# MOTHER TERESA WOMEN'S UNIVERSITY
# KODAIKANAL

## DEPARTMENT OF HOME SCIENCE

## B.Sc. FOODS & NUTRITION

## SYLLABUS TO BE IMPLEMENTED FROM THE ACADEMIC YEAR 2021-2022

## (CHOICE BASED CREDIT SYSTEM)

**Mother Teresa Women's University, Kodaikanal**
**Department of Home Science**
**Choice Based Credit System (CBCS)**
**2021-2022 onwards)**
**B. Sc-Foods and Nutrition**

1. **About the Programme:**
Foods and Nutrition specialization provides the students an in depth knowledge and skills for enhancing employability and entrepreneurship in all areas namely; Food Processing, Quality Control, Food safety, Nutrition and Dietetics. This programme facilitates to gainknowledge on concepts, theories, principles of food science, food service management, food preservation, interior decoration, child development, physiology, biochemistry, microbiology, basic nutrition, clinical nutrition, life span nutrition, medical nutrition therapy and public health nutrition related to the holistic development and wellness of the individual, family and community at large.

2. **Program Educational Objectives (PEOs)**

| | |
|---|---|
| **PEO 1** | To impart the fundamental knowledge in all the major domains of Home Science and related areas of studies |
| **PEO 2** | To develop competency of students in application of knowledge in different settings i.e. family, community, workplace etc. |
| **PEO 3** | To impart and cultivate skills for wide range of professions related Home Science |
| **PEO 4** | To prepare them for higher degrees with specializations |
| **PEO 5** | To create professionals in home science related areas and to foster research acumen, teaching skills for career prospects in government and public services or to emerge as successful entrepreneurs. |

**3. Eligibility:**
Candidates for admission to the first year of the Degree of B. Sc-Home Science shall be required to have passed the Higher Secondary Examinations (with the specialization-Chemistry/ Biology/ Home Science/Nursing/Science-based disciplines) conducted by the Government of Tamil Nadu or any recognized board.

4. **General Guidelines for UG Programme**

1. **Duration:** The programme shall extend through a period of 6 consecutive semesters and the duration of a semester shall normally be 90 days or 450 hours. Examinations shall be conducted at the end of each semester for the respective subjects.

2. **Medium of Instruction:** English

3. **Evaluation:** Evaluation of the candidates shall be through Internal Assessment and External Examination.

| Evaluation Pattern | Theory | | Practical | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| **Internal** | **10** | **25** | **10** | **25** |
| **External** | **30** | **75** | **30** | **75** |

- **Internal (Theory): Test (15) + Assignment (5) + Seminar/Quiz(5) = 25**
- **External Theory: 75**

- **Question Paper Pattern for External examination for all course papers.**

**Max. Marks: 75** **Time: 3 Hrs.**

| S.No. | Part | Type | Marks |
|---|---|---|---|
| 1 | **A** | **10*1 Marks=10**<br>Multiple Choice Questions(MCQs): 2 questions from each Unit | **10** |
| 2 | **B** | **5*4=20**<br>Two questions from each Unit with Internal Choice (either /or) | **20** |
| 3 | **C** | **3*15=45**<br>Open Choice: Any three questions out of 5 : one question from each unit | **45** |
| Total Marks | | | **75** |

*** Minimum credits required to pass: 156**

**5. Conversion of Marks to Grade Points and Letter Grade (Performance in a Course/ Paper)**

| Range of Marks | Grade Points | Letter Grade | Description |
|---|---|---|---|
| 90 – 100 | 9.0 – 10.0 | O | Outstanding |
| 80-89 | 8.0 – 8.9 | D+ | Excellent |
| 75-79 | 7.5 – 7.9 | D | Distinction |
| 70-74 | 7.0 – 7.4 | A+ | Very Good |
| 60-69 | 6.0 – 6.9 | A | Good |
| 50-59 | 5.0 – 5.9 | B | Average |
| 40-49 | 4.0 – 4.9 | C | Satisfactory |
| 00-39 | 0.0 | U | Re-appear |
| ABSENT | 0.0 | AAA | ABSENT |

**6. Attendance**

Students must have earned 75% of attendance in each course for appearing for the examination. Students with 71% to 74% of attendance must apply for condonation in the Prescribed Form

with prescribed fee. Students with 65% to 70% of attendance must apply for condonation in the Prescribed Form with the prescribed fee along with the Medical Certificate. Students with attendance lesser than 65% are not eligible to appear for the examination and they shall re-do the course with the prior permission of the Head of the Department, Principal and the Registrar of the University.

**7. Maternity Leave**

The student who avails maternity leave may be considered to appear for the examination with the approval of Staff i/c, Head of the Department, Controller of Examination and the Registrar.

**8. Any Other Information**

In addition to the above mentioned regulations, any other common regulations pertaining to the UG Programmes are also applicable for this Programme.

**9. Program Outcomes**

On completion of this Programme, the learners will be able to

**PO1 -** gain an understanding of the association between food and health.
**PO2 -** learn the preventive measures to overcome metabolic abnormalities.
**PO3 -** acquire knowledge and skills in the pursuit of academic excellence aimed at advancement in this area of specialization and extension activities.
**PO4** - develop self-reliance through the balance of freedom and discipline within the body, mind, and spirit.
**PO5** - understand and apply nutritional assessment techniques.
**PO6** - integrate the broad aspect of food into dietetics practice.
**PO7** - impart nutrition counseling and education to individuals, groups, and communities.
**PO8** - acquire professional, vocational, and entrepreneurial skills for career design and development.

**10. Program Specific Outcomes (PSO)**

On completion of this Programme, the learners will be able to

**PSO1** - appraise the quality of foods and nutrition and appreciate their significance for healthy living.
**PSO2** - apply food science knowledge to describe the function of ingredients food.

**PSO3** - apply technical skills, knowledge of health behavior, clinical judgment, and decision-making skills.
**PSO4** - assess and evaluate the nutritional status of individuals and communities and their response to nutrition intervention.
**PSO5** - educate the community on dietary modification based on the severity of illness and complications of the diseases.

## B.Sc. FOODS and NUTRITION Curriculum

| S. No | Course Code | Title of the Course | Credits | Hours | | Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | | | T | P | INT | EXT | Total |
| **FIRST SEMESTER** | | | | | | | | |
| 1 | U21LTA11 | PART-I Tamil I | 3 | 6 | 0 | 25 | 75 | 100 |
| 2 | U21LEN11 | PART-II English I | 3 | 6 | 0 | 25 | 75 | 100 |
| 3 | U21FNT11 | **CORE I** - Food Science | 4 | 5 | 0 | 25 | 75 | 100 |
| 4 | U21FNP11 | **CORE II** – Practical-I Food science practical | 4 | 0 | 6 | 25 | 75 | 100 |
| 5 | U21CHA11 | **ALLIED I** – Chemistry | 4 | 5 | 0 | 25 | 75 | 100 |
| 6 | U21EVS11 | Environmental Studies | 2 | 2 | 0 | 25 | 75 | 100 |
| 7 | U21PELS11 | Professional English-I | 4 | 6 | 0 | 25 | 75 | 100 |
| | | **Total** | **24** | **36** | | - | **-** | **700** |
| **SECOND SEMESTER** | | | | | | | | |
| 8 | U21LTA22 | PART-I -Tamil II | 3 | 6 | 0 | 25 | 75 | 100 |
| 9 | U21LEN22 | PART-II English II | 3 | 6 | 0 | 25 | 75 | 100 |
| 10 | U21FNT21 | **CORE III**– Fundamentals of Nutrition | 4 | 5 | 0 | 25 | 75 | 100 |
| 11 | U21FNT22 | **CORE IV** – Human physiology | 4 | 5 | 0 | 25 | 75 | 100 |
| 12 | U21CHA22 | **ALLIED II** - Chemistry Practical | 4 | 0 | 5 | 25 | 75 | 100 |
| 13 | U21VAE21 | Value Education | 3 | 3 | 0 | 25 | 75 | 100 |
| 14 | U21PELS22 | Professional English-II | 4 | 6 | 0 | 25 | 75 | 100 |
| | | **Total** | **25** | **36** | | **-** | **-** | **700** |
| **THIRD SEMESTER** | | | | | | | | |
| 15 | U21LTA33 | PART-I Tamil III | 3 | 6 | 0 | 25 | 75 | 100 |
| 16 | U21LEN33 | PART-II English I | 3 | 6 | 0 | 25 | 75 | 100 |
| 17 | U21FNT31 | **CORE V** Nutrition Through Life Cycle | 4 | 5 | 0 | 25 | 75 | 100 |
| 18 | U21FNA33 | **ALLIED III** Nutritional Biochemistry | 4 | 5 | 0 | 25 | 75 | 100 |
| 19 | U21FNE311 U21FNE312 U21FNE313 | **ELECTIVE-I** Entrepreneurship Development/ Bakery and Confectionary/ Extension Education | 3 | 4 | 0 | 25 | 75 | 100 |
| 20 | U21MSS31 | **SBE-I** Managerial skills | 2 | 2 | 0 | 25 | 75 | 100 |
| 21 | | **Non-Major Elective-I** | 2 | 2 | 0 | 25 | 75 | 100 |
| 22 | U21PELS33 | Professional English- III | 4 | 6 | 0 | 25 | 75 | 100 |
| | | **Total** | **25** | **36** | | | | **800** |
| **IV SEMESTER** | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 23 | U21LTA44 | PART-I Tamil IV | 3 | 6 | 0 | 25 | 75 | 100 |
| 24 | U21LEN44 | PART-II English IV | 3 | 6 | 0 | 25 | 75 | 100 |
| 25 | U21FNT41 | **CORE VI** - Therapeutic Nutrition | 4 | 4 | 0 | 25 | 75 | 100 |
| 26 | U21FNP42 | **CORE VII** Therapeutic Nutrition Practical | 4 | 0 | 4 | 25 | 75 | 100 |
| 27 | U21FNA44 | **ALLIED IV** Nutritional Biochemistry Practical | 4 | 0 | 4 | 25 | 75 | 100 |
| 28 | U21FNE421<br>U21FNE422<br>U21FNE423 | **ELECTIVE-II**<br>Food hygiene and sanitation<br>Communication and Media<br>Skills Diet for Disease | 3 | 3 | 0 | 25 | 75 | 100 |
| 29 | U21CSS42 | **SBE-II**-Computer Skills for Office Management | 2 | 0 | 2 | 25 | 75 | 100 |
| 30 | | **Non -Major Elective –II** | 2 | 2 | 0 | 25 | 75 | 100 |
| 31 | U21PELS44 | Professional English- III | 4 | 6 | 0 | 25 | 75 | 100 |
| | | **Total** | **29** | **37** | | **-** | **-** | **900** |
| **FIFTH SEMESTER** | | | | | | | | |
| 31 | U21FNT51 | **CORE VIII**- Textiles and Clothing | 4 | 5 | 0 | 25 | 75 | 100 |
| 32 | U21FNT52 | **CORE IX** – Community Nutrition | 4 | 5 | 0 | 25 | 75 | 100 |
| 33 | U21FNT53 | **CORE X** - Human Development | 4 | 5 | 0 | 25 | 75 | 100 |
| 34 | U21FNT54 | **CORE XI** - Food Service Management | 4 | 5 | 0 | 25 | 75 | 100 |
| 35 | U21FNT55 | **CORE-XII**-Food Microbiology | 4 | 5 | 0 | 25 | 75 | 100 |
| 36 | U21FNE531<br>U21FNE532<br>U21FNE533 | **ELECTIVE-III**<br>Food Safety and Quality Control /Nutritional Counseling/ Gender and Development | 3 | 3 | 0 | 25 | 75 | 100 |
| 37 | U21FNS53 | **SBE III-** Food processing Fundamentals | 2 | 2 | 0 | 25 | 75 | 100 |
| | | **Total** | **25** | **30** | | **-** | **-** | **700** |
| **SIXTH SEMESTER** | | | | | | | | |
| 38 | U21FNT61 | **CORE XIII** – Nutrition and Fitness | 4 | 5 | 0 | 25 | 75 | 100 |
| 39 | U21FNT62 | **CORE XIV** – Family Resource | 4 | 5 | 0 | 25 | 75 | 100 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Management | | | | | | |
| 40 | U21FNT63 | **CORE XV** – Functional Foods and Nutraceuticals | 4 | 5 | 0 | 25 | 75 | 100 |
| 41 | U21FNT64 | **CORE-XVI**- Nutrition in special Condition | 4 | 5 | 0 | 25 | 75 | 100 |
| 42 | U21FNP63 | **CORE-XVII** –Community Nutrition Practical | 4 | 0 | 5 | 25 | 75 | 100 |
| 43 | U21FNE641<br>U21FNE642<br>U21FNE643 | **ELECTIVE-IV**<br>Food Packaging / Children with Special Needs/ Fashion Design | 3 | 3 | 0 | 25 | 75 | 100 |
| 44 | U21FNS64 | **SBE-IV** Food fermentation | 2 | 2 | 0 | 25 | 75 | 100 |
| 45 | U21EAS61 | Extension Activities (NSS/NCC/RRC/YRC/Physical education) | 3 | - | - | | | 100 |
| | | **Total** | **28** | **30** | | | | **800** |
| | | **Grand total** | **156** | **205** | | **-** | **-** | **4600** |

**Non-Major Electives– NME**

**NME – I** - U21FNN311 -Fundamentals of Food Science
U21FNN312 - Nutrition and wellness

**NME – II** - U21FNN421 - Basics of Human Nutrition
U21 FNN422 - Food Preservation concepts

**Additional credit courses**

U21FNO31 Online course 3rd semester
U21FNI41-Internship 4th semester
U21PHV-Value added course 5th semester

## SEMESTER – I

| Course Code | U21FNT11 | FOOD SCIENCE | L | T | P | C |
|---|---|---|---|---|---|---|
| CORE-I | | | 5 | - | - | 4 |
| **Cognitive level** | | **K2-Understanding K3-applying K4-Analysing K5 –valuating** | | | | |
| **Learning objectives** | | **The course aims**<br>1) to know the role of food inhealth.<br>2) to enable students to obtain knowledge of different food groups and their contribution tonutrition.<br>3) to help them study the different methods of cooking and their advantages anddisadvantages.<br>4) to enable the students to apply the process of differentfoods.<br>5) to enable them to gain experience in the preparation of foods with attention to the preservation of their nutritive value-oriented to Indiancooking. | | | | |

**Unit I Food groups**

Food definition, functions of food, food groups-: energy-yielding foods, body building foods, protective foods, classification, five food groups, seven food groups, balanced diet- definition, planning of balanced diet, Recommended Dietary Allowances (RDA) Dietary guidelines.

**Unit II Cereals and Pulses**

Cereals: Structure and nutritive value of rice and wheat, Gelatinization, Process of milling and malting -wheat, Rice, Gluten formation, Nutritive value of millets - ragi, bajra. Pulses: Germination process, factors affecting the cooking quality of pulses, composition, nutritive value, and its advantages in cookery. Cereals-structure, nutritive value, classification, processing, milling, Pulses and legumes - nutritive value, processing in pulses, toxins in pulses.

**Unit III Vegetables and Fruits Vegetables**

Vegetables and Fruits Vegetables – Selection of vegetables, Nutritive value, Changes in nutritive value before and after cooking, Effect of cooking on the vegetable pigments. - chlorophyll, carotenoids, anthocyanin, anthoxanthin. Fruits- Classification, nutritive value, ripening of fruits, Effect of browning and its prevention, Storage of fruits.

**Unit IV Milk and meat products**

Milk and Milk Products: Types of milk, pasteurization of milk, composition and nutritive value, milk products – cheese, paneer, and khoa Egg: Structure, composition and nutritive value, Qualitative determination of egg and its role in cookery.Meat: Structure, composition, and nutritive value of meat, the cutting process of meat, cooking changes in meat, and tenderness of the meat. Poultry-classification, Nutritive value, Selection and cooking methods poultry. Fish -selection of fish, Structure, composition, and nutritive value.

**Unit V Fats and sugar**

Fats, Sugar, Beverages and Spices Fats and Oils- composition of common fats and oils, smoking temperature, rancidity, and role of fats and oils in cookery. Sugar – Nutritive value, sugar-related products, stages of sugar cookery, Crystallization, Factors affecting crystallization. Beverages: classification, nutritive value - coffee, tea, cocoa, milk-based beverages, fruit juices, and aerated beverages. Spices and condiments – Types and use in Indian cookery, Medicinal value.

**Textbooks**

1. SrilakshmiFood Science, Seventh Edition, New Age International Publishers, New Delhi, 2018
2. Manay S and Swamy S, Food Facts and Principles, New Age International (P) Ltd Publishers, New Delhi, 2001

**Reference books**

1. Reddy SM, Basic Food Science and Technology, New Age Publishers, New Delhi, 2015
2. Lowe B, Experimental cookery from chemical and physical stand point, forgotten books, UK, 2015
3. Potter NM andHotchkiss JH, Food Science, C.B.S. Publishers, New Delhi, reprint 2008
4. Roday S, Food Science and Nutrition, Oxford university press, New Delhi, 2007
5. McCance and Widdowson, Composition of food, 6th Edition, Food Standards Agency, 2004

**COURSE OUTCOMES:**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| **K2** | **CO1** | energy requirements and the Recommended Dietary Allowances. |
| **K2** | **CO2** | nutritive value, understand the cooking quality factors, and develop skills in the preparation and storage of milk and egg products. |
| **K3** | **CO3** | nutritional classification, understand the changes in pigments and acquire skills in preserving nutrients and pigments in the processing and storage of vegetables and fruits. |
| **K4** | **CO4** | determine the smoking point of any cooking oils and the stages of sugar cookery |
| **K5** | **CO5** | Assess the effect of the addition of acid, fat, salt, water, and sugar on the texture of flesh foods quality. |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | S | M | S | S | S | S | S | S | S | S | S |
| CO2 | S | S | S | S | S | S | S | M | S | S | S | S |
| CO3 | S | S | S | S | S | S | S | S | S | S | M | S |
| CO4 | S | S | S | S | M | S | S | S | S | S | S | S |
| CO5 | S | M | S | S | S | S | S | S | S | S | S | S |

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
WeaklyCorrelating(W) - 1Mark
NoCorrelation(N) - 0mark

| Course Code | U21FNP11 | FOOD SCIENCE PRACTICAL | L | T | P | C |
|---|---|---|---|---|---|---|
| CORE-II | | | - | - | 6 | 4 |
| Cognitive level | | K 1 – Recall<br>K2 - Understanding<br>K3 -Applying<br>K4 - Analyzing<br>K6 -Creating | | | | |
| Learning objectives | | Course aims<br>1. to understand the advantages and disadvantages of cooking methods on the stability of nutrients.<br>2. to analyze the effect of processing and storage on the nutritional composition of foods.<br>3. to learn the factors influencing the cooking quality of different foods. | | | | |

**I. Grouping offoods**

a. Basic 4, 5, 7, and 11, Meaning of foods – solids, liquids, andbutter.
b. My plate

Familiarizing with laboratory equipment, procedure, and learn to weigh food ingredients.

**II. Experimental cookery ofcereals**

Preparation of cereal products using rice, wheat, and ragi based on steaming, absorption, pressure cooking, and straining methods. Steaming, boiling,and pressure -cooking separation ofthe gluten content ofWheat.

**III. Experimental cookery ofPulses**

Effect of Cooking in hard and soft water, alkali.

**IV. Experimental cookery of vegetables, Green leafyVegetables**

Study on the effect of acid, alkali, heat, and time on the color, texture, and flavor.

**V. Milk**

Preparation of Paneer, Curd, and Whey water using different types of milk. (Identification of physical parameters of developed products) Stages of sugar cookery

**Textbook**

1. Srilakshmi B Nutrition Science, New age International Pvt Ltd, 2017

**Reference books**

1. *Williams Aspden*Practical Skills in Food Science, Nutrition and Dietetics, Pearson Education Limited, 2011
2. Mohini Sethi. EramS. Rao Food science Experiments and

Applications,SecondEdition2019

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K1 | CO1 | fundamentals of cereals, pulses,fruits &vegetable processing, equipment, andproducts. |
| K2 | CO2 | Demonstrate the different methods of cooking. |
| K3 | CO3 | Choose Appropriate Cooking Method to Conserve Nutrients. |
| K4 | CO4 | Evaluate the basic methods and principles involved in cooking. |
| K6 | CO5 | evaluate the change of pigment during cooking |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | **S** | M | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO2** | S | **S** | S | **S** | **S** | **S** | M | **S** | S | **S** | **S** | S |
| **CO3** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO4** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO5** | M | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating(W) - 1Mark
No Correlation(N) - 0mark

## SEMESTER-II

| Course Code | U21FNT21 | FUNDAMENTALS OF NUTRITION | L | T | P | C |
|---|---|---|---|---|---|---|

| CORE-III | | 5 | - | - | 4 |
|---|---|---|---|---|---|
| **Cognitive level** | **K 1 – Recall**<br>**K2 - Understanding**<br>**K4 - Analyzing**<br>**K5 – Evaluating** | | | | |
| **Learning objectives** | **Course aims**<br>1. To enable the students to learn the basic nutrients and their functions.<br>2. To enrich the students to familiarize the RDA and deficiency of nutrients.<br>3. Understand the sources of nutrients, the role of nutrients in the maintenance of good health. | | | | |

**Unit I Energy**

Energy – a unit of energy, determination of energy, Contents of food, Basal Metabolic Rate (BMR), energy requirement (ICMR) of various age groups and sources.

Carbohydrates – classification, functions in the body, digestion, absorption and utilization, sources, requirements. Dietary fibre - Classification, sources, Requirements, and physiological importance.

**Unit II Protein**

Protein – classification, functions in the body, digestion, absorption, utilization, sources, and requirements. Essential and non-essential amino acids, Protein Energy Malnutrition (PEM) –causes, prevention, and treatment.

**Unit III Lipids**

Lipids – simple lipids, compound lipids, derived lipids, classification, functions, digestion, essential fatty acids, absorption, utilization, sources, and requirements. Lipids in our daily diet, the role of lipids in various diseases.

**Unit IV Fat-soluble vitamins**

Fat-soluble vitamins: A, D, E, K: Functions, digestion and absorption, RDA, food sources, and deficiency diseases.

Water-soluble vitamins: Vitamin B1, B2, B4, B6, B12, and C: Functions, digestion and absorption, RDA, food sources, and deficiency diseases.

**Unit V Micro and Macro minerals**

**Macro minerals:** Calcium, phosphorus, magnesium, sodium, and potassium: functions, requirements, deficiency and toxicity.

**Micro minerals:**Iron, copper, zinc, manganese, iodine, fluoride: Function, Requirements, Deficiency &toxicity

**Textbook:**

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

**References**

1. Paul S Bio Nutrition, Fundamental, and Management, RBSAPublishers, 2003
2. Kango m Normal Nutrition, Curing disease through diet, Third Edition, CBSPublication, 2005
3. Benjamin Caballero et.al Encyclopedia of Human Nutrition, Second Edition, Elsevier Limited, 2005
4. MahtabS, Bamji, Kamala et.al Text Book of Human Nutrition, Third Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi, 2015
5. Sumati R Mudambi et.al Fundamentals of Foods, Nutrition and Diet Therapy, New age International (P)Ltd, 2020

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| **K1** | **CO1** | Understand the role of food and nutrients in health and disease prevention. |
| **K2** | **CO2** | Develop competence to carry out investigations in nutrition. |
| **K3** | **CO3** | Development of a balanced diet to improve the general wellness of an individual. |
| **K4** | **CO4** | Understand functions of physiological systems as related to nutrition. |
| **K5** | **CO5** | Evaluate nutrition information based on scientific reasoning for clinical and community application. |

**Mapping of COs with POs& PSOs:**

| CO/ PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | S | M | S | S | S | S | S | S | S | S | S |
| **CO2** | S | S | S | S | S | S | M | S | S | S | S | S |
| **CO3** | S | S | S | S | S | S | S | S | S | S | M | S |
| **CO4** | S | S | S | S | S | S | S | S | S | S | S | S |
| **CO5** | M | S | S | S | S | S | S | S | S | S | S | S |

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

| Course Code | U21FNT22 | HUMAN PHYSIOLOGY | L | T | P | C |
|---|---|---|---|---|---|---|
| CORE-IV | | | 5 | - | - | 4 |

| | |
|---|---|
| **Cognitive level** | **K2- Understand K3 –Applying K4 –Analyzing** |
| **Learning objectives** | **Course aims to**<br>1. Enable students to understand the structure and physiology of various organs in thebody.<br>2. Help students to obtain a better understanding of the principles of nutrition and dietetics through the study of physiology. |

**UNIT: I Cell**

Cell – structure, types of tissue, cell functions.

Digestive system –mouth, tongue, salivary glands, esophagus, stomach, small intestine, large intestine: Structure, functions, movements (Deglutition, peristalsis) and secretion of the gastrointestinal tract (Various enzymes and indigestion).

**UNIT: II Respiratory system**

Respiratory system external organs of the respiratory system- nasal cavity, respiratory organ, parts of the respiratory system, structure, functions of the respiratory system, mechanism of the respiratory system, transport ofgases.

**UNIT: III Circulatory system**

Circulatory system – Composition of blood – the structure of the heart and its working mechanism – conduction of heartbeat.

Excretion organ – general organization (including the structure of kidney, nephron, mechanism of urineformation).

**UNIT: IV Sense Organs**

Sense Organs – tongue, nose Eye, Ear, Skin: structure, functions, and its importance. Nervous system – Central nervous system – autonomic nervous system: structure of the brain, the role of the spinalcord.

**UNIT: V Endocrine gland**

Endocrine gland: definition, functions, hormones, Pituitary, Adrenal, Thyroid, ACTH, Parathyroid, and sex glands - Structure. Functions of ductless glands, location, hormone secretion, hyper, and hyposecretion its effect

**Text book**

1. M. Arumugam,Human physiology, SarasPublication, 2016

**Reference Books**

1. Sembulingam, Kirma, and PremaSembulingam. *Essentials of medical physiology*. JP Medical Ltd, 2012.
2. Ashalatha, P. R., and G. Deepa. *Textbook of Anatomy & Physiology for Nurses*. JP Medical Ltd, 2012.
3. Chatterjee CC, Human Physiology, Volume I, 11th Edition, CBS Publishers, New Delhi, 2016.
4. Sathya P and Devananda V, Textbook of Physiology, First edition, CBS Publishers and

Distributors Pvt Ltd, New Delhi, 2013
5. Boron WF and Boulais EL, Medical Physiology, IIedition,SaundersElsevier, 2009

**COURSE OUTCOMES:**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K2 | CO1 | Understand the Structure and Functions of the various organ systems of the body. |
| K2 | CO2 | Compare the digestive and excretory systems and infer the mechanisms of digestion and excretion in human beings. |
| K3 | CO3 | Relate the Structure with Functions of the tissues and organs. |
| K4 | CO4 | Comprehend the Mechanism of Action of Organs. |
| K4 | CO5 | Discuss the role of hormones and functions of human reproductive System. |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO 1 | PSO 2 | PSO3 | PSO4 | PSO 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | S | S | S | S | S | S | M | S | S | S | S |
| CO2 | S | S | S | M | S | S | S | S | S | S | S | S |
| CO3 | M | S | S | S | S | M | S | S | S | S | S | S |
| CO4 | S | S | S | S | S | S | S | S | S | S | S | M |
| CO5 | S | S | S | S | S | S | S | S | S | M | S | S |

**Strongly Correlating (S) - 3Marks**
**Moderately Correlating (M) - 2marks**
**Weakly Correlating (W) - 1Mark**
**No Correlation (N) - 0mark**

## SEMESTER- III

| Course Code | U21FNT31 | NUTRITION THROUGH LIFE CYCLE | L | T | P | C |
|---|---|---|---|---|---|---|
| CORE-V | | | 5 | - | - | 4 |

| | |
|---|---|
| **Cognitive level** | **K2: Understand K3: Applying**<br>**K4: Analyzing K5: Evaluating** |
| **Learning objectives** | **Course aims to**<br>1. Learn the principles of mealplanning.<br>2. Plan& prepare meals for the family members at different income levels.<br>3. Plan meals for special groups - infants, preschoolers, adolescents, pregnant & nursing mothers, and theaged. |

**Unit I - Nutrition in Pregnancy and Lactation**

Nutritional status and general health, Physiological changes in pregnancy, Fetal under nutrition and consequence, Energy and calorie relationship in pregnancy, Weight gain protein vitamin mineral nutrition in pregnancy. Nutritional status and physiological changes during pregnancy and nutritional requirements. Complications Role of specific nutrients in pregnancy.

Lactation: Composition of breast milk, Importance of colostrum, RDA for lactating mother.

**Unit II - Nutrition during early childhood**

Infancy: Nutritional status of infancy, Growth monitoring, Nutritional allowances, Breast feeding- importance, Weaning, Feeding premature infants, Low birth weight babies, and their nutritional care. Breast feeding Vs Bottle feeding

Pre-school age: Nutritional requirements, growth and diet prevalence of malnutrition, Malnutrition, and mental development, food habit, RDA.

**Unit III – Nutrition during school age and adolescence**

**School-age:** Physical development and nutritional status, Food habits, and nutritional requirements.

**Adolescent:** Pattern of growth, nutritional need and food habit, Behavioral modification to combat malnutrition. Factors affecting food choices Nutritional problems among adolescence eating disorders

**Unit IV - Nutrition for adult**

Adulthood-definition stages of adulthood period, early adulthood, middle adulthood, late adulthood, nutritional needs, deficiencies, RDA, Factors influencing Nutritional requirements based on physical activity.

**Unit V - Nutrition for Elderly (Geriatric nutrition)**

Old age: definition, stages of old age, physiological changes in old age period, socio-economic and physiological factors of the aged, and nutritional care of elderly. Dietary modification for old age recommended dietary intake.

**Textbook**

1. Srilakshmi, Dietetics, New Age Publishers, New Delhi, 2017

**Reference books**


1. Williams SR Nutrition and Diet Therapy, Sixth Edition C.V. Melskey Co,2000
2. Kango M Normal Nutrition, Curing diseases through diet, First Edition CBS Publications.2005
3. Paul S Text Book of Bio-Nutrition, Fundamental, and Management, RBSA Publishers.2003
4. Judith E. Brown Nutrition through the life cycle 5$^{th}$Edition, CENGAGE Learning, US. 2019
5. Swaminathan M Food and Nutrition, SecondEdition, 2017


**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| **K2** | **CO1** | Physiological changes and hormones are involved during pregnancy and lactation. |
| **K3** | **CO2** | Plan a healthy food choice for physical, physiological psychological aspects in infancy. |
| **K4** | **CO3** | the students will be able to relate nutrient needs to developmental stages and plan diets that will adequately meet nutritional needs During childhood. |
| **K4** | **CO4** | the student will learn the impact of growth and development in Arriving at the nutritional needs of adolescents. |
| **K5** | **CO5** | Determine nutrient requirements during old age. |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | S | S | S | S | S | S | S | M | S | S | S |
| CO2 | S | S | S | S | S | S | S | S | S | S | S | S |
| CO3 | S | S | M | S | S | S | S | S | S | M | S | S |
| CO4 | S | S | S | S | M | S | S | S | S | S | S | S |
| **CO5** | M | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | M | S |

**Strongly Correlating (S) - 3 Marks**
**Moderately Correlating (M) - 2 Marks**
**Weakly Correlating (W) - 1Mark**
**No Correlation (N) - 0 Mark**

| **Course Code** | **U21FNA33** | **NUTRITIONAL BIOCHEMISTRY** | **L** | **T** | **P** | **C** |
|---|---|---|---|---|---|---|
| **Allied-III** | | | **5** | **-** | **-** | **4** |
| **Cognitive level** | | **K2: Understanding**<br>**K4: Analyzing**<br>**K5: Evaluating** | | | | |

| | |
|---|---|
| **Learning objectives** | **Course aims to**<br>1. the principles of Biochemistry<br>2.knowledge on the effect of diet on health and the functions of biological systems in relation to Nutritional biochemistry |

**Unit I – Carbohydrates**

Carbohydrate Metabolism Definition, Classification of carbohydrates – Monosaccharide, Disaccharide, and polysaccharide. Metabolism – glycolytic pathway, Electron transport chain, glycogenesis, Glycogenolysis, and Gluconeogenesis. Disorder of carbohydrate metabolism-Diabetes mellitus.

**Unit II - Proteins and lipids**

Protein metabolism Definition, Classification of protein, Structure, Physical properties, Chemical properties, Amino acids- Essential and non-essential.

Lipid metabolism Definition, Structure, Classification of lipids-Saturated, Unsaturated fatty acid, Bio-Synthesis of fatty acid. Lipoproteins: Types, composition, role, and significance in diseases.

**Unit III – Enzyme**

Enzymes –definition, functions of enzymes, classification of enzymes, mechanism of enzyme action, regulation of enzyme action, factors affecting enzyme activity. Role of enzymes in different digestion and metabolicpathways.

**Unit IV - Water balance**

Water- composition of water in the human body, functions of water, water intake, Output, Balance, Dehydration: causes, and overcome measures, edema: causes, and preventive measures. Factors affecting water balance, Buffer system,

**Unit V - Antioxidants**

Biochemical reactions in the human body, antioxidants and human health, free radical formation, antioxidant-rich foods, application of biochemistry in medicine & treatment in food science and nutrition.

**Text books:**

1. Ramadevi K, Ed: Ambika Shanmugam's Fundamentals of biochemistry for medical students, 8th edition, Wolters Kluwer Health, India, 2016
2. Rodwell V, Bender D, Botham KM, Kennelly PJ, Weil PA, Harper's Illustrated Biochemistry, 30th Edition, McGraw hill Education, 2015.
3. Sulochana H, Principles of Biochemistry, PBS enterprises, Chennai, 2010

**Reference books**

1. Cox MM and Nelson DL, Lehninger Principles of biochemistry, 5th edition, EH Freman&Company, New York, 2008
2. Vasudevan DM, Sreekumari S, Textbook of Biochemistry, 5th edition, Jaypee Publishers, New Delhi, 2007.
3. Veera Kumari L, Biochemistry, 1st edition, MJP Publishers, 2005.

**COURSE OUTCOMES:**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| **K2** | **CO1** | Students will understand the principles of biochemistry and also chemistry of major nutrients. |
| **K2** | **CO2** | The knowledge about the major metabolic pathways in human metabolism. |
| **K3** | **CO3** | The synthesis of nucleic acids and proteins. |
| **K4** | **CO4** | obtain complete knowledge on Enzyme and its application |
| **K5** | **CO5** | gain knowledge about the importance of vitamins and minerals in Human development. |

**Mapping of COs with Pos & PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO 2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | S | S | S | S | M | S | S | S | S | M |
| CO2 | S | S | S | S | M | S | S | S | S | M | S | S |
| CO3 | S | S | S | S | S | S | S | S | S | S | S | S |
| CO4 | M | S | S | M | S | S | S | S | S | S | S | S |
| CO5 | S | S | S | S | S | S | S | S | M | S | S | S |

**Strongly Correlating (S) - 3Marks**
**Moderately Correlating (M) - 2marks**
**Weakly Correlating (W) - 1Mark**
**No Correlation (N) - 0mark**

## SEMESTER-IV

| Course Code | U21FNT41 | THERAPEUTIC NUTRITION | L | T | P | C |
|---|---|---|---|---|---|---|
| CORE-VI | | | 4 | - | - | 4 |

| | |
|---|---|
| **Cognitive level** | **K2: UnderstandingK3: Applying**<br>**K4: Analyzing K6: Creating** |
| **Learning objectives** | **Course aims to**<br>1. Understand the fundamentals of baking and learn t<br>2. Learn the current status, growth rate, the economic importance of baking and confectionery inIndia. |

**Unit I Diet therapy**

Concept of Diet therapy: Purpose and principle of therapeutic diets, modification of normal diet, classification of therapeutic diets. Different feeding techniques - oral feeding, tube feeding, parenteral feeding, the role of dieticians in nutritionalcare.

**Unit II Fever diet**

Fever: Causes, symptoms, management: Febrile disease acute – Typhoid, influenza, malaria, chronic – tuberculosis. Dietary management for fever condition: menu planning.

**Unit III Gastro intestinal diet**

The disease of GI Tract: Diarrhoea, dysentery and constipation, Peptic ulcer: causes, symptoms, dietary recommendations.

The disease of Liver – Hepatitis, Cirrhosis, Assessment of gall bladder diseases nutritional status, causes, symptoms, and dietary treatment

**Unit IV Life style diseases**

Life style associated diseases

a) Causes symptoms and food exchange list, dietary treatment for Diabetesmellitus
b) Cardiovascular diseases – hypertension, atherosclerosis, congestive cardiac failure, and sodium-restricted diet in causes symptoms and dietarytreatment.
c) Obesity and leanness – cause symptoms and dietarytreatment.

**Unit V Renal diseases and cancer**

a) Diseases of the excretory system– nephritis, nephritic syndrome, urinary calculi, renal failure.
b) Diet in allergy – definition, classification, food allergies. Test for allergy, dietetic treatment.
c) Cancer – causes symptoms of dietary treatment.

**Text books**

1. Robinson, Corinne Hogden, and Marilyn R. Lawler. *Normal and therapeutic nutrition*. No. Ed. 16. Collier Macmillan Publishers, 1982.
2. Dietary Guidelines of Indians- A Manual, National Institute of Nutrition, Hyderabad, 2006.
3. Srilakshmi B, Dietetics, sixth edition, New age Publishing Press, New Delhi, 2011.

**Reference books**

1. Stacy N, William's Basic Nutrition and Diet Therapy, 12th edition, Elsevier publications, UK, 2005.
2. Elia M, Ljunggvist O, Stratton RJ, Lanham SA, Clinical Nutrition (The Nutrition Society Textbook), 2nd edition, Wiley Blackwell Publishers, 2013
3. Mahan LK, Stump SE, and Raymond JL, Krause's Food and Nutrition Care Process, 13th Edition, Elsevier Saunders,2004.

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K2 | CO1 | Plan and prepare a standardized hospital diet for the needed patients. |
| K2 | CO2 | Understand the concept, purpose, and principles of diet therapy and the role and types of dietitians. |
| K3 | CO3 | Delineate various deficiency disorders concerning their prevalence, causes, symptoms, and preventive measures. |
| K4 | CO4 | discuss the kinds of commercial formulas available for oral and enteral feedings. |
| K5 | CO5 | compare the food exchange list in the control of diabetes and complications. |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO 2 | PSO3 | PSO4 | PSO 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO2** | S | **S** | S | **S** | **S** | M | S | **S** | S | **S** | **S** | S |
| **CO3** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO4** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO5** | S | **S** | S | **S** | **S** | **S** | S | **S** | M | **S** | **S** | S |

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

| Course Code | U21FNP42 | THERAPEUTIC NUTRITION PRACTICAL | L | T | P | C |
|---|---|---|---|---|---|---|
| COREVII | | | - | - | 4 | 4 |
| Cognitive level | | K2: Understanding K3: Applying<br>K4: Analyzing K5: evaluating K6: creating | | | | |
| Learning objectives | | The course aims to<br>1. gain knowledge about the role of nutrition in disease conditions.<br>2. develop skills and techniques in the planning and preparation of therapeutic diets for various disease conditions. | | | | |

**Planning and preparation of therapeutic dietfor:**

1. Routine hospital diet.
2. Typhoid
3. Tuberculosis
4. Diabetes mellitus
5. Peptic ulcer
6. Heart diseases
7. Kidney disease
8. Liver disease
9. Obesity
10. Underweight
11. Diarrhea
12. Constipation

**Text Book**

1. Swaminathan Food Nutrition, Volume I, The Bangalore Printing and Publishing Company, Bangalore, 2002
2. Gibney M J, Elia, MLjingquist. O Clinical Nutrition, Blackwell Science Publishing Co. USA. 2005

**References:**

1. Anita F.P. Nutrition, Fourth Edition, Oxford University Press, Delhi, 2002
2. Raheena, BA Textbook of Food, Nutritionand Dietetics, Sterling Publishers, New Delhi, 2009
3. Srilakshmi, B Dietetics New Age International Publishers, NewDelhi, 2018

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K2 | CO1 | design the principles of meal planning, diet therapy, therapeutic diets, and nutrition support. |
| K3 | CO2 | make appropriate dietary modifications for various disease conditions based on the path physiology. |
| K4 | CO3 | demonstrate the method to plan and prepare a diet for various diseases. |
| K5 | CO4 | evaluate the concept of food groups and exchanges for planning and preparing a balanced diet for various age groups and physiological conditions. |
| K6 | CO5 | create skill development in planning therapeutic diets using food exchange lists. |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO 4 | PO5 | PO 6 | PO 7 | PSO 1 | PSO2 | PSO 3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | **S** | S | **S** | **S** | **S** | S | S | S | S | S | S |
| **CO2** | M | **S** | S | **S** | **S** | **S** | S | S | S | S | S | S |
| **CO3** | S | **S** | S | **S** | **S** | **S** | S | S | S | S | S | S |
| **CO4** | S | **S** | S | **S** | **M** | **S** | S | S | S | S | S | S |
| **CO5** | S | **S** | S | **S** | **S** | **S** | S | S | S | S | S | S |

**Strongly Correlating (S) - 3Marks**
**Moderately Correlating (M) - 2marks**
**Weakly Correlating (W) - 1Mark**
**No Correlation (N) - 0mark**

| Course Code | U21FNA44 | NUTRITIONAL BIOCHEMISTRY PRACTICAL | L | T | P | C |
|---|---|---|---|---|---|---|
| Allied-IV | | | - | - | 4 | 4 |
| **Cognitive level** | | **K2: Understanding**<br>**K3: Applying**<br>**K4: Analyzing**<br>**K5: Evaluating** | | | | |
| **Learning objectives** | | **Course aims to**<br>1. Understand the biochemical preparationmethods.<br>2. Identify the qualitative analysis of bio-organic compounds. | | | | |

**1. Qualitative analysis of bio-organiccompounds**

a. Carbohydrates
b. Aminoacids
c. Tests forproteins
d. Tests for lipids – test for cholesterol – kit method TGkit

**2.Biochemicalpreparation**

a. Starch(potato)
b. Lactose(Milk)
c. Casein(Milk)

**3.Use of PH meter for the preparation of buffer.**

**4.VerificationofBeerLambert'slawusing a colorimeter.**

1. Determining the extinction coefficient of a given color compound.
2.Determining the concentration of any given colour compound using a standard graph.

**Text book**

1. Miller DD Food chemistry a laboratory manual, First Edition, John Wiley &Sons, 2014

**Reference book**

1. Conn EE and Stump PK Outlines of Biochemistry, Wiley Eastern (P) Ltd., NewDelhi, 1981
2. Linder MC Nutritional Biochemistry and Metabolism with clinical applications, Second Edition, Appleton andLange, 1991
3. Plummer DT An introduction to Practical Biochemistry, Tata McGraw Hill, New Delhi.1996

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledgeabout

| | | |
|---|---|---|
| K2 | CO1 | gain knowledge about quantitative analysis. |
| K2 | CO2 | use of PH meter for the preparation of buffer |
| K3 | CO3 | apply practical skills in qualitative analysis of proteins |
| K4 | CO4 | Acquire skill in the preparation of the solution. |
| K5 | CO5 | determining the extinction coefficient of a given colour compound. |

**Mapping of COs with POs& PSOs:**

| CO/ PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | **S** | M | **S** | **S** | **S** | S | **S** | S | **S** | **M** | S |
| **CO2** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO3** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO4** | S | **S** | S | **S** | **S** | **S** | S | **M** | S | **S** | **S** | S |
| **CO5** | M | **S** | S | **S** | **S** | **S** | S | **S** | S | **M** | **S** | S |

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

**Semester-V**

| Course Code | U21FNT51 | TEXTILES AND CLOTHING | L | T | P | C |
|---|---|---|---|---|---|---|
| CORE-VIII | | | 5 | - | - | 4 |
| **Cognitive level** | | **K2: Understanding K3: Applying K4: Analyzing K5: Evaluating** | | | | |
| **Learning objectives** | | **The course aims to**<br>1. understand textile fibers, their properties, andtheir uses.<br>2. impart knowledge on spinning, fabricproduction.<br>3. to develop the skill to choose appreciate dyes and printing techniques for a givenfabric | | | | |

**Unit I Textile fibers**

**Fiber** – Definition, Meaning, Classification of Textiles Fibers- Natural fiber-cotton, Flax, silk, wool- origin, manufacturing process, properties, and end-uses. Minor Textile fibers-, properties and uses.Regenerated fibers-Rayon and acetate-origin, manufacturing process, properties, and end-uses.

**Unit II Synthetic fibers**

**Synthetic fibers:** Nylon, Dacron, Orlon, and Acrylic- origin, manufacturing process, properties, and end-users. Spinning –Definition, meaning, types of spinning. Yarn and Twist – Definition, counts of yarns.Meaning and Classification natural manmade yarns and Novelty yarns.Blends and Mixtures (understanding concepts only).

**Unit III Fabric structure**

**Fabric Structure**: Weaving- Definition, Meaning, parts, and functions of the simple loom. Types of weaves- Basic weaves and fancy weaves-Mock leno, honeycomb, huck-a-back, backed cloth, dobby, jacquard. Non-woven, knitting- Definition, Meaning, classification of knitting, Knotting, Lacing, Braiding, Bonding and Felting.

**Unit IV Textile finishing**

**Textile Finishing** –Basic Finishes-Singeing, Desiring, scouring bleaches, Mercerizing, Napping, Sanforising, Special finishes –Antimicrobial, Water-repellent, and Waterproof finishes, Flame Resistant, Stain Resistant, finishes suitable to Natural and manmade fibers.

**Unit V Dyeing**

**Dyeing**- Definition of Dyes, Meaning and concept of Dyes, Classification of dyes, Dyes suitability to various fibers. Methods of Dyeing- Stock dyeing, yarn dyeing, piece dyeing, cross, and union dyeing. Printing – Definition, Styles of printing-Direct, Discharge, Resist. Colorfastness.

**Textbook**

1. Rose Sinclair Textile and Fashion, wood head publishingLtd. 2005

**Reference books**

1. Anne Allen and Fulani Seaman Fashion Drawing-The basic principles replica press private Ltd,India.2005
2. H. Mattila intelligent textiles and clothing wood head publishing Ltd. 2006
3. Sara J Kadolph The Textiles Dorling Kindersley India Pvt.,Ltd.2009
4. R.Shishao The global textile and clothing industry wood head publishing Ltd.2012
5. Dr. SubramaniaSenthilKannanMuthu Handbook of lifecycle assessment(LCA) of textile and clothing,wood head publishing Ltd.2015

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K2 | CO1 | Understand the textile fibers, their properties, and their uses. |
| K3 | CO2 | Impart knowledge on spinning, fabric production |
| K4 | CO3 | Gain knowledge in different types of textile fibers, origin, its classifications and properties. |
| K4 | CO4 | Able to identify different fiber types based on their physical and chemical parameters. |
| K5 | CO5 | Acquire knowledge in dyeing and finishing. |

**Mapping of COs with POs& PSOs:**

| CO/ PO | PO1 | PO2 | PO 3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | **M** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO2** | S | **S** | S | **S** | **S** | **S** | S | **S** | M | **S** | **S** | S |
| **CO3** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO4** | S | **S** | S | **M** | **S** | **S** | S | **S** | S | **S** | **M** | S |
| **CO5** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |

**Strongly Correlating (S) - 3Marks**
**Moderately Correlating (M) - 2marks**
**Weakly Correlating (W) - 1Mark**
**No Correlation (N) - 0Mark**

| Course Code | U21FNT52 | COMMUNITY NUTRITION | L | T | P | C |
|---|---|---|---|---|---|---|
| CORE IX | | | 5 | - | - | 4 |
| COGNITIVE LEVEL | | K2: Understanding<br>K3:Applying<br>K4: analyzing<br>K5: Evaluating | | | | |
| Learning Objectives | | The Course aims to<br>1. know the development of an individual from infancy to adolescence.<br>2. develop an awareness of the problems of children, adolescents, and exceptionalchildren. | | | | |

**Unit I Community nutrition**

Concept of Community, the concept of nutrition, Determinants of food consumption and nutritional problems of the community- Malnutrition- aetiology of malnutrition- Measure to combat malnutrition improvement of nutrition of a community.

**Unit II Assessment of nutritional status**

Assessment of Nutritional status of the community -Anthropometry: height, weight, BMI, WHR, IBW, Clinical: deficiency diseases, Biochemical methods: Hemogram analysis, Diet surveys: 24-hour recall, three-day dietary recall, food frequency.

**Unit III Nutrition program**

Existing nutrition programs in the state- various National (ICMR, ICAR, NIN, NNMB, NHANES, CFTRI) and international organizations (UNICEF, WHO, FAO).Nutrition surveillance – objectives, indicators in nutritional surveillance and their characteristics, data surveillance in India.

**Unit IV Nutrition education**

Nutrition education: definition, concept, tothe community- meaning and principles of program planning – plan of work and its elements, conducting nutrition education to the community. Learning objectives and outcomes of nutritioneducation.

**Unit V Teaching aids**

Teaching aids for nutrition education: Audio Visual Aids- Traditional and modern methods in conducting nutrition education program to the community. Benefits of nutritioneducation tools.

**Textbook**

1. Dandiya S. ChandZafer, Z.Y Health Education and Community, Vallabh Prakashan Printers, New Delhi. 2003

**Reference: -**

1. Park Textbook of preventive and social Medicine, 18th,

BanarsidesBhanotPublishers, Jabalpur, 2005
2. Srilakshmi B Nutrition Science, New Age International Pvt.Ltd, NewDelhi, 2006
3. KhaderFoods, Nutrition, and Health, Kalyani Publishers, New Delhi. 2003
4. RamachandranDharma lingam Health education, VikasPublishingHouse Pvt.Ltd. New Delhi. 2005
5. Reedy. R.S Nutrition Education common health, Publishers, New Delhi, 1998

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K2 | CO1 | identify suitable methods for resolve nutrition-related problems in community. |
| K3 | CO2 | evaluatethe nutritional status of the community. |
| K4 | CO3 | analyze maternal and child health care programs. |
| K4 | CO4 | assess immunization and its effective actions. |
| K5 | CO5 | outline the various agencies in uplifting the nutritional status and their roles. |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | M |
| **CO2** | S | **M** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO3** | S | **S** | S | **S** | **S** | **S** | S | **S** | M | **S** | **S** | S |
| **CO4** | S | **S** | S | **S** | **M** | **S** | S | **S** | S | **S** | **S** | S |
| **CO5** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |

**Strongly Correlating (S) - 3Marks**
**Moderately Correlating (M) - 2marks**
**Weakly Correlating (W) - 1Mark**
**No Correlation (N) - 0mark**

| Course Code | U21FNT53 | HUMAN DEVELOPMENT | L | T | P | C |
|---|---|---|---|---|---|---|

| CORE X | | 5 | - | - | 4 |
|---|---|---|---|---|---|
| COGNITIVE LEVEL | K 2: Understanding K 4: Analyzing<br>K 5: Evaluating | | | | |
| Learning Objectives | The Course aims to<br>1. know the development of an individual from infancy to adolescence.<br>2. develop an awareness of the problems of children, adolescents, and exceptionalchildren. | | | | |

**Unit I Growth and development**

Human Development – Significance – Stages of Life Span Growth and Development - Meaning, principles, factors influencing growth and development. Methods of child study-- projective technique, observation, experimentation, case study (elementary treatment). Needs of Children.

**Unit I Prenatal development and childbirth**

Conception, Stages of prenatal development. Signs and symptoms of Pregnancy.Common discomforts and complications of pregnancy.Factors influencing prenatal development.Maternal mortality – Causes and prevention. Child Birth – stages and types. Post-natal care of the mother.

**Unit III**

Pre-School Education: Meanings, objectives, importance, and types. Pre-school setup, equipment, characteristics of pre-school teacher's importance of audio-visual aids for pre-school.Play- definition and types.

**Unit IV Social and emotional development**

Social, emotional, adjustment problem of adolescence.Physiological needs of children-love, affection – security independence.

Behavior Problems: Causes, prevention, types – temper tantrum, thumb sucking, bedwetting, and other issues.

**UNIT-V**

Children with Special Needs - Definition, identification, Classification: physically challenged, visually challenged, autism, ADHD, dyslexia, and other learning disabilities, special education services, and their importance. Agencies to promote the special children.

**Textbook**

1. Devadas R.P and Jaya N Child development, Macmillan Publishers, India, 1994

**Reference book**

1. Hurlock, F. B Child development, 6 th Edition M.C grow Hill Network. 2004
2. Suriakanthi A Child development, An introduction. Kavitha publicationsGandhigram Tamil Nadu, 2004

3. Papalia,D.E and Olds,S.W Human Development, TataMc.Graw Hill Company, NewYork, 2005
4. ShrimaliS Child Development, RawatPublications, NewDelhi. 2008
5. Santrock J. WChild development grows Hill Network. 2014

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K2 | CO1 | Outline the principles of development from conceptionto birth. |
| K5 | CO2 | Compare the development pattern of infancy and early childhood during the life cycle. |
| K5 | CO3 | Critique the growth and development changes between childhood and adolescence. |
| K4 | CO4 | Explain the importance of childhood care, guidance and Counseling. |
| K4 | CO5 | Discuss the methods of disciplining children and their effects. |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO2** | S | **S** | S | **S** | **S** | **S** | S | **S** | M | **S** | **S** | S |
| **CO3** | S | **S** | M | **S** | **S** | **S** | S | **S** | S | **S** | **M** | S |
| **CO4** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **M** | **S** | S |
| **CO5** | S | **S** | S | **S** | **S** | **S** | M | **S** | S | **S** | **S** | S |

**Strongly Correlating (S) - 3Marks**
**Moderately Correlating (M) - 2marks**
**Weakly Correlating (W) - 1Mark**
**No Correlation (N) - 0mark**

| Course Code | U21FNT54 | FOOD SERVICE MANAGEMENT | L | T | P | C |
|---|---|---|---|---|---|---|

| CORE XI | | 5 | - | - | 4 |
|---|---|---|---|---|---|
| COGNITIVE LEVEL | K 2: Understanding K 4:Analyzing<br>K 5:Evaluating | | | | |
| Learning Objectives | The course aims to<br>• discuss the scope of foodservice management principles and functions.<br>• explain the functions of personnel management organization.<br>• compare the electrical and non-electrical equipments in the food serviceestablishment.<br>• analyze the cost account methods and theirimportance.<br>• evaluatethe kind of kitchenlayout. | | | | |

**Unit I Foodservice management: overview**

Foodservice systems: Definition, objective, functions: Planning, organizing, directing, controlling, coordinating, and evaluating. Types of service – English, French, American, room service and mobile, buffet. Growth of foodservice industry – factors affecting the growth of food service industry.

**Unit II Equipments and layout**

Equipments used in Foodservice industries-Classification of equipments electrical and non-electrical equipments for food storage, preparation, serving, dishwashing, and laundering. Food plant -Types of Kitchens, Layout of different food service establishments, drainage, Waterlines, lighting, and ventilation.

**Unit III Food safety**

Food safety: definition, principles, the importance of food safety in foodservice institutes, sanitation and hygiene in food service institution- kitchen, distribution, and Storage. Waste disposal, Pest control, and other safety measures.

**Unit IV Tools of management and personnel management**

Tools-The Organization Chart, Job Description, and specification, Time schedule, Work schedule, Job Analysis, Personnel Management: Selection, training, supervision of personnel. Labor policy and legislation. Employee facilities and benefits, welfare schemes, and laws governing food service institutions.

**Unit V Financial management**

Financial Management: Buying and accounting procedures in food service institution, budget and its types, inventory control, methods of cost control, Cost accounting/analysis-

Cost concepts- types of cost-fixed cost, semi-fixed cost, variable cost. Cost accounting and bookkeeping, maintenance of the account, balance sheet, foodcosting.

**Textbook**

1. Mohini Sethi and SurjeetMalhan, Catering Management, Third Edition, New Ade International (P) Ltd Publishers, 2015

**Reference**


1. West. B.B. Wood L., Harger, V.F. Food Service Institutions,5thEdition, John Wiley and Sons, INC., New York1977
2. Shukla. M.C. Business Organization and Management S. Chand and Co., Ltd., Ramnagar, New Delhi1982
3. Nathaniel,R.S Catering Management for Hotel,Surjeet publication New Delhi, 1991
4. P.N. Reddy, S. SGulshan. Principles of Business Organization and Management, Eurasia Publishing House, Ramnagar New Delhi.2007
5. June Payne Foodservice Management Principles and Practices, 13 th Edition, Pearson Education Limited.2016


**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain Knowledge about

| | | |
|---|---|---|
| K2 | CO1 | Discuss the scope of foodservice management principles and functions. |
| K5 | CO2 | Explain the functions of personnel management organization |
| K4 | CO3 | Compare the electrical and non-electrical equipment's in foodservice establishment. |
| K4 | CO4 | Analyze the cost account methods and their importance. |
| K5 | CO5 | Evaluate the kind of kitchen layout. |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | **S** | S | **M** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO2** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO3** | S | **S** | S | **S** | **S** | **S** | S | **S** | M | **S** | **S** | S |
| **CO4** | S | **S** | M | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO5** | M | **S** | S | **S** | **S** | **S** | M | **S** | S | **S** | **S** | S |

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

| Course Code | U21FNT55 | FOOD MICROBIOLOGY | L | T | P | C |
|---|---|---|---|---|---|---|

| CORE-XII | | 5 | - | - | 4 |
|---|---|---|---|---|---|
| **Cognitive level** | **K2: Understanding**<br>**K3: Applying**<br>**K4: Analyzing** | | | | |
| **Learning objectives** | **The course aims to**<br>1. gain knowledge of the role of micro-organisms in health and disease<br>2. to understand the role of micro-organisms in the spoilage of various foods.<br>3. to gain knowledge of micro-organisms in relation to food and food preservation | | | | |

**Unit I Microorganisms classification**

Micro Organism in food Bacteria – General characteristics of bacteria, bacteria morphology, cell structure, motility, nutrition, reproduction, and respiration.

Virus: - General characteristics of viruses, viral diseases, symptoms, and control of viral diseases.

Yeast: - General characteristics of yeast, the economic importance of yeast.

Mould: - General characteristics of Mould, economic importance of Mould.

Protozoa: - General characteristics of protozoa, morphology, plasmodium, protozoa diseases- dysentery, malaria.

**Unit II Factors affecting microbial growth**

The general principle underlying spoilage of food: fitness and unfitness of food for consumption, causes of spoilage, factors affecting the growth of microorganisms in food: moisture, humidity, temperature, oxygen, pH, and other factors. Physicaland Chemical changes caused bymicroorganisms.

**Unit III Food contamination**

Sources of Microorganisms in foods, classification of food: perishable, semi-perishable, non-perishable foods. Types of food spoilage microorganisms Spoilage of specific food groups- cereal and cereal products, pulses, fruits and vegetables, milk and meat products,

**Unit I Food Fermentations**

Fermentation –definition and types, Microorganisms used in food fermentations Dairy Fermentations-starter cultures and their types, the concept of probiotics, types of fermented foods, methods and preparation for vinegar, sauerkraut, soya sauce. Advantages of fermented foods, commercially fermentedfoods.

**UNIT: V**

Food-borne diseases: Bacterial food borne diseases (Staphylococcal intoxication, Botulism, Salmonellosis, Shigellosis, Enteropathogenic Escherichia Coli Diarrhoea Clostridium Perfringens gastroenteritis, Bacillus cereus Gastroenteritis). Food Borne Viral Pathogens, protozoa, Mycotoxins: Aflatoxicosis, Mycotoxicosis, Ergotism

**Textbooks: -**

1. Frazier W.C and West Off DC 2013) Food Microbiology. Fifth Edition Graw HillEducation (India) Pvt Ltd. Delhi 2013

**Reference Books-**


1. PelczarMicha ECS and Kreigh NR Microbiology, Eighth Edition, Tata McGraw Hill, NewDelhi. 2000
2. Willey UM, Sherwood LM, and WoolvertonCJ Prescott's Microbiology, Eighth Edition, Mc Graw-HillInternational, 2011
3. Foster WM Food Microbiology, CBSPublishers. 2016
4. Thomas J. Montville Food MicrobiologyJohnwiley and Sons, Ltd. 2008)
5. GeorgeBanwart Basic FoodMicrobiologySecondEdition, International ThomsonPublishing, Tokyo. 2012


**COURSE OUTCOME**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K2 | CO1 | Understand the classification of micro-organisms and its characteristics in foods. |
| K2 | CO2 | The factors affecting the growth in controlling the growth curve of micro organisms. |
| K3 | CO3 | Able to preserve the perishable foods from different types of microbial spoilage. |
| K4 | CO4 | Compare food borne infection and food intoxication. |
| K4 | CO5 | Explore the beneficial effects of microorganisms in the processing and development of fermented foods. |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | **S** | S | **M** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO2** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO3** | S | **S** | S | **S** | **S** | **S** | S | **S** | M | **S** | **S** | S |
| **CO4** | S | **S** | M | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO5** | M | **S** | S | **S** | **S** | **S** | M | **S** | S | **S** | **S** | S |

| | | |
|---|---|---|
| Strongly Correlating (S) | - | 3Marks |
| Moderately Correlating (M) | - | 2marks |
| Weakly Correlating (W) | - | 1Mark |
| No Correlation (N) | - | 0mark |

## SEMESTER VI

| Course Code | U21FNT61 | NUTRITION AND FITNESS | L | T | P | C |
|---|---|---|---|---|---|---|
| CORE-XIII | | | 5 | - | - | 4 |
| COGNITIVE LEVEL | | K2: Understanding<br>K3: Applying<br>K4: Analyzing | | | | |
| Learning Objectives | | The Course aims to<br>1. learn about the importance of Nutrition in sports personnel.<br>2. to find out the sources of generation of energy for muscle and force generation. | | | | |

**Unit I Body composition**

Body composition and fitness Body Composition- classification (Fat mass and fat-free mass) and its components, factors influencing body mass composition. Techniques for measuring body composition Fitness-definition, parameters of fitness- cardiovascular endurance, muscular strength, muscular endurance, flexibility, and bodycomposition

**Unit II Assessment of exercise**

Assessment and benefit of exercise- physiological, psychological, and sociological.Physical activity guidelines. Assessing personal fitness- pre-participation, screening, and risk assessment. Role of exercise in disease prevention – diabetes, cardiovascular disease, obesity, bone health, andcancer**.**

**Unit III Energy system**

Energy systems and electrolyte balance Reviews of different energy systems for endurance and power activity- Fuels and nutrients to support physical activity. Shifts in carbohydrate and fat metabolism, mobilization of fat stores during exercise. Water and electrolyte balance- Losses and their replenishment during exercise and sports events, the effect of dehydration, sports drinks

**Unit IV Nutrition for sportspersons**

Nutrition for sports person Definition, physiological and significant changes during exercise, types of stress faced by sports persons, nutrition needs of sports persons-macro and micronutrient needs,the role of water and electrolytes. Role of nutrition and recommendations – pre-exercise, during, and post-exercise Nutrition supplement and ergogenicaids**.**

**Unit V Yoga and fitness**

Yoga and nutrition fitness in special conditions 5.1 Yoga and fitness- effects on general vitality and immune, endocrine, neurons, digestion, and muscular systems, dietary pattern. Awareness about the alternative systems for health and fitness like Ayurveda, yoga, vegetarianism, and traditionaldiets

**Textbooks**

1. Bean A,*The Complete Guide To Sports Nutrition,* 7th edition, Bloomsbury, London, 2013.
2. Srilakshmi B, Suganthi V, Ashok CK. Exercise physiology, fitness and Sports Nutrition. New age international publishers, 2018.

**Reference Books**

1. Dunford M, *Fundamentals Of Sports And Exercise Nutrition,* Human Kinetics, Illinois, 2010
2. Jeukendrup A and Gleeson M, *Sports Nutrition: An introduction to energy production and performance,* Human Kinetics publishers, 2004
3. Maughan RJ, Burke LM, Handbook of Sports Medicine & Science- Sports Nutrition, Blackwell Science publications, 2002

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K2 | CO1 | Outline the self-responsibility for personal health and wellness. |
| K4 | CO2 | Analyze the role ole of nutrition in sports. |
| K2 | CO3 | Discuss the various parameters used to find healthstatus. |
| K3 | CO4 | Evaluate the effect of exercise on various nutrient metabolisms. |
| K2 | CO5 | Compare different exercise methods and learn their application. |

**Mapping of COs with POs& PSOs:**

| CO / PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | **S** | S | **M** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO2** | S | **S** | S | **S** | **S** | **S** | S | **S** | M | **S** | **S** | S |
| **CO3** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **M** | S |
| **CO4** | S | **S** | S | **S** | **S** | **S** | M | **S** | S | **S** | **S** | S |
| **CO5** | M | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |

**Strongly Correlating (S) - 3Marks**
**Moderately Correlating (M) - 2marks**
**Weakly Correlating (W) - 1Mark**
**No Correlation (N) - 0mark**

| Course Code | U21FNT62 | FAMILY RESOURCE MANAGEMENT | L | T | P | C |
|---|---|---|---|---|---|---|
| CORE- XIV | | | 5 | - | - | 4 |
| COGNITIVE LEVEL | | K2: Understanding<br>K3: Applying<br>K4: Evaluating | | | | |
| Learning Objectives | | The Course aims to<br>• understand the importance of management in family and personalliving<br>• improve their ability in the management of familyResources<br>• understand and apply the basic principles of art in Interior decoration.<br>• understand the elementary principles of planning a house and its interiorarrangement.<br>• to use the principles of design in day-to-daylife. | | | | |

**Unit I Hotel management**

**Home Management Meaning and Process-**Concept of Home Management.Planning, organizing, controlling, and evaluation. Managerial inputs – values, goals, and standards – their interrelationship. Resources – classification and characteristics; are optimizing the use of family resources.Decision making – Meaning, types – steps in decision making – ways of resolving conflicts.Characteristics of a good homemanager.

**Unit II Time and energy management**

**Time and energy management Time -** Importance of time management – guidelines in the planning time schedule. Energy: Its importance –fatigue-types of fatigue and ways of overcoming fatigue. Work simplification – Mundel's Classes of changes. Work measurement. Advantages of worksimplification.

**Unit III Applied art design**

**Applied art Design - Meaning**, types, characteristics, elements of design, principles of design harmony, proportion, balance, emphasis, and rhythm. Colour: Qualities of colour – Prang colour system – colour harmonies. Application of the principles in simple designs. Flower arrangement: Principles, types. Accessories in the home – Classification, and selection.

**Unit IV House Plan and Arrangement Site**

**House plan and arrangement Site -** Selection – factors to be considered. House Plans – types – reading of floor plans – drafting floor plansfor middle- and low-income group families.Features of a house contributing to livability – orientation, grouping – roominess, lighting and ventilation, circulation, storage facilities, privacy, flexibility, sanitation, andeconomy**.**

**Unit V Room Arrangement Furniture**

**Room arrangement furniture -** Selection, arrangement,and care.Furnishings – Type, Selection, and care. Application of art principles in room arrangement. Kitchen – different types of kitchen layout and its work simplification.

**Textbook**

1. Seetharaman, Premavathy, Sonia Batra, and PreetiMehra. *An Introduction to Family Resource Management*.CBS, 2005.

**References:**


1. Seymour, John, The Self-Sufficient Life and How to Live It. London: DK Publishing, 2003.
2. Princen, T, The Logic of Sufficiency. New York: MIT Press, 2005.
3. Ciperthwaite, Wm, A Handmade Life: In Search of Simplicity. New York: Chelsea Green, 2004.
4. Heinberg, Richard, Power-down: Options and Actions for a Post-Carbon World. Canada: New Society Publishers, 2004.
5. Moore, Tami James, and Sylvia M. Asay. *Family resource management*. Sage Publications, 2017.


**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledgeabout

| | | |
|---|---|---|
| K4 | CO1 | improve their ability in the management of family Resources |
| K2 | CO2 | understand and apply the basic principles of art in Interior decoration. |
| K2 | CO3 | understand the elementary principles of planning a house andits interior arrangement. |
| K3 | CO4 | to use the principles of design in day-to-day life. |
| K5 | CO5 | the importance of management in family and personal living. |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | **S** | S | **M** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO2** | M | **S** | S | **S** | **S** | **S** | S | **M** | S | **S** | **S** | S |
| **CO3** | S | **S** | S | **M** | **S** | **S** | S | **S** | S | **M** | **S** | S |
| **CO4** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | M |
| **CO5** | S | **S** | S | **S** | **S** | **S** | M | **S** | S | **S** | **S** | S |

**Strongly Correlating (S) - 3Marks**
**Moderately Correlating (M) - 2marks**
**Weakly Correlating (W) - 1Mark**
**No Correlation (N) - 0mark**

| Course Code | U21FNT63 | FUNCTIONAL FOODS AND NUTRACEUTICALS | L | T | P | C |
|---|---|---|---|---|---|---|
| CORE-XV | | | 5 | - | - | 4 |
| COGNITIVE LEVEL | | K 2 -Understanding K 4 – analyzingK 5 – Evaluating | | | | |
| Learning Objectives | | The course aims to<br>1. enable the students to familiarize themselveswith functional foods and Nutraceuticals<br>2. enable the students to know the importance of functional foods andNutraceuticals | | | | |

**Unit I Functional foods**

Definitions Background, the status of nutraceuticals and functional food market, the difference between nutraceuticals and functional foods, Types of nutraceutical compounds and their health benefits, currentscenario.

**Unit II Nutraceuticals**

Types of nutraceutical compounds – Phytochemicals, phytosterols, and other bioactive compounds, peptides, and proteins, carbohydrates (dietary fibers, oligosaccharides, and resistant starch), prebiotics, probiotics and symbiotic, lipids (Conjugated Linoleic Acid, omega-3 fatty acids, fat replacers), vitamins and minerals; their sources and role in promoting humanhealth.

**Unit III Phytochemicals**

Phytochemicals compounds used as functional food sources, their sources and health benefits: Flavonoids, allylsulfides, carotenoids, indoles, isothiocyanates, cardiac glycosides, monoterpenes, isoflavones and saponins, glycosylates, OrganoSulphur compounds, omega- 3 fattyacids.

**Unit IV Functional foods in various groups**

Functional foods: Cereal and cereal products, Milk and milk products, egg, oils, meat and products, seafoods, nuts and oilseeds, functional fruits and vegetables, herbs and spices, beverages (tea, wine,etc.), Fermented foods – their health benefits and role in conditions like cardiovascular diseases, hypertension, diabetes, etc. Pre-biotic and probiotics –health and other benefits.

**Unit V Functional foods regulations**

Role of functional foods as an antioxidant, their potential for use in improving health.Development in the processing of functional foods.Formulation and fabrication of functional foods.Stability of nutraceuticals. Safety, Consumer acceptance, and assessment of health claims, labeling, marketing, and regulatory issues related to nutraceuticals and functional foods.

**Textbook:**

1. Satyanarayana, U, Biotechnology, Books and Allied (P) Ltd., Kolkata, 2007

**References:**

1. Dubey, R.C Text Book of Biotechnology, S. Chand and Co. Ltd, NewDelhi2001
2. Israel Goldberg Functional foods, Pharma foods and Nutraceuticals, Culinary and Hospitality Industry Publication Services, 2001
3. Robert Easy Wildman Handbook of Nutraceuticals and functional foods, Culinary and Hospitality Industry Publication Services, 2001

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledgeabout

| | | |
|---|---|---|
| K2 | CO1 | Analyze the photochemical compounds physiological compounds and functional of natural as basis well of as various synthetic |
| K5 | CO2 | Compare functional food and nutraceuticals in plant sources to evaluate the potential health benefits of plant-based bioactive components |
| K4 | CO3 | Assess pro-biotics, prebiotics, and symbiotics and evaluate the potential health benefits. |
| K4 | CO4 | Explain the regulatory issues related to nutraceuticals and functional foods. |
| K5 | CO5 | Evaluate the Consumer acceptability and marketing of potentially available functional food Products |

**Mapping of COs with POs& PSOs:**

| CO / PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO2** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **M** | **S** | S |
| **CO3** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO4** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO5** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | M |

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

| Course Code | U21FNT64 | NUTRITION IN SPECIAL CONDITION | L | T | P | C |
|---|---|---|---|---|---|---|
| CORE-XVI | | | 5 | - | - | 4 |
| COGNITIVE LEVEL | | K2 -Understanding K4 - analyzing<br>K5 – Evaluating | | | | |
| Learning Objectives | | The course aims to<br>1. to identify and contribute to the prevention of public health/ social health problems in the country.<br>2. to equip students with workable knowledge to treat common illnesses athome.<br>3. to combat various National nutritional emergencies and epidemic diseases.<br>4. to understand the difficulties involved in feeding children withspecial needs. | | | | |

**Unit I - Nutritional care for the children with special needs**

Nutritional care for the children with special needs Overview of the disability, food and nutritional needs, and their modification. Attention deficit hyperactivity disorder, Autism, Cerebral palsy, Down's syndrome. Major nutritional problems and eatinghabits.

**Unit II - Epidemic diseases**

Epidemic diseases - (i) Dengue, chikungunya, and other epidemic conditions.Hypothyroidism and hyperthyroidism. Wilson's Disease: epidemiology, causes, symptoms, complications, nutritional requirement, dietary measures, a nutritional and eating disorder in epidemic diseases, problems, and preventive measures.

**Unit III- Nutritional Emergency**

Nutritional Emergency Nutrition during an emergency: Natural calamity - war, flood, fire famine Nutrition in a sea voyage, Mountaineering. Food requirements, the importance of food supply, the concept of food preparation and distribution, food contamination, and food-borne diseases.

**Unit IV- Space nutrition**

Space Nutrition: Food Selection. Food preparation for space Planning and serving the food, Classification of space food and Dehydrated foods use in space. Organization for food safety, safety measures in space foods, and importance of space nutrition. Recent advances in space nutrition.

**Unit V - Armed forces nutrition**

Armed forces nutrition: The history of Military nutrition, Nutrient Support in Military person, the role of nutrient in the injured person, Estimation of energy and protein metabolism in armed person. Recent developments in armed forces nutrition, the significance of armed forces nutrition.

**Text books**

1. Sharma S, Wadhwa A., "Nutrition in the Community- A textbook", Elite Publishing House Pvt. Ltd, 2003.
2. Srilakshmi B. "Dietetics" Seventh Edition, New Age International (P) Ltd, 2011

**References:**

1.Gibney., "Public Health Nutrition", Blackwell Publishing,2004.
2.Khanna., "Textbook of Nutrition and Dietetics", Phoenix Publisher,2013.

**Course outcomes**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K2 | CO1 | prevention of public health/ social health problems in the country. |
| K5 | CO2 | workable knowledge to treat common illnesses at home. |
| K4 | CO3 | combat various National nutritional emergencies |
| K4 | CO4 | epidemic diseases. |
| K5 | CO5 | difficulties involved in feeding children with special needs. |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |
| **CO2** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **M** | **S** | **S** |
| **CO3** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |
| **CO4** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |
| **CO5** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** | **S** |

**Strongly Correlating (S) - 3Marks**
**Moderately Correlating (M) - 2marks**
**Weakly Correlating (W) - 1Mark**
**No Correlation (N) - 0mark**

| Course Code | U21FNP63 | COMMUNITY NUTRITION PRACTICAL | L | T | P | C |
|---|---|---|---|---|---|---|
| CORE-XVII | | | - | - | 6 | 4 |
| COGNITIVE LEVEL | | K2: Understand K3: Applying K4: Analyzing<br>K5: Evaluating K6: Creating | | | | |
| Learning Objectives | | The Course aims to<br>1. identify suitable methods for resolve nutrition-related problems inthe community.<br>2. analyze maternal and child health careprograms.<br>3. understand the various AV Aids used itseffectiveness. | | | | |

**Assessment of nutritional status**

1. Anthropometry–Hb,weight,BMICalculation,HeadandChestcircumference,
2. Biochemicalassessment(Haemoglobin,Bloodpressure, andbloodglucoselevels)
3. Clinical assessment – using aquestionnaire
4. (3 days 24 Hour dietary recall, foodfrequency)

**II. Visit ICDS and Noon mealcentres**

1. Functions of ICDS and noon mealcentres
2. Beneficiaries of ICDS and noon mealcentres

**III. Nutritioneducation**

1. Av Aids and tools used for nutritioneducation
2. Plan a nutrition education program for a selectedgroup.

**Textbook:**

1. Park K, Park's Textbook of preventive medicine, 2005.
2. Bamji, Textbook of Human Nutrition, Oxford publishers, New Delhi, 2010

**Refernces**

1.ChanderVir S, Public Health Nutrition in developing countries, Part II, 1st edition, Woodhead Publishing, New Delhi, 2011
2. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., Nutritive value of Indian foods, NIN, Hyderabad, 2010
3. Bhatt VB, *Protein Energy Malnutrition*, PeePee Publishers, New Delhi, 2008
4. Sharma N, *Child Nutrition*, 1st edition, Murarilal& sons, New Delhi, 2006

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledgeabout

| | | |
|---|---|---|
| K2 | CO1 | Assess the nutritional status of the community. |
| K3 | CO2 | To understand the Functions and beneficiaries of ICDS and noon meal centres. |
| K4 | CO3 | Gain knowledge on the national effort to combat malnutrition. |
| K5 | CO4 | Biochemical assessment (Haemoglobin, Blood pressure, and blood glucose levels) |
| K6 | CO5 | To gain knowledge about Dietary assessment. |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | **S** | S | **M** | **S** | **S** | S | **S** | S | **M** | **S** | S |
| **CO2** | S | **S** | S | **S** | **S** | **S** | M | **S** | S | **S** | **S** | M |
| **CO3** | M | **S** | S | **S** | **S** | **S** | S | **S** | S | **M** | **S** | S |
| **CO4** | S | **S** | M | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO5** | S | **S** | S | **S** | **S** | **S** | S | **M** | S | **S** | **S** | S |

**Strongly Correlating (S) - 3Marks**
**Moderately Correlating (M) - 2marks**
**Weakly Correlating (W) - 1Mark**
**No Correlation (N) - 0mark**

| Course Code | U21FNE311 | ENTEREPRENEURSHIP DEVELOPMENT | L | T | P | C |
|---|---|---|---|---|---|---|
| ELECTIVE-I | | | 4 | - | - | 3 |
| COGNITIVE LEVEL | | K2: Understanding K 4: Analyzing K5: Evaluating | | | | |
| Learning Objectives | | The course aims to<br>1) create awareness about entrepreneurship as an effective to a "White-collarjob".<br>2) students can be taken to trade fairs to collect information on industrial products of interest. | | | | |

**Unit I Entrepreneurship**

Entrepreneurship – meaning, importance, types – the role of entrepreneurs in economic development, need, the transition from income generation to self-employment, and Entrepreneurship. Qualities of a good entrepreneur.Problems of entrepreneurs, qualities of an entrepreneur – entrepreneur as a career.

**Unit II Factors influencing entrepreneurial development**

Factors influencing entrepreneurial development – Economic, legal, social and psychological factors. How to start a business – production, selection – a form of ownership plant location – land, building, water, and power – raw materials – machinery – manpower – otherinfrastructuralfacilities– Licensing,registration,andlocalbye-laws.

**Unit III Agencies supporting Entrepreneurial Development Programme**

Agencies supporting Entrepreneurial Development ProgrammeInstitutional Arrangement for Entrepreneurship development – D.I.C., TIIC, S.I.D.C.O, N.S.I.C., S.I.S.I – Institutional Finance to Entrepreneurs – T.I.I.C.,S.I.D.B.I.
Commercial Banks – Incentives to small-scale industries.

**Unit IV Project proposal**

Project proposal – Proposal format and contentsteps in its preparation, Feasibility testing, SWOT analysis. Project report – Meaning and Importance – Project Identification – Contents of a project report – (as per requirements of Financial Feasibility and Economic Feasibility – Break-Even Analysis.

**Unit V Entrepreneurship in food product development**

Entrepreneurship developments in food product developments, functions, significance.Case histories of successful entrepreneurs – Entrepreneurship development in India – Women Entrepreneurship in India -Sickness in small scale industries and their remedialmeasures.

**Text books**

1. Chaiwallah S.A. Sales Management, Himalayan Publishing House New Delhi, 1999.
2. Dr.N.Rajan Nair, Sajith R. Nair Marketing, Sutanchand Sons, New Delhi, 2002

**References**

1. Vasant Desai, Project Management and entrepreneurship, Himalaya Publishing House, New Delhi, 2000
2. David H. Moll, Entrepreneurship, prentice Hall of India, New Delhi 1999.
3. Frank Jerkins, Advertising, prentice Hall of India, New Delhi, 2000.

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledgeabout

| | | |
|---|---|---|
| K2 | CO1 | have an ability to discern and distinct entrepreneurial traits. |
| K4 | CO2 | understandthe systematic process to select and screen a businessidea. |
| K4 | CO3 | to assess opportunities and constraints for new business ideas |
| K5 | CO4 | design strategies for successful entrepreneurs. |
| K5 | CO5 | write a business plan. |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **M** | **S** | S |
| **CO2** | S | **S** | M | **S** | **S** | **S** | S | **S** | S | **S** | **S** | M |
| **CO3** | S | **S** | S | **S** | **S** | **S** | M | **S** | S | **S** | **S** | S |
| **CO4** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO5** | M | **S** | S | **S** | **S** | **S** | S | **S** | M | **S** | **S** | S |

**Strongly Correlating (S) - 3Marks**
**Moderately Correlating (M) - 2marks**
**Weakly Correlating (W) - 1Mark**
**No Correlation (N) - 0mark**

| Course Code | U21FNE312 | BAKERY AND CONFECTIONERY | L | T | P | C |
|---|---|---|---|---|---|---|
| ELECTIVE-I | | | 4 | - | - | 3 |
| **Cognitive level** | K2: Understanding K3: Applying<br>K4:Analyzing K6: Creating | | | | | |
| **Learning objectives** | **Course aims to**<br>• understand the fundamentals of baking and learn the technologies behind bakery products.<br>• learn the current status, growth rate, the economic importance of baking, and confectionery in India. | | | | | |

**Unit I - Introduction of bakery**

Introduction of bakery–definition, principles, types of baked and confectionery products. Major and minor equipment – required to start a small bakery unit. Baking Industry: scope in the Indian economy. History of Baking- present trends, Bakery terms. Nutritional facts of bakery products, Standards, and regulations.

**Unit II - Ingredients of bakery**

Major and minor ingredients in baking Major ingredients – flour, fat, sugar and leavening agent – types, role in bakery Minor ingredients – milk, water, salt – types, role in baker.
Bakery Products: Ingredients & processes for bread, biscuits, cookies & crackers.
Cakes, pastries, doughnuts, rusks, other baked products Staling and losses in baking.

**Unit III - Principles of baking**

Principles involved in the yeast products preparation, methods – straight dough method, salt delayed method, no dough time method, sponge and dough method, ferment and dough method. Modified bakery products and breakfast cereals: High fiber, low sugar, low fat, and gluten-free bakery products for people with special requirements. Production and quality of breakfastcereals.

**Unit IV - Confectionery Products**

Confectionery Products: Characteristics and processingof raw material; Technology of manufacturing of Hard-boiled candies, toffees, fruit drops, chocolates, and other confectioneries: ingredients, processes, product quality parameters, defects, and corrective measures.

**Unit V - Equipments in bakery and confectionery**

Equipment used in Bakery and Confectionery Industry: Working on various equipment like Mixers, proofing chambers, dough dividers, molder and sheeter, baking ovens, cooling chamber, sealing and packaging machines, rolling and cutting machine of bakery and confectioneryunit.

**Text Books:**

1. Dubey, S.C (2007) Basic Baking 5 th edition. ChanakyaMudrak Pvt. Ltd. New Delhi.
2. Raina,Basic Food Preparation-A complete Manual. 3 rd. edition, Orient Longman Pvt. Ltd. USA, 2003.

**Reference Books**

1. Hui, YiuHin, Harold Corke, Ingrid De Leyn, Wai-Kit Nip, and Nanna A. Cross, eds. *Bakery products: science and technology*. John Wiley & Sons, 2008.
2. Kaur, Kulvinder. *In the Bakery*.Routledge, 2019.
3. Khetarpaul, Neelam. *Bakery Science and cereal technology*.Daya Books, 2005.

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K2 | CO1 | understand the bakery science and its application on processing. |
| K3 | CO2 | identify the basic ingredients to prepare bakery and confectionery products. |
| K4 | CO3 | assess various methods in the preparation of modified bakeryproducts. |
| K4 | CO4 | choose the appropriate bakery equipment based on the specific needs. |
| K6 | CO5 | check Faults and provide remedies for bakery products. |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | **S** | S | **S** | **S** | **M** | S | **S** | S | **S** | **S** | S |
| **CO2** | S | **M** | S | **S** | **M** | **S** | S | **S** | S | **M** | **S** | S |
| **CO3** | S | **S** | S | **S** | **S** | **S** | S | **M** | S | **S** | **S** | M |
| **CO4** | M | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO5** | S | **S** | S | **M** | **S** | **S** | S | **S** | S | **S** | **S** | M |

**Strongly Correlating (S) - 3Marks**
**Moderately Correlating (M) - 2marks**
**Weakly Correlating (W) - 1Mark**
**No Correlation (N) - 0marks**

| Course Code | U21FNE313 | EXTENSION EDUCATION | L | T | P | C |
|---|---|---|---|---|---|---|
| ELECTIVE-I | | | 4 | - | - | 3 |
| **Cognitive Level** | K2: Understand<br>K3: Apply<br>K4: Analyze | | | | | |
| **Learning Objectives** | **The course aims to**<br>• Understand the fundamentals of Extension Education<br>• know the various extension methods and<br>• familiarizing types of audios - visual aids | | | | | |

**Unit I Fundamentals of Extension Education**

History of Extension - origin, and growth, Scope and importance of Extension Education Meaning and definition of extension education, Characteristics and types of Extension Education, Contents and components of extension education, Goals and objectives of extension education.

**Unit II Principles of Extension Education**

Principles of extension education: Philosophy of extension education, Principles of extension education, Principles of Teaching, Training and Field work, Principles of Learning, Learning Experience, Elements of teaching-learning situation, Types of the Learning situation.

**Unit III Classification of extension methods**

Classification of extension methods: Meaning and functions of extension methods, the significance of extension methods, techniques, approaches, and strategies, Classification based on the size of the audience, nature or form, Criteria for selection, and combination of various extension methods.

**Unit IV Audio-Visual aids**

Audio-Visual aids - Meaning and definition, Types of Audio-Visual aids - Merits and Demerits. – Meaning, classification – Audio aids, visual aids, Audio visual aids. preparation and use of audio, visual aids. Factors influencing the effectiveness of audio visual aids, Cone of Experience and its importance in extension teaching.

**Unit V New initiatives in Extension pluralism**

New initiatives in Extension pluralism: Meaning and definition of private extension, Public extension and Extension pluralism, Role of public and private extension system, Strategies for privatizing Extension, Cyber extension, Public-private partnership, New Concepts: Demand-driven extension, market-led extension.

**Text books**

1.Reddy, Adivi. An Extension Education, Sree Lakshmi Press, Bapatala, 1995.
2. Jha, J.K, Encyclopaedia of Teaching of Home Science, Vol.I, II, and III. New Delhi: Anmol Publications, 2002

3. Easwaran A., ABC of Extension Education, GRI, Gandhi gram 2007.

**Reference books**

1..Mohanty, Sandhya Rani. *Home Science Extension Education and Rural Development*.Anchor Academic Publishing, 2017.
2. Rathore, O. S., O. S. Rathore, S. D. Dhankar, M. S. Chauhan, and S. N. Ojha. *Handbook of Extension Education*.Agrotech Pub. Academy, 2001.
3. Nisha, Maimun. *Understanding extension education*.Gyan Publishing House, 2006.

**Course outcomes**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K2 | CO1 | Know the concept, fundamentals, and scope of extension |
| K2 | CO2 | Know the principles of extension education |
| K2 | CO3 | Understand the classification of extension methods |
| K3 | CO4 | Analyze the audio-visual aids, types, merits, and demerits |
| K4 | CO5 | Examine the new initiatives in extension pluralism |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PSO 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | S | S | S | S | S | S | S | S | S | S | S |
| CO2 | S | S | M | S | S | M | S | S | S | S | M | S |
| CO3 | S | S | S | M | S | S | S | S | S | S | S | S |
| CO4 | S | S | S | S | S | S | S | S | S | S | M | S |
| CO5 | S | S | S | S | S | S | S | S | S | S | S | S |

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

| Course Code | U21FNE421 | FOOD HYGIENE AND SANITATION | L | T | P | C |
|---|---|---|---|---|---|---|
| ELECTIVE II | | | 3 | - | - | 3 |
| COGNITIVE LEVEL | | K 1: Recall<br>K2: Understanding<br>K 5: Evaluating | | | | |
| Learning Objectives | | The course aims to<br>1)To study the Introduction to sanitation and public health related to the foodservice industry which includes potential hazards that may occur in the operation and production offood. | | | | |

**Unit I Food hygiene**

Food hygiene: Importance of food safety in the food processing industry, Risk classification, Microbial contamination (including cross-contamination/indirect contamination) Chemical contamination, Physical contamination, Allergen contamination. Sanitation Overview Sanitary Regulations: Definition, Types of Hygiene and sanitation.

**Unit II Personal hygiene**

Personal hygiene: General principle of food hygiene and food handling habits, Importance of worker hygiene, health status, illness and injuries, Personal cleanliness and behavior, visitors, hygiene verification, Hand washing procedure. Personal hygiene of the food handler, Program of Good Health For Food handlers, Roots of Contamination, safety measures for food service personnel. • Care maintenance of Protective Clothing.

**Unit III Insect and pest control**

Insect and pest control: Importance of Pest Control in the food industry, Pest Classification (insects, rodents, and birds), Problems caused by pests, Prevention and effective control measures, Integrated pest management system, and tools. Food Storage Sanitation; Food Transport Sanitation, Pest Control, Packaging Sanitation, Waste Product Disposal.

**Unit IV Cleaning and sanitation**

Cleaning and sanitation: Importance of cleaning technology, general cleaning and sanitary considerations, sanitation principle and the requirements for a food sanitation program, Cleaning agents: different types of cleaning agents, Sanitizing agents, Equipment and systems, Evaluation of sanitation efficacy.

**Unit V Water supply and Infrastructure**

Water supply and Infrastructure: Sanitary aspects of building, Plant layout and design, Water in the food industry, water sources, water uses, Water quality, Purification and disinfection of water, water treatments, water quality standards, Drinking water specifications, Pollution Control, Waterborne diseases, airborne diseases preventing measure for diseases.

**Text books**

1.Bryan, F.L. Hazard Analysis Critical Control Point Evaluations A Guide to Identifying Hazards and Assessing Risks Associated with Food Preparation and Storage. World Health Organization, Geneva, 2000.
2. Frazier. W., Food Microbiology, McGraw-Hill co Ltd, New Delhi.2015
3.Adams M, R and Moss M, O., Food Microbiology, New Age International (P) Ltd., New Delhi, 2015.

**Reference books**

1. Vijaya Ramesh, Food Microbiology, MJP Publications, 2007.
2. David, A. Shapton, and Naroh F. Shapton Principles and Practices for the Safe Processing of Foods, Heineman Ltd., Oxford, 2011.

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K1 | CO1 | Classify the common kinds of physical/chemical contamination and simple measures to prevent food poisoning. |
| K2 | CO2 | Explain how high standards of personal hygiene for food handlers can be achieved. |
| K1 | CO3 | Define integrates practices for economic control of pests |
| K6 | CO4 | Design food hygiene and sanitation measures to control the spread of microorganisms. |
| K5 | CO5 | Criteria to fulfil water safety and environmental requirements. |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | S | S | S | S | S | S | M | S | S | S | S |
| CO2 | S | S | S | S | S | S | S | S | S | S | S | S |
| CO3 | M | S | S | S | S | S | S | S | S | S | S | S |
| CO4 | S | S | S | S | S | S | S | S | S | M | S | S |
| CO5 | S | S | M | S | S | S | S | S | S | S | S | S |

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

| Course Code | U21FNE422 | COMMUNICATION AND MEDIA SKILLS | L | T | P | C |
|---|---|---|---|---|---|---|
| ELECTIVES II | | | 3 | - | - | 3 |
| **Cognitive Level** | K2: Understand<br>K3: Apply<br>K4: Analyze | | | | | |
| **Learning Objectives** | **The course aims to**<br>1. State the basics of communication.<br>2.acquire skills in producing visual aids.<br>3.select, use and prepare visual aids for non-formal education. | | | | | |

**Unit I Communication overview**

Communication – Meaning, objectives, elements, communication models – Aristotle, Shanon Weaver, Berlo and Leagns.and barriers of communication – How to overcome barriers, advantages of proper communication, communication barriers, problems of communication barriers and its overcome measures.

**Unit II Methods of teaching**

Methods of teaching: concept, objectives, different types of teaching, functions, and significance of different teaching methods. According to use – Individual, Group, and Mass. According to form – Written, Spoken and Visual – Objectives, advantages, and limitations of all form's methods of teaching

**Unit III Audio visual aids**

Audio-Visual aids – Meaning, classification – Audio aids, visual aids, Audio visual aids. Preparation and use of audio, visual, and audio-visual aids.Factors influencing the effectiveness of audio-visual aids, Cone of Experience and its importance in extension teaching.

**Unit IV Mass media**

Mass media – Meaning, Characteristics, types – Radio, Television, Print media, Outdoor.Media. Print Media Vs Broadcast Media. New communication technologies – computers, e -mail, video conferencing, internet, cyber safes, (elementary understanding).

**Unit V Traditional media**

Traditional Media – concept, types, uniqueness, different types of traditional media, folk songs, puppets shows, Street play, drama, and villupattu. Objectives of traditional media, comparison between traditional media and modern media.Significance of traditional media and its advantages.

**References:**

1.Baran, Stanley J. "Introduction to mass communication." (2015).
2. Singhal, A. & Rogers, E. India's Communication Revolution from Bullock Carts to Cyber Marts. New Delhi: Sage Publications, 2001.

3. Reddy, A. Adivi, and A. Reddy. *Extension education*.Sree Lakshmi Press, 1987.
4.Dubey, V. K. *Extension education and communication*. New Age International, 2008.

**Course outcomes**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K2 | CO1 | Understanding of communication, models of communication. |
| K3 | CO2 | Acquire skills in the Preparation of visual aids. |
| K2 | CO3 | Collect first-hand information in visiting media centres. |
| K3 | CO4 | Able to organize exhibitions at the village level. |
| K4 | CO5 | Able to effectively use modern communication technologies. |

**Mapping of COs with POs& PSOs:**

| CO/ PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | S | M | M | S | S | S | S | S | S | S | S |
| CO2 | S | S | S | M | S | S | S | S | S | S | S | S |
| CO3 | S | S | S | M | S | S | S | S | S | S | S | S |
| CO4 | S | S | S | M | S | S | S | S | S | S | M | S |
| CO5 | S | S | S | S | S | S | S | S | S | S | S | S |

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

| Course Code | U21FNE423 | DIET FOR DISEASES | L | T | P | C |
|---|---|---|---|---|---|---|
| ELECTIVES II | | | 3 | - | - | 3 |

| | |
|---|---|
| **Cognitive level** | K2:Understanding K3: Applying<br>K4: Analyzing K6: Creating |
| **Learning objectives** | **Course aims to**<br>1. To develop capacity and aptitude in taking up dietetics as a profession.<br>2. Understanding the consequences of nutritional problems in the society.<br>3. Create awareness on community nutrition-based programmes. |

**Unit I Concept of diet therapy**

Concept of diet therapy: Purpose and principle of therapeutic diets, modification of normal diet, classification of therapeutic diets, routine hospital diets: clear fluid, full fluid, semi-fluid, semi-solid, solid. Different feeding techniques - oral feeding, tube feeding, parenteral feeding, the role of dieticians in nutritional care.

**Unit II Fever diet**

Fever: Causes, symptoms, dietary management: Febrile disease acute – Typhoid, influenza, malaria, chronic – tuberculosis: epidemiology, causes micro organism involved in fever, symptoms, complications, diagnosis, dietary recommendations and foods included and avoided.

**Unit III Gastro intestinal diseases**

Diseases of upper-gastrointestinal tract: Causes, pathogenesis, dietary modification, and diet planning for Gastritis, Peptic ulcer, Diseases of lower-intestinal tract: Causes, pathogenesis, dietary modification, and diet planning fordiarrhoea, dysentery, Constipation Haemorrhoids, Surgery of colon – gastrostomy, jejunostomy, and cancer of the colon

The disease of liver – hepatitis, cirrhosis, gall bladder diseases

**Unit IV Life style associated diseases**

a. Diabetes mellitus: Causes symptoms and food exchange list, dietary treatment for Diabetes mellitus.

b.Cardio vascular diseases – hypertension, atherosclerosis, congestive cardiac failure, and sodium-restricted diet in causes symptoms and dietary treatment.

c. Obesity and leanness – causes symptoms and dietary treatment.

**Unit V Renal diseases and others**

a.Diseases of the excretory system– nephritis, nephrotic syndrome, urinary calculi, renal failure.

b.Diet in allergy – definition, classification, food allergies. Test for allergy, dietetic treatment.

c.Cancer – causes symptoms of dietary treatment.

**Text books**

1. Robinson, Corinne Hogden, and Marilyn R. Lawler. *Normal and therapeutic nutrition*. No. Ed. 16. Collier Macmillan Publishers, 1982.
2. Dietary Guidelines of Indians- A Manual, National Institute of Nutrition, Hyderabad, 2006

3. Srilakshmi B, Dietetics, sixth edition, New age Publishing Press, New Delhi, 2011.

**Reference books**

1. Stacy N, William's Basic Nutrition and Diet Therapy, 12th edition, Elsevier publications, UK, 2005.
2.Elia M, Ljunggvist O, Stratton RJ, Lanham SA, Clinical Nutrition (The Nutrition Society Textbook), 2nd edition, Wiley Blackwell Publishers, 2013
3. Mahan LK, Stump SE, and Raymond JL, Krause's Food and Nutrition Care Process, 13th Edition, Elsevier Saunders, 2004.

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K2 | CO1 | Plan and prepare a standardized hospital diet for the needed patients. |
| K2 | CO2 | Understand the concept, purpose, and principles of diet therapy and the role and types of dieticians. |
| K3 | CO3 | Apply various deficiency disorders concerning their prevalence, causes, symptoms, and preventive measures. |
| K4 | CO4 | Discuss the kinds of commercial formulas available for oral and enteral feedings. |
| K4 | CO5 | Compare the food exchange list in the control of diabetes and complications. |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | S | S | S | S | S | S | S | S | S | S | S |
| CO2 | S | S | S | S | S | M | S | S | S | S | S | S |
| CO3 | S | S | S | S | S | S | S | S | S | S | S | S |
| CO4 | S | S | S | S | S | S | S | S | S | S | S | S |
| CO5 | S | S | S | S | S | S | S | S | M | S | S | S |

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

| Course Code | U21FNE531 | FOOD SAFETY AND QUALITY CONTROL | L | T | P | C |
|---|---|---|---|---|---|---|
| ELECTIVES III | | | 3 | - | - | 3 |
| COGNITIVE LEVEL | | K2-Understand K3 -Applying K4 –Analyzing | | | | |
| Learning Objectives | | The course aims to<br>1) Acquire knowledge on food safety and food laws<br>2) Study about quality control and common food standards. | | | | |

**Unit I Food safety concept**

Importance of food safety in the food processing industry Risk classification, National and international food regulatory agencies, General food laws and food safety regulations, Nutritional labeling regulation (mandatory and optional nutrients, nutritional descriptors, and approved health claims); Microbial contamination (including cross-contamination/indirect contamination) Chemical contamination, Physical contamination, Allergen contamination.

**Unit II Food Safety Programs**

Definitions and importance, Good Manufacturing Practices, (GMPs), Pest Control Program, Facility Maintenance, Personal Hygiene, Supplier Control, Sanitary.

Design of Equipment and Infrastructure, Procedures for Raw Material Reception, Storage and Finished Product Loading, Sanitation Program.(Sanitation Standard Operating Procedures (SSOPs).Product Identification, Tracking and Recalling Program, Preventive Equipment Maintenance Program, Education and Training Program.

**Unit III Food adulteration**

Adulteration of food - common adulterants and tests to detect common adulterants.Cereals and products - bread, biscuits, cakes products. Fruits Products: Jam, juices, squashes, ketchup, sauce. Oils and Fats: Coconut oil, groundnut oil, palm oil, sunflower oil, Vanaspati. Milk and Products: Skimmed milk powder, partly skimmed milk powder, condensed sweetened milk. Other products - coffee, tea, sugar, honey,toffees.

**Unit IV Hygiene and Sanitary Practices**

Personal Hygiene - Health Requirements - Location and Surroundings of Food Industry - Slaughter House - Good Manufacturing Practices - Good Food Hygiene Practices - Storage.

The food safety concepts, importance, and its significance, food safety, and hygiene in differentfoods.

**Unit V National and International laws**

FAO/WHO, FSSAI Codex Alimentarius commission, fair average quality (FAQ) specification for food grains, ISO 22000 series. HACCP: Background, current status, structuredapproach,principles,benefits, and limitations.ConsumerProtectionAct(CPA).

**Text Books:**

1. Sather A.Y A first course in food analysis, New Age Publications, New Delhi 1999
2. Redman, Nina. *Food safety: a reference handbook*. ABC-CLIO, 2007.

**References:**

1. Motarjemi, Yasmine, Gerald Moy, and Ewen Todd, eds. *Encyclopedia of food safety*. Academic Press, 2013.
2. Roberts, Cynthia A. *The food safety information handbook*. Greenwood Publishing Group, 2001
3. Motarjemi, Yasmine, and HuubLelieveld, eds. *Food safety management: a practical guide for the food industry*. Academic Press, 2013

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K2 | CO1 | Discuss different food safety and quality aspects. |
| K2 | CO2 | gain knowledge on food safety and food laws and study about quality |
| K4 | CO3 | Identify objectives, Importance, functions of quality control, stages of quality control. |
| K3 | CO4 | Apply safety principles related to the food industry. |
| K4 | CO5 | Analyze basic principles of HACCP, SQF, and ISO and sanitation. |

**Mapping of COs with POs& PSOs:**

| CO / PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO 6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO2** | M | **S** | S | **S** | **S** | **S** | S | **S** | S | **M** | **S** | S |
| **CO3** | S | **S** | S | **S** | **M** | **S** | S | **S** | S | **S** | **S** | S |
| **CO4** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **M** | S |
| **CO5** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

| Course Code | U21FNE532 | NUTRITIONAL COUNSELLING | L | T | P | C |
|---|---|---|---|---|---|---|
| ELECTIVES III | | | 3 | - | - | 3 |
| **Cognitive level** | | K2: Understanding K3: Applying<br>K5: Evaluating | | | | |
| **Learning objectives** | | **Course aims to**<br>1. learn the basic concept of nutrition counselling<br>2. enrich the different types of counseling and the importance of diet counselling | | | | |

**Unit I Nutritional counselling**

Nutritional counselling: Meaning, needs, and types of nutritional counseling planning of diet and their importance, techniques, and qualities of nutritional counseling. Nutritional counselling in health management, technology in nutritional counselling, applications of video, posters telephonic conversation in online dietcounselling.

**Unit II Dietician roles**

The Dietician a) Classification b) Code of ethics c) Responsibility d) The dietician in India e) Indian dietetic association f) Technology in diet counselling- usage of mobile applications in diet counselling.

**Unit III Disease specific diet counselling**

Nutritional counseling for cardiovascular patients, diabetes mellitus, malnourished pregnant women, obese person, anemic person: counselling based on disease, age of the patient, educational status of the patient, stages of disease condition, complications of disease condition, new diet adaptation, and otherissues.

**Unit IV Assessment needs of patients**

Assessment – Assessment of needs of patients, Communication process, Patient Education. Anthropometrical profile of the patient, biochemical parameters of the patients, clinical status, and their type of dietary pattern also assessed the previous nutritional status of the patient screening.

**Unit V Community-based counselling**

Counseling for communities: definition, objectives of community-based counselling, the importance of counselling to the community, planning, and Organizing counseling Camps for a specific disease, counselling for nutritional deficiencies, counselling for vulnerable groups, tools used for counselling to thecommunity.

**Textbook:**

1. Srilakshmi,Dietetics Eight Edition ,New age international (p) Ltd .2014
**2.** Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., Nutritive value of Indianfoods, NIN, Hyderabad, 2010

**References Books**

1. RuthA. Roth, Nutrition Diet therapysixth Edition, New age international (p) Ltd.2013
2. KaveriChakravarthy.A.SText book of Nutrition in health anddisease.2016
3. Joshi Y.K, Basics of Clinical Nutrition, 2nd edition, JP Medical Publishers Pvt Ltd,New Delhi, 2008
4. Stacy N, *William's Basic Nutrition and Diet Therapy*, 12th edition, Elsevier publications, UK, 2005

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K2 | CO1 | To gain knowledge about the role of dietician in nutritional counselling |
| K2 | CO2 | Explain types of diet and compare. |
| K3 | CO3 | Planning of diet in Diabetes mellitus. |
| K3 | CO4 | Planning of diet in Pregnant women. |
| K5 | CO5 | Create skill development in planning diets using food exchange lists |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PSO 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | M | S | S | S | S | S | S | S | S | S | S |
| **CO2** | S | S | S | S | S | S | S | S | S | S | S | S |
| **CO3** | S | S | S | S | M | S | S | S | S | S | S | S |
| **CO4** | S | S | S | S | S | S | S | S | M | S | S | S |
| **CO5** | S | S | S | S | S | S | S | S | S | S | S | |

**Strongly Correlating (S) - 3Marks**
**Moderately Correlating (M) - 2marks**
**Weakly Correlating (W) - 1Mark**
**No Correlation (N) - 0mark**

| Course Code | U21FNE533 | | L | T | P | C |
|---|---|---|---|---|---|---|

| ELECTIVES III | GENDER AND DEVELOPMENT | 3 | - | - | 3 |
|---|---|---|---|---|---|
| **Cognitive Level** | K2: Understanding<br>K4:Analyzing<br>K5: Evaluating | | | | |
| **Learning Objectives** | **The course aims to**<br>1. develop concern for women's issues and problems<br>2. have a basic idea of the efforts in India for womenuplift. | | | | |

**Unit I Gender and Development**:
Concept of gender, gender roles, gender budgeting, gender auditing, gender mainstreaming, gender analysis matrix, shift from welfare to development and empowerment, gender in development, gender and development, National and International efforts for gender empowerment.

**Unit II Status of Women in India**
Status of Women in India:Status – Meaning, Status of Women as per latest census report – Gender gaps and their implications, Sex ratio, Life expectation at birth, Health, Nutrition and Mortality, age at marriage, fertility, literacy, employment.

**Unit III Violence against women**
Violence against women: concepts, different types of violence, dowry, divorce, female feticide and infanticide, sexual discrimination, sexual exploitation, obscene advertisements, and projects in the mass media. Efforts for the elimination of all forms of discrimination.

**Unit IV Policies for Women's development**
Policies for Women's development: objectives of women development policies, National Policy for Women's empowerment, Policy perspective, mainstreaming, a gender perspective in the development process. Economic, Social, Legal, and political empowerment of Women.

**Unit V Women and Law**
Women and law: concept of law in women's development, importance of law in women's development, popular women welfare laws, marriage, dowry, divorce, property, employment and adoption, political participation, legal literacy for Women, family Counselling center and cybercrime.

**References**

1. Presser, Harriet, and Gita Sen. *Women's empowerment and demographic processes: Moving beyond Cairo*. Oxford University Press, 2000.
2. Sawyer, Roger. *We are but women: women in Ireland's history*. Routledge, 2002.
3. Forster, Christine, and Jaya Sagade. *Women's Human Rights in India*. Routledge India, 2019.
4. Pandit, Harshida. *Women of India: An Annotated Bibliography*. Vol. 26. Routledge, 2017.

**Course outcomes**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K2 | CO1 | trace the significance of gender development in national development |
| K3 | CO2 | report the violence against women at family and workplace. |
| K2 | CO3 | get familiarize with legislation and policies for women |
| K4 | CO4 | Analyze the status of women in society. |
| K3 | CO5 | Identify the laws available for the welfare of women. |

**Mapping of COs with POs& PSOs:**

| CO/ PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | S | M | M | S | S | S | S | S | S | M | M |
| CO2 | S | S | S | S | S | M | S | S | S | S | M | S |
| CO3 | S | S | S | S | S | S | S | S | S | S | S | S |
| CO4 | S | S | S | S | S | S | S | S | S | S | S | S |
| CO5 | S | S | S | S | S | S | S | S | S | S | M | S |

Strongly Correlating (S) -3 Marks
Moderately Correlating (M) -2 marks
Weakly Correlating (W) -1 Mark
No Correlation (N) -0 mark

| Course Code | U21FNE641 | | L | T | P | C |
|---|---|---|---|---|---|---|

| ELECTIVES IV | FOOD PACKAGING | 3 | - | - | 3 |
|---|---|---|---|---|---|
| COGNITIVE LEVEL | K2: Understanding<br>K4:Analyzing<br>K5: Evaluating | | | | |
| Learning Objectives | The course aims to<br>1) The functions of packaging<br>2) Various methods of packaging<br>3) Shelf Life of the products<br>4) Various equipment for packaging<br>5) Application during transportation. | | | | |

**Unit I Food packaging concepts**

Food packaging: definition, objectives of food packaging, the importance of food packaging, Introduction to food packaging: Packaging terminology- definition. Functions of food packaging, Packaging environment. Characteristics of foodstuff that influences packaging selection

**Unit II Different package methods**

Different types of packaging material and their properties: Glass, Paper and paper board, Corrugated fibre board (CFB), Metal containers: Tin Plate and Aluminum, Composite containers, Collapsible tubes, Plastic Films, Laminations, Metalized films, Co-extruded films, Testing of packaging material

**Unit III Packaging systems**

Packaging Systems and methods: Vacuum Packaging, controlled atmospheric packaging, modified atmospheric packaging, Aseptic Packaging, Retort processing, Microwave packaging, Active Packaging, intelligent packaging, Edible packaging, Shrink and stretch packaging.

**Unit IV Packaging of finished goods**

Packaging of finished goods: Weighing, filling, scaling, wrapping, cartooning, labelling, marking, and trapping. Labelling: Standards, purpose, description types of labels, labeling regulation barcode, nutrition labelling, health claims, mandatory labeling provision.

**Unit V Safety measures of packaging**

Safety measures of food packaging: Hazards of packaging material: Packaging specifications, the shelf life of packed foods, convenience and hazards of packaging materials, moisture absorption properties of foods and selection of packaging materials, the interaction between packaging and foods.

**Text books**

1. Vijaya Khader Food Science and Technology, Indian Council of Agricultural Research, Newdelhi. 2001
2. NIIR Board Food Packaging Technology, Handbook National Institute of

IndustrialResearch, New Delhi. 2004

**Reference books**

1. Jung H. Han Innovations in FoodPackaging, 2013
2. AlexandraGrumezescuFoodPackaging. 2016
3. AlexandraMihaiGrumezescuFood Packaging and preservation. 2017

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K2 | CO1 | To discuss the characteristics and functions of materials used in food packaging. |
| K4 | CO2 | To identify the types of packaging material for suitable product. |
| K4 | CO3 | The standard method used for the marketing of developed products. |
| K5 | CO4 | Various methods of food packaging to increase the shelf life's |
| K5 | CO5 | Construct audio-visual aids. |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO 1 | PSO2 | PSO 3 | PSO4 | PSO 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | **S** | S | **M** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO2** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **M** | **S** | S |
| **CO3** | S | **S** | S | **S** | **S** | **S** | S | **M** | S | **S** | **S** | S |
| **CO4** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO5** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | M |

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

| Course Code | U21FNE642 | CHILDREN WITH SPECIAL NEEDS | L | T | P | C |
|---|---|---|---|---|---|---|
| ELECTIVE-IV | | | 3 | - | - | 3 |

| | |
|---|---|
| **Cognitive Level** | K2: Understanding K4: Analyze K3: Apply |
| **Learning Objectives** | **The course aims to**<br>• Acquire knowledge about the special needs of exceptional children and the methods of satisfying their needs<br>• Acquire skills in guiding the parents of exceptional children. |

**Unit I Children with special needs**

Children with Special needs: Meaning, Types, Characteristics, History of Education of Exceptional Children. Special educators – their qualities and qualifications. Defining disabilities, Models of disability Classifying disabilities, the social construction of disability, Demography, Rights of Children withDisabilities.

**Unit II Common childhood disabilities**

Common Childhood Disabilities –definition, methods of identification, assessment methods, and etiology with reference to Locomotor disability, Visual disability, Auditory and speech disability, Intellectual disability, Autism, and Learning Disability.

**Unit III Children with disabilities**

Children with Disabilities and Society - Families of children with disability, Prevention, and management of different disabilities, physicallyChallenged Children: Orthopedically Handicapped – types, educational practices- Special education and inclusion, Policy andprogrammes and Policies for children withdisabilities.

**Unit IV Programmes**

Programmes and Policies for children with disabilities -The Indian Constitution, National Policy for Persons with Disabilities 2006, The Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act 1995, The Rehabilitation Council of India Act 1992, The National Trust for Welfare of Persons with Autism, Cerebral Palsy, Mental Retardation, and Multiple Disabilities Act 1999. Legal Rights of the Disabled in India, Role of Important Institutionslaws.

**Unit V Characteristics and educational needs**

Characteristics and educational needs– types, characteristics, and educational needs, Speech challenged – types, characteristics, and educational needs, Assistive technology - meaning, need, types benefits - the barriers to assistive technology. Scheme of Assistance to Disabled Persons for Purchase/ Fitting of Aids & Appliances (ADIP).

**Text books**

1. Mangal S.K., “Educating Exception Children”, PHI Learning Private Limited, New Delhi, 2009
2. Reddy G.L, and Sujatha J., “Children with Disabilities” Discovery Publishing House, New Delhi,2006
3. Reddy S.K.,” Educating of Children with Special Needs” Discovery

publishing House, New Delhi 2007

**Reference books**

1. Reddy L., Ramar R., and Kusuma A. "Hearing Impairment-An Educational Consideration", Discovery Publications, New Delhi 2004
2. Relakar S., Delvi U., and KautA. "Fundamentals of speech and speech teaching" 2006
3. SharmaK., "Rehabilitation of Hearing-Impaired Children", Sarup and Sons,NewDelhi, 2006

**Course outcomes**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| **K3** | **CO1** | empathize the needs of exceptional children |
| **K2** | **CO2** | familiarize with the educational provisions of exceptional children |
| **K4** | **CO3** | gain skills in identifying children with special needs. |
| **K2** | **CO4** | Understand the special needs of exceptional children |
| **K3** | **CO5** | Identifying the methods to satisfy the need of exceptional children. |

**Mapping of COs with POs& PSOs:**

| CO/ P O | PO 1 | PO2 | PO 3 | PO4 | PO5 | PO6 | PO 7 | PS O 1 | PS O 2 | PS O 3 | PS O 4 | PS O 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | **S** | M | **S** | **S** | **S** | S | **S** | S | **S** | **M** | S |
| **CO2** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **M** | **M** | S |
| **CO3** | S | **S** | S | **M** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO4** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO5** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |

**Strongly Correlating (S) - 3Marks**
**Moderately Correlating (M) - 2marks**
**Weakly Correlating (W) - 1Mark**
**No Correlation (N) - 0mark**

| Course Code | U21FNE643 | FASHION DESIGN | L | T | P | C |
|---|---|---|---|---|---|---|
| ELECTIVE-IV | | | 3 | - | - | 3 |

| | |
|---|---|
| **Cognitive Level** | K2: Understand<br>K3: Apply<br>K4: Analysis |
| **Learning Objectives** | **The course aims to**<br>1. Impart knowledge about functions and theories of clothing.<br>2. Understand the basics of the fashion and fashion industry.<br>3. Develop sensitivity towards the selection of garments and garment design. |

**Unit I Meaning of fashion**

Meaning of Fashion– objectives, scope, importance, Need for clothing, and Fashion perspectives - Fashion terminologies. Fabric terms, Accessory Terms, Common Sewing Terms, and Industry Language. Fashion evolution- haute couture, pretaporter.

**Unit II Fashion Movement**

Fashion Movement - Meaning, Theories, and principles- trickle up, trickledown, and trickle across. Fashion - cycle, Fashion forecasting, fashion change – social and psychological reasons.

**Unit III Substance of Fashion Industry**

The substance of Fashion Industry -concepts and importance of fashion industry, fashion industry in India, Soft goods chain-textile, apparel & retail segment - Apparel Categories, Designing process - World fashion design centers, Influential designers in India and abroad

**Unit IV Fashion Business Trends**

Fashion Business Trends –current trends in India, importance, Consumer Groups, Consumer Buying Consumer market, Importance of demographics and psychographics & Niche Marketing. Fashion enterprise- fashion information services.Fashion websites.

**Unit V Career in Fashion Industry**

A career in Fashion Industry– importance and scope, Career planning process, Training and experience needed, Career in textile, apparel, retail & fashion promotion, Entrepreneurship in fashion, boutique management.

**Text books**

1. Kathryn Mc Kelvey and Janine Munslow Fashion Design: Process, Innovation, and Practice,BlackwellScienceLtd.,BlackwellPublishingCompany,UK.2005
2. Jenny Davis A Complete Guide to Fashion Designing, First Edition, Abhishek Publications, Chandigarh.2006
3. Mahadevan, M.G. Textile colouring, First Edition, Abhishek Publication Chandigarh. 2008

**Reference books**

1. Premlata Mullick Textbook of Textile Designing, Kalyani Publishers, Ludhiana. 2006
2. Parachure, J. W Fundamentals of Designing for Textiles and other end-use,

Woodhead publishing, India, New Delhi.2009

**Course outcomes**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| **K3** | **CO1** | Identify the role and functions of clothing and recognize the factors affecting selection and evaluation of clothing. |
| **K2** | **CO2** | Explain the concept of fashion, its terminology, sources, and factors affecting it. |
| **K2** | **CO3** | Describe the global fashion industry and its leading designers. |
| **K4** | **CO4** | Classify and illustrate various components of the garment. |
| **K3** | **CO5** | Apply the knowledge of elements and principles in design interpretation. |

**Mapping of COs with POs& PSOs:**

| CO / PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PSO 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | S | S | M | **S** | S | S | S | S | S | S | S |
| **CO2** | S | S | S | M | **S** | S | S | S | S | S | S | S |
| **CO3** | S | S | M | M | **S** | S | S | M | S | S | M | S |
| **CO4** | S | S | S | M | **S** | S | S | S | S | S | S | S |
| **CO5** | S | S | S | M | **S** | S | S | S | S | S | S | S |

**Strongly Correlating (S) - 3Marks**
**Moderately Correlating (M) - 2marks**
**Weakly Correlating (W) - 1Mark**
**No Correlation (N) - 0mark**

| **Course Code** | **U21FNN311** | **FUNDAMENTALS FOOD SCIENCE** | **L** | **T** | **P** | **C** |
|---|---|---|---|---|---|---|
| **Non-Major electives** | | | **2** | **-** | **-** | **2** |

| | |
|---|---|
| **Cognitive level** | K2-Understanding K3-applying K4-Analysing<br>K5 – Evaluating |
| **Learning objectives** | **Course aim**<br>1. To know the role of food inhealth.<br>2. To enable students to obtain knowledge of different food groups and their contribution tonutrition.<br>3. To help them study the different methods of cooking and their advantages anddisadvantages.<br>4. To enable the students to apply the process of differentfoods.<br>5. To enable them to gain experience in the preparation of foods with attention to the preservation of their nutritive value-oriented to Indian cooking. |

**Unit I Food groups**

Food definition, functions of foods: energy-yielding foods, bodybuilding foods, protective foods. Food groups-classification of foods by ICMR, five food groups: balanced diet- definition, planning of balanced diet, Recommended Dietary Allowances (RDA) Dietary guidelines.

**Unit II Cereals and pulses**

Cereals and pulses: different types of cereals and pulses, structure, nutritive value, classification, processing, milling, nutrient content, different types of cooking cereals. Pulses and legumes –different types of pulses, nutritive value, processing in pulses, toxins in pulses.

**Unit III Fruits, vegetables, and milk foods**

Fruits: classification of fruits Vegetables: classification of vegetables, Milk – classification, nutritive value. Pigments and Flavouring compounds, the role of pectin in fruits, processing, and preservation. Milk - composition and Nutritive value, physical properties of milk, Different types of milk and milk products, the role of milk and milk products in cookery.

**Unit IV Meat and fish foods**

Meat: Different types of flesh foods, fish and poultry – meat – composition, and nutritive value, post-mortem changes, ageing of meat, tenderizing of meat, curing of meat, cuts, and grades of meat, meat cookery, storage. Fish and poultry - Nutritive value.

**Unit V Nuts and oilseeds, Sugar, Spices, and Condiments**

Nuts and oilseeds- different types of nuts and oilseeds and their availability nutritive value and processing. Sugar –types, stages, sugar cooking, and processing. Spices and Condiments – Classification description, uses procurement and storage.

**Textbook:**

1. SrilakshmiFoodScience,SeventhEdition,New Age International Publishers, New Delhi.2018

**Reference books**


1. M.N.AhmedFood Science and Nutrition, First Edition, 2005
2. Norman N.Potter.JosephHotchkissFood Science,Fifth Edition,2007
3. Sunetra RodayFood Science and Nutrition,Second Edition,2012
4. Sumati RajagopalMudambi Food Science,2015
5. Dr.M.SwaminathanFood and Nutrition, SecondEdition,2017


**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K2 | CO1 | The student will gain knowledge about energy requirements and the Recommended Dietary Allowances. |
| K2 | CO2 | Knowledge of nutritive value, understand the cooking quality factors, and develop skills in the preparation and storage of milk and egg products. |
| K3 | CO3 | Knowledge on nutritional classification, understand the changes in pigments, and acquire skills in preserving nutrients and pigments in the processing and storage of vegetables and fruits |
| K4 | CO4 | Determine the smoking point of any cooking oils and the stages of sugar cookery |
| K5 | CO5 | Assess the effect of the addition of acid, fat, salt, water, and sugar on the texture of flesh foods quality. |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | **S** | M | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO2** | S | **S** | S | **S** | **S** | **S** | S | **M** | S | **S** | **S** | S |
| **CO3** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **M** | S |
| **CO4** | S | **S** | S | **S** | **M** | **S** | S | **S** | S | **S** | **S** | S |
| **CO5** | S | **M** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0Mark

| Course Code | U21FNN312 | NUTRITION AND WELLNESS | L | T | P | C |
|---|---|---|---|---|---|---|
| on-Major electives | | | 2 | - | - | 2 |

| | |
|---|---|
| **Cognitive level** | **K1-Knowledge<br>K2-<br>Understandin<br>g K3-<br>applying** |
| **Learning objectives** | To enable the students to acquire<br>Elementary knowledge on wellness and fitness<br>Knowledge on the relationship between nutrition andwellness |

**Unit I Concept of wellness**

Wellness; definition and concept of wellness, fitness and Health Definition and Indicators of Health - Parameters, Components, and Relationship between Wellness, Fitness, and Health - Challenges and Personalized approach.

**Unit II Nutrition and health**

Nutrition and Health Introduction - Food Groups, Adequate Diet, My Pyramid, Foods for Health, Millennium Development Goals, Role of Macro and Micronutrients – Carbohydrates, Proteins, Fats, Vitamin D, Calcium, Iron, Optimum Nutrition and Hydration forHealth.

**Unit III Physical activity**

Physical Activity: definition and methods of physical activity, training Aerobic and anaerobic training -To enhance Cardio Vascular Endurance, Flexibility, and Body Composition, Measurement of PAL, Benefits of Fitness training and Gadgets for measuring PA.

**Unit IV Diseases and fitness**

Diseases and fitness: Diseases due to faulty food habits and physical inactivity. Non-communicable Disease conditions- Underweight, Obesity, Diabetes mellitus, Hypertension, Cancer, Cardiovascular Disease, Anemia. Diet modifications, the role of physical activity in disease prevention.

**Unit V Stress management**

Stress and Health Management: definition and objectives, the importance of stress management. Stress assessment and management techniques-under weight, overweight, and obesity, relaxation techniques –yoga and meditation for health, theimportance of yoga and its benefits in health management.

**Text books**

1. Swaminathan, Essential of Food and Nutrition‟, Bangalore Printing Publishing Company, 2008
2. Kathleen Mahan, Sylvia Escott Stump, “Krause’s Food and Nutrition and Diet Therapy‟ W.B Saunders Company, USA,2000.
3. Swaminathan, M. Essentials of Foods and Nutrition, Volume I and II Ganesh and Co., Madras,2003.

**Reference books**

1. Mahan, Kathleen L. Krause's Food, Nutrition and Diet Therapy, W.B. Saunders, 11th Edition 2004.
2. Srilakshmi. E. Nutrition Science, New Age International Publishers, 2012.
3. Swaminathan, M. Advanced Textbook on Food Science and Nutrition, Vol:2, Second edition, Reprinted, Bangalore Printed and publishing Co Inc, Bangalore, 2003.

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K2 | CO1 | Understand the concept of Wellness, Fitness, and Health |
| K2 | CO2 | Acquired knowledge on basic food groups |
| K3 | CO3 | Importance of wellness |
| K4 | CO4 | Different types of diet-related diseases |
| K5 | CO5 | Role of nutrition in health |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | **S** | M | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |
| **CO2** | S | **S** | S | **S** | **S** | **S** | S | **M** | S | **S** | **S** | S |
| **CO3** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **S** | **M** | S |
| **CO4** | S | **S** | S | **S** | **M** | **S** | S | **S** | S | **S** | **S** | S |
| **CO5** | S | **M** | S | **S** | **S** | **S** | S | **S** | S | **S** | **S** | S |

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0

| **Course Code** | **U21FNN421** | **Basics of Human Nutrition** | **L** | **T** | **P** | **C** |
|---|---|---|---|---|---|---|
| **NME-II** | | | **2** | **-** | **-** | **2** |
| **Cognitive Level** | | K2: Understand<br>K3: Apply<br>K5: Evaluate | | | | |

| | |
|---|---|
| **Learning Objectives** | Course aims to<br>1. understand the major nutrients relevant to human health.<br>2. gain knowledge on dietary sources, intake levels, physiological role, and requirement of major nutrients on the human body.<br>. |

**Unit I Introduction to nutrition**

Introduction to nutrition: Definition of nutrition- food, health, nutritional status, malnutrition, over nutrition, under nutrition, functions of food, balanced diet, food pyramid, ICMR Basic five food groups.

**Unit II Macronutrients**

Macronutrients: carbohydrates- classification, functions, food sources.
Dietary fibre - Functions, food sources & deficiencies. Lipids and fats- definition, classification, functions, Deficiency, sources-Proteins, Definition, classification, functions, deficiency, sources.

**Unit III Micronutrients**

Micronutrients: vitamins-, definition, classification &functions of vitamins
Nomenclature, functions, deficiency& sources of vitamins A, D, E, K Nomenclature, functions, deficiency& sources of vitamins B1, B2, B3, folic acid, B6, B12.

**Unit IV Minerals**

Minerals: classification, Macrominerals: and micro minerals:Calcium, phosphorus, magnesium, sulfur, sodium and potassium.
Micro minerals: Iron, Zinc, iodine, fluorine, sodium
Definition functions, deficiency diseases, food sources, recommended dietary intake.

**Unit V Water**

Water: Distribution of water and electrolytes, functions, requirements, sources, water balance, water depletion, water excess. Water: dehydration, causes, symptoms, preventive measures, oedema- causes, and preventive measures.

**Text books**

1. Srilakshmi B, Dietetics, sixth edition, New age Publishing Press, New Delhi, 2011
2. Park, K.: Park's Textbook of Preventive and Social Medicine, 18th Edition, M/s. Banarasi das Bhanot, Jabalpur, 2000.
3. Swaminathan, M. Essentials of Food and Nutrition, Vols. I and II. Ganesh & Co. 2000.

**Reference books**

1. Stacy N, William's Basic Nutrition and Diet Therapy, 12th edition, Elsevier publications, UK, 2005.
2. Mahan LK, Stump SE, and Raymond JL, Krause's Food and Nutrition Care Process, 13th Edition, Elsevier Saunders, Missouri, 2012
3. Barasi, Mary. *Human nutrition: a health perspective*. CRC Press, 2003.
4. Roday S, Food Science, and Nutrition, Oxford university press, New Delhi, 2007

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K2 | CO1 | Identify the functions and deficiencies of minerals. |
| K2 | CO2 | Explain the structure and components of nutrients. |
| K3 | CO3 | Outline the water distribution in the human body |
| K4 | CO4 | Analyze the different quality aspects of macronutrients and discuss on specific functions of macronutrients in the human body |
| K5 | CO5 | Identify the functions and deficiencies of minerals. |

**Mapping of COs with POs& PSOs:**

| CO/ PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | S | S | S | S | S | S | S | S | S | S | M |
| CO2 | S | S | S | S | S | S | S | S | S | S | S | S |
| CO3 | S | S | M | S | S | S | S | S | S | S | S | S |
| CO4 | S | S | S | S | S | S | S | S | S | S | S | S |
| CO5 | S | S | S | S | S | S | S | S | S | S | S | S |

Strongly Correlating (S) - 3 Marks Moderately Correlating (M) - 2 marks
Weakly Correlating (W) -1 Mark No Correlation (N) - 0 mark

| Course Code | U21FNN422 | FOOD PRESERVATION CONCEPTS | L | T | P | C |
|---|---|---|---|---|---|---|
| Non-Major electives | | | 2 | - | - | 2 |
| COGNITIVE LEVEL | | K 2: Understanding K3: Applying K5: Evaluating K 6: Creating | | | | |

| | |
|---|---|
| Learning Objectives | The course aims to<br>1) study the basics of various food preservation technologies and the criteria needed to be taken for the appropriate processing of foods.<br>2) contribute proper utilization of food free from contamination increased shelf life with prevention of wastage. |

**Unit I Food preservation**

Introduction to Food Preservation: Definition and scope of Food preservation Technology, Principles of food preservation, perishable, non-perishable food, causes of food spoilage: Microbial, Physical, Chemical contamination, causes of food contamination, sources of microorganisms.

**Unit II Food preservation methods**

Food preservation by low temperature: Introduction to Refrigeration, cold storage, and freezing, Principle of the freezing, freezing curve, Changes occurring during freezing, Types of freezing - slow freezing, quick freezing. Introduction to thawing, changes during thawing, and its effect on food.

**Unit III Methods of preservation**

Food preservation by high-temperature Thermal processing methods of foods: cooking methods blanching methods, pasteurization methods and sterilization of foods, canning in food preservation, bottling methods, and spoilages in canned foods.

**Unit IV Food preservation by drying and dehydration**

Food preservation by drying and dehydration-Definition of drying and dehydration, Drying curve and Factors affecting rate of drying, Different methods of drying and driers used in the food industry, drying foods, dehydrated foods, availability of drying foods in the market,

**Unit V Food preservatives**

Food preservation by irradiation and preservatives: Definition, Methods of Irradiation, Uses and safety aspects of radiation in food processing. Preservatives: natural preservatives- salt, sugar, honey, oil, tamarind, chemical preservatives: class II Preservatives.

**Text Books:**

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

**Reference Books**

1. Subbulakshmi, Shobha A et.al., Food Processing and Preservation, New Age International Publishers.2006
2. Srilakshmi Food Science, NewAgeInternational Publishers 2008
3. Sudesh and Neelam Food Preservation, Published by Agro tech 2009
4. Brennan JG and Grandison AS Food processing handbook. 2nd Edition, John Wiley 2012
5. Mano Ranjan Kalia Food Quality Management Second Edition, Agrotech Publishing Academy, Udaipur 2014

6. Dr. Anju Singh Handbook of food preservation, Published by Agro tech 2017

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K6 | CO1 | Design and develop the unit operations required to produce a given food product. |
| K2 | CO2 | Classify the various types of food spoilage and prevent using suitable processing methods. |
| K2 | CO3 | Outline the principles and concepts of processing techniques and its effects on product quality. |
| K5 | CO4 | Evaluate the novel technologies in food preservation. |
| K3 | CO5 | Utilize the possible, recent preservation methods in the food processing sector. |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | **S** | S | **S** | **S** | **S** | M | **S** | S | **S** | **S** | S |
| **CO2** | S | **S** | M | **S** | **S** | **S** | S | **S** | S | **M** | **S** | S |
| **CO3** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **M** | **S** | S |
| **CO4** | S | **S** | M | **S** | **S** | **S** | S | **S** | S | **S** | **S** | M |
| **CO5** | S | **S** | S | **S** | **S** | **S** | M | **S** | S | **S** | **S** | S |

**Strongly Correlating (S) - 3Marks**
**Moderately Correlating (M) - 2marks**
**Weakly Correlating (W) - 1Mark**
**No Correlation (N) - 0mark**

| **Course Code** | **U21FNS53** | | **L** | **T** | **P** | **C** |
|---|---|---|---|---|---|---|
| **Skill based Electives-III** | | **FOOD PROCESSING FUNDAMENTALS** | **2** | **-** | **-** | **2** |
| COGNITIVE LEVEL | | K 2: Understanding<br>K3: Applying | | | | |
| Learning Objectives | | The course aims to<br>1. Plan a processing method to increase the shelf life using Thermal and non-thermal methods of processingtechniques.<br>2. Choose the best processing techniques to be used for a | | | | |

| | |
|---|---|
| | specific group ofproducts. |

**Unit I Pre- and post-harvest processing**

Pre-and post-harvest processing: concepts, principles, advantages of pre-and post-harvest processing, nature of harvested crop, plant, and animal products. Maturity index – definition, principle, Assessment methods for various crops. Principles of storage: storage of grains – conditions and effects of cold storage onquality.

**Unit II Processing and preservation**

Processing and preservation by heat: Blanching, Pasteurization, sterilization and UHT processing, canning, extrusion cooking, dielectric heating, microwave heating, roasting, and frying. Retort processing. Drying – types, principles, drying curve, water activity, and microbial spoilage due to moisture. Dehydration of fruits, vegetables, and animal products – ultra filtration, reverse osmosis.

**Unit III Different preservation**

Different preservation and processing methods: the objective of preservation, advanages of food preservation. Preservation using low temperature: Refrigeration, freezing, CA, MA & freeze-drying principles, mechanism of action, and effect on the quality of food product quality, advantages, and disadvantages.

**Unit IV other preservation methods**

Food irradiation and chemical preservation: Food irradiation regulations in food irradiation. Food additives and chemical preservatives: natural preservatives: honey, salt, sugar, oil and chemical preservatives, GRAS and permissible limits for chemical preservatives, advantages, and disadvantages.

**Unit V Non-thermal methods**

Processing and principles using non-thermal methods: High-pressure processing, Use, and application of enzymes and microorganisms in processing and preservation of foods. Food fermentation: objectives, principles, advantages of fermentation, fermented foods, pickling, and smoking.

**Text books:**

1.Rao, M.A., S.S.H. Rizvi, and A.K. Datta ―Engineering Properties of Rood¦, 3rd Edition, Taylor & Francis,2005
2. Majumdar, A.S. ―Dehydration of Products of Biological Origin¦, Oxford & IBH Publication,2004
3. Fellows, P.J. Food processing technology: Principle and Practice. 2nd Ed. CRC Publishers,2005

**Reference books**

1. Desrosier NW & James N. Technology of food preservation. AVI. Publishers, 2007

2. Das, H. ―Food Processing Operations Analysis¦, Asian Books, 2005

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K6 | CO1 | Understand the pre-and post-harvest technology |
| K2 | CO2 | Different processing methods |
| K2 | CO3 | Various techniques in food processing |
| K5 | CO4 | Chemical preservation methods |
| K3 | CO5 | Thermal processing methods |

**Mapping of COs with POs& PSOs:**

| CO / PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | **S** | S | **S** | **S** | **S** | M | **S** | S | **S** | **S** | S |
| **CO2** | S | **S** | M | **S** | **S** | **S** | S | **S** | S | **M** | **S** | S |
| **CO3** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **M** | **S** | S |
| **CO4** | S | **S** | M | **S** | **S** | **S** | S | **S** | S | **S** | **S** | M |
| **CO5** | S | **S** | S | **S** | **S** | **S** | M | **S** | S | **S** | **S** | S |

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

| **Course Code** | **U21FNS64** | **FOOD FERMENTATION** | **L** | **T** | **P** | **C** |
|---|---|---|---|---|---|---|
| **SBE IV** | | | **2** | **-** | **-** | **2** |
| COGNITIVE LEVEL | | K 2: Understanding<br>K3: Applying | | | | |
| Learning Objectives | | This course aims to<br>Provide the concepts of fermentation techniques<br>Importance and benefits of fermented foods | | | | |

**Unit I Basics of fermentation**

Fermentation, types of fermentation, Fermentation Pathways for Industrial Products: Biochemical pathways of metabolic reactions for utilization of carbon sources and formation of different metabolites by microorganisms; Strain Development -Various techniques of modifying the strains for increased production of industrialproducts.

**Unit II Fermented foods**

Fermentative Production: a) Foods: Processes for preparing fermented products including Yogurt (curd) and other Traditional Indian Products like idli, dosa, dhokla, shrikhand, etc., Soya based products like soya sauce, natto, etc., Cocoa, Cheese, etc.; fermented foods in the market and itsneeds.

**Unit III Beverages**

Beverages: concepts of fermentation in beverage processing, types of fermented beverages, alcoholic beverages based on fruit juices (wines), cereals (whisky, beer, vodka, etc.,), sugar cane (rum), etc. Process description, quality of raw materials, fermentation process controls,etc.) Industrial chemicals.

**Unit IV Fermented production**

Fermentative Production of different products: Organic acids like (Citric Acid, Lactic Acid), Amino Acids (Glutamic acid, Lysine), Antibiotics (Erythromycin, Penicillin), Polysaccharides (Dextran, Xanthan), etc.; steroids transformation; process descriptions and key controls for optimal production.

**Unit V Advantages of fermentation**

Advantages of fermentation: health benefits, gastrointestinal diseases and fermented foods, the role of fermented foods in nutrient absorption. Processed fermented foods in the market. Prebiotics: role of prebiotics in health, probiotics: role of probiotics in health.

**Text books**

1. M.N. Ahmed Food Science and Nutrition, First Edition, 2005
2. Norman N. Potter.Joseph H. Hotchkiss Food Science, fifth edition, 2007
3. SunetraRoday Food Science and Nutrition, SecondEdition, 2012
4. SumatiRajagopalMudambi Food Science, 2015
5. Swaminathan Food and Nutrition, SecondEdition, 2017

**Reference books**

1. Vogel, H.C. and C.L. Todaro, Fermentation and Biochemical Engineering Handbook: Principles, Process Design and Equipment, 2nd Edition, Standard Publishers 2005.

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K6 | CO1 | Concept and types of fermentation |
| K2 | CO2 | Different types of fermented foods |
| K2 | CO3 | Alcoholic fermented foods |
| K5 | CO4 | Fermentation with acids and alkalis |
| K3 | CO5 | Advantages of fermented foods |

**Mapping of COs with POs& PSOs:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | **S** | S | **S** | **S** | **S** | M | **S** | S | **S** | **S** | S |
| **CO2** | S | **S** | M | **S** | **S** | **S** | S | **S** | S | **M** | **S** | S |
| **CO3** | S | **S** | S | **S** | **S** | **S** | S | **S** | S | **M** | **S** | S |
| **CO4** | S | **S** | M | **S** | **S** | **S** | S | **S** | S | **S** | **S** | M |
| **CO5** | S | **S** | S | **S** | **S** | **S** | M | **S** | S | **S** | **S** | S |

**Strongly Correlating (S) - 3Marks**
**Moderately Correlating (M) - 2marks**
**Weakly Correlating (W) - 1Mark**
**No Correlation (N) - 0mark**

# VALUE ADDED COURSE

| Course Code | U21FNV51 | FOOD BIOTECHNOLOGY | L | T | P | C |
|---|---|---|---|---|---|---|
| SEMESTER -V | | | 30 | | | 2 |
| COGNITIVE LEVEL | | K 4: Analyzing<br>K 5: Evaluating<br>K 6: Creating | | | | |

| | |
|---|---|
| Learning Objectives | The course aims to<br>1) Explain the methods that humans have developed to use biotechnology to produce foods and food ingredients<br>2) Apply the biotechnological tools and techniques |

**Unit I Introduction to biotechnology:**
Scope of biotechnology, Concept of Gene Cloning-Restriction enzymes, Modifying enzymes, enzymes and its application in food biotechnology. Vectors- Properties of good vector, Introduction of Genes, Selection of recombinants.

**Unit II Genetic Engineering**:
Genetically modified foods-Definition, examples of genetically modified foods, advantages, disadvantages, and safety aspects of foods produced by genetic engineering, Application of genetic engineering in food biotechnology. Rules and regulations for genetically modified foods

**Unit III Food fermentation:**
Food fermentation: the concept of microbial fermentation; fermentation process: dual and multiple fermentation, continuous fermentation and batch fermentation; factors controlling fermentation, fermented food products: dairy fermented foods, cereal-based food fermentation,

**Unit IV Enzymes in food processing industries**
Principles of enzyme immobilization: concept and importance of enzyme application. Types of immobilization techniques and their importance; Immobilized enzymes in food processing. Enzymes application advantages and its harmful effects on health

**Unit-V Biotechnology for Food Production**
History, developments, current status of transgenic crops -Crop improvement and enhanced agronomic performance- Food products with enhanced shelf-life, processing and functional quality- Nutritional enhancement-macro and micronutrients.

**Textbook:**

1. Satyanarayana, U, Biotechnology, Books and Allied (P) Ltd.,Kolkata2007

**Reference books**

1. Dubey, R.C Text Book of Biotechnology, S.Chand, and Co. Ltd, NewDelhi. 2001

2. Israel Goldberg Functional foods, Pharma foods and Nutraceuticals, Culinary and Hospitality Industry PublicationServices.2001
3.Robert Easy Wildman Handbook of Nutraceuticals and functional foods, Culinary and Hospitality Industry Publication Services, 2001

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledge about

| | | |
|---|---|---|
| K4 | CO1 | Explain the methods that humans have developed to use biotechnology to produce foods and food ingredients. |
| K4 | CO2 | Identify the pros and cons of the use of biotechnology to produce foods including ecological, social, and economic impacts |
| K5 | CO3 | Apply the biotechnological tools and techniques |
| K5 | CO4 | Assess the importance of various fermentation methods to design various fermented foods and food products |
| K6 | CO5 | Apply the knowledge and synthesize new solutions and ways of thinking in food industries |

**Mapping of COs with POs& PSOs:**

| **CO / PO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PSO1** | **PSO2** | **PSO3** | **PSO4** | **PSO5** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | S | S | S | S | S | S | **S** | S | **S** | S | S |
| **CO2** | S | S | S | S | S | S | S | **S** | M | **S** | S | S |
| **CO3** | M | S | S | S | S | S | S | **S** | S | **S** | S | S |
| **CO4** | S | S | S | S | S | S | S | **S** | S | **S** | S | S |
| **CO5** | S | S | S | S | S | S | S | **S** | S | **M** | S | S |

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

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