

PERIYAR UNIVERSITY

PERIYAR PALKALAI NAGAR

SALEM – 636 011



SYLLABUS FOR
B.Sc. - NUTRITION AND DIETETICS

CHOICE BASED CREDIT SYSTEM

OUTCOME BASED EDUCATION

(For Candidates admitted in the Colleges affiliated
to Periyar University from 2021 - 2022 onwards)

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REGULATIONS

1. Preamble:

Nutrition and Dietetics curriculum has been structured to prepare the undergraduates to achieve skills to move forward with the development of the society/community/nation and entrepreneurship. Nutrition has been recognized and given a special role in national development. This course is following on the same lines laid out in National Policy of Nutrition. This curriculum aims at training students to take up leadership roles in extension and community outreach programs. The students are encouraged to develop a scientific temper. Familiarizing them with the use of newer technologies, methods in family and community linkages, and sustainable use of resources for human development are the hall mark of this course. This course aims at enriching the minds of the students who have interest in learning finer points of nutrition. Nutrition is the key to facilitate the study and enhance the quality of human life. Its approach is therefore inherently interdisciplinary. Its curriculum that engages the student through teaching, research and extension.

2. ELIGIBILITY FOR ADMISSION:

Candidates for admission to the first year of the Degree of Nutrition and Dietetics course shall be required to have passed the Higher Secondary Examinations conducted by the Government of Tamil Nadu or any other equivalent examination.

As per Government Order (2020-2021) G.O.(1D)N0.110, Higher Education (G1) Department, dated 18.07.2020.

- ELIGIBILITY:**
1. General Stream: Chemistry with Biology or Home Science
 2. Vocational Stream: Biology or Home Science.

3. ELIGIBILITY FOR THE AWARD OF THE DEGREE:

A candidate shall be eligible for the award of the Degree only if she has undergone the prescribed course of study for a period of not less than three academic years, passed the examinations of all the six semesters prescribed.

4. COURSE OF STUDY:

The main subject of study for Bachelor Degree shall consist of the following:

PART-I: Tamil / Other languages

PART-II: English

PART -III: Core Courses, Elective Courses and Allied Courses

PART-IV: SBEC*/ NMEC**/Add-on course / EVS/ Value Education

PART-V: **Extension Activities:** NSS / NCC / Sports / YRC and other Extracurricular activities offered under part V of the programmes.

*Skilled Based Elective Course

** Non Major Elective Course

Semester I&II: Allied Course I- Chemistry Allied II- Chemistry and Allied Course practical Chemistry (Compulsory).

Semester III&IV: Allied Course I- General Home Science I Allied II- General Home Science I I and Allied Course practical General Home Science I (Compulsory)

Non major elective course subjects may be chosen by the respective colleges and the same must be communicated to the University.

5. Examinations

There shall be six examinations- two in the first year, two in the second year and two in the third year. Candidates failing in any subject / subjects will be permitted to appear for such failed subject / subjects at subsequent examinations. The Syllabus has been divided into six semesters. Examinations for I, III and V semesters will be held in November/ December and for II, IV and VI semesters will be held in April / May. The practical examination I will be held at the end of I year. II will be held at the end of II year. III and IV will be held at the end of III year.

Requirement to appear for the examination A candidate shall be permitted to appear for the university examinations for any semester (practical/theory) if He / She secure not less than 75% of attendance in the number of working days during the semester.

6. Passing Minimum

A candidate who secures not less than 40% in the university (external) Examination and 40% marks in the external examination and continuous internal assessment put together in any course of Part I, II, III & IV shall be declared to have passed the examination in the subject (theory or Practical).

7. Classification of Successful Candidates

Candidates who secure not less than 60% of the aggregate marks in the whole examination shall be declared to have passed the examination in First Class. All other successful candidates shall be declared to have passed in the Second Class. Candidates who obtain 75% of the marks in the aggregate shall be declared to have passed the examination in First Class with Distinction provided they pass all the examinations prescribed for the course at the first appearance. Candidates who pass all the examinations (Part I, II, III & IV) prescribed for the course in the **FIRST APPEARANCE ITSELF ALONE** is eligible for ranking.

8. Maximum Duration for the completion of the programme:

The maximum duration for completion of the UG Programme shall not exceed twelve semesters.

9. Commencement of this Regulation:

These regulations shall take effect from the academic year 2021-2022, i.e. for students who are to be admitted to the first year of the course during the academic year 2021-2022 and thereafter.

10. Pattern of Question Paper (All Courses)

Time : 3 Hours

Maximum:75 Marks

Part A : 15 x1 =15 (Multiple Choice) (Three questions from each unit)

Part B : 2 x 5 = 10 (Any Two questions) (One question from each unit)

Part C : 5 x 10 = 50 (One question from each unit with internal choice)

11. EVALUATION PATTERN FOR INTERNAL ASSESSMENT**11A. THEORY PAPERS**

component	Time	Total Marks	IA marks
Test I	2 hours	50	10
Test II	2 hours	50	10
Assignment (minimum 2)		10	05
		Total	25

PASS PERCENTAGE

Passing minimum (Internal Assessment) 40%	10 marks
Passing minimum (External Assessment) 40%	30 marks
Total	40 marks

11B. PRACTICALS

External Assessment (EA)		Internal Assessment (IA)	
60 Marks		40 Marks	
component	Time	Total Marks	IA marks
Practical I	3 hours	50	15
Practical I	3 hours	50	15
Record			05
Attendance			05
Total			40

PASS PERCENTAGE

Passing minimum (Internal Assessment) 40%	16 marks
Passing minimum (External Assessment) 40%	24 marks
Total	40 marks

Programme Outcomes

PO1. KNOWLEDGE

Students:

- Follow the developments in the field of nutrition and dietetics.
- Have knowledge and skill of the information and communication technologies essential to follow today's technological developments and improve themselves in this field.
- Acquire the skill of understanding the basic values and culture of the society they live in, adapting to these and changing themselves positively.
- Have knowledge of the concepts of physiology, nutritional biochemistry, nutrition, dietetics and other related to human health.

PO2. SKILLS

Students:

- Acquire the ability to apply the knowledge and skills they obtain to the situations encountered in both national and international level, as well as the ability of lifelong learning.
- Aware of professional ethics.
- Apply the scientific methods and techniques, as well as quality management processes related to their field.
- Acquire the skills of designing experiments/projects and conducting and interpreting them by analysing their results.

PO3. COMPETENCES

Students:

- Use the knowledge they acquire to increase the society's level of health and quality of life.
- Have the skills of planning the work processes in the fields of professional application, being a team member, collaborating and conducting collaborative studies.

Program Specific Outcomes (PSO)

Nutrition & Dietetics students will demonstrate the following learning

Objectives upon completion of this degree program

1. Understanding, critically assessing and knowing how to use and apply information sources related to nutrition, food, lifestyle and health.
2. Being familiar with nutrients, their function in an organism, bioavailability, requirements and recommended quantities, as well as the bases of energetic and nutritional balance.
3. Interpreting a nutritional diagnosis, evaluating nutritional aspects of a clinical record and implementing a dietary treatment plan.
4. Understanding the structure of food services, nutrition departments and hospital nutritionists, identifying and developing the functions of a nutritionist-dietician in a multidisciplinary team.
5. Perform food system management and leadership functions that consider sustainability in business, healthcare, community, and institutional areas

COURSE OF STUDY AND SCHEME OF EXAMINATION

SEMESTER I								
Part	Study Component	Course Title	Hrs/ week	Exam				Credit
				Dur. Hrs	CIA	Uni. exam	Total	
I	Language	Tamil I or other language	6	3	25	75	100	3
II	Language	English I- Communicative English	6	3	25	75	100	3
III	Core I	Human Physiology	6	3	25	75	100	5
III	Core Practical I	Human Physiology	3	-	-	-	-	-
III	Allied I	Chemistry I	4	3	25	75	100	4
III	Allied Practical I	Chemistry	3	-	-	-	-	-
IV	Add-on course	Professional English-I	6	3	25	75	100	4
IV	-	Value Education	2	3	25	75	100	-
		TOTAL	36		150	450	600	19
SEMESTER II								
Part	Study Component	Course Title	Hrs/ week	Exam				Credit
				Dur. Hrs	CIA	Uni. exam	Total	
I	Language	Tamil II or other language	6	3	25	75	100	3

II	Language	English II-Communicative English	4	3	25	75	100	3
III	Core II	Food Science	6	3	25	75	100	5
III	Core Practical II	Food Science	3	3	40	60	100	3
III	Allied I	Chemistry II	4	3	25	75	100	4
III	Allied Practical I	Chemistry	3	3	40	60	100	2
III	Core Practical I	Human Physiology	-	3	40	60	100	3
IV	Add-on course	Professional English-II	6	3	25	75	100	4
IV	-	Environmental Studies	2	3	25	75	100	-
II	Naan Mudhlvan Skill Development Course	Language proficiency for employability(Generic Name)- Effective English (Course Name)30-45 hours	2	3	25	75	100	2
		TOTAL	36		295	705	1000	29

SEMESTER III

Part	Study Component	Course Title	Hrs/ week	Exam				Credit
				Dur. Hrs	CIA	Uni. exam	Total	
I	Language	Tamil III or other language	6	3	25	75	100	3
II	Language	English III-Communicative English	6	3	25	75	100	3

III	Core III	Nutritional Biochemistry	4	3	25	75	100	4
III	Core Practical III	Nutritional Biochemistry	2	-	-	-	-	-
III	Allied II	General Home Science I	4	3	25	75	100	4
III	Allied Practical II	General Home Science	2	-	-	-	-	-
IV	SBEC I	Food preservation and processing	2	3	25	75	100	3
IV	NMEC I	Other Major	2	3	25	75	100	2
IV	NMSDC	Digital Skill for Employability- Microsoft Office Essentials	2	3	25	75	100	2
		TOTAL	30		150	450	600	22

SEMESTER IV

Part	Study Component	Course Title	Hrs/ week	Exam				Credit
				Dur. Hrs	CIA	Uni. exam	Total	
I	Language	Tamil IV or other language	6	3	25	75	100	3
II	Language	English IV- Communicative English	6	3	25	75	100	3
III	Core IV	Principle of Human Nutrition	4	3	25	75	100	4

III	Core Practical III	Nutritional Biochemistry	-	3	40	60	100	3
III	Core Practical IV	Food Analysis and Quality Control	3	3	40	60	100	3
III	Allied II	General Home Science II	4	3	25	75	100	4
III	Allied Practical II	General Home Science	3	3	40	60	100	2
IV	SBEC II	Food Standard and Quality Control	2	3	25	75	100	3
IV	NMEC II	Other Major	2	3	25	75	100	3
IV	Naan Mudhalvan Skill Development Course	Employability Skills- Microsoft	2	3	25	75	100	2
		TOTAL	30		295	705	1000	30

SEMESTER V

Part	Study Component	Course Title	Hrs/ week	Exam				Credit
				Dur. Hrs	CIA	Uni. exam	Total	
III	Core V	Nutrition in Life Cycle	5	3	25	75	100	5
III	Core VI	Advanced Dietetics	5	3	25	75	100	5
III	Core Practical V	Nutrition in Life Cycle	3	-	-	-	-	-
III	Elective I	Public Health Nutrition	4	3	25	75	100	4
III	Elective II	Basic in Research Methodology	4	3	25	75	100	4

IV	SBEC III	Bakery Science	3	3	25	75	100	3
IV	SBEC IV Practical I	Food Preservation and Bakery	2	-	-	-	-	-
III	Core VII	Institutional Training	2	-	-	-	-	-
IV	NMSDC	Advanced Technology for Employability – International Regulatory Requirement in Clinical Trial & Data Management	2	3	25	75	100	2
		TOTAL	30		125	375	500	21

SEMESTER VI

Part	Study Component	Course Title	Hrs/ week	Exam				Credit
				Dur. Hrs	CIA	Uni. exam	Total	
III	Core VII	Institutional Training	3	3	40	60	100	4
III	Core VIII	Food Microbiology	5	3	25	75	100	4
III	Core IX	Quantity Food Service and Physical Facilities	5	3	25	75	100	4
III	Core Practical V	Nutrition in Life Cycle	-	3	40	60	100	3
III	Core Practical VI	Dietetics	3	3	40	60	100	3
III	Elective III	Nutrition for Sports and Fitness	4	3	25	75	100	4
IV	SBEC IV Practical I	Food Preservation and Bakery	-	3	40	60	100	3

IV	SBEC V	Diet Counselling	4	3	25	75	100	3
IV	SBEC VI	Entrepreneurship Development	4	3	25	75	100	3
	NMSDC	Food and Agri Business Management skills for Employability -Organic Food Production Techniques	2	-	-	-	-	2
V	Extension Activities/NSS/NCC/YRC/OTHERS							
		TOTAL	30		285	615	900	33
		OVER ALL TOTAL					4600	152

SEMESTER I	
Core/Major Course I	Human Physiology
Paper Code:	Theory: 6 hrs/week

Course Learning Outcomes:

1. Gain the basic knowledge of human anatomy and physiology.
2. Define the main structures composing human body.
3. Explains structure and functions of cells, tissues and organs, systems of the human body.
4. Relates structure and functions of tissue.
5. Provides excellent preparation for careers in the health professions and/or biomedical research.

Course Content

Unit-I

Cell – Structure of organelles and functions. Tissues – Structure, classification and functions.

Unit-II

Blood – Composition, functions, coagulation, factors affecting coagulation, blood groups. Gastrointestinal and Hepato biliary system – Structure, physiology and functions for different organs and role of hormones and enzymes.

Unit- III

Immune system – Innate, acquired and active immunity, cell mediated immunity, humoral immunity and complement system.

Heart and circulation – Structure, cardiac cycle, cardiac output, factors affecting cardiac output, normal ECG, heart failure, blood pressure, control and factors affecting blood pressure.

Unit- IV

Respiratory system – Structure and functions, Lung volumes and lung capacities, Factors affecting efficacy of respiration.

Excretory system - (A) Urinary System: - Structure and functions of organs of urinary system (In brief), Mechanism of urine formation. (B) Skin:- Structure and functions, Regulation of body temperature.

Unit- V

Reproductive system –(A)Female reproductive system -- Structure and functions, menstrual cycle, menarche and menopause.

(B) Male Reproductive system -- Structure and functions.

Endocrine system - Thyroid, Parathyroid, Adrenal gland, Pituitary and Sex glands – Structure and functions.

References

1. Ross and Wilson(2011), Anatomy and physiology in Health and Illness, 11th Edition, Church Hill Livingstone.
2. West, J.B.(2007), Best and Taylor's Physiological Basis of Medical Practice, 11th Edition.
3. Gyton (1996), Test Book of Medical Physiology, 9th Edition, Prism Books Pvt. Ltd.,W.B. Sanders Company, USA.
4. Chatterjee C.C (2016), Human Physiology Volume I, Medical Allied Agency, Kolkata.
5. Chatterjee C.C (2004), Human Physiology Volume II, Medical Allied Agency, Kolkata.
6. Sembulingam, K. (2000) Essentials of Medical Physiology, Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
7. Chaudhri, K. (1993) Concise Medical Physiology, New Central Book Agency (Parental) Ltd., Calcutta.

SEMESTER I	
Core/Major Practical I	Human Physiology
Paper Code:	Theory: 3 hrs/week

Course Learning Outcomes:

1. Gain the basic knowledge of the different vital organs, glands and tissues under a microscope.
2. To estimate the blood parameters like hemoglobin, blood group, bleeding time, clotting time and platelet count

Course content

1. Microscopic study of tissues- epithelial, connective and muscular.
2. Collection of blood sample- Capillary blood from finger tips and venous blood.
3. Separation of blood components (Centrifugation).
4. Estimation of hemoglobin- Sahli's Acid hematin method.
5. Determination of Hematocrit (Wintrobe method).
6. Preparation and examination of stained blood smear (Wedge or glass slide method).
7. Determination of Erythrocyte Sedimentation Rate (Wintrobe method).
8. Determination of blood group.
9. Determination of bleeding time (Duke method) and coagulation time (Capillary tube method).
10. Platelet count (Rees Ecker method by hemocytometry).
11. Clinical examination of radial pulse (pulse rate).
12. Measurement of blood pressure (Sphygmomanometry).
13. Effect of exercise on blood pressure and heart rate.
14. Microscopic structure of heart, digestive system and kidney.
15. Microscopic structure of reproductive organs- ovary, uterus, mammary glands and testis.
16. Microscopic structure of endocrine glands- thyroid, pituitary and adrenal.

Reference: G.K.Pal and Pravati pal, Text book of practical physiology, Orient Longman Ltd. 2001.

SEMESTER II	
Core/Major Course I	Food Science
Paper Code:	Theory: 6 hrs/week

Course Learning Outcomes:

1. Summarize and critically discuss and understand both fundamental and applied aspects of Food Science.
2. Identifying nutrient specific force and apply the principles from the various factors of foods and related disciplines to solve practical as well as real world problems.
3. Understand the food groups and their functions, acquire knowledge on different methods of cooking and apply process of different foods.
4. Use combination of foods in the development of food products. 5. Identify and control adulterants in various foods and evaluate food quality.
5. Use current information Technologies to locate and apply evidence-based guidelines and protocol and get imported with critical thinking to take leadership roles in the field of health, diet and special nutritional needs.

Course Content

Unit-I

Food: Definition, functional classification, groups (4, 5,7 and 11), food pyramid.

Cooking: Definition and objectives; Methods- Moist heat methods, dry heat methods, combination of both and micro wave cooking; Effect of cooking on nutrients.

Beverages: Classification; Coffee beverage- Constituents and method of preparation; Tea-Types, preparation; Cocoa- Composition, nutritive value and preparation of cocoa beverage; Fruit beverages- Types; Introduction to vegetable juices, milk based beverages, malted beverages, carbonated non alcoholic beverages and alcoholic beverages.

Unit-II

Cereals and millets: Structure, composition and nutritive value of rice, wheat and oats; Nutritive value of maize, jowar, ragi and bajra. Cereal cookery: Effect of moist heat- Hydrolysis, Gelatinisation and factors affecting gelatinization, gel formation, retrogradation and syneresis; Effect of dry heat; Role of cereals in cookery.

Pulses: Composition, nutritive value, toxic constituents; Pulse cookery- Effect of cooking, factors affecting cooking quality, role of pulses in cookery, germination and its advantages.

Unit-III

Milk and milk products: Composition and nutritive value of milk; Milk cookery- Effect of heat, effect of acid and effect of enzymes; Milk products- Non fermented and fermented products (does not include preparation); Role of milk in cookery.

Egg: Structure, composition, nutritive value; Egg cookery- Effect of heat, factors affecting coagulation of egg proteins and effect of other ingredients on egg protein; Role of egg in cookery; Home scale method for detecting egg quality.

Meat: Classification, composition, nutritive value, rigor mortis, ageing and tenderizing; Meat cookery- Changes during cooking.

Poultry: Classification, composition and nutritive value.

Fish: Classification, composition, nutritive value, selection and principles of fish cookery.

Unit-IV

Vegetables: Classification (nutritional), composition, nutritive value; Pigments in vegetables- Water soluble and water insoluble; Enzymes, flavor compounds and bitter compounds; Vegetable cookery- Preliminary preparation, changes during cooking, loss of nutrients during cooking, effect of cooking on pigments, role of vegetables in cookery.

Fruits: Classification, composition, nutritive value, ripening of fruits; Browning- Types and preventive measures.

Spices: General functions, role in cookery; Medicinal value of commonly used spices.

Unit-V

Fats and oils: Composition and nutritive value, basic knowledge about commonly used fats and oils (lard, butter, margarine, cotton seed oil, ground nut oil, coconut oil, soya bean oil, olive oil, rice bran oil, sesame oil, rape seed oil, mustard oil and palm oil); Spoilage of fat- Types and prevention; Effect of heating, role of fats and oils in cookery.

Sugar and related products: Nutritive value, characteristics and uses of various types of sugars; Sugar cookery- Crystallization and factors affecting crystallization; Stages of sugar cookery; Role of sugar in cookery.

Reference

1. Maney S (2008). Foods, Facts and Principles, 3rd Edition Published by Wiley Eastern, New Delhi.
2. Usha Chandrasekhar (2002) Food Science and Application in Indian Cookery, Phoenix Publishing House P. Ltd., New Delhi.
3. Raina U, Kashyap S, Narula V, Thomas S Suvira, VirS, Chopra S (2010) Basic Food Preparation: A Complete Manual, 4th Edition, Orient Black Swan Ltd, Mumbai.
4. Srilakshmi, B. (2017) Nutrition Science, New Age International (P) Ltd., New Delhi,.
5. Mahtab, S. Bamji, Kamala Krishnasamy, Brahman G.N.V (2012) Text Book of Human Nutrition, Third Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi.
6. Sunetra Roday (2017). Food Science and Nutrition, Oxford University Press, New Delhi.

SEMESTER II	
Core/Major Practical I	Food Science
Paper Code:	Theory: 3 hrs/week

Course Learning Outcomes:

1. Demonstrate skills on determination of edible portion, effect of cooking on volume and weight.
2. Choose appropriate cooking method to conserve nutrients.
3. Acquire skills on different methods of cooking. Understand experimental cookery.
4. Develop recipes by applying knowledge on cooking methods and properties of food

Course Content

1. Grouping of foods according to ICMR classification.
2. Measurement of food materials using standard measuring cups, spoons and weighing.
3. Find the percentage of edible portion of foods.
4. Observe the microscopic structure of different starches before and after gelatinization (rice, wheat and corn).
5. Study the effect of temperature, time of heating, concentration, addition of sugar and acid on gelatinization of starch.
6. Prepare recipes using the following processes- Gelatinization, gluten formation and gel formation.
7. Demonstrate the best method of cooking rice.
8. Demonstrate the effect of soaking, hard water, sodium bi carbonate and papaya on cooking quality of pulses.
9. Prepare recipes using whole gram, dhal, pulse flours, sprouted pulses and cereal pulse combination.
10. Demonstrate the factors affecting coagulation of milk protein.
11. Prepare recipes using milk and its products.
12. Demonstrate the formation of ferrous sulphide in boiling egg and its preventive measures.

13. Demonstrate the effect of addition of acid, fat, salt, water and sugar on the texture of omelettes.
14. Prepare recipes where egg acts as – thickening agent, binding agent, emulsifying agent and enriching agent.
15. Demonstrate the effect of acid, alkali and over cooking on vegetables containing different pigments.
16. Demonstrate the effects of different amounts of water added to vegetables during cooking on flavor and appearance.
17. Demonstrate enzymatic browning in vegetables and fruits and any four methods of preventing it.
18. Prepare the following using fruits and vegetables- salads, soups and curries.
19. Determine the smoking point of any 4 cooking oils.
20. Prepare recipes using shallow fat and deep fat frying methods.
21. Demonstrate the stages of sugar cookery
22. Prepare recipes using various stages of sugar cookery and jaggery.
23. Preparation of any one beverage under the following types- refreshing, nourishing, stimulating, soothing and appetizing.

Reference

1. Srilakshmi. B. Food Science, New Age International (P) Ltd. Publishers, Sixth edition. 2016.
2. Khanna K, Gupta S, Seth R, Mahna R, Rekhi T (2004). The Art and Science of Cooking: A Practical Manual, Revised Edition. Elite Publishing House Pvt Ltd.
3. Raina U, Kashyap S, Narula V, Thomas S, Suvira, Vir S, Chopra S (2010). Basic Food Preparation: A Complete Manual, Fourth Edition. Orient Black Swan Ltd.
4. Bamji MS, Krishnaswamy K, Brahmam GNV (2009). Textbook of Human Nutrition, 3rd edition. Oxford and IBH Publishing Co. Pvt. Ltd.

SEMESTER III	
Core/Major Course III	Nutritional Biochemistry
Paper Code:	Theory: 4 hrs/week

Course Learning Outcomes:

1. To acquire knowledge related to the role of TCA cycle in central carbon metabolism.
2. To understand the importance of lipid as storage molecules and as structural component of bio membranes.
3. Capable of describing biochemical pathways relevant in nutrient metabolism.
4. To understand the concepts of preparation of buffers
5. To acquire fundamental knowledge on enzymes and their importance in biological reactions.

Course Content

Unit- I

Fundamentals of Biochemistry, Biological Membranes and Transport. Carbohydrates- Definition, classification. Structure (linear) of Monosaccharides- Glucose, fructose and galactose; Disaccharides- Maltose, lactose and sucrose; Polysaccharides- Starch and glycogen. Definition of Glycolysis, glycogenesis, glycogenolysis and gluconeogenesis. Metabolism- Glycolytic pathway, oxidation of pyruvic acid, Citric Acid Cycle. Pentose Phosphate Pathway

Unit- II

Lipids- Definition, classification and properties. Metabolism- Beta - Oxidation and biosynthesis of fatty acids. Cholesterol metabolism. Definitions- Ketone bodies, ketogenesis and ketosis.

Unit- III

Protein- Definition, classification, structure, physical properties, chemical properties and utilization. Amino acids- Types, Definition - deamination, transamination and decarboxylation. Urea production Enzymes and co-enzymes- Definition, types, classification and factors affecting velocity of enzyme catalyzed reactions.

Unit- IV

Introduction to genetic control of metabolism- Nucleic acids-Types, composition, structure, functions, replication. Elementary knowledge of biosynthesis of protein Electron transport chain and oxidative phosphorylation. Bioenergetics.

Unit- V

Acid – base balance: Acid-base balance in normal health, definition of buffers, principles of buffers, major sources of acid produced in the body, physiological buffer system and role of different buffer systems. Fluid and electrolyte balance- Maintenance in normal health.

Reference

1. 1.Pattabiraman. T.N. Concise Text Book of Bio-chemistry, 2 nd edition, All India Publishers and Distributors , 1998.
2. Deb. A.C., Fundamental of Biochemistry, New Centruy Book Agency (P) Ltd, Reprint 2004.
3. Ambika Shanmugam, Fundamentals of biochemistry for Medical students,
4. Karthik Pprinters, 7th edition, 1992.
5. U.Sathyannarayana and U.Chakrabani, Biochemistry, Third Edition, Uppala- Author Publishers, 2007.

6. Mahtab. S.Bamji, Kamala Krishnaswamy and G.N.V Brahman, Text Book of Human Nutrition, Oxford and IBH Publishing Company, Third Edition.2009
7. Ramadevi K, Ed: Ambika Shanmugam's Fundamentals of biochemistry for medical students, 8th edition, Wolters Kluwer Health, India, 2016.
8. Rodwell V, Bender D, Botham KM, Kennelly PJ, Weil PA, Harper's Illustrated Biochemistry, 30th Edition, McGraw hill Education, 2015.
9. Sulochana H, Principles of Biochemistry, PBS enterprises, Chennai, 2010.
- 10.Cox MM and Nelson DL, Lehninger Principles of biochemistry, 5th edition, EH Freeman&Company, New york, 2008
11. Vasudevan DM, Sreekumari S, Textbook of Biochemistry, 5th edition, Jaypee Publishers, New Delhi, 2007
- 12.Veerakumari L, Biochemistry, 1st edition, MJP Publishers, 2005
- 13.Murray RK, Granner DK, Mayes PA, Rodwell VW, Harper's Illustrated Biochemistry, 26th edition, McGraw hill publishing house,., 2003

SEMESTER III	
Core/Major Practical III	Nutritional Biochemistry
Paper Code:	Theory: 3 hrs/week

Course Learning Outcomes:

1. To learn qualitative and quantitative analysis of biological fluids such as urine, blood and their estimation using standard methods.

Course Content

1. Qualitative analysis of carbohydrate-glucose, fructose, lactose, sucrose and maltose.
2. Qualitative analysis of amino acids- histidine, methionine, tryptophan, tyrosine, arginine and cysteine
3. Determination of urinary phosphorus and urea.
4. Estimation of blood cholesterol, iron and glucose.

SEMESTER III	
SBEC I	Food preservation and Processing
Paper Code:	Theory: 2 hrs/week

Course Learning Outcomes:

1. Describe the principles of food preservation
2. Suggest the application of the preservation process depending on the type of food.
3. To understand the principles of processing plant foods and to study the need for processing foods.
4. Choose the appropriate application of certain conservation processes with regard to the preservation of quality and the satisfactory durability of food products.
5. Optimize process parameters for selected conservation processes taking into account the physico-chemical properties of food products.

Course Content

Unit I

Introduction of food preservation - Definition and scope of food preservation, Principles of preservation, Food Preservation by high temperature - Sterilization Pasteurization Blanching and Canning.

Unit II

Food preservation by drying and dehydration: Definition, drying as a means of preservation, Differences between sun drying and types of driers used in the food industry. Evaporation – Definition, factors affecting evaporation, names of evaporators used in food industry.

Unit III

Food Preservation by Low temperature - Introduction to refrigeration, cool storage and freezing- Definition, Principle of freezing, changes occurring during freezing, Types of freezing.

Preservatives and its types and Shelf life of food products.

Unit IV

Food Processing- Definition, Importance, Scope of food processing industry.

Classification of plant food processing - Fruit and vegetable processing, Cereal and legume processing and Oil seeds processing.

Unit V

Classification of animal food processing - Milk processing, Meat processing, Fish processing, Poultry processing.

Introduction to Food Packaging- Objectives and functions of food packaging,

- Types of packaging Materials (briefly).

Reference

1. Potter NN (2013) Food science. 2. Brennan JG and Grandison AS (2012) Food processing handbook. 2nd Edition, John Wiley.
2. Manoranjan Kalia(2014)Food Quality Management Second Edition, Agrotech Publishing Academy, Udaipur.
3. Walter A. Mercer, (1988) Advances in Food Research First Edition, Academic Press, University of California, U.S.A. 3. Potter N (1995) Food Technology, 5th Edition, Cornell University, Ithaca, New York.
4. Coles R, McDowell D and Kirwan MJ, Food Packaging Technology, CRC Press, 2003
5. Frazier WC and Westhoff DC, Food Microbiology, TMH Publication, New Delhi, 2004.
6. Meyer LH, Food Chemistry, CBS Publication, New Delhi, 1987 8. Potter NH, Food Science, CBS Publication, New Delhi,
7. Ranganna S, Handbook of Analysis and Quality Control for Fruits and Vegetable, Products, 2 nd ed.

SEMESTER IV	
Core/Major Course IV	Principle of Human Nutrition
Paper Code:	Theory:4 hrs/week

Course Learning Outcomes:

1. Summarize and critically discuss and understand both fundamental and applied aspects of nutrition.
2. Able to explain functions of specific nutrients in maintaining health
3. Identifying nutrient specific force and apply the principles from the various factors of foods.
4. Gain in basic knowledge of the different nutrients and their role in maintaining health of the community
5. Develop skills in qualitative analysis and quantitative estimation of nutrients.

Course Content

Unit-I

Science of Nutrition, Concept of Nutrition- Definition of nutrition, health, nutritional status and malnutrition. RDA- Definition, factors affecting RDA and methods used for deriving RDA.

Carbohydrates- Definition ,composition, functions, maintenance of blood sugar levels, requirement, sources, digestion and absorption; Dietary fiber- Definition, classification, physiological effects and sources.

Unit-II

Proteins- Definition, composition, nutritional classification of proteins and amino acids, functions, sources, requirements, digestion and absorption. Evaluation of protein quality: PER, BV, NPU and Chemical score.

Lipids- Definition, composition, functions, sources, requirements, digestion and absorption. Essential fatty acids – Definition, functions, sources and effects of deficiency.

Unit- III

Energy- Definition, units of measurement, direct and indirect calorimetry; Determination of energy value of food, Total Energy requirement, Factors affecting physical activity, Factors affecting Basal Metabolic Rate, factors affecting Thermic effect of food, Recommended Dietary Allowances and Sources

Unit- IV

Macro Minerals- Calcium and Phosphorous: Functions, requirements, sources and effects of deficiency. Micro minerals- Iron, Iodine, Copper, Fluorine and Zinc: Functions, sources, requirements and effects of deficiency. Sodium and Potassium : Functions, sources, requirements and effects of imbalances.

Unit- V

Fat soluble Vitamins – Vitamin A, D, E and K: Functions, requirements, sources and effects of deficiency. Water Soluble Vitamins – Thiamine, riboflavin, niacin, ascorbic acid, folic acid, vitamin B6 and vitamin B12: Functions, requirements, sources and effects of deficiency.

Reference

1. Sumathi R. Mudambi, Rajagopal, M.V., Fundamentals of Foods and Nutrition, New Age International (P) Ltd, Publishers, Third edition, 1997.
2. Srilakshmi B., Nutrition Science, New Age International (P) Ltd, Publishers, Fifth ,multi colour edition, 2016.
3. Mangala Kango, Normal Nutrition, Curing diseases through diet, CBS Publications, First edition, 2005.
4. Sue Rodwell Williams, Nutrition and Diet Therapy, C.V. Melskey Co., 6th edition, 2000.
5. Mahtab. S.Bamji, Kamala Krishnaswamy and G.N.V Brahman, Text Book of Human Nutrition, Oxford and IBH Publishing Company, Third Edition. 2009.

SEMESTER IV	
Core/Major Practical IV	Food Analysis and Quality Control
Paper Code:	Theory:3 hrs/week

Course Learning Outcomes:

1. To understand different sampling techniques employed in chemical analysis of foods
2. To understanding on the quality attributes, their measurement principle and instrumentation of various instruments used in food quality analysis.
3. To learn about the importance of various methods to identify any adulteration aspect of food.

Course Content

1. Determination of moisture, ash and fiber in food.
2. Estimation of calcium, phosphorous, iron and ascorbic acid in food.
3. Estimation of total nitrogen in food.
4. Estimation of titrable acidity, pectin content of foods and lactose.
5. Estimation of specific gravity of milk using lactometer.
6. Determination of gluten content.
7. Determination of sugar concentration of food products using refractometer.
8. Sensitivity tests for four basic tastes.
9. Isolation of microorganisms by Pure Culture Technique and Microbial count by Standard Plate Count Method.
- 10 .Morphology and structural features of various bacteria and fungi commonly associated with Foods.
- 11.Tests for identification of adulterants present in commonly used foods.

Reference

Ranganna S. 2001. Handbook of Analysis and Quality Control for Fruit and Vegetable Products. 2nd Ed. Tata-McGraw-Hill. Govt. of India.

SEMESTER IV	
SBEC II	Food Standard and Quality Control
Paper Code:	Theory:2 hrs/week

Course Learning Outcomes:

1. To provide an opportunity to learn food quality standards.
2. To develop the skills on the standardization of food products with respect to quality maintain according to universal food standards worldwide.
3. To understand the principles of sensory evaluation
4. To develop skills to carry out sensory evaluation of a newly developed product
5. To understand the terms food adulteration and adulterant.

Course Content

Unit I

Standardization of Foods; Definition, Standards of Quality, for cereals, starchy foods, spices and condiments, sweetening agents, meat and meat products, vinegar, sugar and confectionary, beverages-alcoholic and non alcoholic , carbonated water etc., Milk and milk products , oils and fats , Canned foods , fruits and vegetables products.

Unit II

Food laws and regulation: Mandatory and voluntary food laws, International quality systems and standards like ISO and Food Codex, BRC; International trades & federal agencies, Indian act-Food Safety and Standards Act, 2006.

Unit III

Various food acts- PFA, FPO, AGMARK, MMPO, MFPO, edible oil acts, standard weight acts. HACCP AND WTO (briefly).

Unit IV

Concept of quality: quality attributes: physical, chemical, nutritional and microbial evaluation and measurement. Sensory evaluation- Types of sensory evaluation.

Unit V

Microbial quality control- determination of microorganisms in foods by cultural, microscopic, physical, chemical methods. Food adulteration- Definition, types of adulteration and toxic constitutes.

Reference

1. Siddappaa, G. S., Girdhari Lal and Tandon, G.L. 1998. Preservation of Fruits and Vegetables. ICAR, New Delhi
2. Sivasankar, B. 2002. Food Processing and Preservation. PHI Learning Pvt. Ltd. Delhi
3. Srilakshmi. 2010. Food Science. New age International 978-81-224-2724-0.
4. Srivastava, R. P. & Sanjeev Kumar. 2002. Fruits and vegetable Preservation – Principles and Practice. International Book Distributing Co., Lucknow.
5. Swaminathan, M. 1988. Hand book of Food Science & Experimental Foods. Bappco publishers, Bangalore
6. U.D. Chavan and J.V. Patil. 2013. Industrial Processing of fruits and vegetables. Astral International Pvt Ltd. New Delhi.
7. Vijay, K. 2001. Text Book of Food Sciences and Technology. ICAR, New Delhi.

SEMESTER V	
Core/Major Course V	Nutrition in Life Cycle
Paper Code:	Theory:5 hrs/week

Course Learning Outcomes:

1. To apply knowledge of the science of nutrition to human health across the lifespan.
2. Relate foods and nutrients to the biological requirements of humans at different stages of the life cycle.
3. Explain, compare and contrast the nutritional requirements of humans during different stages of the life cycle.
4. Apply collaboration and team work skills through shared learning in nutritional disease topics.
5. To formulate a dietary intervention plan to address nutritional deficiencies or excesses according to the health needs of individuals relative to age, developmental and disease status.

Unit-I

Menu planning – Objectives, planning balanced diets, food exchange lists.

Nutrition in pregnancy – Food and nutrient requirements, physiological changes during pregnancy, developmental stages of the embryo, physiological cost of pregnancy and complications in pregnancy.

Nutrition in lactation – Food and nutrient requirements, physiology of lactation, composition of breast milk, influence of mother's diet on the quality and quantity of milk production.

Unit-II

Nutrition during infancy – Growth and development during infancy, food and nutrient requirements, advantages of breast feeding, artificial feeding, preterm baby –nutritional requirements, weaning- types of weaning foods and supplementary foods, problems in weaning.

Unit III

Nutrition during preschool age – Food and nutrient requirements, eating habits and behaviour, growth and development and factors inhibiting growth.

Nutrition for school going children – Food and nutrient requirement, growth pattern, packed lunches, school lunch programmes.

Unit IV

Nutrition during adolescence – Food and nutrient requirements, changes in growth pattern, puberty, menarche, changes in food habits, binge eating disorder, predisposition to osteoporosis, anaemia, under nutrition, premenstrual syndrome, malnutrition due to early marriage, nutritional programmes.

Unit V

Nutrition in adulthood – Food and nutrient requirements, changes in consumption pattern - physical, mental and social changes influencing meal pattern.

Nutrition in old age – Food and nutrient requirements, physical, physiological, biological and psychological changes influencing meal pattern.

Reference

1. Wardlaw G.M, Hampi J.S, DiSilvestro R.A, Perspectives in Nutrition, 6th edition, McGraw Hill, 2004.
2. Chadha R and Mathur P, Nutrition: A Lifecycle Approach. Orient Blackswan New Delhi, 2015.
3. Seth V and Singh K, Diet Planning through the Life Cycle: Part 1 Normal Nutrition. A Practical Manual. Elite Publishing House Pvt. Ltd. New Delhi, 2006.
4. Robinson, Normal and therapeutic nutrition.: Macmillan Pub. Company New York , 2006.
5. Sumati R. Mudambi, M.V. Rajagopal., Fundamental of food, nutrition and diet therapy. New age international publishers, New Delhi, 2015.
6. Srilakshmi B., Dietetics, New age international publishers, New Delhi, 2014.

SEMESTER V	
Core/Major Course VI	Advanced Dietetics
Paper Code:	Theory:5 hrs/week

Course Learning Outcomes:

1. Integrate knowledge of research principles and methods associated with nutrition and dietetics practice.
2. Use effective and appropriate communication skills in providing information, advice and professional opinion to individuals, groups and communities.
3. Collect, organize and assess data relating to the health and nutritional status of individuals, groups and populations.
4. Demonstrate initiative and judgment using a professional, ethical and entrepreneurial approach advocating for excellence in nutrition and dietetics.
5. Independently plan and execute a research project in regard to nutrition and dietetics practice.

Course Content

Unit-I

Concepts in diet therapy - Growth and Scope of Dietetics, Purposes and Principles of Therapeutic Diets, Modifications of Normal Diets, Classification of the Therapeutic Diets.

Unit-II

Diet Therapy in Obesity, Underweight and Diabetes Mellitus Etiology, Pathophysiology, Clinical symptoms, metabolic alterations, Assessment/Indicators, Lifestyle & Dietary guidelines for the following conditions- Obesity (Bariatric Surgery: types, Management), Underweigh, Diabetes Mellitus (Acute and Chronic Complications of Diabetes Diet Modifications, Use of Food Exchange Lists, Insulin-Types and Use, Oral Hypoglycemic Agents, Carbohydrate counting, Glycemic Index, Glycemic Load).

Unit-III

Diet Therapy in Gastrointestinal Disorders and Diseases of the liver
Etiology, Pathophysiology, Clinical Symptoms, Assessment/Indicators,
Lifestyle & Dietary guidelines for the following conditions- Diarrhea,
Dysentery, Constipation, Peptic Ulcer, Jaundice, Hepatitis, Fatty Liver,
Cirrhosis.

Unit IV

Diet Therapy in Diseases of the Cardio Vascular System and Kidney
Diseases Etiology, Pathophysiology, Clinical Symptoms, Lifestyle & Dietary
guidelines for the following conditions- Atherosclerosis, Hyperlipidemia,
Hypertension, Nephrotic Syndrome, Nephrolithiasis, Acute and Chronic
Renal Failure, Dialysis and Kidney Stones.

Unit-V

Diet Therapy for Fever -Acute and chronic infectious disease-Typhoid,
Tuberculosis And HIV and AIDS a. Guidelines for management of
tuberculosis and infectious diseases. Cancer- Etiology, Metabolic
alterations, Types of Cancer, Dietary Recommendation for Cancer Survivors.
Nutritional therapy for Cancer.

Reference

1. Srilakshmi, B. Dietetics ,New Age International P. Ltd., New Delhi, 2018.
2. Dietary Guidelines of Indians – A Manual, National Institute of Nutrition, Hyderabad, 2015
3. Garg, M. Diet, Nutrition and Health, ABD Publishers, 2006. • Krause, M.V. and Mahan, L.K. Food, Nutrition and Diet Therapy, 9th Ed., W.B. Saunders Company, Philadelphia, 2019.
4. Maimun Nisha, Diet Planning for Diseases, Kalpaz Publishers, 2016. • Dietary Guidelines of Indians – A Manual, National Institute of Nutrition, Hyderabad, 2011.
5. Brown, J (2014).Nutrition now (7thed). Wadsworth, USA, ISBN-13:978-1-133-93653-4, ISBN 10:1-133-93653-9 • Nelms M, Sucher K (2015). Nutrition Therapy and Pathophysiology. (3rd edition) Cengage Learning, USA. ISBN-13: 978-1305111967, ISBN-10: 130511196

SEMESTER V	
Core/Major Practical V	Nutrition in Life Cycle
Paper Code:	Theory:3 hrs/week

Course Learning Outcomes:

1. Nutrition in life cycle focuses on food management through proper planning, preparation, monitoring, implementation and supervision of different age groups and to develop basic counseling skills as dietitian.

Course Content

1. Display raw and cooked food materials according to exchange lists given below. Record their nutritive value. Milk exchange list, Meat exchange list, Pulse exchange list, Cereal exchange list, Vegetable-A exchange list, Vegetable-B exchange list, Fruit exchange list and Fat exchange list.
2. Prepare and display one serving of common cooked foods given below. Record their weight and nutritive value. Cereal preparations, pulse preparations, vegetable preparations, fried snacks, non vegetarian preparations, bakery products, chutneys and sweets.
3. Planning, preparing and serving a meal for low income family, middle income family and high income family.
4. Planning, preparing and serving a meal for a pregnant woman in first second and third trimesters.
5. Planning, preparing and serving a meal for a lactating woman (0-6 months and 6-12 months).
6. (a). Planning, preparing and serving a meal for an infant.
(b). Planning and preparing an indigenous weaning mixes.
7. Planning, preparing and serving a meal for a preschooler.
8. Planning, preparing and serving a meal for a school going child (a boy and a girl).
9. (a). Planning, preparing and serving a meal for an adolescent.

(b). Planning and preparation of any five packed lunches.

10. Planning, preparing and serving a meal for an adult

(sedentary, moderate and heavy worker).

11. Planning, preparing and serving a meal for an old age person.

Reference

1. Srilakshmi, B. Dietetics ,New Age International P. Ltd., New Delhi, 2018.
2. Dietary Guidelines of Indians – A Manual, National Institute of Nutrition, Hyderabad, 2015.
3. Dietary Guidelines of Indians – A Manual, National Institute of Nutrition, Hyderabad, 2011

SEMESTER V	
Elective Course I	Public Health Nutrition
Paper Code:	Theory:4 hrs/week

Course Learning Outcomes:

1. Finally, the concepts and knowledge required for the delivery of community nutrition services will be applied to program planning, intervention and program evaluation.
2. Gaining knowledge on nutritional programmes and policies overcoming malnutrition.
3. Understanding the national, international and voluntary nutritional organizations to combat malnutrition.
4. Able to organize community nutrition education programme with the application of computers.
5. Apply immunological intervention programmes to overcome epidemic of communicable diseases.

Course Content

Unit-I

Introduction to public health nutrition a National development- Meaning and Scope of Public Health Nutrition, Roles and responsibilities of public health nutritionists, Definitions of optimum health, malnutrition (under nutrition, overweight, obesity, micronutrient deficiency), nutritional status, nutrition intervention, food and nutrient supplements, , nutrition education, morbidity, mortality rates.

Malnutrition - Ecology Consequences and of Malnutrition, Strategies To Overcome Malnutrition. Relation of nutrition to national development, Nutrition and food security.

Unit-II

Nutritional assessment Introduction, Definition of Nutritional Status, Instruments, Standard of Reference, Age Assessment, Measurement Techniques, Weight, Linear Measurement/Height, Circumferences, Soft Tissue Subcutaneous Fat, Objective and Classification of nutritional assessment Methods Overview of nutritional status assessment methods: Direct Nutritional Assessment parameters -Anthropometry, clinical signs and symptoms, dietary assessment and biochemical parameters. Indirect Nutritional Assessment parameters- a)Vital Statistics: Age Specific Mortality Rate, Morbidity and Cause of Specific Mortality, b) Ecological variables including crop production and c)Economic factors i.e. per capita income, population density & social habits

Unit-III

Social & behavior change communication Concepts, components and process of communication for nutrition health promotion • Definitions of Formal – non-formal communication, Participatory communication • Components of BCC(Sender, Message, Channel, Receiver) • Various types of communication – interpersonal, mass media, visual, verbal/ non-verbal. • need of SBCC in India. • Training workers in nutrition education programmes • Methods of education when to teach, whom to teach.

Unit -IV

National, international and voluntary organizations to combat malnutrition Role of Nutrition in Achieving Global Targets • Optimal Infant and Young Child Feeding: Significance of the first 1000 days of life • Improving maternal, infant and young child nutrition – WHO Global Targets 2025 • Nutrition Intervention programmes in India –ICDS , Mid-Day Meal (MDM) program. Fortification program National Programs to Combat Micronutrient Malnutrition: NIPI, VAPP and NIDDCP.

National and international agencies in combating malnutrition: International- WHO, FAO, UNICEF- Aim and functions. National- ICAR, ICMR, NIN, NFI, FNB, CFTRI, NNMB, NSI, DFRL- Aim and functions.

Unit-V

Epidemiology of communicable diseases • Definition, causes, signs and symptoms, treatment and prevention of communicable diseases, Respiratory infections and intestinal infections, • Other infections- dengue, Flu • Types of immunity- active, passive and herd-group protection • Immunization agents- vaccines, immunoglobulin • Immunization schedules - National and WHO Expanded Programme on Immunization Universal Passive, Combined, Chemoprophylaxis, non-specific measures.

Reference

1. Park A. (2007), Park's Textbook of Preventive and Social Medicine XIX Edition M/S Banarasidas, Bharat Publishers, 1167, Prem Nagar, Jabalpur, 428 001(India)
2. Bamji M.S, Prahlad Rao N, Reddy V (2004). Textbook of Human Nutrition II Edition, Oxford and PBH Publishing Co. Pvt. Ltd , New Delhi
3. Bhatt D.P (2008), Health Education, Khel Sahitya Kendra, New Delhi • Gibney MJ, Margetts BM, Kearney JM, Arab L (2004) Public Health Nutrition Blackwell Publishing Co. UK
4. Swaminathan M (2007), Essentials of Food and Nutrition. An Advanced Textbook Vol.I, The Bangalore Printing and Publishing Co. Ltd, Bangalore
5. UNICEF. <https://www.unicef.org/>
6. WHO. <http://www.who.int/>
7. National Guidelines on Infant and Young Child Feeding. wcd.nic.in
8. WHO Non-communicable diseases and risk factors. <http://www.who.int/ncds/en/>
9. National Nutrition Mission – ICDS. icds-wcd.nic.in • Ministry of Health & Family Welfare, www.mohfw.nic.in
10. Field guide to designing communication strategy, WHO publication- 2007
11. Communication for Development (C4D) Capability Development Framework, UNICEF and 3D Change, 2009

SEMESTER V	
Elective Course II	Basic in Research Methodology
Paper Code:	Theory:4 hrs/week

Course Learning Outcomes:

1. Basic knowledge on the role and importance of research in science.
2. Critically analyse research methodologies identified in existing literature.
3. Understanding the complex issues inherent in selecting a research problem, selecting an appropriate research design, and implementing a research project.
4. Develop a research proposal or industry project plan.
5. Search for, select and critically analyse research articles and paper

Course Content

Unit I

Research- Meaning, Definition, Characteristics, Objectives, Motivation Importance and types. Research Methods and Research Methodology, Criteria of a good research.

Unit II

Literature review - Definition, Purpose and Importance.

Research Design - Definition, Essential, Element, Characteristics and Types.

Unit III

Sample Design- Definition and Types.

Data Collection - Definition and Types.

Unit IV

Processing of Data - Editing, Coding, Classification and Tabulation.

Analysis of Data(Theory)- A) Measures of central tendency-Mode, Median and Mean. B) Measures of dispersion- Range, Mean Deviation and Standard Deviation.

Unit V

Layout of the Research Report - Preliminary Page, Main Text and End Matter.

Types of Reports - Technical and Popular

Oral Presentation - Structure of Presentation.

Sample Research Proposal in Science- Introduction, Problem Statement, Objectives, Preliminary Literature Review, Methodology and Reference.

Reference

1. Kothari, C.R., (2004), Research Methodology, Methods and Techniques, Second Revised Edition, New Age International Publishers, New Delhi.
2. Ranjit Kumar, (2011), Research Methodology: a step-by-step Guide for Beginners, Third Edition, SAGE Publications, New Delhi.
3. Beverley Moriarty, (2018), Research Skills for Teachers – From Research Question to Research Design, Allen & Unwin Publishers, Australia.
4. Rajendra Kumar, C. (2008), Research Methodology, APH Publishing Corporation, New Delhi.
5. Pagadala Suganda Devi (2017), Research Methodology: A Handbook for Beginners, Notion Press, Chennai.
6. Vijayalakshmi Ponnuraj and Sivaprakasam, C. (2008), Research Methods: Tips and Techniques, MJP Publishers.

SEMESTER V	
SBEC III	Bakery Science
Paper Code:	Theory:3 hrs/week

Course Learning Outcomes:

1. Resize recipes to meet production needs and equipment capacities.
2. Scale, mix, mold, proof and bake yeast raised goods.
3. Prepare cookies using various common dividing and panning techniques.
4. Prepare product finishes such as washes, glazes, icings and fillings.
5. To develop skills for setting up a bakery unit. And to enhance entrepreneurial skills in bakery and confectionery.

Course Content

Unit-I

Baking: Meaning, process and scientific principles involved. Basic plan and layout of a bakery unit.

Equipments used in bakery: Large equipments, small equipments and tools; types of ovens.

Ingredients used in bakery: Functional classification of ingredients- structure builders, tenderizers, moisteners, driers and flavors.

Unit-II

Flour: Composition, types and quality characteristics.

Sugar: Sources, uses and types of commercially available sugars.

Fats: Fats used as shortenings- Butter, margarine emulsified fats and flavored oils; properties and uses of shortenings.

Unit-III

Leavening agents: Definition and classification- physical; chemical-baking powder and its types, baking soda; biological- yeast- types and role in baking.

Moisturizing agents: Egg, water and milk- their role in baking.

Unit-IV

Bread: Ingredients used, steps in bread making process, processing methods, characteristics of good bread (external and internal), faults in shape, texture, crust and flavor of bread.

Cakes: Ingredients, types, cake making methods, test for doneness, characteristics of good cake (external and internal), cake faults and remedies.

Icing: Meaning, types, ingredients used and preparation guidelines.

Unit-V

Cookies: Characteristics, preparation methods and problems in cookie making.

Biscuits: Steps involved in biscuit making.

Pastries: Types and method of preparation.

Reference

1. Neelam Khetarpaul, Raj Bala Grewal and Sudesh Jood, Bakery science and cereal technology, Daya publishing house. 2013.
2. John Kingslee, A professional text to Bakery and Confectionary, New Age International (P) Limited. 2014.
3. NIIR Board of consultants and engineers, The complete technology book on bakery products, second edition, National Institute of Industrial Research, Delhi. 2009.
4. Manay Shakunthala, N and Shadaksharaswamy M. Food Facts and Principles, New Age International (P) Ltd Publishers, Reprint 2005.
5. Vijaya Khader, Text book of Food Science and Technology, Indian Council of Agricultural Research, New Delhi, 2001

SEMESTER V	
SBEC IV Practical I	Food Preservation and Bakery
Paper Code:	Theory:3 hrs/week

Course Learning Outcomes:

1. Apply major food preservation techniques and explain underlying principles.
2. Design common bakery and confectionery recipes.

Course Content

1. Preparation of Jam, Jelly and Marmalade.
2. Preparation of Fruit juices and Squashes.
3. Preparation of Pickles.
4. Preparation of Fruit preserves – Tuity fruity with papaya, petha with white pumpkin and murabha with ginger.
5. Preparation of vathal and vadagam.
6. Preparation bread, bun, cakes, biscuits, cookies, pastry and icing.
7. Preparation of sandwiches and desserts.

SEMESTER V& VI	
Core/ Major Course VII	Institutional Training
Paper Code:	Theory:3 hrs/week

Course Learning Outcomes:

1. Explore career alternatives prior to graduation.
2. Integrate theory and practice.
3. Develop work habits and attitudes necessary for job success.
4. Develop communication, interpersonal and other critical skills in the job interview process.
5. Build a record of work experience.

Course Content

It is compulsory for all the students to complete the 2 given institutional training programs in a reputed institution for a period of 15 days each. At the end of the final year, each student has to submit a report of the training and undergo a viva voce examination. Marking system is as follows:

Component	Marks
Internal Evaluation (Report writing parts and viva)**	40
External Evaluation(Two Questions (20 marks***), Training Reports(20 marks) and viva voce (20 marks))	60
Total	100

**Internal marks will be awarded by the faculty of the department.

*** External Examiner will set the questions

Aspects to be covered in the institutional training programs

(A) Dietary internship training

1. Assessing the nutritional status and diet history of patients.
2. Planning diet sheets, preparing and providing guidance in the production of therapeutic diet.

3. Supervising the preparation of diets.
4. Supervising the delivery of trays to the patient.
5. Getting feedback from patients regarding diets.
6. Understanding the layout of hospital dietary unit.
7. Acquiring practical knowledge in diet counseling.
8. Under taking 2 case studies at hospital situation.

(B) Food processing training

1. Studying the type of processing techniques used by the industry.
2. Gaining knowledge on equipments used in processing.
3. Understanding the packaging process.
4. Obtaining experience in quality control operations.
5. Studying the waste disposal methods.
6. Market survey for the demand for the product in the market.

SEMESTER VI	
Core/ Major Course VIII	Food Microbiology
Paper Code:	Theory:6 hrs/week

Course Learning Outcomes:

1. Explain the interactions between microorganisms and the food environment, and factors influencing their growth and survival.
2. Explain the significance and activities of microorganisms in food.
3. Describe the characteristics of food borne, waterborne and spoilage microorganisms, and methods for their isolation, detection and identification.
4. Understand the role of microorganisms in environment.
5. Apply preservation techniques to avoid food spoilage.

Course Content

Unit-I

Microorganisms important in food microbiology – Mold, Fungi, Algae, Bacteria and Virus – general characteristics. Contamination of foods – green plants and fruits, animals, sewage, soil, water, air during handling and processing. Spoilage – cause, classification, factors affecting kinds and numbers of microorganisms in food.

Unit-II

Spoilage of different groups of foods – cereal and cereal products, vegetables and fruits, meats and meat products, fish and other sea foods, eggs, poultry, milk and milk products and canned foods.

Unit III

Food preservation – Methods and principles of food preservation, delay of microbial decomposition, prevention of microbial decomposition, removal of micro organisms.

Preservation by use of high temperatures – Factors affecting heat resistance of microorganisms, commercial heat preservation methods –sterilization, canning, pasteurization, blanching.

Preservation by use of low temperatures – Growth of microorganisms at low temperatures, low temperatures storage – cellar, chilling and frozen.

Unit IV

Preservation by drying - Methods of drying, factors in control of drying, treatments of foods before after drying. Preservation by chemicals,

Preservation by Irradiation – Microwave radiation, Ultraviolet radiation and ionizing radiation.

Unit V

Food borne illness – Food hazards, significance of food borne disease, incidence of food borne illness, risk factors associated with food borne illness.

Bacterial agents of food borne illness – Clostridium botulinum, Escherichia coli, Salmonella, Shigella and Staphylococcus- The organism, pathogenesis and clinical features and association with foods.

Reference

1. Adams M.R., Moss M.O., Food Microbiology, New age international publishers, New Delhi, 2015.
2. William C Frazier., Dennis C Westhoff., Food Microbiology, McGraw Hill education private limited, New delhi, 2014.
3. Sivasankar., Food Processing and Preservation, PHI Learning private limited New delhi, 2015.
4. Branen A.L. and Davidson, P.M.. Antimicrobials in Foods. Marcel Dekker, New Delhi, 1983.
5. Jay J.M., Modern Food Microbiology. 3rd Edn. VNR, New York.utta. 1980 9th Edition, Prism Books Pvt. Ltd.,1986

SEMESTER VI	
Core/ Major Course IX	Quantity Food Service Physical Facilities
Paper Code:	Theory:6 hrs/week

Course Learning Outcomes:

1. Manage the human resources within a food services organization or department.
2. Communicate appropriately with clients, staff and management.
3. Apply food services technology and operate industry equipment.
4. Develop nutritional menus for food service production.
5. Design and run a quantity food service establishment.

Course Content

Unit-I

Quantity food service: Meaning and evolution. Classification of food service institutions according to a). Function: Profit oriented, service oriented and public health facility oriented b) Processing method: Conventional system, commissary system and fast food service systems.c)Service of food: Self service, tray service and waiter-waitress service.

Unit-II

Space organization: Kitchen- Size and type; developing kitchen plan; work simplification- work area, worker's area of reach, work space, equipment materials and supplies and movement at work; features to be considered in designing kitchen; kitchen lay out.

Storage space: Location, planning, lay out, safety and security. Service area: Location, planning, dimensions and decor.

Equipments: Classification, selection, design, installation, operation, care and maintenance of commonly used equipments.

Unit-III

Food purchasing: Food buyer- Knowledge, quality and functions of a food buyer; methods of buying food.

Receiving and storage of food: Delivery methods, delivery procedure; Receiving; Storage- organization of storages, general procedure for storage; Store keeping- store records, order form and goods received book.

Unit-IV

Menu planning: Menu- Definition, functions, need for and factors to be considered in menu planning, procedure for writing menu, types and construction of menu, menu display.

Standardization of recipe: Definition, methods of standardization, standard recipe format and uses.

Standard portion sizes: Definition, portioning equipments and portion control.

Unit-V

Food production: Meaning, types of food production system, process of food production (briefly), large quantity cooking techniques, use of leftover food and holding techniques.

Food service: Meaning, styles- waiter service, self service and vending.

Reference

1. Mohini Sethi and Surjeet Malhan, Catering management- An integrated approach, Third edition, New Age International publishers. 2015.
2. Mohini Sethi, Institutional food management, Second edition, New Age International publishers. 2016.
3. Kinton, R and Cesarani, V., The Theory of Catering ELBS, VII Edition, 1992.
4. Lillicap, D.R and Cousins, J.A. Food and Beverage Service, ELBS, IV Edition, 1994.

SEMESTER VI	
Core Practical VI	Dietetics
Paper Code:	Theory:3 hrs/week

Course Learning Outcomes:

1. Understanding of the conditions where nutrition plays a significant role in disease management.
2. Develop the knowledge to provide nutrition and dietetic care for individuals, groups and populations who have or already are at risk of developing long-term health conditions.

Course Content

1. Preparation of any 5 recipes for the following therapeutic hospital diets- clear liquid, full liquid, semi solid, bland, soft and regular diets.
2. Planning and preparation of diets for the following conditions using SOAP format for nutritional management. [Students have to analyze the given case history, prepare SOAP note, plan a day's menu and calculate the nutritional requirements. Record must include Food plan (total exchanges/ day), meal pattern and menu (distribution of exchange into meals and snacks)].
 - a. Obesity and under weight
 - b. Gastro intestinal disorders – Peptic ulcer, diarrhoea and constipation
 - c. Febrile condition- typhoid and TB
 - d. Diseases of liver and gall bladder-Hepatitis and cirrhosis.
 - f. Diabetes mellitus
 - g. Diseases of cardio vascular system – Atherosclerosis and Hypertension
 - h. Diseases of kidney and urinary tract – Nephrolithiasis, Nephrotic syndrome and kidney stones
 - i. Cancer and AIDS.

Reference V.Vimala, Advances in diet therapy- Practical manual, New Age International Publishers, 2010.

SEMESTER VI	
Elective Course III	Nutrition for Sports and Fitness
Paper Code:	Theory:4 hrs/week

Course Learning Outcomes:

Upon successful completion of the course students shall be able to:

1. Explain the principles of physical fitness and nutrition (such as body composition, energy intake, energy expenditure, and the acute and chronic physical changes related to exercise and nutrition) complement each other in helping to develop physiological well-being and overall health.
2. Explain the principles of fitness and nutrition (such as setting realistic short-term behavior change goals and the relationship of exercise and diet to stress reduction) complement each other in helping to develop psychological well-being and overall health.
3. Identify some of the social and cultural influences on food habits and exercise/activity patterns.
4. Evaluate current nutritional information with regard to its contribution to Health and physical fitness.
5. Apply the knowledge acquired for planning diet for athletes.

Course Content

Unit-I

Physical fitness: Definition; benefits of physical activity; Physiology and biochemistry of exercise: Muscle contraction; weight and body composition of athletes; adaptation of muscle and body physiology to exercise; effect of excessive physical exercise on cardio vascular and pulmonary system.

Unit-II

Energy sources for muscle use- ATP, phospho creatine, glucose, fat and protein; anaerobic metabolism for high intensity bursts and power; aerobic metabolism for endurance. Nutritional assessment and counseling for athletes.

Unit-III

Nutritional requirement: Effect of differential intakes of macro nutrients (carbohydrates, protein and fat) on the athletic endeavor; hydration strategies to optimize physical activity capacity; importance of timing the nutrient and fluid intake to match tissue requirements.

Unit-IV

Nutritional needs and plans for sports requiring power and speed before, during and after exercise; Nutritional needs and plans for sports requiring endurance before, during and after exercise; Nutrition plan for sports requiring combined power and endurance.

Unit-V

Nutrition needs of male, female, younger and older athletes. Ergogenic aids: Effect of ergogenic aids and other substances on physical activity; sports drinks for endurance activities; nutrition supplements available for athletes.

Reference

1. Gordan.M.Wardlaw, Perspectives in Nutrition, fourth edition, Mc. Graw Hill companies. 1999.
2. Antia. F.P. and Philip Abraham, Clinical dietetics and Nutrition, fourth edition, Oxford University Press. 2002.
3. Srilakshmi. B., Dietetics, seventh edition, New age international (P) Limited. 2014.
4. L.Kathleen Mahan, Sylvia Escott-stump, Krause's Food, Nutrition and Diet therapy, ninth edition, W.B. Saunders company., 1996.
5. Don Benordot, Advanced sports nutrition, second edition, Human Kinetics, 2012.

SEMESTER VI	
SBEC V	Diet Counselling
Paper Code:	Theory:4 hrs/week

Course Learning Outcomes:

1. Understanding the diet counseling skills and acquaint them with basic principle.
2. Determine and translate nutrient needs into menus for individuals and groups across the lifespan, in diverse cultures and religions.
3. Students will be able to interpret and apply nutrition concepts to evaluate and improve the nutritional health of individuals with medical conditions
4. Produce oral and written communications for a group education session.
5. Interview individuals for diet histories and Counsel individuals.

Course Content

Unit I

Dietitian – Classification, code of ethics, responsibilities. Computer application - Use of computers by dietitian, dietary computations, dietetic management, education/training, information storage and administrations. Teaching aids used by dietitians - charts, leaflets, posters etc., preparation of teaching material for patients.

Unit II

Diet Counselling-meaning, significance, process, types.

Goals of counselling, individuals, group and family counseling.

Basic sequence in counselling.

Communication process in counselling and linguistics in clinical dietary practices, problems in communication.

Unit III

Techniques of obtaining relevant information- Retrospective information, Dietary Diagnosis, Assessing food and nutrient intakes, Lifestyles, Physical

activity, Stress, Nutritional Status. Correlating Relevant Information and identifying areas of need.

The Care Process - Setting goals and objectives short term and long term, Counselling and Patient Education, Dietary Prescription.

Motivation - Hospitalized patients and Outpatients.

Unit IV

Counselling Skills Approaches to counselling – Psycho analytic approach, Behaviouristic, Humanistic approach Pre – Helping phase: Rapport building skills, Attending and listening skills. Stage I skills: Empathy, respect, Genuineness and concreteness. Stage II skills: Advanced empathy, self disclosure, Immediacy and Confrontation. Stage III skills : Goal setting, Action plan Programme and Brainstorming.

Unit V

Teaching aids used by dietitians- charts, leaflets, posters etc., preparation of teaching material for patients suffering from Digestive disorders, Hypertension, Diabetes, Atherosclerosis & Hepatitis and cirrhosis.

Reference

1. Gibson, R.L., Mitchell, M.H.(2005). Introduction to counselling and guidance (6th Ed) •
2. Gelso, C.J., Fretz, B.R.(1995). Counselling Psychology, Bangalore, Prism Books Pvt Ltd.
3. Sharma, T.C.(2002). Modern Methods of Guidance and Counseling, New Delhi, sarup& sons
4. Mahan L K and Escott Stump S (2013). Krause's Food & Nutrition Therapy, 13th ed. Saunders-Elsevier.
5. Stacy Nix (2009). William's Basic Nutrition and Diet Therapy, 13th Edition. Elsevier Mos
6. Thomas Briony; (1995). Blackwell Manual of Dietetic practise. (2nd Ed.) Oxford: New York .,1995.

SEMESTER VI	
SBEC VI	Entrepreneurship Development
Paper Code:	Theory:4 hrs/week

Course Learning Outcomes:

1. Understand the concept of entrepreneurship.
2. Identify ways to approach supportive Institutions and Banks for starting an enterprise.
3. Analyze the steps in product selection and form of ownership.
4. Focus on the formation of project proposal and practice effective accounting processes.
5. Understand the requirements to become an entrepreneur.

Course Content

Unit-I

Entrepreneur: Definition, qualities and essential skills of an entrepreneur, communication and presentation skill; innovativeness; idea generation and SWOT analysis. Steps to start a small enterprise, learning journey of a successful entrepreneur.

Unit-II

Business plan for small enterprises: Importance of business plan, purpose, contents and benefits of business plan; business plan creation process, benefits of business plan, preparation of sample business plan. Business ethics and etiquettes.

Unit-III

Market survey: Meaning, process of conducting market survey, points to be considered for effective market research; steps to register a company; regulatory requirements.

Unit-IV

Management process and policies: Importance of policy creation, corporate governance, management process, management functions- production and operation management, marketing management, financial management and human resource management.

Pricing policy and methods of pricing.

Unit-V

Marketing management- Concept of marketing, market assessment, market regulation, market targeting, marketing mix, promotional strategies and tips for successful marketing.

Financial needs: Types of financial needs- fixed and working capital; methods of raising capital, working capital management, working capital cycle.

Reference

1. Entrepreneurship development- Your gateway to the journey of entrepreneurship, ICT Academy of Tamil Nadu, Chennai. 2015.
2. S.S. Khanka, Entrepreneurial development, S.Chand Publications, 2007.
3. Vasant Desai, Entrepreneurial development, Vol-1, Himalaya Publishing House, 2009.

SEMESTER III	
Allied Course II	General Home Science I
Paper Code:	Theory:4 hrs/week

Course Learning Outcomes:

1. Develop an understanding of concepts and basics of textiles.
2. Understands and define the key textile terms.
3. Understand basic principles of clothing construction.
4. Concept, definition, universality and scope of family resource management.
5. Practicing knowledge gained on selection of site and building principles in real life situations.

Course Content

Unit I

Textile – Definition, Terminology and Classification of textile fibers. Basic unit and Polymer bonds in textile fiber, Physical and Chemical Properties of fibers.

Processing of Manufacture of all Natural and Man-Made Fibers – Plant, Protein, Man-Made, Cellulosic, Synthetic, Metallic, Mineral and Elastomeric Fibers.

Unit II

Clothing : Origin of Clothing , Principles of Clothing, Clothing Construction – Drafting flat pattern and Dapping.

Textile Designing, Fashion Designing – Influence Factors, Fashion Cycle, Broken fashion cycles, Fashion adoption theories and Business and Merchandizing.

Unit III

Home Management : Definition, Characteristic of Management , Importance of Home Management, Motivation Factors of Management (Values,Goals,Standards) , Home Management Process

Unit IV

Family Resource Management: Types and Characteristics of Family Resource.

Family Decision Making – Definition and Types of Decision Making.

Housing – Definition, Importance and Functions of a House , Principles of Planning, Space Allocation and Organization in Independent Houses, Apartments and Flats.

Symbols used in Drafting Plans, Reading Plans and Blueprint.

Unit V

Interior Design: Definition, Principles and Classification.

Household Equipments

Colors – Definition , Classification, Factors Influencing Choice of Colors

Furniture and Lighting – Definition and Types.

Reference

1. Sunita Mishra (2018), Selective and Scientific Books, New Delhi.
2. Bhargava, B. (2001). Family Resource Management and Interior Decoration, Delhi: University Book House. Bhargava, B. (2001).
3. Housing and Space Management. Jaipur: University Book House Ltd.
4. Seetharaman, P., Batra, S., & Mehra, P. (2005). An Introduction to Family Resource Management. New Delhi: CBS Publishers & Distributors (ISBN 13: 9788123911861)
5. Shukul, M., and Gandotra, V. (2006). Home Management and Family Finance. New Delhi: Dominant Publishers and Distributors. (ISBN No. 81-7888-403-8).

SEMESTER III & IV	
Allied Practical II	General Home Science
Paper Code:	Theory:3 hrs/week

Course Content

1. To prepare first aid kit.
2. Preparation budget for low, middle and high income group family
3. Learning to fill different bank forms- Fill form to withdraw and deposit money, Open account in bank, Recurring deposit.
4. Drawing house plans for low, middle and high income groups.
5. Drawing kitchen layout for different families with plumbing and wiring.
6. Preparation of an album on development milestones of children.
7. Market study on –Cost of different types of furnitures
8. Designing greeting cards for different occasion (any five occasions).
9. Table setting-Fruit and vegetable carving.
- 10.To identify various types of fibres using- burning test and visual inspection.
- 11.Basic stitches.
- 12.Use of waste material for making decorative and utility materials.
- 13.Paper cutting for decorating a house for special occasions.
14. Prepare one poster/chart on environmental/personal hygiene and sanitation.
- 15.Preparation and evaluation of label- Evaluation of label on different type of food products, Prepare label.
- 16.Methods of strain removal.
- 17.Methods of soap and detergent preparation.
18. Kitchen gardens-use the waste container(any four greens).
- 19.To prepare simple dishes using different germination methods (any five food).

SEMESTER IV	
Allied Course II	General Home Science II
Paper Code:	Theory:4 hrs/week

Course Learning Outcomes:

1. Provide situations to understand significance of family income and expenditure and saving for future.
2. Know the importance of early childhood years and significance of intervention programs for early childhood development.
3. Learn about women's human rights and laws related to women in India.
4. Gain knowledge on consumer protection Laws and Acts and reflect upon personal rights and responsibilities
5. Learn about the concept of extension, extension approaches and models

Course Content

Unit I

Family: Meaning and Characteristics of Family, Types of Family, Family Life Cycle , Family Wants, Family Income , Family Expenditure and House Hold Accounts , Family Budgets , Economics , Consumer Protection – Definition , Importance , Law , Consumer Education and Advertisement.

Unit II

Child Development: Principles of Development, Stages of Growth and Development.

Life Span Development – Psychodynamic Theory – Psycho – Analytic Theory of Freud – Erick Ericksons, Psycho – Social Theory , Learning Theory , Social Learning Theory , Cognitive Developmental Theory , Kohlberg's Moral Reasoning Theory , Information : Processing Theory . Bronfen Brenners Theory, Life – Span and Life – Cycle Theory.

Unit III

Early Childhood Care and Education : Emerging Trends – Trends , Issues and Concern , Development Problems , Mental Sub normality – Mental Retardation – Learning Disabilities , Behavior Difficulties – Speech and Language Disorders – Hearing Impairment – Visual Impairment – Physical Handicap – Giftedness, Guidance and Counseling.

Unit IV

Child and Human Development : Early Childhood Care and Development – Principles of Development , Types of Change in Development.

Socialization in various Family Contexts Across Different Cultures – Process in Socialization, Social and Non- Social People , Difficulties in Conforming to Social Expectations , Foundations of Social Behavior laid by Babyhood , Behavior patterns in social situations during early childhood.

Women studies - Women's Equality, Violence against Women, Women Health, Women Empowerment, Women and Human Rights.

Unit V

Extension Education: Non Formal Education and Extension Education, History and Development of Home Science Extension, Concepts of Extension Education, Philosophy of Extension Education, Principles of Extension Education, Difference between Formal and Extension Education, Extension Education: A Developed discipline.

Curriculum Planning and Development : Objectives of non formal education ,Planning non formal education Programme, Management and Administration of formal/non formal and extension education, Monitoring , Supervision and evaluation formal, non formal and extension education, Major types of test, Qualities of a good test.

Reference

1. Bhargava, B. (2005). Family Resource Management and Interior Decoration, Jaipur: Apple Printer and V. R. Printers.

2. Deacon, R. F., and Firebaugh, F.M. (1975). Home Management: Contexts and Concepts. Boston: Houghton Mifflin Company.
3. Nisha, M. (2006). Understanding Extension Education. New Delhi: Kalpay Publications.
4. Reddy, A.A. (2001). Extension Education. Bapatla: Sri Lakshmi Press.
5. Singh, U.K and Nayak, A.K. (2007). Extension Education. New Delhi: Common Wealth Publishers.
6. Sunita Mishra (2018), Selective and Scientific Books, New Delhi.

SEMESTER III (other major)	
NMEC I	Basic Food Science
Paper Code:	Theory:2 hrs/week

Course Learning Outcomes

The students will be able to

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

UNIT - I

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

UNIT - II

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

UNIT - III

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

UNIT - IV

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

UNIT - V

Fruits- Classification, nutritive value and changes during ripening.

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

Reference

1. Sumathi R. Mudambi, Shalini M. Rao, M.V. Rajagopal Food Science, revised second edition, New Age International (p) Limited, Publishers New Delhi, reprint. 2006.
2. N. Swaminathan, Food Science and Experimental foods, The Bangalore printing and publishing Co. Ltd. Bangalore, 1992.
3. B. Srilakshmi, Food Science, New Age international (P) Ltd, New Delhi, Reprint 2006.
4. N. Shakuntala Manay, M. Shadaksharaswamy, Foods – Facts and Principles. 2nd Edition. New Age International (P) Ltd, New Delhi, Reprint 2005.

SEMESTER IV(other major)	
NMEC II	Basic Nutrition
Paper Code:	Theory:2 hrs/week

Course Learning Outcomes

The students will be able to

1. Understand the principles of nutrition
2. Learn about the nutrients and deficiency

UNIT - I

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

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

UNIT - III

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

UNIT - IV

Minerals

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

UNIT - V

Vitamins

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

Reference

1. Mangala Kango Normal Nutrition (Fundamental & Management) RBSA Publishers S.M.S Highway Jaipur – 302003 L, 2003.
2. M. Raheena Begum, Text book of Foods, Nutrition and Dietetics, Second Revised Edition, Sterling Publishers Private Ltd, New Delhi, 2005.
3. B. Srilakshmi, Nutrition Science, New Age International (P) Ltd, New Delhi, 2002.
4. Mahtab S. Bamji, N. Pralhad Rao, Vinodini Reddy, Text Book of Human Nutrition Oxford and IBH Publishing Co. Pvt. Ltd, New Delhi, Reprint 1999.