





S. No	Part	Subject Code	Title of the Subject	Hours /Week	Duration of Exam (hrs)	Marks			Credits
						Internal	External	Total	
1	I	EN18101	General English-I (AECC-I)	3	3	40	60	100	3
2	I	VE18101	Value Education & Personality Development (AECC-2)	2	3	40	60	100	2
3	II	FS21101	Human Anatomy and Physiology (GE- I)	4	3	40	60	100	4
4	II	FS21102	Basic Food Science (Core-1)	4	3	40	60	100	4
5	II	FS 21103	Fundamentals of Nutrition (Core-2)	5	3	40	60	100	4
6	II	FS21104	Nutritional Biochemistry (Core-3)	5	3	40	60	100	4
<b>PRACTICALS</b>									
7	II	FS21105	Basic Food Science (Core-1)	2	3	40	60	100	1
8	II	FS21106	Fundamentals of Nutrition (Core-2)	2	3	40	60	100	1
9	II	FS21107	Nutritional Biochemistry (Core-3)	2	3	40	60	100	1
<b>TOTAL</b>				29		360	540	900	24



**GENERAL ENGLISH -I**

**Credits: 3**  
**Subject Code: EN18101**

**Semester: I**  
**No. of Lecture Hours: 45Hrs**

**Objectives:**

- To enhance the learners' communication skills by giving adequate exposure in reading, writing, listening and speaking skills and the related sub-skills.
- To develop oral and written communicative skills among the students so that their employability enhances and English becomes the medium of their livelihood and personality.

**Outcome:** Students will be able to identify and implement new linguistic skills and communication skills through role play and group discussions.

**UNIT-I** **9Hrs**

**Wit and Humor**

From the text "A Tea Party" by Ruth Praver Jhabvala

- Explanation of the text 2
- Grammar----Nouns, Articles 2
- Vocabulary---Homonyms, homophones, homographs 2
- Writing Skill--- Note- Making 2
- Speaking Skill – Note-Making 1

**UNIT-II** **9Hrs**

**Risk Management**

From the text "Deadly Factory Fires in India."

- Explanation of the text 2
- Grammar----Tenses – The Present Tense 2
- Vocabulary ---Synonyms 2
- Writing Skill--- Information Transfer 2
- Speaking Skill--- 1

**UNIT-III** **9Hrs**

**Human Values**

From the text "India's Contribution to World Unity"

- Explanation of the text 2
- Grammar--- Tenses- The Past Tense 2
- Vocabulary ---- Adjective and Adverb Suffixes 2
- Writing Skill--- Formal Letters. Curriculum Vitae 2
- Speaking Skill--- JAM 1

**UNIT-IV** **9Hrs**

B.Sc. Food Science, Nutrition and Dietetics

Syllabus for 2021-2024 batch



### The Cyber Age

- From the text “Polymer Bank Notes”
- Explanation of the text 2
- Grammar----Concord or Subject Verb Agreement 2
- Vocabulary -----Word Formation. Collocations. 2
- Writing Skill---- References and Bibliographies. 2
- Speaking Skill--- Presentations 1

### UNIT-V

9Hrs

#### Sports

From the text “Sachin Tendulkar”

- Explanation of the text 2
- Grammar-----Adjectives, Comparison of Adjectives 2
- Vocabulary—Common Errors, Commonly Misspelt Words, Commonly Confused Words 2
- Writing Skill- Technical Reports, Project Reports 2
- Speaking Skill----Group Discussions 1

#### ESSENTIAL READING:

Skills Annexe. **Functional English for Success. Orient Black Swan**

#### SUGGESTED READING:

- Balasubramaniam, M. 1985 **Business Communication.** New Delhi: Vani Educational Books.
- Krishna Mohan and Meera Banerjee, 1990. **Developing Communication Skills.** New Delhi: Macmillan India Ltd.
- Krishnaswamy.N. and Sriraman, T. 1995. **Current English for Colleges.** Madras: Macmillan India Ltd.
- Narayanaswamy.V.R. 1979 **Strengthen Your Writing.** New Delhi: Orient Longman.
- Sharma.R.and Krishna Mohan. **Business Correspondence.** 1978. New Delhi. Tata McGraw-Hill Publishing Co.



**VALUE EDUCATION & PERSONALITY DEVELOPMENT**

**Credits: 2**

**Subject code : VE18001**

**Semester: I**

**No. of Lecture hours: 30**

**Objective:** To produce intellectually competent, morally upright, socially committed, spiritually inspired citizens in the service of the Nation and the World.

**Outcome:** Students will be transformed in to conscientious citizens through holistic education and contribute Nation Building.

**UNIT- I**

**6Hrs**

**Introduction to Ethics**

- Why Value Education? 2
- Reasons to have Ethics for Life 1
- Accepted Norms and Counter Values 1
- Dimensions of Human Development: Physical, Intellectual, Emotional, Moral, Spiritual and Social 2

**UNIT-II**

**6Hrs**

**Approach to Life**

- Conscience and Pseudo-Conscience 1
- Happiness as Life-goal 1
- Values revealed and lived in Religions 1
- Experience of God 1
- Love: The three components of Love 1
- Some of the basic stages and issues of Life: Family, Love, Sex, Marriage 1

**UNIT-III**

**6Hrs**

**Concern For Others**

- Self and Another 2
- Human Context 2
- Moral Problems of a Society / True Society : Social Desire, Social Fear, Social Silence, Social Indifference 2

**UNIT-IV**

**6Hrs**

**Transformation Of Self**

- Definitions of personality 1
- Characteristics of personality 1
- Elements of personality 1
- Traits of good personality 1
- Self-Identity, self concept 1
- Self-Discovery, self-acceptance 1
- Self-Esteem

WORK SHEET (1): Self Estimation



**UNIT-V**

**6Hrs**

**Life Enrichment Skills**

- Purpose of life - Goal setting
- Characteristics of Goals
- Building Relationships
- Time Management
- Stress Management
- Emotional Management
- Conflict Management
- Team Management (Group Dynamics)

WORK SHEETS (1) & (2): 1) Anger Management  
2) Team Management

**ESSENTIAL READING:**

1. Human Values - Development Programme - AIACHE
2. In Harmony

**HUMAN ANATOMY AND PHYSIOLOGY**



**Credits : 4**  
**Subject Code: FS21101**

**Semester : I**  
**No. of lecture hours: 60**

### Objectives

- To familiarize students with specific terminology
- To enable the students to learn structure and functions of organs
- To prepare the students to understand the physiology of human body

### Outcome

**CO1:** The students will be able to describe basic aspects of anatomy and physiology.

**CO2:** The students will be able to classify different functions of digestive and respiratory system of human body.

**CO3:** Students will be able to identify different blood groups, endocrine glands.

**CO4:** Students will be able to appraise the functions of nervous and Musculo skeletal system.

**CO5:** Students will be able to describe the functions of reproductive and excretory system .

### UNIT I

#### CELL AND ITS ORGANELLES

**12Hrs**

- Cell as a unit of the body, Cell organelles and their functions, cell division 3Hrs
- Tissue level of organization: types of tissues, structure and function 3Hrs
- Skin – Structure and functions 3Hrs
- The Integumentary system: epidermis, dermis, hair, sebaceous glands and sweat glands 3Hrs

### UNIT II

#### DIGESTIVE AND RESPIRATORY SYSTEMS

**12Hrs**

- Digestive System- Major organs of the digestive system, Anatomy of the alimentary canal, Functions of the organs of digestive system, Physiology of digestion, 3Hrs
- Absorption mechanism-Importance of Na + /Cl - ; Na + glucose transporter, Elimination of unabsorbed food materials, Digestion and absorption of food and the role of enzymes and hormones 3Hrs
- Respiratory system- Major organs of the respiratory system, Functions of the organs of respiratory system. 3Hrs
- Physiology of exchange of gases, Muscular exercise-tidal and vital volumes. 3Hrs

### UNIT III



<b>CIRCULATORY, HORMONAL ENDOCRINE GLANDS</b>	<b>12HRS</b>
● Circulatory system	3Hrs
a. Blood	
(i) Blood and its composition	
(ii) Blood groups	
(iii) Coagulation of blood	
● b. Structure of heart	3Hrs
(i) Arterial system, venous system-afferent efferent vessels	
(ii) Blood circulation	
(iii) Structure and functions of heart-detail	
(iv) Heart rate, Cardiac output, blood pressure and its regulation	
(v) Circulation of blood	
(vi) Cardiac cycle and Purkinje fibres	
● Lymphatic system and Immunity	3Hrs
(i). Functions	
(ii). Lymphatic vessels, lymphocytes, Lymphoid tissues and organs	
(iii). Body defense's (Non-specific and Specific)	
(iv). Innate immune system	
(v). Immune response	
● Hormonal Endocrine glands – Name and general functions	3Hrs
a. Pituitary	
b. Thyroid	
c. Parathyroid	
d. Pancreas	
e. Adrenal	
f. Sex glands (male and female)	
g. GI tract hormones	

#### UNIT- IV

<b>NERVOUS, MUSCULOSKELETAL SYSTEMS</b>	<b>12Hrs</b>
● Nervous System- Nerve cell structure and function	3Hrs
● Brain-Major division and sensory motor neurons	3Hrs
● Central nervous system, Autonomic NS, Parasympathetic NS	3Hrs
● Musculoskeletal System - Types of muscles, functions and Skeletal system – formation of bone and teeth	3Hrs

#### UNIT- V



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## REPRODUCTIVE AND EXCRETORY SYSTEM

12Hrs

- Reproductive System - Structures and functions of sex glands and organs including hormones 3Hrs
- Menstrual cycle-estrogen versus progesterone, Testosterone-single hormone impact, Physiology of pregnancy-intra uterine layers- role of B6/B12 vitamins in neuronal development, Parturition and Menopause 3Hrs
- Excretory System - Structure and functions of Kidney, bladder, formation Of urine 3Hrs
- Counter current mechanisms in regulating blood pressure, Structure and function of skin- Regulation of body temperature 3Hrs

## REFERENCES

1. Best CH and Taylor (1989). The Human Body. Published by Asia, New Delhi, National Book depot, Mumbai, India.
2. Bijlani RL(1995). Understanding Medical Physiology. Published by Jaypee Brhers Medical (P) Ltd, New Delhi, India
3. Winwood (1988). Sear's Anatomy and Physiology for nurses. Published by Edward Arnold, London
4. Wilson (1989). Anatomy and Physiology in Health and Illness. Published by Churchill Livingstone, Edinburgh
5. Chatterjee CC (1988). Text book of Medical physiology. Published by W.B, London
6. Pearce Evelyn (1992). Anatomy and Physiology for Nurse. Published by Faber & Faber Ltd, London
7. Iyer E (1975). Text book of Zoology –Vol II
8. Silverthorn, D. Human Physiology, (5 th ed). Published by Benjamin-Cummings Pub Co

## BASIC FOOD SCIENCE



**Credits : 4**  
**Subject Code: FS21102**

**Semester : I**  
**No. of lecture hours: 60**

### Objectives

- To study the various preparation methods of food
- To provide an understanding of gelatinisation concepts.
- To familiarize students with flour quality and fat compositions.
- To enable students to classify proteins and enzymes.
- To enable students understand physical and functional properties of meat products.

### Outcome

**CO1:** Students will be able to understand various methods of food processing.

**CO2:** Students will be able to learn about sugars and sweeteners.

**CO3:** Students will be able to evaluate the roll of cereals and fats in food.

**CO4:** Students will be able to differentiate various chemical reactions occurring in proteins and enzymes.

**CO5:** Students will be able to explain role of meat products in health.

### UNIT –I

#### BASIC FOOD COMMODITIES

12 Hrs

- Major food commodities and minor food commodities, Objectives of cooking, preliminary preparation of food. 3Hrs
- Methods of food preparation. ( Dry heat, Moist heat and combination methods) 3Hrs
- Medium of food preparation( water, steam, oil / fat, air ) 3Hrs
- Microwave cooking and Solar cooking, nutrient losses during cooking. 3Hrs

### UNIT – II

#### POLYSACCHARIDES, SUGARS AND SWEETENERS

12 Hrs

- Starch: Structure, gelatinization, methods for following gelatinization changes. 3Hrs
- Characteristic of some food starches. Gelatinization. Modified food starches. 3Hrs
- Non-starch Polysaccharides: Cellulose, hemicelluloses, pectin's, gums, animal polysaccharides. 3Hrs
- Sugar and Sweeteners: Sugar, Syrups, Natural and Synthetic sweeteners 3Hrs



**UNIT – III** **12Hrs**  
**CEREALS AND CEREAL PRODUCTS; FATS AND OILS**

- Cereal grains: - 2Hrs
  - (i) Structure and composition.
  - (ii) Flours and flour quality.
- Extruded foods 2Hrs
- Cereal products- 3Hrs
  - (i) Breakfast cereals, wheat germ burger, puffed and flaked cereals.
- Fats, Oils and Related Products 5Hrs
  - (i) Sources, composition, effects of composition on fat properties.
  - (ii) Functional properties of fat and uses in food preparations.
  - (iii) Fat substitutes. Fat deterioration and antioxidants.

**UNIT – IV** **12Hrs**  
**PROTEINS AND ENZYMES**

- Proteins – Classification 2Hrs
- composition, denaturation. 2Hrs
  
- Enzymes: Nature of enzymes, stability and action. Proteolytic enzymes oxidizes, lipases 4Hrs
- enzymes decomposing carbohydrates and application, Immobilized enzymes. 4Hrs

**UNIT – V**  
**12 Hrs**

**MILK AND MEAT PRODUCTS**

- Milk - Composition. Physical and functional properties. Effects of processing and storage. 3Hrs
- Dairy products- curd, yoghurt, butter, whey, cottage cheese, cheese, frozen desserts. 3Hrs
- Poultry, Egg - composition and Nutritive value and changes during cooking 3Hrs
- Meat and Fish – composition and Nutritive value and changes during cooking 3Hrs

**REFERENCES**

1. Owen R. Fennema, 1996 **Food Chemistry**, 3<sup>rd</sup> Edition, New York: Marcel and Dekker Publishers.
2. Meyer L.H, 2004 **Food Chemistry**, 1<sup>st</sup> Edition, New Delhi: CBS Publishers.
3. Norman N. Potter, 1996, **Food Science**, 5<sup>th</sup> Edition, New Delhi: CBS Publishers.
4. B. Srilakshmi, 2001 **Food Science**, 2<sup>nd</sup> Edition, New Delhi: New Age International.



## FUNDAMENTALS OF NUTRITION

**Credits : 4**  
**Subject Code: FS21103**

**Semester : I**  
**No. of lecture hours: 75**

### Objectives

- To enable students understand various concepts of nutrients
- To make students understand about good groups and balanced diet
- To validate the knowledge of determining the energy expenditure.
- To promote basic knowledge of macro-nutrients
- To enable the students to know about micro-nutrients

### Outcome:

**CO1:** Students will understand nutrient interrelationships and functions of food

**CO2:** Students will learn concepts of RDA by ICMR

**CO3:** Students will evaluate metabolism of energy

**CO4:** Students will classify and understand knowledge of Macro-nutrients

**CO5:** Students will classify and understand knowledge of and micro-nutrients

### UNIT-I

#### BASIC NUTRITION

**15Hrs**

- Definition of health , Nutrition, Food , Nutrients, Proximate principles, Adequate Nutrition, Nutritional Status, Malnutrition. 5Hrs
- Functions OF Food : Physiological, Social and Psychological Functions, Classification of food based on origin, function and Nutritive value. 5Hrs
- Functions OF nutrients, Interrelationship between Nutrition and Health. Classification of Nutrients – Macro and Micro nutrients 2Hrs
- Importance, Source, Requirements and Deficiency symptoms of Carbohydrates, Fats, Proteins, Vitamins, Minerals and Water 3Hrs

### UNIT II

#### HUMAN NUTRITION REQUIREMENTS

**15Hrs**

- Food Groups – based on source, based on functions, Basic 4Hrs
- Five groups, Food Pyramid. 4Hrs
- Definition of RDA, RDA for Indians by ICMR. Use and Limitations. 4Hrs
- Balanced Diet and its importance. 3Hrs



### UNIT III

#### ENERGY METABOLISM

15Hrs

- Determination of energy value of food by bomb calorimeter. 4Hrs
- Measurement of energy by direct and indirect calorimetry- Benedicts oxy calorimeter, Thermic Effect of Food 4Hrs
- Energy balance: Components of TEE (Total Energy Expenditure) - 4Hrs  
BMR, Physical Activity, SDA
- Factors affecting Basal Metabolic Rate 3Hrs

### UNIT IV

#### MACRONUTRIENTS: CARBOHYDRATES, PROTEINS, FATS AND WATER

15 Hrs

- Classification 3Hrs
- Food sources 2Hrs
- Physiological functions, Requirements 5Hrs
- Deficiencies and Excess, Water balance 5Hrs

### UNIT V

#### MICRONUTRIENTS: VITAMINS AND MINERALS

15 Hrs

- Fat soluble vitamins - Requirements, Sources, Functions, Deficiencies and Excess 4Hrs
- Water soluble Vitamins- Requirements, Sources, Functions, Deficiencies and Excess 3Hrs
- Macro minerals Requirements, Sources, Functions, Deficiencies and Excess 4Hrs
- Micro Minerals- Requirements, Sources, Functions, Deficiencies and Excess 4Hrs

### REFERENCES

1. Swaminathan M (2000). Advanced Textbook on Foods and Nutrition, Vol I (2 nd ed.). Published by Bangalore Printing and Publishing Ltd, Bangalore
2. Bamji MS, Prahlad Rao N and Reddy V (2010). A Textbook on Human Nutrition (3 rd Edition). Published by Oxford and IBH Publishing Co., New Delhi
3. Garrow JS, James WPT, Ralph A and James JPT (2000). Human Nutrition and Dietetics (10 th ed.) Published by Churchill Livingstone. ISBN-10: 0443056277, ISBN-13: 978-0443056277
4. Gibney MJ, Macdonald IA and Roche H (2010). Nutrition and Metabolism (2 nd ed.). Published by Wiley-Blackwell, ISBN: 978-1-4051-6808-3
5. Geissler C (2009). Fundamentals of Human Nutrition. Churchill Publications, US.
6. Krause and Mahan (2008). Food Nutrition, Diet Therapy (12 th ed.). Published by WB Saunders Company



## NUTRITIONAL BIOCHEMISTRY

Credits: 4

Subject code: FS21104

Semester: I

No. of lecture hours: 75

### Objectives

- To develop an understanding of the principles of biochemistry.
- To obtain an insight into the chemistry of carbohydrates
- To apply the knowledge in the field of lipids
- To enable students to gain practical knowledge regarding the basic methods involved in analysis of proteins and amino acids.
- To obtain knowledge on intermediary metabolism

### Outcome

CO1: The students will be able to identify the importance of nutrient utilization

CO2: The students will be able to explain the carbohydrates chemistry and its metabolism.

CO4: The students will be able to explain lipid chemistry and its metabolism.

CO5: The students will be able to explain protein chemistry and its metabolism

CO5: The students will be able to identify the importance of bioenergetics and biological oxidation

### UNIT- I

#### ENZYMES AND UTILIZATION OF NUTRIENTS

15Hrs

- Enzymes: Definition, importance, nomenclature and classification of enzymes, factors affecting enzyme activity 3Hrs
- Coenzymes, cofactors, enzyme inhibition and regulation. 5Hrs
- Digestion, Absorption and utilization of Nutrients. 5Hrs
- Nutrient Metabolism, Transport of metabolites across membranes 2Hrs

### UNIT- II

#### CARBOHYDRATES

15Hrs

- Carbohydrate Chemistry and Metabolism 3Hrs
- Importance, classification of carbohydrates 3Hrs
- Metabolism of carbohydrates: Glycolysis, Citric Acid Cycle, Glycogenesis, Glycogenolysis, Gluconeogenesis 4Hrs
- Hexose Monophosphate Shunt and Blood sugar regulation 5Hrs

### UNIT- III



**LIPIDS** **15Hrs**

- Importance, classification of lipids 2Hrs
- properties of lipids 2Hrs
- Metabolism of lipids: Oxidation of fatty acids, fatty acid synthesis, Metabolism of unsaturated fatty acids 6Hrs
- Types of lipoproteins and their functions 5Hrs

**UNIT-IV**

**AMINO ACIDS AND PROTEINS** **15Hrs**

- Amino Acids and Proteins – Chemistry and Metabolism 3Hrs
- Structure of proteins – primary, secondary, tertiary and quaternary structures and Functions of proteins 3Hrs
- Classification of amino acids, Biologically important peptides 4Hrs
- General reactions: Transamination, deamination and decarboxylation Reactions and Urea cycle 5Hrs

**UNIT-V**

**INTERMEDIARY METABOLISM** **15Hrs**

- Methods to study metabolism 3Hrs
- Bioenergetics and Importance of biological oxidation 4Hrs
- Components of electron transport chain 4Hrs
- Oxidative phosphorylation and ATP generation 4Hrs

**REFERENCES**

1. Deb AC (2001). Fundamentals of Biochemistry. Published by New Central Book Agency, Calcutta.
2. Weil JH (1990). General Biochemistry (6 th ed.). Published by Wiley Eastern Ltd, New Delhi
3. Murray R, Rodwell V, Bender D, Botham KM, Weil PA, Kennelly PJ (2009).
4. Harper's Illustrated Biochemistry (28 th ed.) Published by McGraw-Hill Medical.
5. Conn EE and Stumpf PK, Bruening G and Doi RH (2006). Outlines of Biochemistry (5 th ed.). Published by Wiley India Pvt. Ltd.
6. Mahansan, R. (2009). Practical Biochemistry. Published by Vayau Edu
7. Hames BD and Hooper NM (2003). Biochemistry. (2 nd ed). Published by Viva books private limited, New Delhi, India
8. Sharma S (1993). Practical Biochemistry (1 st ed.). Published by Jaipur : Classic Publishing House.
9. Plummer D T (2008). An introduction to Practical Biochemistry (3 rd ed.). Published by Tata McGraw Hill.

**BASIC FOOD SCIENCE**



## PRACTICALS

**Credits: 1**

**Subject code: FS21105**

**Semester: I**

**No. of Practical hours: 30**

**Objective:** To analyse the constituents of foods

**Outcome:** Students will independently analyse the various constituents of foods.

1. Identification of different non-perishable commodities-cereals,  
3  
millets and their by-products.
2. Gelatinization of starches  
3
3. Factors affecting gelatinization- Concentration of starch, Temperature,  
Sugar, salt, Acid, Alkali 4
4. Stages of sugar cookery 3
5. Recipes using egg as a leavening agent – Mayonnaise  
2
6. Foaming properties of egg  
3
7. Factors affecting stability of foam- using Egg white, Egg yolk, Salt, sugar  
3
8. Tenderization of meat using various tenderizing agents  
4
9. Effect of acid and alkali on milk proteins  
3
10. Effect of heat on the Alkaline phosphatase enzyme in milk  
2

### SUGGESTED READING

1. Owen R. Fennema, 1996 Food Chemistry, 3rd Edition, New York: Marcel and Dekker Publishers.
2. Meyer L.H, 2004 Food Chemistry, 1st Edition, New Delhi: CBS Publishers.



**Loyola Academy, Old Alwal, Secunderabad 500 010**

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3. Norman N. Potter, 1996, Food Science, 5th Edition, New Delhi: CBS Publishers.
4. B. Srilakshmi, 2001 Food Science, 2nd Edition, New Delhi: New Age International.



**FUNDAMENTALS OF NUTRITION  
PRACTICALS**

**Credits: 1**

**Subject code: FS21106**

**Semester: I**

**No. of Practical hours: 30**

**Objective:** To analyse the proximate of foods

**Outcome:** Students will independently analyse the various proximate of foods.

- |  |   |
|--|---|
| 1. Identification of food sources for various nutrients  | 3 |
| 2. Food standardization and preparation, understanding the principles involved, nutritional quality and portion size of dishes used in daily diet. | 6 |
| i. Calorie dense dishes, - any two   | 2 |
| ii. Protein rich dishes- any two   |   |
| iii. seasonal vegetable curry preparations- any two  |   |
| 3. Use of Pedometer for physical activity  | 3 |
| 4. Questionnaire to identify nutritional deficiencies among the vulnerable groups  | 3 |
| 5. Estimation of Moisture  | 2 |
| 6. Estimation of Ash   | 2 |
| 7. Estimation of protein by micro Kjeldhal method  | 3 |
| 8. Estimation of calcium by titrimetric method   | 3 |
| 9. Estimation of Iron by colorimetry   | 3 |
| 10. Estimation of Vitamin C by 2, 6 dichloro indephenol method   | 2 |

**SUGGESTED READING**

1. Pomeranz Y and Meloan C E., 1996 **Food Analysis: Theory and Practice**, 3<sup>rd</sup> Edition, New Delhi: CBS Publishers.
2. Nielsen S S., 1994 **Introduction to the chemical analysis of foods**, London: Jones and Bartlett Publishers.
3. Nielsen S S. 2003 **Food Analysis Laboratory Manual**, USA: Chips Ltd.



## NUTRITIONAL BIOCHEMISTRY (PRACTICALS)

**Credits: 1**

**Subject code: FS21107**

**Semester: I**

**No. of Practical hours: 30**

### Objectives

- To develop an understanding of the principles of biochemistry.
- To enable students to gain practical knowledge regarding the basic methods involved in analysis of different nutrients.

### Outcome:

- The students will gain practical knowledge in analyzing different nutrients

I. Usage of different types of glasswares in clinical chemistry	1
II. Qualitative tests of carbohydrates	
1. Glucose	3
2. Fructose	3
3. Lactose	3
4. Xylose	3
5. Starch	3
<b>Qualitative tests of amino acids</b>	
6. Aromatic amino acids	1
7. Sulphur containing amino acids	3
8. Qualitative tests of proteins	2
9. Solubility, Coagulation by heat, Alcohol , pH and heavy metals	3
10. Estimation of proteins by Biurette method	2
11. Determination of rancidity parameters: acid value, peroxide value	3

### SUGGESTED READING:

1. Deb AC (2001). Fundamentals of Biochemistry. Published by New Central Book Agency, Calcutta.
2. Weil JH (1990). General Biochemistry (6 th ed.). Published by Wiley Eastern Ltd, New Delhi
3. Murray R, Rodwell V, Bender D, Botham KM, Weil PA, Kennelly PJ (2009).
4. Harper's Illustrated Biochemistry (28 th ed.) Published by McGraw-Hill Medical.
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S. No	Part	Subject Code	Title of the Subject	Hours / Week	Duration of Exam (hrs)	Marks			Credits
						Internal	External	Total	
1	I	EN18201	General English-II (AECC-3)	3	3	40	60	100	3
2	I	IC19201	Indian Heritage and Culture (AECC-4)	2	3	40	60	100	2
3	II	FS21201	Food Microbiology (GE-2)	4	3	40	60	100	4
4	II	FS21202	Basic Dietetics (Core -4)	5	3	40	60	100	4
5	II	FS21203	Family meal Management (Core-5)	5	3	40	60	100	4
6	II	FS21204	Principles of Food science (Core-6)	4	3	40	60	100	4
<b>PRACTICALS</b>									
7	II	FS21205	Basic Dietetics (Core -4)	2	3	40	60	100	1
8	II	FS21206	Family meal Management (Core-5)	2	3	40	60	100	1
9	II	FS 21207	Principles of Food science (Core-6)	2	3	40		100	1
10	III	PL18001	PLANET* (Outreach)	-	-	-		-	1
<b>TOTAL</b>				29		360	540	900	25



**YEAR-WISE AND SEMESTER-WISE DISTRIBUTION OF SUBJECTS**  
**B.Sc. FOOD SCIENCE, NUTRITION AND DIETITICS**  
**SECOND SEMESTER**  
**ACADEMIC YEAR 2022-23 BATCH 2022-25 (CBCS)**



**GENERAL ENGLISH -II**

**Credits: 3**

**Subject Code: EN18201**

**Semester: II**

**No of Lecture Hours: 45**

**Objectives:**

- To enhance the learners' communication skills by giving adequate exposure in reading, writing, listening and speaking skills and the related sub-skills.
- To develop oral and written communicative skills among the students so that their employability enhances and English becomes the medium of their livelihood and personality.

**Outcome:** Students will be able to improve Language in a holistic way through application, differentiation, organization and creation of their own composition in writing skills.

**UNIT- I**

**9Hrs**

**Biography**

From the text "Mokshagundam Visvesvaraya"

Explanation of the text,

- Grammar ---- Conjunctions, Adverbs
- Vocabulary ----- Prefixes and Suffixes
- Writing Skill -----Paragraph Writing
- Speaking Skill—Role Plays

2  
2  
2  
2  
1

**UNIT-II**

**9Hrs**

**Health**

From the text "Three Days to See"

Explanation of the text

- Grammar -----Usage of Modal Auxiliary Verbs
- Vocabulary --- Collective Nouns ,Technical Vocabulary
- Writing Skill -----Report Writing
- Speaking Skill -----Jam

1  
2  
2  
2  
2

**UNIT-III**

**9Hrs**

**Short Story**

From the text "Leela's Friend" by R.K.Narayan

- Explanation of the text
- Grammar----Phrasal Verbs, Wh- Questions
- Vocabulary----Noun and Verb Suffixes
- Writing Skill-----Writing a Narrative
- Speaking Skill --Debates

2  
2  
2  
2  
1



**UNIT-IV** **9Hrs**

**Inspiration**

From the text “The Last Leaf” by O. Henry

- Explanation of the text 2
- Grammar----- Prepositions 2
- Vocabulary-----Idioms 2
- Writing Skill----- Précis Writing 2
- Speaking Skill--- Presentations 1

**UNIT-V** **9Hrs**

**Human Interest**

From the text” The Convocation Speech”

- Explanation of the text 2
- Grammar---- Active and Passive Voice 2
  - Vocabulary-----One-word Substitutes 2
  - Writing skill----- Essay Writing 2
  - Speaking Skill---- Group Discussion 1

**ESSENTIAL READING:**

Epitome of Wisdom, Maruthi Publications.

**SUGGESTED READING:**

1. Krishna Mohan and Meera Banerjee. **Developing Communication Skills**. 1990. New Delhi. Macmillan India Ltd..
2. Krishnaswamy.N. and Sriraman, T. **Current English for Colleges**. 1995. Madras Macmillan India Ltd.
3. Narayanaswamy, V.R.. **Strengthen Your Writing**. 1979. New Delhi. Orient Longman.
4. Sharma, R.C. and Krishna Mohan. **Business Correspondence**. 1978. New Delhi. Tata McGraw-Hill Publishing Co.



**INDIAN HERITAGE & CULTURE**

**Credits : 2**  
**Subject Code : IC19001**

**Semester : II**  
**No. of Lecture Hours: 30**

**Objectives:**

- To apprise the students with a sound background of Indian Culture.
- To equip the students with social & community problems of India.
- To prepare the student for civil service exams where Indian Heritage & Culture paper is compulsory for all the streams.

**Outcome:** Students will be knowledgeable about Indian custom, traditions and also be able to attempt competitive exams.

**UNIT-I** **6 Hrs**

**Introduction – Impact Of Geography On Indian Culture**

- Meaning of culture – Characteristics of Indian Culture, Caste system 2
- Indus Valley Civilization and Vedic/Aryan Culture 2
- Golden Age of Indian Culture– Mauryas and Guptas, Satavahavas, Pallavas, Cholas. 2

**UNIT-II** **6 Hrs**

**Medieval India – Influence Of Islam On Indian Culture**

- Cultural Development under the Delhi Sultanate and Mughals 1
- Contribution of Sher Shah and Akbar to Indian Administrative System 2
- Cultural Achievements of Vijayanagara and Kakatiya rulers 1
- Fine Arts – Sculpture, Painting, Music and Dance 2

**UNIT-III** **6Hrs**

**Indian Religion and Impact of West**

- Western Education – Socio Religious Reform Movement 1
- Rise of Indian National movement – Mahatma Gandhi – Non violence and Satyagraha – Eradication of untouchability 2
- Ishwara Chandra Vidyasagar and Veerasalingam – Emancipation of women and struggle against caste. 1
- Hinduism – Islam – Christianity – Sikhism – Zoroastrianism – Jainism and Buddhism 2



**UNIT-IV**

**6Hrs**

**Children And Youth Issues**

- Child Abuse, Child Labour – Effects of Abuse on Children 1
- Youth Unrest – Important agitations and movements by Youth 1
- Terrorism – Causes and Consequences 2
- Alcoholism, Drug Addiction and other deviations 2

**UNIT-V**

**6Hrs**

**Women, Gender Related Issues and Rights**

- Violence against Women – Transgender issues – LGBT 2
- Know your Rights – Classification of Rights and Importance 2
- Changing local and national politics – Making our world a better place 2

**SUGGESTED READING:**

- 1 Jha, Dr K.N. **Studies in ancient & Medieval India**. 2006. Gurgaon: COSMOS Book hive Ltd.
- 2 Mahajan, V.D. **Ancient India**. 2008. New Delhi: S.Chand.
- 3 Manasseh, Dr P. 2010. **An Overview of Indian Culture**. Hyderabad: Gamaleil Publishers,
- 4 Malpani, Madanlal & Malpani, Shamsunder. 2014 **Indian Heritage and Culture**. Ludhiana: Kalyani Publishers.
- 5 Mhaske, Dr R.H. 2012 **Human Rights, Social Justice and Political Challenges**. . Kanpur: Chandralok Prakashau.
- 6 Singh, Gurdip & Ahuja, V.K. 2012 **Human Rights in 21<sup>st</sup> Century**. New Delhi: Universal Law Publisher.



## FOOD MICROBIOLOGY

**Credits: 4**

**Subject code: FS21201**

**Semester: II**

**No. of lecture hours: 60**

### Objective

- To study the various microorganisms associated with foods.
- To evaluate methods of detection of microorganisms
- To learn microbiology of food commodities
- To understand uses of microorganisms in various foods
- To validate various food borne illnesses

### Outcome

**CO1:** The students will be able to identify different microorganisms associated with food.

**CO2:** The students will be able to appraise the microbial estimation in food.

**CO3:** The students will be able to classify microorganism associated with food and water.

**CO4:** The students will be able to compare different food preservation techniques used.

**CO5:** The students will be able to explain food borne illness caused due to microorganisms.

### UNIT I

**12 Hrs**

#### FOOD MICROBES

- Types of microorganisms and their general characteristics -Bacteria, Viruses, Fungi (Yeasts and Moulds), Protozoa 3Hrs
- Role of Microorganisms in food spoilage 3Hrs
- Factors affecting growth of microbes (Intrinsic factors and Extrinsic factors) – Nutrition, redox potential, pH conditions, Carbon and Nitrogen Sources, 3Hrs
- Antimicrobial barriers and constituents. 3Hrs

### UNIT II

#### MICROBIAL ESTIMATION

**12 Hrs**

- Sources of microorganisms – Soil, water, plants and of animal origin, Useful microorganisms – Bacteria, Yeast, mold and fungi, Estimating number of microorganisms, sampling, sample size 3Hrs
- Aseptic collection of samples, total cell counts and viable cell counts, plate counters. 3Hrs
- Indicator organisms, Alternative and Rapid methods for detection of specific microbes and toxins, Dye-reduction tests, Electrical methods, ATP determination, Pure cultures-preparation, maintenance and preservation 4Hrs
- Microbiological quality control and HACCP 2Hrs



### UNIT III

#### MICROORGANISMS ASSOCIATED WITH FOOD & WATER 12 Hrs

- Microbiology of Food commodities 2Hrs
- Contamination and preservation of Cereals, Pulses, Nuts and Oilseeds, Fruits and Fruit products, Vegetables and Vegetable products, Meat, dairy and their products 3Hrs
- Spoilage & beneficial role of microorganisms in Cereals, Pulses, Nuts and Oilseeds, Fruits and Fruit products, Vegetables and Vegetable products, Meat, dairy and their products 4Hrs
- Microbiology of water- Contamination and microbial standards 3Hrs

### UNIT IV

#### APPLICATION OF MICROORGANISMS IN FOODS 12 Hrs

- Fermented food products - Bread making, Alcoholic beverages – Beer, wines, other alcoholic beverages, Vinegars, cheese, other dairy products, other lactic acid fermented products 3Hrs
- Microbial protein and vitamins 3Hrs
- Acid fermented vegetables 3Hrs
- Gums, Organic acids, Enzymes, antimicrobial agents, amino acids, fats and single cell proteins 3Hrs

### UNIT V

#### FOOD BORNE ILLNESSES 12 Hrs

- Food borne pathogens 3Hrs  
Food borne infections - Escherichia coli, Salmonella, Staphylococcus aureus, vibrio, yersinia, Listeria)
- Food poisoning /Food borne Intoxications - (Aeromonas hydrophila, Bacillus cereus, Brucella, Campylobacter, Clostridium botulinum, Clostridium perfringenes, 3Hrs
- Hepatitis A and B 3Hrs
- Gastroenteritis viruses 3Hrs

### REFERENCES

1. Frazier W.C. 1995 **Food Microbiology** IV edition, New York: Mcgraw Hill Book Company.
2. James M jay 1996 **Modern food microbiology** IV edition, New Delhi: CBS publishers.
3. M.R. Adams and M.O. Moss, 2004 **Food Microbiology**, Second Edition, New Delhi: Panima Publishing corporation.

### BASIC DIETETICS



**Credits: 4**  
**Subject code: FS21202**

**Semester: II**  
**No. of lecture hours: 75**

**Objective**

- To understand the concept of a diet and the role of dietician
- To learn the assessment and complications of obesity
- To know the strategies and guidelines in planning weight managing diets.
- To understand various types of diets
- To validate the dietary modifications of diabetes and hypertension

**Outcome**

**CO1:** Students will gain knowledge regarding the practical aspects of meal planning

**CO2:** Students will learn principles of diet and dietary modifications

**CO3:** Students will evaluate the strategies for menu planning

**CO4:** Students will identify the importance of intermittent fasting

**CO5:** Students will understand various deficiency disorders

**UNIT I**

**DIET THERAPY** **15Hrs**

- Purpose, Diet therapy and types of Therapeutic Diets, Hospital diets and progressive modifications 5Hrs
- Modifications in texture and consistency, Modifications in Nutrients, Drug and Diet interaction 5Hrs
- Roles and responsibilities of a dietician in a hospital and in a community 3Hrs
- Adjuncts to diet therapy Dietary supplements 2Hrs

**UNIT II** **15Hrs**

**DIET DURING ENERGY IMBALANCE**

- Importance of weight regulation. 1Hrs
- Underweight- Definition, Causes, Principles of the Diet, Dietary Modifications, Foods to Be Included and Foods to be Avoided 4Hrs
- Obesity - Definition, Causes, Assessment (BMI, Body Weight, Brokas Index), Type (Grade I, II, III, Apple and Pear shape) 5Hrs
- Complications, Principles of the Diet, Dietary Modifications, Foods to Be Included and Foods to Be Avoided. 5Hrs

**UNIT III**

**STRATEGIES FOR WEIGHT MANAGEMENT** **15Hrs**



- Concept of BMI, Determination of Energy needs, Translating RDA into Daily food intake 5Hrs
- Factors affecting fuel utilization 3Hrs
- Guidelines for planning weight managing diets 2Hrs
- Strategies for weight loss and weight maintenance – Diet therapy, Physical exercise, stress management, Pharmacotherapy, Weight loss surgery 5Hrs

#### UNIT IV

##### DIETS FOR WEIGHT LOSS

15Hrs

- Low Carbohydrate Diets: Atkins Diet, Ketogenic diet, The Zone Diet, Summer Bell et.al, Diet, Dukan Diet 5Hrs
- The south beach Diet 3Hrs
- General Motor's Weight loss program 3Hrs
- Intermittent Fasting 4Hrs

#### UNIT V

##### DEFICIENCY DISORDERS

15Hrs

- Diabetes - Definition, Causes, Types, T2DM- risk factors, Signs, Symptoms, Complications and Dietary Modifications 3Hrs
- T1DM- risk factors, Signs, Symptoms, Complications and Dietary Modifications 2Hrs
- Hypertension- Definition, Causes, Types, risk factors, Signs, Symptoms, Complications and Dietary Modifications 5Hrs
- Atherosclerosis - Definition, Causes, risk factors, Signs, Symptoms, Complications and Dietary Modifications 5Hrs

#### REFERENCES

1. Bamji MS, Krishnaswamy K, Brahmam GNV 2009. **Textbook of Human Nutrition**, 3rd edition. New Delhi: Oxford and IBH Publishing Co. Pvt. Ltd.
2. Srilakshmi 2007, **Food Science**, 4th Edition. New Delhi: New Age International Ltd.
3. NIN, ICMR 1990 . **Nutritive Value of Indian Foods**
4. Seth V, Singh K 2005. **Diet planning through the Life Cycle: Part 1. Normal Nutrition**. A Practical Manual, Fourth edition, Bhopal: Elite Publishing House Pvt Ltd.
5. ICMR 2010 . **Nutrient Requirements and Recommended Dietary Allowances for Indians**.

#### FAMILY MEAL MANAGEMENT

**Credits : 4**  
**Subject Code: FS21203**

**Semester : II**  
**No. of lecture hours: 75**



**Objective:**

- To understand the concept of an adequate diet and the importance of meal planning
- To know the factors affecting the nutrient needs during the pregnancy and lactation
- To know the factors affecting the nutrient needs during the infancy and preschool children
- To know the factors affecting the nutrient needs during the school children and adolescents
- To know the factors affecting the nutrient needs during geriatrics

**Outcome:**

**CO1:** Students will be able to describe basic terms and principles of meal planning.

**CO2:** Students will be able to use nutritional knowledge to apply during pregnancy and lactation period.

**CO3:** Students will be able to identify nutrition related problems in infants and peaceful children.

**CO4:** Students will be able to construct knowledge on nutrition programs held by government.

**CO5:** Students will be able to identify the nutritional requirements, nutritional problems in adults and geriatrics.

**UNIT-I**

**MEAL PLANNING FOR THE FAMILY**

**15 Hrs**

- Objectives in meal planning, Nutritional adequacy of a meal, factors affecting the food selection, family size and composition 5Hrs
- Principles and Steps of meal planning. 2Hrs
- Food Exchange Lists, Reference man and Reference Woman 3Hrs
- Adulthood – Nutritional Requirements for an Adult Man and Adult Woman 5Hrs

**UNIT-II**

**NUTRITION IN PREGNANCY AND LACTATION**

**15Hrs**

- Nutrition in pregnancy- physiological stages of pregnancy, expected weight gain, preconceptional nutrition 5
- Nutritional and food requirements, complications 3
- Nutrition in lactation- role of hormones, Indian nursing mothers 4
- Nutritional and food requirements 3

**UNIT-III**

**NUTRITION IN INFANCY AND PRESCHOOL CHILDREN**

**15 Hrs**

- Nutrition in infancy- nutritional and food requirements 4Hrs
- Preterm baby and weaning 3Hrs
- Nutrition in preschool- nutritional and food requirements 4Hrs
- Nutrition related problems 4Hrs



#### UNIT-IV

#### NUTRITION IN SCHOOL CHILDREN AND ADOLESCENCE

**15 Hrs**

- Nutrition in school children- nutritional and food requirements 4Hrs
- Packed lunches and school lunch programmes 5Hrs
- Nutrition during adolescence – nutritional and food requirements 4Hrs
- Nutritional problems 2Hrs

#### UNIT-V

#### NUTRITION FOR GERIATRICS

**15Hrs**

- Nutrition in old age- process of ageing, 2Hrs
- Nutritional and food requirements 3Hrs
- Nutrition related problems 5Hrs
- Degenerative diseases, exercise, drugs 5Hrs

#### REFERENCES

1. Bamji MS, Krishnaswamy K, Brahmam GNV 2009. **Textbook of Human Nutrition**, 3rd edition. New Delhi: Oxford and IBH Publishing Co. Pvt. Ltd.
2. Srilakshmi 2007, **Food Science**, 4th Edition. New Delhi: New Age International Ltd.
3. Wardlaw MG, Paul M Insel Mosby 1996 . **Perspectives in Nutrition**, Third Edition. New Jersey: Blackwell Publishers.
4. Khanna K, Gupta S, Seth R, Mahna R, Rekhi T 2004. **The Art and Science of Cooking: A Practical Manual**, Revised Edition. Bhopal: Elite Publishing House Pvt Ltd.
5. NIN, ICMR 1990 . **Nutritive Value of Indian Foods**.
6. Seth V, Singh K 2005. **Diet planning through the Life Cycle: Part 1. Normal Nutrition**. A Practical Manual, Fourth edition, Bhopal: Elite Publishing House Pvt Ltd.
7. ICMR 2010 . Nutrient Requirements and Recommended Dietary Allowances for Indian

### PRINCIPLES OF FOOD SCIENCE

**Credits: 4**

**Semester: II**

**Subject code: FS21204**

**No. of lecture hours: 60**

#### Objectives

- To impart knowledge pertaining to the functional properties of nutrients
- To provide basic understanding of water and water activity
- To provide knowledge on the role of enzymes in food
- To understand the concept of various pigments



- To obtain insight about toxins and their effects

**Outcome**

**CO1:** Students will gain knowledge on the functional properties of nutrients in food.

**CO2:** Students will understand the properties of water

**CO3:** Students will learn occurrence of enzymes in various foods

**CO4:** Students will obtain insight about properties of pigments

**CO5:** Students will evaluate the toxicology of additives in food

**UNIT I**

**FUNCTIONALITY OF PROTEIN AND CARBOHYDRATES AND LIPIDS**

**12 Hrs**

- Functionality of proteins - hydration and solubility, surface-active properties-emulsion and foaming, gelation, dough, texturization, flavour binding. 4Hrs
- Functionality of carbohydrates - Resistant starch, complex carbohydrates, fibers, gums, pectin, modified starches bulking, gelation, viscosity modifiers, sweeteners- principles of sweetening, glazing, flavor fixatives 4Hrs
- Functionality of lipid - emulsion, crystallinity, polymorphism, palatability. Physicochemical Properties- Melting point, Cloud point, Smoke Flash and Fire Points, Rheology. 4Hrs

**UNIT – II**

**WATER AND WATER ACTIVITY**

**12 Hrs**

- Water
  - a. Properties of water-melting point, boiling point, surface tension, specific heat, dielectric constant, latent heat of fusion, vaporisation and sublimation 3Hrs
  - b. Structure of ice and effect of salts on aqueous solutions
- Types of water – free and bound water, Relative humidity 3Hrs
- Water activity and its significance 2Hrs
- Functionality of water in foods: Principles and properties of colloidal systems, Emulsions, Emulsifiers, Viscosity, Surface tension and Surfactants. 4Hrs

**UNIT-III**

**ENZYMES IN FOODS**

**12 Hrs**

- Enzymes: Classification, Specificity, Catalysis and regulations. 3Hrs
- Factors affecting enzyme activity. Occurrence of enzymes in foods and their role Enzyme inhibitors in foods, Immobilised enzymes 3Hrs
- Enzymes in food processing – manufacture of cheese, cheese spreads and other indigenous products 3Hrs
- Browning reactions in foods: enzymatic and non-enzymatic, Methods to prevent browning. 3Hrs



**UNIT-IV**

**12Hrs**

**PIGMENTS**

- Structure, properties and effect of processing on plant and animal pigments 3Hrs
- Haemoglobin, Myoglobin, 3Hrs
- Chlorophyll, Carotenoids, anthocyanins and flavanoids. 4Hrs
- Miscellaneous pigments 2Hrs

**UNIT-IV**

**12Hrs**

**FOOD TOXICOLOGY**

- Naturally occurring toxicants – plant origin, 3Hrs
- Naturally occurring toxicants - microbial and animal origin 3Hrs
- Accidentally occurring toxicants 3Hrs
- Intentionally added toxicants / Food additives 3Hrs

**SUGGESTED READING:**

1. Sethi Mohini / Rao E. S. (2011). Food Science Experiments and Applications. Second edition .CBS Publishers, New Delhi.
2. M. Swaminathan (1979). Food Science and Experimental Foods. Ganesh and Co. Madras
3. Charley H (1982). Food Science. John Wiley and Sons, Inc., New York
4. Potter Norman and Hotchkiss JH (2007). Food Science. C.B.S. Publishers, New Delhi.
5. Sri Lakshmi B (1997). Food Science. Newage International, New Delhi.
6. Vashisht Meera (1998). Introduction to Food, Nutrition and Food Processing. Anmol Publication Pvt Ltd, New Delhi.
7. Yadav S (1997). Food Chemistry. Anmol Publication Pvt Ltd, New Delhi.
8. Vieira E (2010). Elementary Food Science (4 th ed.) Chapman Hall
9. Laxmi Lal (2010). Fruit Science: Objective Fundamentals, Agrotech Publishing Department of Foods and Nutrition



**BASIC DIETETICS  
PRACTICALS**

**Credits: 1**

**Subject code: FS21205**

**Semester: II**

**No. of lecture hours: 30**

**Objective**

- To understand the concept of an adequate diet and the importance of meal planning and calculate nutrients of various diets.

**Outcome**

- Students will gain knowledge regarding the practical aspects of meal planning and prepare nutritionally adequate diets in relation to age, activity levels, physiological state and socio-economic status.

1. Plan, calculate and prepare clear fluid diet	3
2. Plan, calculate and prepare full fluid diet	3
3. Plan, calculate and Prepare soft diet	4
4. Plan, calculate and prepare a diet for underweight person	4
5. Plan, calculate and prepare a diet for obese person	4
6. Plan, calculate and prepare a diet for diabetes	4
7. Plan, calculate and prepare a diet for Hypertensive patient	4
8. Plan, calculate and prepare a diet for Atherosclerosis	4

**REFERENCES**

1. Gopalan C, Rama Sastri BV and Balasubramanian SC (1993). Revised and updated by Narasinga Rao BS, Deosthale YG and Paul KC. Nutritive Value of Indian Foods, Hyderabad. National Institute of Nutrition, Indian Council of Medical Research.
2. Sharma S (2000). Human Nutrition and Meal Planning. Published by Mrs. S Chowdhary for Jnanada Prakashan (P&D) (JNANADA), 24, Daryaganj, N.Delhi.
3. Bernstein, M. (2010). Nutrition for the older Adult. Published by Jones
4. BLutz C and Przytulski K (2010). Nutrition and Diet therapy: evidence based applications, (4 th ed). Published by Jaypee Brothers, New Delhi ISBN 978-81-8448-247-8



**FAMILY MEAL MANAGEMENT  
PRACTICALS**

**Credits: 1**

**Subject code: FS21206**

**Semester: II**

**No. of Practical hours: 30**

**Objective**

- To understand the concept of an adequate diet and the importance of meal planning

**Outcome**

- Students will gain knowledge regarding the practical aspects of meal planning and prepare nutritionally adequate diets in relation to age, activity levels, physiological state and socio-economic status

1. Standardization of weights and measures Conversion of weights and volumes of raw foods to cooked foods	3
2. Food exchange system and its application	3
3. Plan and prepare Weaning food for infants	3
4. Plan and prepare Packed Lunch for School Going Child.	3
5. Plan and prepare Adolescent diet 13-15 years girl	3
6. Plan and prepare adolescent diet for 16-18 years	3
7. Plan and prepare diet for adult (Sedentary activity)	3
8. Plan and prepare diet for Pregnant woman	3
9. Plan and prepare diet during Lactation	3
10. Plan and prepare diet for Geriatrics	3

**SUGGESTED READING**

1. Gopalan C, Rama Sastri BV and Balasubramanian SC (1993). Revised and updated by Narasinga Rao BS, Deosthale YG and Paul KC. Nutritive Value of Indian Foods, Hyderabad. National Institute of Nutrition, Indian Council of Medical Research.
2. Sharma S (2000). Human Nutrition and Meal Planning. Published by Mrs. S Chowdhary for Jnanada Prakashan (P&D) (JNANADA), 24, Daryaganj, N.Delhi.
3. Bernstein, M. (2010). Nutrition for the older Adult. Published by Jones
4. BLutz C and Przytulski K (2010). Nutrition and Diet therapy: evidence based applications, (4 th ed). Published by Jaypee Brothers, New Delhi ISBN 978-81-8448-247-8



**PRINCIPLES OF FOOD SCIENCE  
PRACTICALS**

**Credits: 1**

**Subject code: FS21207**

**Semester: II**

**No. of Practical hours: 30**

**Objectives**

- To impart knowledge on analyzing various constituents of food

**Outcome**

- The students will gain knowledge in analyzing the constituents of food

1. Effect of mixing time on the rheological characteristics of dough; 3
2. Estimation of gluten content. 3
3. Estimation of Total solids in Jams and Jellies  
3
4. Estimation of sugars, TSS in Degree Brix 3
5. Methods to prevent enzymatic browning using blanching (only Water, 4  
added different level salt in water, salt and Magnesium oxide) in fruits  
and vegetables
6. Methods to prevent enzymatic browning using salt, sugar in fruits  
4  
and vegetables
7. Methods to prevent enzymatic browning using Ascorbic acid, lemon juice in  
5  
fruits and vegetables
8. Effects of Heat on pigments of fruits and vegetables  
3
9. Effect of acid, alkali and metals on pigments of vegetables  
3
10. Identification of food colours from textile colours using paper  
3  
chromatography

**REFERENCES**

1. Sethi Mohini / Rao E. S. (2011). Food Science Experiments and Applications.



- Second edition .CBS Publishers, New Delhi.
2. M. Swaminathan (1979). Food Science and Experimental Foods. Ganesh and Co. Madras
  3. Charley H (1982). Food Science. John Wiley and Sons, Inc., New York
  4. Potter Norman and Hotchkiss JH (2007). Food Science. C.B.S. Publishers, New Delhi.
  5. Sri Lakshmi B (1997). Food Science. Newage International, New Delhi.

**YEAR-WISE AND SEMESTER-WISE DISTRIBUTION OF SUBJECTS  
B.Sc. FOOD SCIENCE, NUTRITION AND DIETITICS  
THIRD SEMESTER  
ACADEMIC YEAR 2022-23 BATCH 2021-24 (CBCS)**

S. No	Part	Subject Code	Title of the Subject	Hours /Week	Duration of Exam (hrs )	Marks			Credits
						Internal	External	Total	
1	I	ES1801	Environmental Studies & Gender Sensitization (AECC-5)	3	3	40	60	100	3
2	I	G22FS1T	Nutrition and Dietetics (GE-3) (ID)	2	3	40	60	100	2
3	I	FS22301	Food Safety, quality control & sensory evaluation (SEC-I)	4	3	40	60	100	4
4	II	FS22302	Principles of Food Processing (Core-7)	4	3	40	60	100	4
5	II	FS22303	Clinical Nutrition (Core-8)	5	3	40	60	100	4
6	II	FS22304	Therapeutic Dietetics (Core-9)	4	3	40	60	100	4
<b>PRACTICALS</b>									
7	II	G22FS1P	Nutrition and Dietetics (GE-3) (ID)	2	3	40	60	100	1



8	II	FS22305	Principles of Food Processing (Core-7)	2	3	40	60	100	1
9	II	FS22306	Clinical Nutrition (Core-8)	2	3	40	60	100	1
10	II	FS22307	Therapeutic Dietetics (Core-9)	2	3	40	60	100	1
<b>TOTAL</b>				30	-	440	660	1100	25

\*Ability Enhancement Compulsory Course (AECC) \* Skill Enhancement Course (SEC)

\*Generic Elective (GE) \* Inter- disciplinary (ID)

### NUTRITION AND DIETETICS (GE-3) (ID)

**Credits: 2**

**Semester: III**

**Subject code: G22FS1T**

**No. of Lecture hours: 30**

**Objective:**

- To impart the knowledge of food science, nutrition and dietetics.
- To gain knowledge about various methods of food preparation
- To get information about the basics of nutrition and about nutrients
- To learn in depth about nutrients and disorders caused due to deficiency of nutrients
- To know more about principles of planning diets, RDA and factors affecting RDA

**Outcomes:**

**CO1:** The students will classify food in relation to health as a source of nutrition.

**CO2:** Students will identify various principles and methods of presentation.

**CO3:** Students will be able to create knowledge on energy value of foods.

**CO4:** Students will be able to identify various deficiency disorders due to imbalance of nutrition.

**CO5:** Students will be able to construct various diet plans.

#### UNIT-I

##### INTRODUCTION TO FOOD SCIENCE

**6Hrs**

- Food -Definition, importance, functions, classification based on origin and function. 1Hr
- Food in relation to health and a source of nutrients. 1Hr
- Cooking - Objectives and importance 1Hr
- Preliminary preparations and Processing and preservation. 3Hrs

#### UNIT-II

##### PRINCIPLES AND METHODS OF PRESERVATION

**6Hrs**

- Principles of preservation and Methods of food preservation, Advantages and limitations 2Hr
- Preservation by high temperature, low temperature 2Hrs
- Preservation using sugar (syruping) and salt (brining), carbonation 1Hr
- Preservation by chemicals, Preservation by use of radiation. 1Hr



### UNIT-III

#### INTRODUCTORY NUTRITION

**6Hrs**

- Introduction to Nutrition, nutrients, health 1Hr
- Proximate principles 1Hr
- Classification of nutrients as macro and micro nutrients 2Hrs
- Energy value of foods and Energy requirements. 2Hr

### UNIT-IV

#### Nutrients and deficiency disorders

**6Hrs**

- Importance of carbohydrates 1Hr
- Importance of proteins 1Hr
- Importance of lipids 1Hr
- Importance of vitamins and minerals and Disorders due to deficiency or imbalance of nutrients. 3Hrs

### UNIT-V

**6Hrs**

#### Diet Planning

- Balanced diet- importance, Principles of planning diets 2Hrs
- RDA- Definition, Factors affecting RDA 1Hr
- Steps in making menu 1Hr
- Food guide and Food group systems ICMR food group system 2Hr

### SUGGESTED READING

- 1.Meyer LJ (1989). Food Chemistry (1st ed.), New Delhi : CBS Publisher
- 2.Swaminathan M (1997). Food Science and Experimental Foods. Madras : Ganesh &Co.
- 3.Maney Shakuntala (1987).Foods, Facts and Principles. New Delhi: Wiley Eastern.



**FOOD SAFETY, QUALITY CONTROL AND SENSORY EVALUATION (SEC-1)**

**Credits: 4**

**Subject code: FS22301**

**Semester: III**

**No. of Lecture hours: 60**

**Objectives**

- To provide orientation towards basic concepts of food safety and toxicology
- To gain knowledge about various food laws and standards
- To impart the knowledge of quality control and methods of sanitation and hygiene
- To get information about various types of hazards and food adulteration
- To understand the sensory evaluation and Factors affecting sensory measurements

**Outcomes:**

**CO1:** The students will be able to understand the basic principle of food safety.

**CO2:** The students will be able to apply their knowledge of food laws for safe food production.

**CO3:** Students will be able to explain various toxicants associated with food.

**CO4:** Students will be able to identify the chemicals toxicant in foods at various level.

**CO5:** Students will be able to appraise microbial toxin associated with food, their occurrence, symptoms and preventive measures.

**UNIT- I**

**BASICS OF FOOD SAFETY AND HYGIENIC HANDLING 12Hrs**

- Food Safety: Definition and factors affecting food safety, safety of left-over foods. Control of Food spoilage 3Hrs
- Food contamination: concept and definition. Sources of contamination 2Hrs
- Safety in food processing a. Food procurement b. Storage c. Handling d. Preparation e. Control of spoilage f. Safety of leftover food. 4Hrs
- Determinants of personal hygiene a. Personal habits b. Clothes c. Illness d. Handling and serving of food e. Education level 3Hrs

**UNIT- II**

**FOOD LAWS AND STANDARDS 12Hrs**

- Introduction to Standards, Specifications and limits 2Hrs
- National Food Regulation-FSSA and important regulatory Agencies –FSSAI, BIS, APEDA 4Hrs
- International regulatory scenario - Codex, WHO, FAO, ICMSF 3Hrs
- Role of organizations - Codex, WHO, FAO, ICMSF 3Hrs



### UNIT- III

#### MANAGEMENT OF HAZARDS AND QUALITY CONTROL 12Hrs

- Need of controlling of critical parameters -Design of food plant, Temperature Danger Zone and Storage of Food, Role of Handler, Personnel Hygiene, Quality of Water and its analysis. 3Hrs
- General Principles of Hygiene, Sanitation and methods of control using physical and chemical agents, Methods of Sanitation and Hygiene: Sterilization and disinfection using heat and chemicals 2Hrs
- Waste product handling and control- Solid and liquid waste disposal. 2Hrs
- Control of infestation- Rodent control, Pest and Rodent Control, Effluent Treatment Plant system importance and Importance and functions of quality control, Principles of quality control 5Hrs

### UNIT- IV

#### HAZARDS ASSOCIATED WITH FOOD 12Hrs

- Food Adulteration: Definition, reasons and types. Adulterants in common food items, Mode of entry of hazards in food. 3Hrs
- Physical hazards –common examples and control measures 3Hrs
- Chemical hazards (naturally occurring, environmental and intentionally added) 3Hrs
- Packaging material as a threat, Impact on health biological hazards (Food borne pathogens: bacteria, viruses and eukaryotes), Seafood and Shell fish poisoning, Mycotoxins, Indicator Organisms 3Hrs

### UNIT- V

#### SENSORY ASPECTS OF FOOD QUALITY 12Hrs

- Sensory assessment of food quality a. Appearance of food visual perception, colour b. Odour and smell c. Flavour d. Texture 3Hrs
- Sensory Testing of Foods:-Threshold Test, Difference Test, Ranking Test, Scoring Test Hedonic Test, Acceptance and Preference Test 3Hrs
- Consideration for Testing Sensory Evaluation-Testing Area, Testing Setup, Lighting Testing Schedule, 2Hrs
- Preparation of Samples a. Coding and order of presentation b. Types of panels-trained and consumer panels c. semi-trained 3Hrs
- Factors affecting sensory measurements 1Hrs

### REFERENCES

1. FSSAI. (2006) Manual of Food safety management System, FSS 2006
2. Fernandes M and Rose A. (2013) Persistent Organic Pollutants and Toxic Metals in Foods. Elsevier Publication.
3. Deshpande S. S. (2013) Handbook of Food Toxicology ebook (Free Down Load)
4. Mathur, P. (2018). Food Safety and Quality Control. Hyderabad: Orient BlackSwan Pvt. Ltd., Mortimore S. and Wallace C. (1995). HACCP-A Practical Approach. London: Chapman and Hill.

### PRINCIPLES OF FOOD PROCESSING



**Credits: 4**  
**Subject code: FS22302**

**Semester: III**  
**No. of lecture hours: 60**

**Objectives:**

- To impart knowledge pertaining to the basic properties of food groups, chemistry of food groups, principles involved in cooking of cereals, legumes, milk, fruits and vegetables and oils & fats.
- To gain knowledge about various processings methods of nuts legumes and oilseeds
- To know in depth about processing and composition of milk and milk products
- To learn about processing, composition and classification of fruits and vegetables, pectin and its application in food industry
- To learn about processing of oils, fats and sugars-physical and functional properties

**Outcomes:**

CO1: Students will be able to understand the principles involved in processing of various food grains.

CO2: Students will be able to evaluate various steps to eliminate antinutritional components in nuts and oil seeds.

CO3: Students will be able to identify various dairy processing method.

CO4: Students will be able to create an understanding on changes occurring in fruits and vegetables during maturation.

CO5: Students will be able to appraise the role of sugar in food preparation.

**UNIT- I**

**CEREALS AND CEREAL PRODUCTS – PROCESSING 12Hrs**

- Wheat- Composition, classification, milling, milled products, types of flour, gluten, doughs and batter. Bread – role of ingredients in bread making, Malting. 5Hr
- Rice- Types of rice, composition, cooking methods, products and fermentation 3Hrs
- Corn and other millets- processing and Nutritive value 2Hrs
- Starch-Sources, functional properties, gelatinization, factors affecting gelatinization, dextrinization, retrogradation 3Hrs

**UNIT-II**

**LEGUMES, NUTS AND OILSEEDS – PROCESSING 12Hrs**

- Legumes and Pulses- Types, composition, milling, cooking, toxic materials (antinutrients), germination, fermentation, digestibility. 5Hrs
- Soyabean and soy products--- 3Hrs
- Oilseeds and Nuts: Types, composition 1Hrs
- Oilseeds and Nuts: Processing and antinutrients 3Hrs



**UNIT-III** **12 Hrs**

**MILK AND MILK PRODUCTS – PROCESSING**

- Milk-composition of milk 2Hrs
- Milk products 2Hrs
- Processing, types of milk, uses in cookery. 4Hrs
- Effect of heat, enzymes, acid, salts on milk and its products. 4Hrs

**UNIT-IV**

**FRUITS AND VEGETABLES- PROCESSING**

**12Hrs**

- Fruits and Vegetables- structure, composition, classification 3Hrs
- Changes occurring during maturation, ripening 3Hrs
- Post-harvest and storage and Pigments, browning 4Hrs
- Pectin and its application in the food industry 2Hrs

**UNIT-V**

**OILS AND FATS AND SUGAR- PROCESSING**

**12Hrs**

- Fats & Oils- types, composition, interesterification of fats, shortening value of fats and oils. 4Hrs
- Sugar-physical properties, functional properties, sources. 3Hrs
- Sugar manufacture, application in food preparation 3Hrs
- Sweetening agents, artificial sweeteners and types of candies 2Hrs

**REFERENCES**

5. Norman N. Potter, 1996, **Food Science**, 5<sup>th</sup> Edition, New Delhi: CBS Publishers.
6. B. Srilakshmi, 2001 **Food Science**, 2<sup>nd</sup> Edition, New Delhi: New Age International.

**CLINICAL NUTRITION**



**Credits: 4**

**Semester: III**

**Subject code: FS22303**

**No. of Lecture hours: 60**

**Objectives**

- To gain knowledge about various types of hospitals diets and feeding methods
- To learn about nutritional counseling and role of dietitian in hospitals
- To attain knowledge about pathogenesis, metabolic changes and clinical diagnosis of various vitamins deficiencies
- To gain knowledge about pathogenesis, metabolic changes and clinical diagnosis of various life style diseases
- To learn about drug and nutrient interaction

**Outcomes**

**CO1:** The students will be able to understand the principles of nutrition in clinical setup

**CO2:** Students will understand diet and nutritional counseling.

**CO3:** Students will be able to create knowledge on clinical diagnosis in deficiency diseases.

**CO4:** Students will be able to identify various lifestyle diseases and their clinical diagnosis.

**CO5:** Students will be able to understand various drugs and their interaction with the foods.

**UNIT I**

**PRINCIPLES OF NUTRITION IN CLINICAL SETUP 12Hrs**

- Food acceptance in illness, Purpose and principles of hospital diets, 2Hrs
- Nutritional assessment in clinical setting, planning of Therapeutic Diets 2Hrs
- classification of therapeutic diets- Liquid diets and soft diet modification of normal diet during illness and convalescence-carbohydrate, protein and fat: type and content. Vitamins, minerals and electrolytes: content. 3Hrs
- Special feeding methods: Basic concepts and methods of - (a) Oral feeding (b) Tube feeding (c) Parental nutrition (d) Intravenous feeding. Types of formulas. Pre and post operative diets 5Hrs

**UNIT II**

**DIET AND NUTRITIONAL COUNSELING 12Hrs**

- Role of Dietician in the hospital. Inpatient Nutritional care process – Patients’ checkup and dietary counseling, interpersonal relationship with patient, planning and implementation of dietary care 3Hrs
- Team approach to nutritional care. 1Hr
- Tools for effective nutritional counseling - Teaching aids used by dietitians- charts, leaflets, posters etc 4Hrs
- Factors affecting the dietary advice and counseling - individual food choice, Communication, behavior modification, Motivation. 4Hrs

**UNIT III**

**CLINICAL DIAGNOSIS IN DEFICIENCY DISEASES 12Hrs**

- Nutritional status and disease common. 1Hrs
- Pathogenesis, Metabolic changes of nutritional



deficiency disease - PEM, Anemia, IDD, Vitamin A Deficiency, Vitamin D, Vitamin B12. 3Hrs

- Clinical diagnosis of nutritional deficiency disease - PEM, Anemia, IDD, Vitamin A Deficiency, Vitamin D, Vitamin B12. 4Hrs
- Interpretation of report of blood and urine in - PEM, Anemia, IDD, Vitamin A Deficiency, Vitamin D, Vitamin B12. 4Hrs

#### UNIT IV

#### CLINICAL DIAGNOSIS IN LIFESTYLE DISEASE 12Hrs

- Pathogenesis, Metabolic changes of life style diseases: Obesity, Hypertension, Diabetes and CVD- Atherosclerosis, Hypercholesterolemia and Hypertriglyceridemia 3Hrs
- Clinical diagnosis of life style diseases: Obesity, Hypertension, Diabetes and CVD- Atherosclerosis, Hypercholesterolemia and Hypertriglyceridemia 3Hrs
- Alteration in nutritional requirement. 2Hrs
- Interpretation of report of blood and urine in lifestyle diseases: Obesity, Hypertension, Diabetes and CVD- Atherosclerosis, Hypercholesterolemia and Hypertriglyceridemia 4Hrs

#### UNIT V

#### DRUG AND NUTRIENT INTERACTION 12Hrs

- Effect of drugs on food intake and absorption: 3Hrs
- Effect of food on absorption of drugs 3Hrs
- Effect of various food and beverages on drug action, Drug effects on nutrients, Interaction of drugs and nutrient 3Hrs
- Effect of food, nutrients and nutritional status on drug dosage and Efficacy. 3Hrs

#### REFERENCES

1. Zaloga, G.P. (1994): Nutrition in Critical Care, Times Mirror/Mosby.
2. Shils, M.E., Olson, J.A., Shike, M. and Ross, A.C. (Ed) (1999): Modern Nutrition in Health and Disease. 9th Edition, Williams and Wilkins.
3. Shikora, S.A. and Blackburn, G.L. (Ed) (1999). Nutritional Support – Theory and Therapeutics, Chapman and Hall, ITP (International Thomson Publishing).
4. Mahan, L.K. and Escott – Stump, S. (2000): Krause's Food Nutrition and Diet Therapy, 10th Ed. W.B. Saunders Ltd.
5. Phillips, G.D. and Lodgers C.L. (1986). Parenteral and Enteral Nutrition. A Practical Guide. Churchill Livingstone.
- Kinney, J.M. and Borum, P. R. (editors) (1989) Perspectives in Clinical Nutrition. Urban and Schwarzenberg.
7. Torosian, M. H. (editor) (1995) Nutrition for the Hospitalised Patient. Basic Science & Principles of Practice.

#### THERAPEUTIC DIETETICS

**Credits: 4**

**Subject code: FS22304**

**Objectives**

B.Sc. Food Science, Nutrition and Dietetics

**Semester: III**

**No. of Lecture hours: 60**

Syllabus for 2021-2024 batch



- To provide knowledge on important aspects of therapeutic dietetics
- To get in detail information about diabetes and cardiovascular diseases and their diets
- To gain knowledge about various renal disorders and their diets
- To study in detail about different GI disorders and their dietary management
- To gain knowledge about various liver and biliary disorders and their management

### Outcomes

**CO1:** The students will be able to understand diet for weight management

**CO2:** Students will identify various causes of diabetes mellitus and its diet

**CO3:** Students will be able to create knowledge on various renal diseases and their diets.

**CO4:** Students will be able to identify various GI diseases and their causes and types

**CO5:** Students will be able to construct various diet plans for liver and biliary disorders.

## UNIT I

### DIET FOR WEIGHT MANAGEMENT

**12Hrs**

- Underweight- Definition, Causes, Principles of the Diet, Dietary Modifications, Foods to Be Included and Foods to be Avoided 4Hrs
- Obesity - Definition, Causes, Assessment (BMI, Body Weight, Brokas Index), Type (Grade I, II, III, Apple and Pear shape) 4Hrs
- Complications, Principles of the Diet, Dietary Modifications, Foods to be Included And Foods to be Avoided 2Hrs
- Eating disorders: Anorexia Nervosa and Bulimia Nervosa 2Hrs

## UNIT II

### DIET IN DIABETES AND CARDIOVASCULAR DISEASES\_

**12Hrs**

- Diabetes - Definition, Causes, Types, T2DM- risk factors, Signs, Symptoms, Complications and Dietary Modifications 3Hrs
- T1DM- risk factors, Signs, Symptoms, Complications and Dietary Modifications 3Hrs
- Hypertension- Definition, Causes, Types, risk factors, Signs, Symptoms, Complications and Dietary Modifications 3Hrs
- Atherosclerosis - Definition, Causes, risk factors, Signs, Symptoms, Complications and Dietary Modifications 3Hrs

## UNIT III

### DIET IN RENAL DISEASES

**12Hrs**

- Nephritis, - Causes, Types, risk factors, Signs, Symptoms, Complications and Dietary Modifications 3Hrs
- Nephrosis: Causes, Types, risk factors, Signs, Symptoms,



- |   |      |
|---|------|
| Complications and Dietary Modifications   | 3Hrs |
| ● Renal Calculi - Causes, Types risk factors, Signs, Symptoms, Complications and Dietary Modifications  | 3Hrs |
| ● Renal Failure - Causes, Types, risk factors, Signs, Symptoms, Complications and Dietary Modifications | 3Hrs |

#### UNIT-IV

#### DIET IN GASTRO – INTESTINAL DISEASES 12Hrs

- |   |      |
|---|------|
| ● Diarrhoea - Definition, causes, types, symptoms, complications and dietary Modifications, foods to be included and foods to be avoided    | 3Hrs |
| ● Constipation - Definition, causes, types, symptoms, complications and dietary modifications, foods to be included and foods to be avoided | 3Hrs |
| ● Peptic Ulcer - Definition, causes, types, symptoms, complications and dietary modifications, foods to be included and foods to be avoided | 3Hrs |
| ● Celiac disease, tropical sprue, irritable bowel syndrome, inflammatory bowel disease- Definition, Symptoms and dietary management         | 3Hrs |

#### UNIT V

#### DIET IN LIVER AND BILLARY DISORDERS 12Hrs

- |  |      |
|--|------|
| ● Hepatitis - Definition, Causes, Types, Symptoms, Complications and Dietary Modifications, Foods to Be Included and Foods to Be Avoided   | 3Hrs |
| ● Cirrhosis - Definition, Causes, Symptoms, Complications and Dietary Modifications, Foods to Be Included and Foods to Be Avoided          | 3Hrs |
| ● Gall stones - Definition, Causes, Symptoms, Complications and Dietary Modifications, Foods to Be Included and Foods to Be Avoided        | 3Hrs |
| ● Pancreatitis- Definition, Causes, Types, Symptoms, Complications and Dietary Modifications, Foods to Be Included and Foods to Be Avoided | 3Hrs |

#### REFERENCES

1. Srilakshmi B – Dietetics, 5<sup>th</sup> edition, New Age International publishers, 2002.
2. Antia F.P - Clinical Dietetics and Nutrition, Oxford University Press, New Delhi, 2003.
3. Mahtab S. Bamji, N Prahlad Rao, Vinodini Reddy -Text book of Human Nutrition, 2<sup>nd</sup> edition, Oxford and IBH publishing Co. Pvt. Ltd, 2004.
4. Swaminathan, M - Essentials of Food and Nutrition, Vol 2, Bangalore Printing and Publishers Co Ltd, Bangalore, 1985.

### NUTRITION AND DIETETICS PRACTICALS (GE-3) (ID)

Credits: 1

Subject code: G22FS1P

B.Sc. Food Science, Nutrition and Dietetics

Semester: III

No. of Lecture hours: 30

Syllabus for 2021-2024 batch



**Objective:**

- To impart the knowledge of food science, nutrition and dietetics

**Outcome:**

- The students will gain knowledge on preparation methods of various food products with the use of preservatives.

1. Preparation of squash	2
2. Preparation of cordial	1
3. Dehydration of fruits and vegetables	2
4. Preparation of pickles	2
4-5 Preparation of jam and jellies	3
6. Preservation by chemicals	1
7-9 Preparation of nutrient dense foods	4

**REFERENCES**

1. Meyer LJ (1989). Food Chemistry (1st ed.), New Delhi: CBS Publisher
2. Swaminathan M (1997). Food Science and Experimental Foods. Madras : Ganesh &Co.
3. Maney Shakuntala (1987).Foods, Facts and Principles. New Delhi: Wiley Eastern.



## PRINCIPLES OF FOOD PROCESSING PRACTICALS

**Credits: 1**

**Subject code: FS22305**

**Objectives**

- To provide basic understanding of principles involved in cooking of cereals, legumes, milk, fruits and vegetables and oils & fats

**Outcome**

- The students will gain knowledge of the principles involved in processing of, legumes, milk, fruits and vegetables and oils & fats

1. Determination of gluten content from wheat flour	4
2-4. Gelatinization of starch and finding the gelatinization temperature in various starches (potato, wheat, corn, rice and arrow root starch).	6
5. Retrogradation of starch.	3
6. Measurement of specific gravity of milk.	3
7. Determination of fat content in milk by Gerbers centrifuge	4
8. Estimation of pectin content in fruits	4
9. Determination of pH of various fruit juices	3
10. Preparation of hard-boiled confectionery	3

### REFERENCES

1. Sethi Mohini / Rao E. S. (2011). Food Science Experiments and Applications. Second edition. CBS Publishers, New Delhi.
2. M. Swaminathan (1979). Food Science and Experimental Foods. Ganesh and Co. Madras
3. Charley H (1982). Food Science. John Wiley and Sons, Inc., New York
4. Potter Norman and Hotchkiss JH (2007). Food Science. C.B.S. Publishers, New Delhi.
5. Sri Lakshmi B (1997). Food Science. Newage International, New Delhi.
6. Vashisht Meera (1998). Introduction to Food, Nutrition and Food Processing. Anmol Publication Pvt Ltd, New Delhi.
7. Yadav S (1997). Food Chemistry. Anmol Publication Pvt Ltd, New Delhi.
8. Vieira E (2010). Elementary Food Science (4th ed.) Chapman Hall
9. Laxmi Lal (2010). Fruit Science: Objective Fundamentals, Agrotech Publishing



## CLINICAL NUTRITION

**Credits: 1**

**Subject code: FS22306**

**Semester: III**

**No. of Lecture hours: 30**

### Objectives

- To provide basic understanding of principles involved in various diets

### Outcome

- The students will gain knowledge planning, preparation of various diets.

## PRACTICALS

1. Standardization of common food preparations	3
2. Planning, preparation and calculation of Normal diet	3
3. Planning, preparation and calculation of Liquid diet	3
4. Planning, preparation and calculation of soft diet	3
5. Planning and preparation of Bland diet	3
6. Planning and preparation of High protein diet and Low protein diet	3
7. Planning and preparation of High Fibre and Low fibre diet	3
8. Planning and preparation of Caloric-restricted	1
9. Planning, Preparation and calculation of low and medium cost diets for PEM and Anaemia	4
10. Planning, Preparation and calculation of low and medium cost diets for Vitamin A deficiency and Iodine deficiency disorder	4

## REFERENCES

1. Zaloga, G.P. (1994): Nutrition in Critical Care, Times Mirror/Mosby.
2. Shils, M.E., Olson, J.A., Shike, M. and Ross, A.C. (Ed) (1999): Modern Nutrition in Health and Disease. 9th Edition, Williams and Wilkins.
3. Shikora, S.A. and Blackburn, G.L. (Ed) (1999). Nutritional Support – Theory and Therapeutics, Chapman and Hall, ITP (International Thomson Publishing).
4. Mahan, L.K. and Escott – Stump, S. (2000): Krause's Food Nutrition and Diet Therapy, 10th Ed. W.B. Saunders Ltd.
5. Phillips, G.D. and Lodgers C.L. (1986). Parenteral and Enteral Nutrition. A Practical Guide. Churchill Livingstone.
6. Kinney, J.M. and Borum, P. R. (editors) (1989) Perspectives in Clinical Nutrition. Urban and Schwarzenberg.
7. Torosian, M. H. (editor) (1995) Nutrition for the Hospitalised Patient. Basic Science & Principles of Practice.



### THERAPEUTIC DIETETICS

**Credits: 1**

**Subject code: FS22307**

**Semester: III**

**No. of Lecture hours: 30**

#### Objective

- To impart the knowledge of therapeutic dietetics.

#### Outcome

- The students will gain knowledge on planning and calculating diets for various diets.

### PRACTICALS

I. Planning, Calculation and Preparation of Diets for 1. Underweight 2. Obesity	3
II. Planning, Calculation and Preparation of Diets for 3. Diabetes- T2DM 4. Hypertension	3
III. Planning, Calculation and Preparation of Diets for gastro intestinal diseases 5. Diarrhea 6. Constipation 7. Peptic Ulcer	3
IV. Planning, Calculation and Preparation of Diets for Liver and Biliary disorders 8. Hepatitis 9. Cirrhosis 10. Gall stones	3
V. Planning, Calculation and Preparation of Diets for renal disorders 11. Nephritis 12. Nephrosis 13. Renal calculi 14. Chronic renal failure	3



**YEAR-WISE AND SEMESTER-WISE DISTRIBUTION OF SUBJECTS**  
**B.Sc. FOOD SCIENCE, NUTRITION AND DIETITICS**  
**FOURTH SEMESTER**  
**ACADEMIC YEAR 2022-23 BATCH 2021-24 (CBCS)**



S. No	Part	Subject Code	Title of the Subject	Hours /Week	Duration of Exam (hrs)	Marks			Credits
						Internal	External	Total	
1	I	FS22401	Applied Statistics (GE-4)	4	3	40	60	100	4
2	I	FS22402	Food Preservation (SEC-II)	3	3	40	60	100	3
3	II	FS22403	Diet Therapy (Core-10)	4	3	40	60	100	4
4	II	FS22404	Advanced Nutrition (Core-11)	4	3	40	60	100	4
5	II	FS22405	Functional Foods and Nutraceuticals (Core-12)	4	3	40	60	100	4
6	II	FS22406	Basics of Research (Core-13)	4	3	40	60	100	4
<b>PRACTICALS</b>									
7	II	FS22407	Food Preservation (SEC-II)	2	3	40	60	100	1
8	II	FS22408	Diet Therapy (Core-10)	2	3	40	60	100	1
9	II	FS22409	Advanced Nutrition (Core-11)	2	3	40	60	100	1
10.	III	FS22410	Summer Internship						1
<b>TOTAL</b>				29	-	360	540	9000	27

\* Skill Enhancement Course (SEC)

\*Generic Elective (GE)

\* Discipline-specific (DS)



## APPLIED STATISTICS (GE-4)

**Credits: 4**

**Subject code: FS22401**

**Semester: IV**

**No. of lecture hours: 60**

### Objective

- To study the basic statistical techniques in relation to food analysis.
- To gain knowledge about random variables and concepts of probability distribution
- To get information regarding various sampling methods
- To attain knowledge about statistical hypothesis tests
- To know about F-test and analysis of various

### Outcome

**CO1:** The students will be able to interpret the correlation between two variables.

**CO2:** The students will be able to develop the probability density function of transformation of random variables.

**CO3:** The students will be able to analyze hypothesis tests of means, proportions and variances using both one & two sample data sets.

**CO4:** The students will be able to explain t-test, chi-square test for independence of attributes and goodness of fit.

**CO5:** The students will be able to classify the analysis of variance of one-way and two-way classification.

### UNIT I

**12Hrs**

- Review of measures of central tendency and measures of dispersion
- Correlation – types of correlation 1Hr
- scatter diagram- Karl Pearson's coefficient of correlation 2Hrs
- rank correlation- non- repeated and repeated ranks - simple problems 1Hr
- Regression lines- regression equations 1Hr
- fitting of linear regression equation 2Hr
- fitting of linear regression equation of Yon X and X on Y -Simple problems. (NOTE: Derivations not required. Applications/ Problems only) 2Hrs

### UNIT II

**12Hrs**

- Random variables, Mathematical expectations 4Hrs
  - Probability distribution (Binomial, Poisson and Normal)- their concepts 4Hrs
  - Applications and problems 4Hrs
- (NOTE: Derivations not required. Applications/ Problems only)



<b>UNIT III</b>	<b>12Hrs</b>
● Sampling – types of sampling- purposive sampling	1Hr
● random sampling and stratified sampling	1Hr
● definition of null hypothesis- alternative hypothesis	1Hr
● type- I error- Type II error- level of significance	1Hr
● Test of significance for large samples	1Hr
● test signification for single proportion	1Hr
● test signification for difference proportion	2Hr
● test signification for single mean- test signification for difference of means	2Hr
● test signification for difference of standard deviation- simple problems	2Hr
(NOTE: Derivations not required. Applications/ Problems only)	
<b>UNIT IV</b>	<b>12Hrs</b>
● Exact samplings distributions (t, $X^2$ , F) their concepts	4Hrs
● Chi- Square Test: Chi – Square Test for goodness of fit	4Hrs
● chi-square test for independence of attributes	4Hrs
● yate’s correction	3Hrs
● T- test: - t- test for single mean	3Hrs
● t- test for two means	3Hrs
● paired t- Test	3Hrs
● t- test for significance of the correlation of coefficient	4Hrs
(NOTE: Derivations not required. Applications/ Problems only)	
<b>UNIT V</b>	<b>12Hrs</b>
● F-Test- analysis of variance- assumptions	6Hrs
● Analysis of Variance	6Hrs
● ANOVA in one way- classification	6Hrs
● two – way of classification	6Hrs
● simple problems	6Hrs
(NOTE: Derivations not required. Applications/ Problems only)	

### REFERENCES

1. S.C. Gupta and V.K. Kapoor, “Fundamentals of Mathematical statistics”, Sulthan /Chand & Sons, New Delhi. 2002.
2. S.C. Gupta and V.K. Kapoor, “Statistical Methods”, Sulthan /Chand & Sons, New Delhi. 2000.
3. V.K. Kapoor “Problems and solution in statistics” 3<sup>rd</sup> edition Sulthan Chand & Sons, New Delhi. 2000.



## FOOD PRESERVATION (SEC-II)

**Credits: 3**

**Subject code: FS22402**

**Semester: IV**

**No. of lecture hours: 45**

### Objectives

- To teach the students basics of food preservation
- To appraise the students of the latest developments in the food preservation
- To prepare various food products using preservation techniques
- To learn about preservation by using irradiation, chemical preservatives, fermentation
- To gain knowledge about role packaging in food preservation

### Outcomes

CO1: The students will be able to understand the importance of food preservation.

CO2: The students will be able to prepare various food products.

CO3: The students will be able to distinguish between low and high temperature preservation.

CO4: The students will be able to identify the latest developments in food preservation.

CO5: The students will be able to appraise the role of packaging in food preservation

### UNIT- I

#### BASIC CONCEPTS IN FOOD PRESERVATION

**9Hrs**

- Importance of food preservation 2Hrs
- Principles involved in preservation of foods 2Hrs
- Factors affecting growth of microorganisms 2Hrs
- Food laws and agencies 3Hrs

### UNIT- II

#### PRINCIPLES AND PRESERVATION OF VARIOUS FOOD PRODUCTS

**9Hrs**

- Fruit juices, squashes and cordials 2Hrs
- Jams, jellies and marmalades 2Hrs
- Tomato products 3
- Chutneys and sauces 2Hrs

### UNIT-III

#### PRESERVATION METHODS

**9Hrs**

- Preservation by means of low temperature-freezing and deep freezing 2Hrs
- Preservation by means of high temperatures 1Hr
- Drying, pasteurization, dehydration, smoking and curing 3Hrs
- Spray drying, Lyophilization, Vacuum packaging, Canning 3Hrs



#### UNIT-IV

##### OTHER PRESERVATION METHODS

	<b>9Hrs</b>
● Preservation using irradiation-UV and gamma radiations	2Hrs
● Preservation by brining, sugaring, inert gas-pickling, carbonation and syruling	2Hrs
● Preservation using chemical preservatives	3Hrs
● Preservation by fermentation-vinegar, alcoholic beverages	2Hrs

#### UNIT-V

##### ROLE OF PACKAGING IN FOOD PRESERVATION

	<b>9Hrs</b>
● Preservation techniques in convenience foods: Some examples	3Hrs
● Role of packaging in food preservation	3Hrs
● Extruded products -	3Hrs

#### REFERENCES

1. KulshresthaSK(1994).Food preservation.PublishedbyVikasPublishingHouse Pvt Ltd,New Delhi
2. Girdharilal, SiddhapaGB and Tandon BL (1986). Preservation of fruits and vegetables.ICAR, NewDelhi
3. KukadeSandBhaveNandMehtaA(1994).FoodpreservationManual.Deptof food and Nutrition, SNTD CollegeofHomeScience, Pune
4. KaliaM (2008).Food Preservation and Processing, Kalyani Nanjunda,India
5. Swamy(2008). FruitsandvegetableTechnology,ProcessandProductDevelopment. PublishedbyPriyadarshini Prakashana,India
6. Jood Sand Khetarpaul N (2009), Food Preservation. PublishedbyAgrotech
7. KaliaM. (2010),Food QualityManagement. PublishedbyAgrotech
8. ArtiSankhlaetal.(2011),FoodPreservation:PrinciplesandPractices.Publishedby Agrotech.

#### DIET THERAPY (CORE-10)

Credits: 4

Semester: IV

B.Sc. Food Science, Nutrition and Dietetics

Syllabus for 2021-2024 batch



Subject code: FS22403

No. of lecture hours: 60

### Objectives

- To provide knowledge and clinical information about various diseases that will be necessary for holistic management of these conditions
- To gain in detail knowledge about diets in various conditions like cancers, gout, arthritis and AIDS
- To learn in detail about pre and post operative diets
- To get information regarding food allergy and intolerance and genetic disorders
- To gain knowledge about nutrition and immune response

### Outcomes

CO1: The students will be able to design different communication models.

CO2: The students will be able to apply the knowledge of Medical Nutrition Therapy for Enteral and Parenteral Nutrition.

CO3: The students will be able to understand the Upper and Lower GI Disorders.

CO4: The students will be able to assess acute and chronic infectious disease.

CO5: The students will be able to gain knowledge on Nutrition Therapy for Diabetes Mellitus

## UNIT I

### BASICS OF DIET THERAPY AND DIET IN INFECTIONS AND FEBRILE CONDITIONS

12Hrs

- Dietary supplements: types of supplements, Adjuncts to diet therapy 3Hrs
- Defense mechanisms in the body, Effects of infection on body mechanisms effect of infection on nutrients, Role of nutrition in infections and dietary modification. 3Hrs
- Diet in Febrile conditions: metabolic changes in fever. Etiology, symptoms, and dietary management of Typhoid, Tuberculosis 3Hrs
- Etiology, symptoms, and dietary management of Tuberculosis 3Hrs

## UNIT II

### DIET IN OTHER CONDITIONS

12Hrs

- Arthritis - Definition, causes, types, symptoms, and dietary modifications, foods to be included and foods to be avoided 3Hrs
- Gout - Definition, causes, symptoms, and dietary modifications, foods to be included and foods to be avoided 3Hrs
- Cancer - Definition, Types, risk factors, Symptoms, Complications and Dietary Modifications, Foods to Be Included and Foods to Be Avoided 3Hrs
- Acquired Immunodeficiency Syndrome - Definition, Causes, Transmission, Symptoms, Dietary Modifications and Prevention 3Hrs

## UNIT III



**DIET IN CRITICAL CONDITIONS** **12Hrs**

- Dietary management in surgical conditions: Pre-operative- Nutritional assessment and dietary management 3Hrs
- Post-operative- Nutritional assessment and dietary management 3Hrs
- Etiology, symptoms, and dietary management of Sepsis, Trauma 3Hrs
- Burns- Metabolic changes, nutrient requirement. Assessment of TBSA Burnt 3Hrs

**UNIT IV**

**DIET IN GENETIC DISORDERS AND FOOD ALLERGY** **12Hrs**

- Inborn Errors of Metabolism; Phenylketonuria – Definition, symptoms, Dietary Management 3Hrs
- Galactosemia - Definition, symptoms, Dietary management 3Hrs
- Lactose Intolerance- Definition, symptoms, Dietary management 3Hrs
- Food Allergy–Definition, Classification, Clinical Signs and Symptoms, Food as Allergens. 3Hrs

**UNIT- V**

**NUTRITION AND IMMUNE RESPONSE** **12Hrs**

- Definition, Role of immune nutrients- Amino acids, Purine Nucleotides, Omega 3 fatty acids 3Hrs
- Immunological components of Breast milk 3Hrs
- Effect of undernutrition and overnutrition on immune function. 3Hrs
- Immunoenhancers, immunosuppressants, conditionally essential nutrients 3Hrs

**REFERENCES**

1. Antia, F.P. (2010). Clinical Dietetics and Nutrition (4thed.). Pharmamed
2. Srilakshmi B (2011). Dietetics (6thed.). Wiley Eastern Limited.
3. Krause and Mahan (2008). Food, Nutrition, Diet Therapy (12thed.). WB Saunders Company, London
4. Sue Rodwell Williams (2009). Nutrition, Diet Therapy (9thed.). WB Saunders Company, London
5. Skipper A (2009). Advanced Medical Nutrition Therapy and Practice. Jone&Barlett Publishers
6. Nelms M (2007). Nutrition Therapy and Pathophysiology. Thomson publishers
7. Gropper S (2009). Advanced Nutrition and Human Metabolism (5thed). Cengage publishers
8. Shils M (2005). Modern Nutrition in Health & Disease (10thed). Lippincott publishers

**ADVANCED NUTRITION (CORE-11)**

**Credits: 4**

**Subject code: FS22404**

B.Sc. Food Science, Nutrition and Dietetics

**Semester: IV**

**No. of lecture hours: 60**

Syllabus for 2021-2024 batch



## Objectives

- To provide knowledge on various aspects of advanced anaerobic nutrition
- To attain knowledge with regards to quality, quantity, digestibility and utilisation of proteins
- To gain information about nutrition for gene expression
- To gain knowledge about sports nutrition
- To get in detail information about role of antioxidants and diseases due to free radicals

## Outcomes

**CO1:** The students will be able to human energy requirements.

**CO2:** The students will be able to apply the knowledge of how to assess protein quality.

**CO3:** The students will be able to understand the nutrition for gene expression.

**CO4:** The students will be able to assess antioxidants.

**CO5:** The students will be able to gain knowledge on sports nutrition

## UNIT I

### HUMAN ENERGY REQUIREMENTS

**12Hrs**

- Energy: Definition and Components of Energy Requirement 1Hrs
- Factors Affecting Energy Expenditure and Requirement, BMR, thermic Effect of Food, Energy Expended in Physical Activity 5Hrs
- Methods of Estimation of Energy Expenditure and Requirements: Direct Calorimetry, Indirect Calorimetry, Double labeled Water (DLW) Technique, Heart Rate Monitoring (MRM) Method, Factorial Estimation of Total Energy Expenditure, 3Hrs
- Energy Requirements and Dietary Energy Recommendations for various age groups and physiological conditions. Energy Imbalance 3Hrs

## UNIT II

### PROTEIN QUALITY

**12Hrs**

- Methods of Evaluation of protein quality- Digestibility coefficient, biological value. 3Hrs
- Net protein utilization, Protein efficiency ratio 3Hrs
- Estimation of protein requirements at different stages through factorial method and nitrogen balance studies. 3Hrs
- Effects of protein quality and quantity on protein utilization. 3Hrs

## UNIT III

### NUTRITION FOR GENE EXPRESSION

**12Hrs**

- Gene Expression - An Overview, Role of Specific Nutrients in Controlling Gene Expression: Proteins, Lipids, Minerals, Vitamins 3Hrs
- Nutrition and Immune response: Role of individual nutrients in immune



response and function. 3Hrs

- Effect of undernutrition and overnutrition on immune function. Immuno enhancers, immunosuppressants, conditionally essential nutrients. 3Hrs

- Effect of food, nutrients and nutritional status on drug dosage and efficacy 3Hrs

#### UNIT IV

##### ANTIOXIDANTS

12Hrs

- Free radicals of oxygen, Sources of Free radicals and Reactive oxygen species 3Hrs
- Disease processes by Free radicals and Reactive oxygen species. 3Hrs
- Markers of oxidative stress, Antioxidant Defense systems-vitamin E, C, Beta carotene, ubiquinone, phyto chemicals, antioxidant enzymes 3Hrs
- Antioxidants and disease- immunity and ageing, cataract, PEM, CVD, Neurological diseases. Combating free radicals and reactive oxygen species, Sources. 3Hrs

#### UNIT V

##### SPORTS NUTRITION

12Hrs

- Introduction, Nutritional considerations for sports / exercising person as compared to normal active person. 4Hrs
- Energy substrate for activities of different intensity and duration, aerobic and anaerobic activities. 4Hrs
- Fluid balance in sports and exercise 1Hr
- importance, symptoms and prevention of dehydration, Sports drink, Dietary supplements and ergogenic aids (nutritional, pharmacological and physiological) 3Hrs

#### References:

1. Zaloga, G.P. (1994): Nutrition in Critical Care, Times Mirror/Mosby.
2. Shils, M.E., Olson, J.A., Shike, M. and Ross, A.C. (Ed) (1999): Modern Nutrition in Health and Disease. 9th Edition, Williams and Wilkins.
3. Shikora, S.A. and Blackburn, G.L. (Ed) (1999). Nutritional Support – Theory and Therapeutics, Chapman and Hall, ITP (International Thomson Publishing).
4. Mahan, L.K. and Escott – Stump, S. (2000): Krause’s Food Nutrition and Diet Therapy, 10th Ed. W.B. Saunders Ltd.
5. Phillips, G.D. and Lodgers C.L. (1986). Parenteral and Enteral Nutrition. A Practical Guide. Churchill Livingstone.
- Kinney, J.M. and Borum, P. R. (editors) (1989) Perspectives in Clinical Nutrition. Urban and Schwarzenberg.
7. Torosian, M. H. (editor) (1995) Nutrition for the Hospitalised Patient. Basic Science & Principles of Practice.

#### FUNCTIONAL FOODS AND NUTRACEUTICALS (CORE-12)

**Credits: 4**

**Semester: IV**

**Subject code: FS22405**

**No. of lecture hours: 60**

#### Objectives



- To provide knowledge on functional foods and nutraceuticals.
- To gain knowledge about sources and functions of nutraceutical ingredients
- To get in depth information about pre and probiotics and their quality assurance and safety
- To learn more about phytochemicals and their classification
- To gain knowledge about role of antioxidants as nutraceuticals

### Outcomes

**CO1:** The students will be able to understand basics of functional foods and nutraceuticals.

**CO2:** The students will be able to apply the knowledge of functions of nutraceuticals.

**CO3:** The students will be able to understand sources and metabolism of prebiotics and probiotics.

**CO4:** The students will be able to assess phytochemicals as nutraceuticals.

**CO5:** The students will be able to gain knowledge on sources and role of antioxidants as nutraceuticals.

### UNIT I

**12Hrs**

#### FUNCTIONAL FOOD AND NUTRACEUTICALS

- Definition, history, types and classification: based on chemical nature 2Hrs
- Benefits of functional foods and nutraceuticals and Mechanism of action of nutraceuticals 2Hrs
- Marketing and regulatory issues of functional foods and Nutraceuticals and Legal status in different countries and safety and regulatory aspects of functional foods and nutraceuticals 4Hrs
- Development of biomarkers to indicate efficacy of functional ingredients, Relation of functional foods and nutraceutical to foods and drugs 4Hrs

### UNIT II

#### SOURCES AND FUNCTIONS OF NUTRACEUTICALS INGREDIENTS 12Hrs

- Food sources-Different foods as functional food: cereal products (oats, wheat bran, rice bran, etc.), fruits and vegetables, milk and milk products, legumes, nuts, oil seeds and sea foods, herbs, spices and medicinal plants. Coffee, tea and other beverages as functional foods/ drinks and their protective effects. 5Hrs
- Complex carbohydrates: oligosaccharides, dietary fibers and resistant starch as functional food ingredients 3Hrs
- Proteins 2Hrs
- Fats: omega 3 fatty acids and conjugated linoleic acid 2Hrs

### UNIT III

#### PROBIOTICS AND PREBIOTICS

**12Hrs**

- Definition, types and important features of probiotic micro- organisms, Health effects of probiotics including mechanism of action GI health,



cancer and other diseases, Probiotics in various foods: fermented milk products, non-milk products, Quality Assurance of probiotics and safety.	3Hr
● Definition, chemistry, sources of prebiotics, Metabolism and bioavailability of prebiotics, Health benefits of prebiotics, prebiotics ingredients in food – galacto oligosaccharides, functional disaccharides (lactulose, lactitol and lactose, resistant starch)	3Hrs
● Perspective for food applications for the following: non-digestible carbohydrates/oligosaccharides: Dietary fiber, Resistant starch, Gums	3Hrs
● Perspective for food applications for the – Polyphenols: Flavonoids, catechins, isoflavones, tannins, Phytoestrogens, Phytosterols, Glucosinolates, Organo Sulphur compounds, other components – Phytates, Protease.	3Hrs
<b>UNIT IV</b>	
<b>PHYTOCHEMICALS AS NUTRACEUTICALS</b>	
● Phytochemicals: definition, mode of action	3Hrs
● Classification of phytochemicals: a) terpenoids b) carotenoids: carotene, lutein, zeaxanthin, lycopene	3Hrs
● Polyphenols: a) non flavonoid polyphenols b) flavonoids: flavanols, flavanol (catechin) flavan-3-ol, flavones, flavanones, anthocyanidins, phytoestrogens c) other poly phenols: curcumin, tannins, lignin, resveratrol	3Hrs
● Sulphur containing compounds: sulphides and glucosinolates	3Hrs
<b>UNIT V</b>	
<b>SOURCE AND ROLE OF ANTIOXIDANTS AS NUTRACEUTICALS</b>	
● Definition of antioxidants	2Hrs
● Mechanism of action	2Hrs
● Role of endogenous antioxidants: super oxide dismutase, catalases, glutathione reductase, peroxidases- glutathione peroxidase in protecting cells	4Hrs
● Role of exogenous antioxidants: retinol, beta carotene, ascorbic acid and tocopherol in prevention of cancer, CVD, ageing and inflammation.	4Hrs

## REFERENCES

1. Cho S. S. and Dreher, M.L. (2001): Handbook Dietary Fibre, Marcel Dekker Inc., New York.
2. Yurawecz, M.P., M.M. Mossoba, J.K.G. Kramer, M.W. Pariza and G.J. Nelson eds (1999) Advances in Conjugated Linoleic Acid Research, Vol. 1. AOCS Press, Champaign.



3. Wildman, R.E.C. ed. (2000) Handbook of Nutraceuticals and Functional Foods, CRC Press, Boca Raton.
4. Fuller, R. ed. (1992) Probiotics the scientific basis, London: Chapman and Hall, New York.
5. Fuller, R. ed. (1997) Probiotics Applications and Practical Aspects, London: Chapman and Hall, New York.
6. Salminen, S. A. Von Wright (eds) (1998): Lactic acid bacteria: microbiology and functional aspects, 2nd edition, Marcell Dekker Inc. New York.
7. Goldberg, I. Ed (1994): Functional Foods: Designer Foods, Pharma Foods, Nutraceuticals, Chapman & Hall, New York.
8. Wood, B.J.B. ed. (1992): The lactic acid bacteria in health and disease, Elsevier Applied Science, London

**BASICS OF RESEARCH (CORE-13)**

**Credits: 4**

**Subject code: FS22406**

**Objectives**

**Semester: IV**

**No. of lecture hours: 60**

B.Sc. Food Science, Nutrition and Dietetics

Syllabus for 2021-2024 batch



- To gain knowledge on principles, tools, sampling designs of research.
- To get information about various sampling methods and their advantages and disadvantages
- To learn about principles purpose and features of research design
- To know more about methods of data collection and different research tools and methods
- To attain knowledge on data and report writing

### Outcomes

**CO1:** Students will be able to understand the significance of research methodology in Home Science research.

**CO2:** Students will be able to understand the types of sampling and sampling designs.

**CO3:** Students will be able to learn the knowledge of principles and purpose of research designs.

**CO4:** Students will be able to know various research tools and methods of data collection.

**CO5:** Students will be able to provide knowledge on coding and classification of data.

### UNIT I

#### INTRODUCTION TO RESEARCH

**12Hrs**

- Research meaning and objective and Types- historical, descriptive, experimental, case study 4Hrs
- Significance of research and Measurement scales – nominal, ordinal, interval, ratio 3Hrs
- Variables – independent, dependent, intervening and Identification of a research problem 3Hrs
- Formulation of research questions, hypothesis and Objectives 2Hrs

### UNIT II

#### SAMPLING AND SAMPLING DESIGN

**12Hrs**

- Population and sample, Sampling types- probability sampling (simple random, systematic random sampling), purposive sampling, stratified sampling, cluster sampling- advantages and disadvantages. 4Hrs
- Sampling bias and error, selection of adequate sample size 2Hrs
- Census and sample survey, steps in sampling design 2Hrs
- Criteria of selecting a sample procedure and characteristics of a good sample design 4Hrs

### UNIT-III

#### RESEARCH DESIGNS

**12Hrs**

- Basic principles of research design 2Hrs
- Purposes of research design: fundamental, applied and action, exploratory and descriptive, experimental, ex-post facto, longitudinal



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and cross-sectional, co-relational.	4Hrs
● Features of a good research design and true experimental design	4Hrs
● Quasi experimental design	2Hrs
<b>UNIT-IV</b>	
<b>RESEARCH TOOLS AND METHODS OF DATA COLLECTION</b>	<b>12Hrs</b>
● Quantitative research tools- mean, median and mode	2Hrs
● Qualitative research tools- focus group discussions, case studies, observations- direct and spot observations, in-depth interview	4Hrs
● Methods of data collection- observation, questionnaire- guidelines for constructing questionnaire, interview- guidelines for successful interview, scaling method, case study, home visits, advantages and disadvantages.	4Hrs
● Reliability and validity of measuring instruments	2Hrs
<b>UNIT-V</b>	
<b>ANALYSIS AND REPORT WRITING</b>	<b>12Hrs</b>
● Coding of data	3Hrs
● Classification and tabulation of data	3Hrs
● Diagrammatic representation of data	3Hrs
● Analysis and interpretation of data; preparation of data	3Hrs
<b>REFERENCES</b>	
1. Edwards: experimental design in psychological research	
2. Kerlinger: foundation of educational research	
3. Bhandarkar P. L. and Wilkinson T.S. (2000), Methodology and techniques of research, Himalaya publishing house, Mumbai.	
4. Bhatnagar G.L. (1900), Research methods and measurements in behavioral and social science, Agri Cole publishing agency, New Delhi.	

### **FOOD PRESERVATION PRACTICALS**

**Credits: 1**  
**Subject code: FS22407**

**Semester: IV**  
**No. of Lecture hours: 30**



### Objectives

- To teach the students basics of food preservation

### Outcome:

- The students will gain knowledge on the latest developments in food preservation

### Preparation of Various Food Products for Preservation

1. Preparation of Lemon squash	2
2. Preparation of Orange squash	2
3. Preparation of Papaya and apple jam	3
4. Preparation of guava jelly	2
5. Preparation of Orange marmalade	2
6. Preparation of Mixed vegetable pickle	2
7. Preparation of Lemon and green chilli pickle	3
8. Preparation of Tomato ketchup	2
9. Other processing methods for food preservation a. Freezing of fruits and vegetables	
a. Drying of vegetables	4
b. Reconstitution of dried vegetables	4
10. Visit to fruit and vegetable preservation Industry	2

### REFERENCES

1.Kulshrestha SK (1994). Food preservation. Published by Vikas Publishing House Pvt Ltd, New Delhi

### DIET THERAPY PRACTICALS

**Credits: 1**

B.Sc. Food Science, Nutrition and Dietetics

**Semester: IV**

Syllabus for 2021-2024 batch



**Subject code: FS22408**

**No. of Lecture hours: 30**

**Objectives**

- To teach the students basics principles of diet therapy

**Outcome:**

- The students will gain knowledge on the planning and calculating diets of various diseases.

1. Planning, Calculation and Preparation of Diets for

- |                       |   |
|-----------------------|---|
| ● Typhoid             | 3 |
| ● Tuberculosis        | 3 |
| ● Cancer              | 4 |
| ● AIDS                | 4 |
| ● Arthritis           | 4 |
| ● Gout                | 3 |
| ● Preoperative diet   | 3 |
| ● post operative diet | 3 |
| ● Burns               | 3 |

**REFERENCES**

1. Zaloga, G.P. (1994): Nutrition in Critical Care, Times Mirror/Mosby.
2. Shils, M.E., Olson, J.A., Shike, M. and Ross, A.C. (Ed) (1999): Modern Nutrition in Health and Disease. 9th Edition, Williams and Wilkins.
3. Shikora, S.A. and Blackburn, G.L. (Ed) (1999). Nutritional Support – Theory and Therapeutics, Chapman and Hall, ITP (International Thomson Publishing).
4. Mahan, L.K. and Escott – Stump, S. (2000): Krause’s Food Nutrition and Diet Therapy, 10th Ed. W.B. Saunders Ltd.
5. Phillips, G.D. and Lodgers C.L. (1986). Parenteral and Enteral Nutrition. A Practical Guide. Churchill Livingstone.
- Kinney, J.M. and Borum, P. R. (editors) (1989) Perspectives in Clinical Nutrition. Urban and Schwarzenberg.
7. Torosian, M. H. (editor) (1995) Nutrition for the Hospitalised Patient. Basic Science & Principles of Practice.

**ADVANCED NUTRITION PRACTICALS**

**Credits: 1**

**Subject code: FS22409**

**Semester: IV**

**No. of Lecture hours: 30**

**Objectives**

B.Sc. Food Science, Nutrition and Dietetics

Syllabus for 2021-2024 batch



- To teach the students important principles of advanced nutrition

**Outcome:**

- The students will gain knowledge on the estimating BMR, body composition, energy requirements, etc.

1. Estimation of Body composition using bioelectrical Impedance 8
  - a) Adolescent girls
  - b) Adolescent boys
  - c) Adult man
  - d) Adult Woman
2. Estimation of BMR using bioelectrical Impedance 8
  - a) Adolescent girls
  - b) Adolescent boys
  - c) Adult man
  - d) Adult Woman
3. Estimation of energy Requirements for: (based on factorial approach) 8
  - a) Adolescent girls
  - b) Adolescent boys
  - c) Adult man
  - d) Adult Woman
4. Sources of Antioxidants and estimation of beta carotene and vit-c among various foods using titrimetric. 6

**REFERENCES**

1. Zaloga, G.P. (1994): Nutrition in Critical Care, Times Mirror/Mosby.
2. Shils, M.E., Olson, J.A., Shike, M. and Ross, A.C. (Ed) (1999): Modern Nutrition in Health and Disease. 9th Edition, Williams and Wilkins.
3. Shikora, S.A. and Blackburn, G.L. (Ed) (1999). Nutritional Support – Theory and Therapeutics, Chapman and Hall, ITP (International Thomson Publishing).



**YEAR-WISE AND SEMESTER-WISE DISTRIBUTION OF SUBJECTS  
B.Sc. FOOD SCIENCE, NUTRITION AND DIETITICS  
FIFTH SEMESTER  
ACADEMIC YEAR 2023-24 BATCH 2021-24 (CBCS)**



S. No	Part	Subject Code	Title of the Subject	Hours /Week	Duration of Exam (hrs)	Marks			Credits
						Internal	External	Total	
1	I	FS21501	Food Service Management (GE-5)	3	3	40	60	100	3
2	I	FS21502	Sports Nutrition (SEC-III)	4	3	40	60	100	4
3	II	FS21503	Food hygiene and Sanitation (Core-14)	4	3	40	60	100	4
4	II	FS12504	Medical Nutrition therapy (Core-15)	4	3	40	60	100	4
5	II	FS21505 A / FS21505 B	Quantity food service and production (DSE - 1) Food Product Development and Entrepreneurship (DSE - 1)	4	3	40	60	100	4
6	II	FS21506 A / FS21506 B	Maternal and Child Nutrition (DSE-2) / Geriatric Nutrition (DSE-2)	4	3	40	60	100	4
<b>PRACTICALS</b>									
7	II	FS21507	Sports Nutrition (SEC-III)	2	3	40	60	100	1
8	II	FS21508	Food hygiene and Sanitation (Core-16)	2	3	40	60	100	1
9	II	FS21509	Medical Nutrition therapy (Core-17)	2	3	40	60	100	1
<b>TOTAL</b>				29	-	360	540	900	26

\* Skill Enhancement Course (SEC) \*Generic Elective (GE)\* Discipline-Specific (DS)

\*Discipline-Specific Elective (DSE)

### FOOD SERVICE MANAGEMENT (GE)



**Credits: 4**

**Semesters: V**

**Subject code: FS23501**

**No. of lecture hours: 60**

**Objectives**

- To gain knowledge of the types of food services institutions in India
- To get familiarized with the principles and tools of management.
- To acquire details pertaining to organization of space and equipments of food services.
- To understand the quality and purchasing of food.
- To gain knowledge pertaining to formulation and standardization of recipes.

**Outcomes**

**CO1:** The students will be able to be identifying different types of menus, food service institutes.

**CO2:** Students will be able to learn about functions & tools of management, catering principles of catering management of & resources.

**CO3:** Students will be able to understand the importance. Kitchen designs, types of storage and equipment Selection.

**CO4:** Students will be to evaluate the characteristics and quality of food.

**CO5:** Students will be able to appraise the labelling of food product and evaluate the various steps involved in formal and standardization of recipes.

**UNIT I**

**FOOD SERVICE INSTITUTIONS**

**12Hrs**

- Classification of food service institutions according to function:  
Profit oriented, service oriented and public health facility oriented. 3Hrs
- Types of menus- Al a carte, table d'hôte, cyclic and combination; Types of food service - Self-service, tray service and waiter-waitress service. 3Hrs
- Management of personnel in food services organization- Recruitment, Induction, Employee facilities and benefits, Evaluation of performance. 3Hrs
- Methods of food purchasing; Food cost – components and behaviour Of cost, factors affecting cost. 3Hrs

**UNIT II**

**MANAGEMENT OF FOOD SERVICE ESTABLISHMENTS**

**12Hrs**

- Function of management: Managing, Planning, Organizing, Directing, Coordinating, Controlling and Evaluating 4Hrs
- Catering Management – Principles (basic guidelines) 3Hrs
- Tools of management – Tangible Tools and Intangible tools 3Hrs
- Management of resources – Natural environment, Work environment 2Hrs

**UNIT III**

**ORGANISATION OF SPACE AND EQUIPMENT IN FOOD SERVICES ESTABLISHMENT**

**12Hrs**



- Planning a layout for food service institutions, features to be considered in kitchen designing Kitchens. 3Hrs
- Storage Space – Types of storage. 1Hr
- Factors to be considered while planning, Service Area – Location. Structural designing and planning storage spaces Equipment–Classification of equipment. 4Hrs
- Selection of equipment, Factors involved in selection of equipments, care and maintenance of equipment. 4Hrs

#### UNIT IV

##### FOOD PURCHASE AND STORAGE

12Hrs

- Characteristics of food – Types of food 2Hrs
- Quality of food –Sensory quality and nutritional quality 2Hrs
- Food purchasing – Importance, Types – open market, formal, negotiated and wholesale. 4Hrs
- Receiving and Food storage – Delivery methods, General guidelines for storing perishable and non-perishable foods. 4Hrs

#### UNIT V

##### STANDARDISATION OF FOOD AND PATENT REGULATIONS

12Hrs

- Formulation and standardization of recipes. 2Hrs
- Steps involved in formulation and standardization of recipes, Significance of food standardization. 4Hrs
- Patent laws- Definition, Evolution of IPR Patent rights in India. 2Hrs
- Food product labelling - purpose and types, Food product labelling regulations. 4Hrs

#### REFERENCES

1. Catering Management – An Integrated Approach – MohiniSethi, SurjeetMalhan, 2nd edition, New Age International Publishers.
2. Food Hygiene and Sanitation – S Roday, Tata McGraw Hill Publishing Co. Ltd., 3rd reprint.
3. Institutional Food Management –Mohini Sethi

### SPORTS NUTRITION (SEC)



**Credits: 4**  
**Subject code: FS23502**

**Semester: V**  
**No. of lecture hours: 60**

### Objectives

- To understand the concept of sports nutrition
- To gain knowledge on the effects of exercise
- To get familiarized with the dietary intake and optimal exercise performance
- To acquire knowledge about sports specific nutrient requirement
- To procure information on challenges among athletes

### Outcomes

**CO1:** The students will be able to learn about physical activity exercise and sports

**CO2:** The students will be able to understand the sports physiology, type's exercises and its impact.

**CO3:** The students will be able to identify the nutritional requirement of sports person and fluid balance

**CO4:** The students will be able to acquire knowledge about special nutrition for female athletes

**CO5:** The students will be able to study about chronic diseases and alcohol effect on athletes

### UNIT I

#### CONCEPTS OF SPORTS NUTRITION

**12Hrs**

- Introduction to physical activity, exercise and sports. 4Hrs
- The paradigm- physical activity and health. 4Hrs
- Physical activity pyramid. 2Hrs
- Bioenergetics in exercise. 2Hrs

### UNIT II

#### EFFECTS OF EXERCISE

**12Hrs**

- Sports physiology, types of exercises and its impact on fitness, effect of exercise on musculo skeletal system, muscle fatigue- prevention and recovery. 4Hrs
- Effect of exercise on cardiac cycle, cardiac output, blood pressure, athlete heart, index of training, importance of heart rate monitoring. 4Hrs
- Effect of exercise on respiratory system, hypoxia and hypercapnia. 2Hrs
- Effect of training on heart and lung performance, chronic and acute adaptation. 2Hrs

### UNIT III

#### DIETARY INTAKE AND OPTIMAL EXERCISE PERFORMANCE

**12Hrs**

- Nutritional requirement of sports person as compared to normal active person, factors affecting fuel utilization. 4Hrs



- Carbohydrate as a energy source for sports and exercise, role of fat as energy source for sports and exercise. 4Hrs
- Protein and amino acid requirements for sports and exercise, important micronutrients for exercise, B complex vitamin, specific minerals and antioxidants. 4Hrs
- Fluid balance in sports: importance, symptoms and prevention of dehydration, sports drink – hypo, iso and hypertonic drink for hydration/energy and recovery drink. 4Hrs

#### UNIT-IV

##### SPORT SPECIFIC NUTRIENT REQUIREMENT

12Hrs

- Sport specific requirements of nutrients for athletes. 3Hrs
- Pre- game and post game regime. 3Hrs
- Special nutrition for female athlete, role of nutrition in stress, fracture and injury. 3Hrs
- Nutrition education to athlete and coach. 3Hrs

#### UNIT-V

##### CHALLENGES AMONG ATHLETES

12Hrs

- Menstrual problem of female athlete, athlete triad and Chronic dieting and eating disorder- sports anemia. 4Hrs
- Nutrition of athlete in hot, cold and high altitude. 3Hrs
- Alcohol influence on athlete 2Hrs
- Doping test 3Hrs

#### REFERENCES

1. Bamji S.M., Rao NP and Reddy V. 1998. Text book of Human Nutrition. Oxford and IBH publishing C. New delhi.
2. Fink H.H., Mikesky E.A and Burgoon A.L. 2012. Practical Applications in sports Nutrition. 3rd ed. Jones and Barlett Learning. USA.
3. Burke Louse and Deakin Vicky (2006) Clinical sports Nutrition.
4. Ira Wolinsky (Ed) (1998): Nutrition in Exercise and Spots, 3<sup>rd</sup> Edition, CRC Press.
5. Nutritional guidelines for sports persons, Geetanjali Bhide and Subhadra Mandalika

### FOOD HYGIENE AND SANITATION (CORE)

Credits: 4

Semester: V

B.Sc. Food Science, Nutrition and Dietetics

Syllabus for 2021-2024 batch



Subject code: FS23503

No. of lecture hours: 60

### Objectives

- To get familiarized with Food Safety and Quality
- To gain knowledge on Indian and International food safety regulations
- To procure information on hygiene and food safety practices
- To acquire knowledge on water and waste management
- To understand the concept of waste disposal

### Outcomes

- CO1:** The students will be able to gain knowledge about food spoilage and food borne diseases  
**CO2:** The students will be able to differentiate food safety regulation and international standards  
**CO3:** The students will be able to understand faults in food preparation  
**CO4:** The students will be able to know the concept of purification of water  
**CO5:** The students will be able to identify different types of disposal wastes

### UNIT I

#### FOOD SAFETY AND QUALITY

12Hrs

- Sources of food spoilage. 3Hrs
- Signs of food spoilage in various foods. 3Hrs
- Food borne infections: incubation period, symptoms, Mode of transmission, control of food borne illnesses. 3Hrs
- Food borne poisoning: incubation period, symptoms, Mode of transmission, control of food borne illnesses.

### UNIT II

#### INDIAN AND INTERNATIONAL FOOD SAFETY REGULATIONS

12Hrs

- Food safety regulations: Prevention of food adulteration Act, Essential Commodities Act, BIS, AGMARK, Standards of weights and measures Act, Export quality control inspection Act, Consumer Protection Act, certification marks, Food Safety Standard Authority In India. 4Hrs
- International Standards: WTO, CODEX ALIMENTARIUS, HACCP. 2Hrs
- Food testing laboratories in India: Municipal labs, FDA labs, central food testing labs, labs of export inspections council, central grain analysis lab, quality control labs of companies, Quality control labs of consumer co – operatives and private testing labs. 4Hrs
- Rights of food inspectors. 2Hrs

### UNIT III

#### HYGIENE AND SAFETY PRACTICES IN FOOD SERVICE INSTITUTIONS

12Hrs

- Definition of hygiene, food hygiene and sanitation, Basic aspects of personal hygiene, Hygienic Food Handling- Procedures to minimize



microbial load, common faults in food preparation.	4Hrs
● Layout and premises- Ventilation and lighting of premises, General guidelines of cleaning equipment and preparation area.	4Hrs
● Importance of pest control in Food Service Institutions- Control of household pest with special reference to---Mosquito, Housefly, Rats and rodents, cockroaches.	4Hrs
● Sanitation training and education, Steps in planning and implementing training programme, Types of accidents at workplace, accidents and their effects, Safety instructions to kitchen staff.	4Hrs
<b>UNIT IV</b>	
<b>WATER MANAGEMENT</b>	<b>12Hrs</b>
● Uses and sources of water.	3Hrs
● Causes and Prevention of water pollution.	3Hrs
● Large scale purification of water and Small scale purification of water.	3Hrs
● Chlorination and methods of chlorination.	3Hrs
<b>UNIT V</b>	
<b>WASTE MANAGEMENT</b>	<b>12Hrs</b>
● Disposal of solid waste.	3Hrs
● Disposal of liquid waste or sewage.	3Hrs
● Disposal of gaseous waste.	3Hrs
● Causes and Prevention of air pollution, soil pollution- pollution by pesticide residue.	3Hrs

## REFERENCES

1. S. Roday 2005 Food Hygiene and Sanitation in Food Industry 7th Edition Published by Tata McGraw Hill Publishing Company New Delhi .
2. Shubhangini A.Joshi.2015 Nutrition and Dietetics 4th Edition Published by McGraw Hill Education (India)Private Limited

## MEDICAL NUTRITION THERAPY (CORE)

**Credits: 4**

**Subject code: FS23504**

**Semester: V**

**No. of lecture hours: 60**



### Objectives:

- To prepare students for understanding the management of various disease conditions
- To make student aware of various nutritional goals and methods of assessments
- To understand the role of diets in various medical conditions
- To gain knowledge about pediatric critical care
- To know the types of care given in critical or terminally ill conditions

### Outcomes

**CO1:** Students will be able to understand about nutritional screening and nutritional assessment

**CO2:** Students will acquire knowledge on planning of diets for various medical conditions.

**CO3:** Students will be able to identify special nutritional requirements, nutritional goals.

**CO4:** Students will get knowledge about critical illnesses and their management

**CO5:** Students will learn about pediatric critical care and their RDAs

### UNIT 1

#### **NUTRITIONAL SCREENING OF CRITICALLY ILL PATIENT** **12Hrs**

- Importance of Nutrition for critically ill patient. 1Hrs
- Role and methods of nutritional assessment: History and physical examination – Physical findings in nutritional deficiencies and Subjective Global Assessment in brief, Prognostic Indices – Valid markers or indices, Instant Nutritional Assessment, Prognostic Nutrition Index, Index of Under nutrition and Hospital Prognostic Index 3Hrs
- Role and methods of nutritional assessment: Laboratory tests – Visceral Protein (albumin), Nitrogen Excretion (Creatinine and Height Index), Catabolic Index, nitrogen balance. Body composition – Body Mass Index, Anthropometry, Arm Muscle Measurement, Chemical analysis- Total Body Weight, Total Body Potassium. 4Hrs
- Role and methods of nutritional assessment: Functional tests- Immune response, Muscle strength, Metabolic cart– Estimation of protein and energy needs, Basal Energy Expenditure, Harris-Benedict Equation. Monitoring therapy and Nutritional goals. 4Hrs

### UNIT II

#### **PEDIATRIC CRITICAL CARE** **12Hrs**

- Recommended Dietary Allowances for premature babies. 2Hrs
- Assessment of nutritional status and requirements of hospitalized children. 2Hrs
- Nutrition for SAM, Nutritional Care in Diarrhoeal diseases – path physiological changes, dietary management in acute and persistent diarrhea, need of Vitamin A and Zinc supplementation. 4Hrs
- Nutritional Care in Respiratory diseases, Hepatic diseases, Diabetes, Heart diseases and Pancreatitis. 4Hrs



**UNIT III**  
**MEDICAL NUTRITION THERAPY IN CRITICAL**  
**ILLNESSES AND ETHICAL CARE IN TERMINALLY ILL PATIENTS**

**12Hrs**

- Path physiological, clinical and metabolic aspects, understanding of the special nutritional requirements, nutritional goals, rehabilitation and monitoring the therapy in critical illnesses like Diabetes Mellitus, Heart failure, Cardiac surgery and transplant. 2Hrs
- Path physiological, clinical and metabolic aspects, understanding of the special nutritional requirements, nutritional goals, rehabilitation and monitoring the therapy in critical illnesses like Respiratory failure and Neurosurgery – head injury, spinal cord injury 2Hrs
- Path physiological, clinical and metabolic aspects, understanding of the special nutritional requirements, nutritional goals, rehabilitation and monitoring the therapy in critical illnesses like Diarrhoea – causes of diarrhoea in the critically ill patients, Causes of malnutrition in hospitalized older persons and Wound healing – nutrients involved in wound healing 2Hrs
- Ethical issues, application of ethical principles to artificial nutritional support. 6Hrs

**UNIT-IV**

**CRITICAL GI DISEASES**

**12Hrs**

- Pathophysiological, clinical and metabolic aspects, understanding of the special nutritional requirements, nutritional goals, rehabilitation and monitoring the therapy in critical illnesses like Gastro Intestinal tract surgery, Gastro-Esophageal Reflux, Gastrointestinal strictures and obstruction, intestinal surgery, rectal Surgery. 3Hrs
- Pathophysiological, clinical and metabolic aspects, understanding of the special nutritional requirements, nutritional goals, rehabilitation and monitoring the therapy in critical illnesses like Hepatic failure, liver transplantation, pre and post liver transplant Nutrition. 3Hrs
- Pathophysiological, clinical and metabolic aspects, understanding of the special nutritional requirements, nutritional goals, rehabilitation and monitoring the therapy in critical illnesses like Pancreatitis – Pancreatic Surgery. 3Hrs
- Pathophysiological, clinical and metabolic aspects, understanding of the special nutritional requirements, nutritional goals, rehabilitation and monitoring the therapy in critical illnesses like End - Stage Renal Disease, dialysis and transplant. 3Hrs



**UNIT-V**

**OTHER CRITICAL ILLNESSES**

**12Hrs**

- Cancer – Breast Cancer, Colon Cancer. 3Hrs
- Acquired Immune Deficiency Syndrome. 3Hrs
- Stress and Trauma, Sepsis. 3Hrs
- Multiple Organ Failure. 3Hrs

**REFERENCES**

1. Zaloga G.P (1994) nutrition in critical care, times mirror/mosby.
2. Mahan I.k and Escott – stump, S (2000) Krause's Food nutrition and Diet therapy, 10<sup>th</sup> edition, W. B Saunders ltd.
3. Charlette R, Gallagher- Allied.(2005).Nutrition care of the terminally ill.
4. KE Elizabeth (2007) Nutrition and Child Development, Paras Medical Publishers.
5. Michael J Gibney, Maris Elia, Olle Ljungquist and Julie Dowsett (2005) Blackwell Publishing Company.
6. Shils, M.E., Olsen J.A, Shike M and Ross A.C (1999) Modern Nutrition in Health and Disease, 9<sup>th</sup> edition, Baltimore, Lippincott Willams and Wilkins publishers.

**QUANTITY FOOD PRODUCTION AND SERVICE (DSE-1)**



**Credits: 4**

**Subject code: FS23505 (A)**

**Semester: V**

**No. of lecture hours: 60**

### **Objectives**

- To gain Knowledge about Food processing, types and equipment.
- To understand menu selection and safety measurements in production.
- To gain knowledge about principles involved in purchasing and marketing.
- To understand uses of storage methods and importance of food service.
- To gain knowledge about management of finance in production.

### **Outcomes**

**CO1:** The students will be able to identify different equipment and types of industries.

**CO2:** The students will be able to learn selection of menus and production management.

**CO3:** The students will be able to understand the principles in purchasing, storage and Marketing.

**CO4:** The students will be able to identify storage methods and food service system.

**CO5:** The students will be able to manage financial resources.

### **UNIT I**

#### **QUANTITY FOOD PRODUCTION**

**12Hrs**

- General procedures used in institutional and commercial food production. 3Hrs
- Flow chart of processes of food production. 3Hrs
- Types of equipments – cooking and non- cooking equipments. 3Hrs
- Types of industrial, welfare and transport catering. 3Hrs

### **UNIT II**

#### **FOOD PRODUCTION SYSTEM MANAGEMENT**

**12Hrs**

- Selection of menus and ingredient control. 3Hrs
- Production forecasting. 3Hrs
- Production scheduling and Production control. 3Hrs
- Safeguard in food production. 3Hrs

### **UNIT III**

B.Sc. Food Science, Nutrition and Dietetics

Syllabus for 2021-2024 batch



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**FOOD PRODUCTION PRINCIPLES** **12Hrs**

- Principles, purchase and storage in traditional, commissary, ready prepared and assembly services. 3Hrs
- Schematic representation of purchasing activity, the market and the buyer, the vendor or the supplier. 3Hrs
- Mode of purchasing: centralized and group. 3Hrs
- Methods of purchasing- informal/ open market buying, formal/ competitive big buying and other types of purchasing. 3Hrs

**UNIT-IV**

**STORAGE AND FOOD SERVICE** **12Hrs**

- Storage- storage space: dry and low temperature, storage room management- organization of storage and store room records. 3Hrs
- Delivery and service of foods- goals and issues; components of food service systems. 3Hrs
- Significance of food service systems. 2Hrs
- Methods of delivery/service- centralized and de—centralized, types of services- table/ counter, tray and self. 4Hrs

**UNIT V**

**FINANCIAL MANAGEMENT** **12Hrs**

- Cost concepts. 3Hrs
- Food cost control. 3Hrs
- Book keeping. 3Hrs
- Books of account. 3Hrs

**REFERENCES**

1. Catering Management – An Integrated Approach – MohiniSethi, SurjeetMalhan, 2nd edition, New Age International Publishers.
2. Food Hygiene and Sanitation – S Roday, Tata McGraw Hill Publishing Co. Ltd., 3rd reprint.
3. Institutional Food Management –Mohini Sethi

**FOOD PRODUCT DEVELOPMENT AND ENTREPRENEURSHIP (DSE-1)**



**Credits: 4**  
**Subject code: FS23505 (B)**

**Semester: V**  
**No. of lecture hours: 60**

### Objectives

- To gain knowledge of new food product development.
- To understand precautions to be taken in product development.
- To get familiarize about labelling of the product.
- To gain knowledge about marketing strategies.
- To gain knowledge of implementing new ideas in the form of Small business.

### Outcomes

**CO1:** The students will be able to develop a new food product.

**CO2:** The students will be able to identify the actions which are important in new product Development.

**CO3:** The students will be able to understand the labelling information.

**CO4:** The students will be able to understand the marketing and promoting strategies.

**CO5:** The students will be able to implement new ideas in the form of small business.

### UNIT I

#### NEW PRODUCT DEVELOPMENT

**12Hrs**

- Introduction to product development. 3Hrs
- Product life cycle. 3Hrs
- Factors affecting development of new product. 3Hrs
- Process of new product development. 3Hrs

### UNIT II

#### STEPS IN NEW PRODUCT DEVELOPMENT

**12Hrs**

- Basic principles and concepts of food product development. 3Hrs
- Standardization methods involved in product development. 3Hrs
- Portion size and portion control, calculation of nutritive value and cost of production. 3Hrs
- Shelf life and storage stability evaluation procedure of developed food products. 3Hrs

### UNIT III

#### PRODUCT LABELLING

**12Hrs**

- Product labeling: purposes, types and regulations. 2Hrs



- Nutrition labeling. 2Hrs
- Grading of foods, specifications of grading of rice, wheat and eggs. 4Hrs
- Emblems and names (prevention of improper use) Act, 1950. 4Hrs

#### UNIT IV

##### FOOD MARKETING

12Hrs

- Marketing characteristics- packaging, price, advertisements, distribution and regulations. 4Hrs
- Food marketing ethics. 2Hrs
- Challenges of marketing. 2Hrs
- Role of government in promoting agricultural marketing. 4Hrs

#### UNIT V

##### ENTREPRENEURSHIP

12Hrs

- Concept and definition of entrepreneurship, determinants of entrepreneurship. 3Hrs
- Dimensions of entrepreneurship- rural, social, women and cultural. 3Hrs
- Small business: definition and composition of small business- economic contribution of small business. 3Hrs
- Strategic planning for small business- steps in strategic planning. 3Hrs

#### REFERENCES

1. Orientation for Food Professionals, A Hand book – P V Suryaprakasa Rao.
2. Indian Patents Law - Legal and Business Implications, Eds Ajith Parulekar, Saritha D'Souza.
3. The law of Intellectual Property Rights – Ed Shiv Sahai Singh.

### MATERNAL AND CHILD NUTRITION (DSE-2)

**Credits: 4**

**Subject code: FS23506 (A)**

B.Sc. Food Science, Nutrition and Dietetics

**Semester: V**

**No. of lecture hours: 60**

Syllabus for 2021-2024 batch



### Objectives

- To Train students to understand various medical conditions and their management
- To provide knowledge on important aspects of maternal health
- To make students aware of the types of feedings, and role of mammary tissues and hormones
- To understand the physiology growth and development during infancy
- To provide information about various health care systems
- To know the importance of breast feeding

### Outcomes

- CO1:** Students will perceive the concepts about maternal nutrition care and in detail about Pregnancy
- CO2:** Students will validate the role of food requirements and nutritional care during lactation, infancy, adolescent stages
- CO3:** Students will learn about the physiology and endocrinology of different medical conditions
- CO4:** Students will get to know about different types of health care programs
- CO5:** Students will gain knowledge about different feeding methods

### UNIT I

#### IMPORTANCE OF MATERNAL NUTRITION

12Hrs

- Meaning and objectives of maternal and child health. 2Hrs
- Main health problems of mother and child in India. 2Hrs
- Current scenario of maternal and child nutrition in India. Vital statistics related with mother and child. 4Hrs
- Management and importance of ante natal care, Complications of pregnancy. 4Hrs

### UNIT II

#### LACTATION

12Hrs

- Development of mammary tissues and role of hormones, Physiology and endocrinology of lactation. 3Hrs
- Composition of human milk, Lactation amenorrhea and effects of breast feeding on maternal health. 3Hrs
- Effect of nutritional status of mother on quantity and quality of breast milk. 3Hrs
- Recent guidelines in infant feeding and complimentary feeding, Factors affecting breast feeding and Breast feeding vs. Bottle feeding. 3Hrs

### UNIT III

#### INFANCY

12Hrs

- Infant physiology, Growth and development during infancy. 3Hrs



- Immunization schedule, Nutritional requirements of infants. 3Hrs
- Food requirements and modification of foods for infants. 3Hrs
- Weaning and principles in preparing complementary food supplements. 3Hrs

#### UNIT IV

##### PRE SCHOOL CHILDREN

12Hrs

- Growth and development of children, Growth Chart. 3Hrs
- Nutritional requirement of Preschool and school going children. 3Hrs
- Nutritional challenges and nutrition for child with special need. 3Hrs
- Childhood Obesity. 3Hrs

#### UNIT IV

##### ADOLESCENCE

12Hrs

- Nutritional requirement during adolescence, Adolescence pregnancy, weight control, anorexia nervosa. 2Hrs
- Influence of life style on eating pattern during adolescence, Maternal and child health Programs in India. 3Hrs
- ANP 5Hrs
  - Supplementary Feeding Programs
  - Special Nutrition Programs
  - Balwadi Nutrition Programs
  - Mid-day Meal Programs
  - Prophylactic doses (vitamin A and iron)
  - ICDS
- The world Breast Feeding Week and the role of BPNI in promotion of breast feeding in India. 2Hrs

##### REFERENCES:

1. Park, K, (2000): Park's Textbook of preventive and social medicine 18<sup>th</sup> edition.
2. Modern Nutrition In health & Disease –Eds A Catherine Ross, Benjamin Cabellaro, Robert j. Cousins, Katherine L. Tucker, Thomas R. Zeegler, 11<sup>th</sup> edition, Williams & Wilkins Publicatio
3. Food Nutrition And Diet Therapy –Kathelene Mahan & Krause, SlviaEscott Stump.
4. Bamji MS, Rao NP & Reddy V.1999.Text book of Human Nutrition. Oxford & IBH



## GERIATRIC NUTRITION (DSE-2)

**Credits: 4**

**Subject code: FS18506 (B)**

**Semester: V**

**No. of lecture hours: 60**

### Objectives

- To gain knowledge about the aging process and mechanism
- To understanding problems / challenges faced by geriatrics
- To complete study regarding geriatrics food / nutrient requirement
- To understand their pattern of life / life pattern
- To learning how geriatric services function

### Outcomes

**CO1:** Students get to understand the life pattern of a geriatric

**CO2:** Students get to prepare diets by understanding the requirement of the aged person

**CO3:** Students will understand about the challenges faced by geriatric

**CO4:** Students will be able to help/ volunteer in geriatric care services

**CO5:** Students will understand a lot more about geriatrics and their activities

### UNIT I

#### INTRODUCTION TO AGEING

**12Hrs**

- Introduction to geriatric care- concept of gerontology, Ageing - Biology of ageing. 4Hrs
- Interaction between biological and psychological aspects in ageing, Interaction between physiological and social processes in ageing. 4Hrs
- Dietetics of Geriatric care-Nutritional requirement. 2Hrs
- Food requirement, dietary modification. 2Hrs

#### UNIT II: ISSUES AND CHALLENGES OF AGEING

**12Hrs**

- Issues and challenges of ageing – economic dependence/ poverty, elderly in rural/ urban area. 3Hrs
- Abuse, neglect, abandonment, physical, health and sensory problems. 3Hrs
- Crime against elderly, retirement and related issues. 3Hrs
- Ageing sensory system and issues with falling, common complaints during ageing. 3Hrs

#### UNIT III: CLINICAL GERIATRIC

**12Hrs**

- Nutritional related problems of old age-osteoporosis ,obesity, neurological Dysfunction. 3Hrs
- Anaemia, Malnutrition and constipation, Infection and Immunity. 3Hrs
- Degenerative disorders in elderly-Dementia, Alzheimer, Parkinson's disease. 3Hrs
- Disorders of upper GIT, lower GIT, Liver, Billiary system and pancreas, Infection of Respiratory system and Coronary heart disease. 3Hrs



**UNIT IV: SOCIAL GERIATRIC**

**12Hrs**

- Types of family – Joint family System, Role of Elders and Younger generation. 3Hrs
- Isolation, Loneliness and Dependency – Dependency Ratio – Generational equality. 3Hrs
- Financial aspects – Sources of income, Old age pension. 2Hrs
- Role of Govt. and NGOs in Socio – economic status of the elderly, Geriatric service for the elderly in western countries and India. 4Hrs

**UNIT-V**

**GERIATRIC SERVICES**

**12Hrs**

- Structure of geriatric service, family as basic unit- models of geriatric service. 3Hrs
- Day hospital, day care centre, long stay care institution. 3Hrs
- Home for the aged, function of the day hospital staff and patients of day hospital. 3Hrs
- Ethical issues in geriatric medicine- age limits on health care, Life sustaining measures. 3Hrs

**REFERENCES**

1. Bali ,P.A(2001) care of the Elderly in India. Changing configurations, Indian Institute of Advanced study, Shimla
2. Bhai, L.T,(2002) Ageing on Indian perspective, Decent Books Pubs, New Delhi
3. Dietetics 5<sup>th</sup> edition by B.Srilakshmi
4. Singh. R. (1994) Educational and Vocational Guidance, Common Wealth pub, New Delhi



## SPORTS NUTRITION PRACTICALS

**Credits: 2**

**Subject code: FS23507**

**Semester: V**

**No. of lecture hours: 30**

### Objective

- To learn and get familiarized with nutritional assessment of athletes.

### Outcomes

- Students will be able to identify the nutritional requirement of sports person and fluid balance.

1. Menu planning for athletes in pre competition phase.
2. Menu planning for athletes in competition recovery phase.
3. Menu planning for athletes in recovery phase.
4. Development of nutritious bars for athletes.
5. Formulation of isotonic, hypotonic and hypertonic beverages for athletes.
6. Methods of measuring dietary recalls: food diary, weighed food record, 24 hr recall.
7. Measuring height, body mass, MUAC and girths.
8. Measuring body composition using various techniques: skin fold technique, DEXA and in body
9. Measuring body composition using various techniques: BOD, POD.
10. Interpretation of nutritional status and dietary counseling for athletes

### REFERENCES

1. Burke Louse and DeakinVicky(2006) Clinical sports Nutrition.
2. Ira Wolinsky(Ed)(1998): Nutrition in Exercise and Spots,3<sup>rd</sup> Edition,CRC Press.
3. Nutritional guidelines for sports persons, Geetanjali Bhide and Subhadra Mandalika



## FOOD HYGIENE AND SANITATION PRACTICALS

**Credits: 2**

**Subject code: FS23508**

**Semester: V**

**No. of lecture hours: 30**

### Objective

- To procure information on hygiene and food safety practices

### Outcomes

- Students will learn various techniques related to food hygiene and sanitation.

1. Development and pre testing of score card for evaluation of personal hygiene, hand washing and food service establishment. 3
2. Survey of scorecard with regard to personal hygiene. 3
3. Survey of scorecard with regard to hand washing. 3
4. Survey of scorecard with regard to food establishment hygiene. 3
5. Report on the survey conducted pertaining to personal hygiene, hand washing and food hygiene. 3
6. Purification of water using small scale techniques- boiling, filtration using alum, chlorination or use of chlorine tablets. 3
7. Determination of hardness of water- temporary and permanent. 3
8. Separation and disposal of various wastes: wet (composting) and dry (burning) 3
9. Measurement of BOD in water 3
10. Development of personal training aids for food services. 3

### REFERENCES

1. S. Roday 2005 Food Hygiene and Sanitation in Food Industry 7th Edition Published by Tata McGraw Hill Publishing Company New Delhi .
2. Shubhangini A.Joshi.2015 Nutrition and Dietetics 4th Edition Published by McGraw Hill Education (India)Private Limited



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**MEDICAL NUTRITION THERAPY PRACTICALS**

**Credits: 2**  
**Subject code: FS23509**

**Semester: V**  
**No. of lecture hours: 30**

**Objective:**  
**Outcomes**

**I. Derive the RDA, plan and calculate a day's diet for the following conditions**

1. Child with juvenile jaundice diabetes (insulin based)
2. Child suffering from jaundice
3. Patient with T1DM with atherosclerosis
4. Patient with T1DM with dialysis
5. Malnourished adult who underwent cardiac surgery (CABG)
6. Hypertensive patient who underwent post liver transplant (recovery phase)
7. Patient with diabetes mellitus and pancreatitis
8. Patient suffering with AIDS and diarrhoea
9. Diet in colon cancer
10. Diet for a patient who underwent GI surgery.

**REFERENCES**

1. Zaloga G.P (1994) nutrition in critical care, times mirror/mosby.
2. Mahan I.k and Escott – stump, S (2000) Krause's Food nutrition and Diet therapy, 10<sup>th</sup> edition, W. B Saunders ltd.
3. Charlette R, Gallagher- Allied.(2005).Nutrition care of the terminally ill.
4. KE Elizabeth (2007) Nutrition and Child Development, Paras Medical Publishers.



**YEAR-WISE AND SEMESTER-WISE DISTRIBUTION OF SUBJECTS**  
**B.Sc. FOOD SCIENCE, NUTRITION AND DIETITICS**  
**SIXTH SEMESTER**  
**ACADEMIC YEAR 2023-24 BATCH 2021-24 (CBCS)**

S. No	Part	Subject Code	Title of the Subject	Hours /Week	Duration of Exam (hrs)	Marks			Credits
						Internal	External	Total	
1	I	FS21601 A / FS21601 B	Community Nutrition (DSE- 3) / Public Health Nutrition (DSE-3)	4	3	40	60	100	4
1	I	FS21602 A / FS21602 B	Diet Counseling and Patient Care / Nutrition communication and counselling	4	3	40	60	100	4
<b>PRACTICALS</b>									
1	II	FS21603	Project Work	21	-	40	60	100	6
Total				<b>29</b>	-	120	180	300	14



## COMMUNITY NUTRITION (DSE-3)

**Credits: 4**

**Subject code: FS23601 (A)**

**Semester: VI**

**No. of lecture hours: 60**

**Objectives:**

- To understand the causes / determinants and consequences of nutritional problems in community.
- To familiarize students with various approaches to nutrition and health interventions, programmes and policies.
- To gain the knowledge tools and technique of health education
- To understand the concept of malnutrition in India
- To gain knowledge about programmes to combat malnutrition

**Outcomes**

**CO1:** Students will be able to understand the concept of community nutrition

**CO2:** Students will acquire knowledge regarding the assessment of nutritional status

**CO3:** Students will be able to understand about nutrition education and health administration

**CO4:** Students will get knowledge on nutrition and health intervention

**CO5:** Students will learn about the difference between national and international organizations

### UNIT I

#### CONCEPTS OF COMMUNITY NUTRITION

**12Hrs**

- Definition and concepts of community, Vital statistics: Mortality, Morbidity, Nutrition policies, Health policies. 4Hrs
- Occupational hazards: Physical, chemical and Biological. 2Hrs
- Protection of health and nutritional status of workers: Women employees in industries and establishments, Medical measures. 4Hrs
- Infrastructure measures and legislation. 2Hrs

### UNIT II

#### ASSESSMENT OF NUTRITIONAL STATUS

**12Hrs**

**Anthropometry:**

- Weight, height, mid arm circumference, head and chest circumference, Skin fold thickness, BMI – uses and limitations, Weight / Height, Weight / Age, Height / Age – ICMR, NCHS standards, Gomez and Waterloo's Classification. 4Hrs

**Diet Surveys:**

- Individual, Institutional and National, Uses and limitations of diet surveys. 2Hrs
- Biochemical methods: uses and limitations, Clinical assessment: uses and Limitations. 2Hrs
- Biomarkers – Definition, Classification – Genetic and biochemical, Examples of biomarkers – RBC, folate, calcium, LDL receptors in CVD, vitamin A. 4Hrs

### UNIT III

B.Sc. Food Science, Nutrition and Dietetics

Syllabus for 2021-2024 batch



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**NUTRITION EDUCATION AND HEALTH ADMINISTRATION** **12Hrs**

- Importance of Nutrition and Health Education, Tools and techniques of health education: Audio aids, Visual aids, Audiovisual aids, advantages and disadvantages. 4Hrs
- Types of approaches: personal, group and mass, advantages and disadvantages. 2Hrs
- Responsibilities of nutritional counselor at community level. 2Hrs
- Health administration: Central level, State level, Village level, Primary Health Care. 4Hrs

**UNIT IV**

**NUTRITION AND HEALTH INTERVENTIONS** **12Hrs**

- Magnitude of malnutrition in India. 3Hrs
- Consequences of malnutrition in India. 3Hrs
- Nutritional problems in India: PEM, Anemia. 3Hrs
- Iodine Deficiency Disorder and Vitamin A Deficiency, Dental caries, Fluorosis. 3Hrs

**UNIT V**

**MEASURES TO COMBAT MALNUTRITION** **12Hrs**

- ICDS, IDDCP. 2Hrs
- Vitamin A Prophylaxis Programme, Anemia Prophylaxis Programme. 2Hrs
- Role of National organizations in combating malnutrition: ICMR, ICAR, NIN. 4Hrs
- Role of International organizations in combating malnutrition: CARE, UNICEF, WHO, FAO, ICRISAT. 4Hrs

**REFERENCES**

- Public Health Nutrition – Michale J. Gibney, Barrie M. Margetts, John M. Kearney and Lenore Arab (Eds.) – Nutrition Society Textbook Series, Blackwell Publishing.
- Nutritional Science – B. Sri Lakshmi, New Age International Publishers, 2nd edition.
- Text Book of Human Nutrition – Mahtab S Bamji, N PrahladRao, Vinodini Reddy, 2nd editon, Oxford & IBH Publishing Co. Pvt. Ltd.
- Social and Preventive Medicine – Part & Park.
- Goyet, Fish.V.Seaman,J and Geijer.U.(1978) The management of Nutrition Emergencies in Large Population, WHO, Geneva.
- The Management of Nutrition in Major emergencies, WHO in collaboration with UNHCR, International Federation of Red Cross and Red Crescent societies and WFP.
- Owen. A. Y. and Frankle, R. T. (1986) Nutrition in the Community. The Art of delivering Services, 2nded. Times Mirror/ Mosby.



## PUBLIC HEALTH NUTRITION (DSE-3)

**Credits: 4**

**Subject code: FS23602 (B)**

**Objectives:**

- To gain knowledge about the concepts of public health
- To increase knowledge in the aspects of various vector borne diseases
- To understand the concepts of epidemiology of zoonal disease
- To acquire knowledge various food borne diseases
- To familiarize with various types of fevers and objectives of vaccinations

**Semester: VI**

**No. of lecture hours: 60**

### Outcomes

**CO1:** Students will be able to understand in detail about public health and ecology of health

**CO2:** Students will gain knowledge regarding various vector borne diseases like malaria, filariasis and dengue

**CO3:** Students will be familiarized with the concepts of epidemiology of zoonal disease

**CO4:** Students will get to the information about various types of fevers and types of vaccinations

**CO5:** Students will know in detail about the epidemiology of food borne diseases and food poisoning.

### UNIT I

#### CONCEPTS OF PUBLIC HEALTH AND DISEASE EPIDEMIOLOGY 12Hrs

- Public health –Rise , Changing concepts; Ecology of Health , Responsibility for health. 3Hrs
- Concept of Disease, Concept of causation: Germ theory of disease; Epidemiological triad; Web of Causation. 3Hrs
- Natural history of disease, Concepts of Disease control, Concepts of prevention, Modes of intervention. 3Hrs
- Factors that influence the epidemiology of a disease and re-emergence of a disease; Association and Causation. 3Hrs

### UNIT II:

#### EPIDEMIOLOGY OF VECTOR BORNE DISEASES 12Hrs

- Malaria: Prevalent major epidemiological types of malaria. Factors responsible for malaria transmission. 3Hrs
- Filariasis: Factors responsible for the transmission of lymphatic filariasis. Infection and infectivity. 3Hrs
- Dengue: Agent factors and environmental factors for Dengue transmission. Epidemiology and risk factors of Classical dengue fever, Dengue haemorrhagic fever (DHF) and Dengue shock syndrome. 6Hrs



### UNIT III

#### EPIDEMIOLOGY OF ZOONAL DISEASES 12Hrs

- Epidemiology of Ascariasis, Taeniasis and Schistosomiasis. 2Hrs
- Amoebiasis: Agent factors (agent, reservoir of infection, period of communicability), host factors and environmental factors of amoebiasis. 4Hrs
- Primary prevention (sanitation, water supply, food hygiene and health education). 4Hrs
- Secondary prevention (early diagnosis and treatment) of amoebiasis. 2Hrs

### UNIT IV

#### EPIDEMIOLOGY OF FEVERS 12Hrs

- Tuberculosis: Epidemiological indices of tuberculosis (Agent factors, host factors, social factors of tuberculosis). 3Hrs
- Risk factors (malnutrition and tuberculosis, HIV and tuberculosis, diabetes and tuberculosis, drug resistance). 3Hrs
- Aims and objectives of RNTCP, BCG vaccination, DOTS strategy. 3Hrs
- Typhoid: Epidemiological determinants and social factors of typhoid, Management of typhoid (control of reservoir, control of sanitation and immunization). 3Hrs

### UNIT V

#### EPIDEMIOLOGY OF FOOD BORNE DISEASES 12Hrs

- Bacterial food infections-Salmonellosis, Shigellosis and Listeriosis. 3Hrs
- Food poisoning: (Staphylococcal & Botulism)-Symptoms, mode of transmission and prevention. 4Hrs
- Viral Hepatitis: Epidemiological determinants of Hepatitis A, B & C (agent factors, host factors and environmental factors, High risk groups). 5Hrs

### REFERENCES

- Public Health Nutrition – Michale J. Gibney, Barrie M. Margetts, John M. Kearney and Lenore Arab (Eds.) – Nutrition Society Textbook Series, Blackwell Publishing.
- Nutritional Science – B. Sri Lakshmi, New Age International Publishers, 2nd edition.
- Text Book of Human Nutrition – Mahtab S Bamji, N PrahladRao, Vinodini Reddy, 2nd editon, Oxford & IBH Publishing Co. Pvt. Ltd.
- Social and Preventive Medicine – Part & Park.
- The Management of Nutrition in Major emergencies, WHO in collaboration with UNHCR, International Federation of Red Cross and Red Crescent societies and WFP.
- Owen. A. Y. and Frankle, R. T. (1986) Nutrition in the Community. The Art of delivering Services, 2nded. Times Mirror/ Mosby.



## DIET COUNSELLING AND PATIENT CARE (DSE-4)

**Credits: 4**

**Subject code: FS23603 (A)**

**Objectives:**

- To understand what diet counseling and patient care is
- To Learn the fundamentals of nutrition communication
- To validate Patient care process administration
- To analyze tools required for effective nutrition counseling
- To understand hospital and community level counseling

**Semester: VI**

**No. of lecture hours: 60**

### Outcomes

**CO1:** Students will gain basic knowledge on counseling

**CO2:** Students will be able to understand different types of counseling for different conditions

**CO3:** Students will get to learn about organizing the health camps.

**CO4:** Students get to learn different techniques and tools required for nutrition counseling

**CO5:** Students get proper knowledge about patient care in hospital and community level

### UNIT I

#### BASICS OF DIET COUNSELING

**12Hrs**

- Diet Counseling-meaning, significance, process, types, Goals of counseling. 3Hrs
- Types of Counseling - individuals, group and family counseling. 3Hrs
- Basic sequence in Diet counseling. 3Hrs
- Materials needed for counseling –models, charts, posters, AV aids, Hand outs etc. 3Hrs

### UNIT II

#### BASICS OF NUTRITION COMMUNICATION

**12Hrs**

- Communication process in counseling. 3Hrs
- linguistics in clinical dietary practices, problems in communication, tools, Role of Counselor & Counseelee. 3Hrs
- Techniques of obtaining relevant information- 24 Hour Dietary recall, List of food likes and dislikes, Lifestyle. 3Hrs
- Impact of counseling on health and disease of individuals – discussion of hospital case studies. 3Hrs



### UNIT III

#### PATIENT CARE PROCESS

12Hrs

- Introduction to Nutrition Care Process: Definition of Nutrition Care Process, Steps of Nutrition Care Process. 2Hrs
- Tools for effective Nutritional counseling. 4Hrs
- Organizing health camps and patient feedback – at hospital level and at community level. 4Hrs
- Diet counselling for kidney disorders. 2Hrs

### UNIT IV

#### DIET COUNSELING AT HOSPITAL AND COMMUNITY LEVEL

12Hrs

- Role of counseling in hospital and community. 3Hrs
- Diet counseling for mother and child care. 3Hrs
- Diet counseling for PEM- marasmus and kwashiorkor. 3Hrs
- Diet counseling for GIT infections in children. 3Hrs

### UNIT V:

#### DIET COUNSELING AT HOSPITAL AND COMMUNITY LEVEL

12Hrs

- Diet counseling for obese people. 3Hrs
- Diet counseling for Diabetics. 3Hrs
- Diet counseling for CVD and kidney disorders. 3Hrs
- Diet counseling for liver disorders, gout, hypothyroidism and Hyperthyroidism. 3Hrs

### REFERENCES

1. Gibney M.J., Margetts, B.M., Kearney, J.M., Arab, L. (Eds) (2004) Public Health Nutrition. NS Blackwell Publishing.
2. Prochaska, K.L., The Transtheoretical Model of Behavioural Change, Shumaker SA(Eds).
3. Public Health Communication: Evidence for Behavior Change by Robert C. Hornik © 2002 by Lawrence Erlbaum Associates, Inc.
4. Communication and Health: Systems and Applications. Edited by Eileen Berlin Ray and Lewis Donohew © 1990 by Lawrence Erlbaum Associates, Inc.
5. Designing health messages: Approaches from Communication Theory and Public Health Practice. Editors: Edward Maibach and Roxanne Louiselle Parrott © 1995 by Sage Publications, Inc.
6. Community Nutrition in Action: An Entrepreneurial Approach. Fourth Edition. Marie A. Boyle and David H. Holben. © 2006 Thomson Wadsworth.



## NUTRITION COMMUNICATION AND COUNSELLING (DSE-4)

**Credits: 4**

**Subject code: FS23604 (B)**

**Objectives:**

- To gain knowledge about basic components in communication
- To understand communication channels and to design messages
- To learn Patient care process administration
- To analyze tools required for effective nutrition counseling
- To understand hospital and community level counseling

**Semester: VI**

**No. of lecture hours: 60**

### Outcomes

**CO1:** Students will gain the potential to understand the basics of communication

**CO2:** Students will be able to design messages for communication

**CO3:** Students will get to understand different modes of communication

**CO4:** Students will learn different techniques and tools required for nutrition counseling

**CO5:** Students will get proper knowledge about patient care in hospital and community level

### UNIT I

#### **BASICS OF COMMUNICATION**

**12Hrs**

- Setting objectives of a nutrition education communication programme. 3Hrs
- Nutrition objective and Educational objectives. 3Hrs
- Communication objectives. 3Hrs
- Identifying target audience. 3Hrs

### UNIT II

#### **COMMUNICATION CHANNELS AND DESIGN MESSAGES**

**12Hrs**

- Essential elements of a message design. 3Hrs
- Media for communication. 3Hrs
- Advantages and disadvantages. 3Hrs
- Development of a communication strategy- components. 3Hrs

### UNIT III

#### **PATIENT CARE PROCESS**

**12Hrs**

- Introduction to Nutrition Care Process. 3Hrs
- Definition of Nutrition Care Process, Steps of Nutrition Care Process. 3Hrs
- Tools for effective Nutritional counseling. 3Hrs
- Organizing health camps and patient feedback – at community level. 3Hrs



#### UNIT IV

#### DIET COUNSELING AT HOSPITAL AND COMMUNITY LEVEL 12Hrs

- Role of counseling in hospital and community. 3Hrs
- Diet counseling for mother and child care. 3Hrs
- Diet counseling for PEM, marasmus, kwashiorkor. 3Hrs
- Diet counseling for GIT infections in children. 3Hrs

#### UNIT V:

#### DIET COUNSELING AT HOSPITAL AND COMMUNITY LEVEL 12Hrs

- Diet counseling for obese people. 3Hrs
- Diet counseling for Diabetics. 3Hrs
- Diet counseling for CVD and kidney disorders. 3Hrs
- Diet counseling for liver disorders, gout, hypothyroidism and hyperthyroidism. 3Hrs

#### REFERENCES

1. Gibney M.J., Margetts, B.M., Kearney, J.M., Arab, L. (Eds) (2004) Public Health Nutrition. NS Blackwell Publishing.
2. Prochaska, K.L., The Transtheoretical Model of Behavioural Change, Shumaker SA(Eds).
3. Public Health Communication: Evidence for Behavior Change by Robert C. Hornik © 2002 by Lawrence Erlbaum Associates, Inc.
4. Communication and Health: Systems and Applications. Edited by Eileen Berlin Ray and Lewis Donohew © 1990 by Lawrence Erlbaum Associates, Inc.
5. Designing health messages: Approaches from Communication Theory and Public Health Practice. Editors: Edward Maibach and Roxanne Louiselle Parrott © 1995 by Sage Publications, Inc.
6. Community Nutrition in Action: An Entrepreneurial Approach. Fourth Edition. Marie A. Boyle and David H. Holben. © 2006 Thomson Wadsworth.



**BASICS OF MEAL PLANNING (Bridge course)**

**Credits:**

**Semester: I/II**

**Subject code:**

**No. lecture hours: 15Hrs**

**Objectives**

- To gain knowledge of the concepts of food
- To get familiarized with the safety aspects of food.
- To acquire details pertaining to spoilage of food.
- To understand the various methods of cooking food.
- To gain knowledge pertaining to basics of menu planning

**Outcomes**

**CO1:** The students will be able to be identifying RDA, its uses and translation

**CO2:** Students will be able to learn about perishability, selection and storage of food

**CO3:** Students will be able to understand the hazards caused by microorganisms, rodents and Insects.

**CO4:** Students will be to learn various preparation methods and loss of nutrients.

**CO5:** Students will be able to appraise the nutritional status and nutritive value.

**UNIT I**

**CONCEPTS OF FOOD**

- Food, functions of food
- inter-relationship of food, nutrition and health
- RDA its uses determining energy needs
- Translating RDA into daily food intake

**UNIT II**

**SAFETY ASPECTS OF FOOD**

- Perishability of foods
- classification
- Quality indicators
- Selection, purchase and storage of food



### UNIT III

#### SPOILAGE OF FOOD

- Food spoilage, their cause And hazards by:
- Microorganisms
- Enzymes
- Insects and rodents

### UNIT IV

#### COOKING METHODS

- Need for cooking
- Preparation methods of food
- Various methods of cooking
- Loss of nutrients

### UNIT V

#### BASICS OF MENU PLANNING

- Signs of good nutritional status
- poor nutritional status
- Guidelines for good health
- Enhancement of nutritive value

### REFERENCES

1. B. Srilakshmi, 2001 **Food Science**, 2<sup>nd</sup> Edition, New Delhi: New Age International.
2. Swaminathan M (2000). Advanced Textbook on Foods and Nutrition, Vol I (2<sup>nd</sup> ed.). Published by Bangalore Printing and Publishing Ltd, Bangalore.
3. ICMR (1989) Nutritive Value of Indian Foods. National Institute of Nutrition, Indian Council of Medical Research, Hyderabad.
4. ICMR (2011) Dietary Guidelines for Indians – A Manual. National Institute of Nutrition, Indian Council of Medical Research, Hyderabad

### **FOOD AS MEDICINE (self-learning course)**

**Credits:**

**Semester: III/IV**

**Subject code:**

**No. lecture hours: 10Hrs**

B.Sc. Food Science, Nutrition and Dietetics

Syllabus for 2021-2024 batch



### **Objectives:**

1. To introduce the concepts of Ayurveda.
2. To impart knowledge on history and evolution of diets and raw foodism.
3. To understand the strategies of fasting and detoxification.
4. To learn various components of dietary treatment.
5. To know the review of various spices and herbs.

### **Outcomes**

- CO1:** Students will be able to be understand flavours, seasons and climate in ayurveda  
**CO2:** Students will be able to learn about various diets, cookware and preparation methods.  
**CO3:** Students will be able to understand the theory and practice of fasting and detoxification.  
**CO4:** Students will be to learn various strategic eating and food allergies.  
**CO5:** Students will be able to learn about herbs, masalas and marinades.

## **UNIT-I**

### **INTRODUCTION TO AYURVEDA**

- Introduction to ayurveda- What is food? Concept of quality
- The three doshas
- Six flavours, seasons and climate
- Food quantity, timing and food combination

## **UNIT -II**

### **HISTORY AND EVOLUTION OF DIETS**

- Practice of food- evolution and history of diet
- Paleolithic diet, ayurvedic diet, vegetarian diet and vegan diet
- Raw foodism and modern diets
- Cookware and preparation methods

## **UNIT-III**

### **FASTING AND DETOXIFICATION**

- Fasting and detoxification
- Theory and practice
- Methods and strategies
- Medicinal herbs as adjuncts

## **UNIT-IV**

### **DIETARY TREATMENT**

- Meal plans and strategic eating
- Food allergies
- Elimination of challenge diet



- Review of health issues and dietary treatment

#### **UNIT-V**

#### **HERBS AND SPICES**

- Review of 50 different herbs and spices
- Use of masalas
- Rubs and marinades

### **BAKING SCIENCE (add on course)**

**Credits:**

**Semester: V/VI**

**Subject code:**

**No. of lecture hours: 30Hrs**

**Objectives:**



1. To know the common ingredients used in baking
2. To understand the various methods used to prepare breads.
3. To learn the procedure and packaging of biscuits.
4. To understand the cake mixing objectives and methods
5. To learn various aspects in preparation of wafers, frozen dough products.

### **Outcomes**

- **CO1:** Students will be able to be understand major and minor ingredients in bakery.
- **CO2:** Students will be able to learn about bread making process.
- **CO3:** Students will be able to understand the preparation, packing and storage of biscuits.
- **CO4:** Students will be to learn about formulation and mixing of cakes.
- **CO5:** Students will be able to learn about frozen dough products.

### **UNIT-I**

#### **GENERAL INGREDIENTS FOR BAKERY PRODUCTS**

- Ingredients: sources, functions, types of wheat flour, miscellaneous flours
- sources, functions, types of Shortenings
- sources, functions, types of Sweeteners and yeast
- Minor ingredients- oxidizing agents, salt, dairy and egg products, mold inhibitors, dough strengtheners/softeners and enrichment

### **UNIT-II**

#### **BREAD**

- Bread making methods- straight and emergency dough methods
- Mixing and dough processing- functions of mixing and mixer types
- Thermal reactions keeping properties of bread and related products
- Bread spoilage and staling, factors and control measures

### **UNIT-III**

#### **BISCUITS, COOKIES AND CRACKERS**

- Ingredients and their functions
- Preparation of biscuits- short dough biscuits, fermented dough biscuits, hard dough biscuits
- Biscuit baking, heat transfer mechanism, changes during baking
- Cooling, packaging and storage



## UNIT-IV

### CAKES

- Cake varieties, ingredients and their functions
- Formulations and formula balance
- Cake mixing objectives and methods
- Batter specific gravity, temperature, pH and baking reactions

## UNIT-V

### WAFERS

- Ingredients and their functions
- Frozen dough products
- Flat bread technology'
- Starches- sources, composition, properties, modification methods and applications in bakery industry

## REFERENCES

1. Dubey, S.C. 2007. Basic baking 5<sup>th</sup> Ed. New Delhi: Chanakya Mudrak Pvt Ltd.
2. Raina 2003. Basic Food Preparation- A Complete Manual. 3<sup>rd</sup> Ed. Mumbai: Orient Longman Pvt Ltd.
3. Manay, S and Shadaskaraswami, M. 2004. Food Facts and Principles. New Delhi: New Age Publishers.
4. Barndt, R. L. 1993. Fat and Calorie – Modified Bakery Products. US: Springer
5. Faridi Faubin, 1997. Dough Rheology and Baked Product Texture. New Delhi: CBS Publications.