiency anemia, obesity, anorexia nervosa and bulimia nervosa disorders.

Nutritional needs of adults (men and women) - Nutrition and work efficiency, nutritional requirements of the adults in relation to occupation.

Nutrition during old age - Physiological changes in ageing, psycho-social and economic factors affecting eating behaviors. Nutritional problems of aged and their managements.

TEXT BOOKS:

1. Shills, E.M. Olsan., A.J. and shike, Lea and Febiger, Modern Nutrition in Health and Disease, Lippincott Williams and Wilkins Publishing, 2006.
2. Srilakshimi. B., Nutritional Science, 7th Edition,, New Age International Pvt, L., 2010.
3. Srilakshimi. B., Dietitics, 6th Edition,, New Age International Pvt, L., 2010.
4. Davidson S Passmore. R., Brock. J.P., Human Nutrition and Dietetics, ELBS and Churchill Livingstone.

REFERENCE BOOKS:

1. Veenu seth.,kalyani singh., pulkit mathur.,Diet Planning through life cycle.,Elite publisher-1993.
2. Sarah arabrahm.,Nutrition through life cycle.,new age International(P) Ltd publishers-2016
3. Sari Edelstein.,Life cycle Nutrition an evidence based approach., Jones and Barlett publisher-2021

WEB REFERENCE:

www.wordcat.org

<https://2012books.lardbucket.org>

<https://libguides.unm.edu>

SEMESTER – IV
20U4NDC04
Credits - 3

CORE PRACTICAL - IV
Total Number of Hours: 35
3 Hours/ Week

NUTRITION THROUGH LIFE CYCLE PRACTICALS

OBJECTIVES:

To enable the students to

- To know the dietary pattern to promote optimum health and their nutritional needs.
- To understand the techniques of estimating micro nutrients.

COURSE OBJECTIVES:

CO1	To know the importance of nutrition during life span and also to enlighten on the RDA and dietary notification for different age groups.	K2
CO2	To define the nutritional needs of each age groups.	K2
CO3	To develop aptitude to learn the stages of growth and development of different age groups	K4
CO4	To familiarize the theories of growth and development of all ages	K4
CO5	Plan diet for all age groups.	K7

PRACTICALS:

1. Planning a day's diet for pregnancy women.
2. Preparing Complimentary feeds for infants-weaning foods.
3. Planning and preparing of a day's diet for a school going child with special emphasis on packed lunches.
4. Planning and preparation of a day's diet for an adolescent girl and boy.
5. Planning and preparation of a day's diet for and adult man and women (sedentary/ moderate/ heavy worker)
6. Planning and preparing a day's diet for a senior citizen.

REFERENCE:

- 1) Srilakshmi. B., Nutritional Science, 7th Edition,, New Age International Pvt, L., 2010.
- 2) Sarah arabrahm., Nutrition through life cycle., new age International(P) Ltd publishers-2016
- 3) Sari Edelstein., Life cycle Nutrition an evidence based approach., Jones and Barlett publisher-2021

SEMESTER – IV
20U2NDA04
Credits - 4

ALLIED - IV
Total Number of Hours: 45
4 Hours/ Week

FOOD MICROBIOLOGY**OBJECTIVES:**

To enable the students to

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

COURSE OBJECTIVES:

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	K7

UNIT I

No. of Hours: 09

Symbiosis, Commensalism, Antagonism, Mutualism, Parasitism, Heterotrophic, Autotrophic, Saprophytes, Holozoic, Culture, Medium (definition with examples only)

Classification of microorganisms, differences between eukaryotic and prokaryotic.

Bacteria morphology, reproduction, growth curve, calculation of generation time, genera important in food microbiology

Virus- occurrence, morphology, Reproduction. Bacteriophage -- definition, structure. Viral disease transmitted through food infective hepatitis, polio and Gastroenteritis

UNIT II

No. of Hours: 09

Mold - morphology, classification, reproduction, physiology and nutrition, genera of molds important in foods

Yeast- morphology, classification, physiology and nutrition, process of hybridization and importance of yeast in foods

Algae-occurrence, morphology, classification, Reproduction and economic importance of Algae.

UNIT III

No. of Hours: 09

General principles underlying spoilage of food- fitness and unfitness of food for consumption, causes for spoilage, bio-chemical and chemical spoilage , factors determining microbial spoilage of food, interaction between food spoilage bacteria.

Contamination, microbes involved and spoilage of:

- a. Cereals and cereal products-tour, bakery products - bread and cake
- b. Fruit and vegetables
- c. Meat, fish, poultry, milk and eggs

UNIT IV

No. of Hours: 09

Foods in relation to disease - Classification of food poisoning agents, classification of food borne diseases and microbial toxins - types and definitions (only)

a) Staphylococcus, clostridium, Listeria monocytogenes, Salmonella, Bacillus, Yersinia, E.coli, Vibrio, Shigella and Campylobacter foods involved, incubation period, symptoms and prevention

b). Food poisoning by fungal toxins - Aspergillus, Penicillium, Fusarium

c). Parasitic infection - causative agents, signs, symptoms and prevention of Taeniasis, Anisakiasis, Amoebiasis and Trichinosis

UNIT V

No. of Hours: 09

a) Microbiology of water- typical organism in various water environments, Bacteriological examination of water for E coli- presumptive test, confirmed and completed test and most probable number, steps in purification of municipal water supplies.

- b) Sewage - composition of sewage, typical organism in sewage (only). BOD definition and determination
- c) Sterilization by physical agents - moist and dry heat , filtration and radiations
- d) Chemicals agents-halogens, phenols, heavy metals, alcohol, aldehydes, hydrogen peroxide.

TEXT BOOKS:

1. M.R adams., M.O.Moss.,Food Microbiology., New age international private limited-2018
2. Bibek ray., Arun Bhunia., Fundamentals of food microbiology(fourth edition)Taylor and francis Ltd-2021
3. William C Frazier., Dennis C Westhoff., Foof Microbiology(fifth edition) McGraw Hill Education-2017

REFERENCES

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.
4. Satish Gupte, The Short Term Book of Medical Microbiology, 9th Edition, Jaypee Brothers Medical Pub (p) Ltd.
5. Vibhavari Pradhan Sumit Bhatnagar, Sangita Malvee, Food Microbiology and Nutrition, SBS Publishers & Distributors PVT Lid.

WEB REFERENCES:

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

SEMESTER – IV
20U4NDAP04
Credits - 2

ALLIED - IV
Total Number of Hours: 30
2 Hours/ Week

FOOD MICROBIOLOGY PRACTICALS

OBJECTIVES:

To enable the students to

1. To understand the key concepts in food microbiology
2. To gain knowledge on various methods of microbial analysis of food and dairy product

COURSE OBJECTIVES:

CO1	To understand the significance and activities of microorganisms in food	K2
CO2	To understand and describe the characteristics of important pathogens and spoilage microorganisms in food and dairy	K2
CO3	To recognize and describe the characteristics of important pathogens and spoilage microorganisms in food	K4
CO4	To gain knowledge on various methods of microbial analysis of food and dairy products	K4
CO5	To learn various methods for their isolation, detection and identification of microorganisms in food.	K5

PRACTICALS

1. Sterilization & disinfectant method (physical/ chemical)
2. Handling and maintenance of microscope
3. Straining method (Gram's staining, spore staining, negative and flagellar staining)
4. Isolation and identification of yeast and molds in bread (LCP/KOH, Germ tube method)
5. Microscopic identification of water Algae (Spirulina/ Cyanobacteria/oscillatoria)
6. Pure culture techniques (Serial dilution, spread method, streak method, pore plate method)
7. Milk qualitative test (MBRT/ Resazurin)
8. Isolation and identification of culture characterization of food spoiled bacteria.

REFERENCE:

1. Dr. R.C. Dubey and Dr. Maheshwari (2010)., Practical Microbiology., Chand. S publisher.
2. Ismai Mohamad Al Bulushi, ()Hand book of Food Microbiology analytical methods
3. Osman Erkemen and T. Faruk Bozoglu (2016), Food Microbiology, 1st edition, Wiley publisher.

SEMESTER – IV
20U4NDS02
Credits - 2

SBEC-II
Total Number of Hours: 30
02 Hours/ Week

SKILL BASED ELECTIVE- FOOD PRESERVATION

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 OUTCOME:

CO1	Understand the role micro organisms in food spoilage	K2
CO2	Learn the concept of preservation	K4
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 -I

No. of Hour: 06

Preservation by use of high temperatures

General principles & methods of food preservation - Jam, jelly, marmalade, preserves, grape squash, RTS.

Canning process, Spoilage of canned foods.

Bottling process - Preparation of Tomato sauce & pickle. Sauerkraut and mango pickle.

Innovative heat processes (only principles).

UNIT -II

No. of Hour: 06

Preservation by use of low temperature

Refrigeration - Principles and methods, preparation of food for cold storage and cold storage defects.

Freezing -- Principles, Air blast, immersion freezing;

Freeze- dehydration and dehydro- freezing. Defects in frozen foods, Refrigeration and freezing - egg, meat, fish and poultry

UNIT -III

No. of Hour: 06

Preservation by drying and dehydration

Principles and methods: sun, solar, vine and mechanical. (cabinet, drum, spray and vacuum).
Dehydration of egg and whole milk powder.

No. of Hour: 06

UNIT - IV

Preservation with chemicals and radiation

Preservatives: Benzoate, sorbates and acetates, SO₂, antibiotics, mold inhibitors and antioxidants and permissible level, Sources of radiation, units of radiation, dosimetry, mode of action of irradiation, Preservation of semi moist/intermediate foods- Principles, and preparation.

UNIT -V

No. of Hour: 06

Preservation with fermentation

Manufacture of fermented beverages -wine, beer and vinegar, preparation of carbonated and carbonated beverage Manufacture of cheese and yoghurt.

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

WEB REFERENCE:

1. www.lic.gov

2. www.cond.org.gr
3. <https://nchfp.uga.edu>

SEMESTER – III
20U3NDN01
Credits - 2

NMEC-1
Total Number of Hours: 30
02 Hours/ Week

BASIC FOOD SCIENCE

OBJECTIVES:

The students will be able to

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

COURSE OUTCOME:

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 – I

No. of Hours: 06

Introduction to Food Science- Functions of food; food guide based on basic five food groups, cooking – objectives and methods.

UNIT – II

No. of Hours: 06

Cereals- Composition and nutritive value of rice and wheat. Best method of cooking, loss of nutrients during cooking; Advantages of par boiling.

UNIT – III

No. of Hours: 06

Pulses - Composition, nutritive value, best method of cooking, loss of nutrients during cooking, germination and its advantages.

UNIT – IV

No. of Hours: 06

Vegetables – Classification, nutritive value, loss of nutrients during cooking and methods of reducing nutrient loss during cooking.

UNIT – V

No. of Hours: 06

Fruits- Classification, nutritive value and changes during ripening.

Fleshy foods- Meat, fish, egg and milk: Nutritive value.

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](https://guides.librariespsu.edu/food%20science)
2. <https://www.nal.usda.gov/fnic/food-science-and-technology>
3. <https://foodinfo.ifis.org>

SEMESTER – IV
20U4NDN02
Credits - 2

NMEC- II
Total Number of Hours: 30
02 Hours/ Week

BASIC NUTRITION

OBJECTIVES:

The students will be able to

- Understand the principles of nutrition
- Learn about the nutrients and deficiency

COURSE OUTCOME:

CO1	Learn the concept of Nutrition	K2
CO2	Understand the role of macronutrients.	K2
CO3	Learn the basic metabolism of macronutrients	K2
CO4	To relate metabolism of macro nutrients with health	K4
CO5	Gain basic knowledge of the different nutrients and their role in maintaining health of the community.	K4

UNIT – I

No. of Hours: 06

Carbohydrate – Classification, functions, blood sugar regulation and sources. Importance and sources of fiber.

Energy: Definition, Units for measuring energy, Energy value of foods and RDA.

UNIT – II

No. of Hours: 06

Lipids – Composition, classification, functions and sources. Role of lipids in causing heart diseases.

UNIT – III

No. of Hours: 06

Protein - Composition, classification (nutritional and biological), functions, sources and RDA.

UNIT – IV

No. of Hours: 06

MINERALS

Calcium, Phosphorus, Iron, Zinc and Iodine– Functions, sources, requirement and effect of deficiency.

UNIT – V

No. of Hours: 06

VITAMINS

Vitamin A, D, E, K, B1, B2 & Vitamin C - Functions, sources, requirement and effect of deficiency.

TEXT BOOK:

1. B. Srilakshmi, (2014), Nutrition Science, New Age International (P) Ltd, New Delhi.

REFERENCE:

1. Mangala Kango, (2003) Normal Nutrition (Fundamental & Management) RBSA Publishers S.M.S Highway Jaipur – 302003 L, 2003.
2. M. Raheena Begum, (2005) Text book of Foods, Nutrition and Dietetics, Second Revised Edition, Sterling Publishers Private Ltd, New Delhi.

WEB REFERENCE:

1. www.nutrition.gov
2. www.nab.edu
3. www.who.int

COMPUTER APPLICATION IN FOOD NUTRITION AND DIETITICS

SEMESTER – III

21UCSA01

Credits - 4

ALLIED- III

Total Number of Hours: 60

04 Hours/ Week

Objectives:

Enable the students to

- Understand the basic of computer and its application
- Gain knowledge to use computers
- Develop skills to apply computer based technology in Food science and Nutrition

UNIT I

Introduction to Computers

History of Development of Computer, Main Frame, Minis, Micros and Super Computer system, Binary Numbers, Bits, Bytes, CPU, Input and Output Devices, Main and Auxiliary Stage Devices, Software and Hardware.

UNIT II

Operation Systems and MS Office

Introduction to Operation System, Windows Application MS Word, MS Excel, MS Access and MS PowerPoint.

UNIT III

Computer Networks

LAN, WAN, Intranet, Extranet, Service Providers, Modem, Fibre Optics Basic of HTML, WWW, URL, TCP/IP.

UNIT IV

Multimedia

Basic Elements, Hardware, Application of Multimedia, Introduction Multimedia, Authorizing Tools.

UNIT V

Application of Computers In Food Science And Nutrition

Power point presentation, nutrient and diet calculations, nutrition education and counselling, nutrition software and websites, e-journals in Food Science and Nutrition, Use of SPSS.

COMPUTER SCIENCE PRATICALS

SEMESTER – III

21UCSAP01

Credits - 2

ALLIED- III

Total Number of Hours: 60

02 Hours/ Week

1. Introduction to Computer Networks
2. Introduction to Macro Flash Player, Adobe Photoshop, Corel Draw
3. Word, pictures, drawing tools and word art
4. MS Word, Excel, Access and Power point
5. Developing Mini Projects in Food Science and Nutrition using MS Word, MS Excel and MS PowerPoint.
6. MS Excel – Database, Formulas and function
7. MS Excel – Creation a Work book and charts.
8. MS Power Point – Diet Counselling presentation
9. Designing Invitation and Pamphlet
10. Slides show for Community Nutrition