# M.SC.,

# DIETETICS AND FOOD MANAGEMENT

## SYLLABUS

**FROM THE ACADEMIC YEAR**

**2023 - 2024**

**TAMILNADU STATE COUNCIL FOR HIGHER EDUCATION,**
**CHENNAI – 600 005**

# M.Sc. Dietetics and Food Management

## INTRODUCTION:

Outcome-Based Education is incorporated into the curriculum based on the requirements of NAAC and UGC – Quality Mandate (2018). To fulfill these requirements, the Programme Educational Objectives (PEOs), Programme Outcomes (POs) and Programme Specific Outcomes (PSOs) and Course Outcomes (COs) were framed for all programmes in alignment with the Vision, Mission and Educational Objectives of the University.

## VISION AND MISSION OF THE UNIVERSITY:

### VISION:

To provide quality education to reach the un-reached.

### MISSION:

- To conduct research, teaching and outreach programmes to improve conditions of human living.
- To create an academic environment that glorify women and men of all races, caste, creed, cultures and all atmosphere that values intellectual curiosity, pursuit of knowledge , academic freedom and integrity.
- To offer a wide variety of campus educational and training programmes, including the use of information technology to individuals and groups.
- To develop partnership with industries and government so as to improve the quality of work place and to serve as catalyst for economic and cultural development.
- To provide quality / inclusive education especially for the rural and unreached segments of economically downtrodden students including women, socially oppressed and differently abled.

## PREAMBLE:

The post graduate programme in this discipline has been designed to provide the students intensive and extensive theoretical and experiential learning. The programme allows flexibility in the choices based

credit systems. It is envisaged that the current of thrust areas, which students can select, based require trained professionals in areas such as Public Nutrition, Dietetics and Clinical Nutrition, Institutional Food Administration as well as Food Science and Quality Control.

| TANSCHE REGULATIONS ON LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK FOR POSTGRADUATE EDUCATION | |
|---|---|
| **Programme** | **M.Sc. DIETETICS AND FOOD MANAGEMENT** |
| **Programme Code** | |
| **Duration** | **2 years for PG** |
| **Programme Outcomes (Pos)** | **PO1: Problem Solving Skill**<br>Apply knowledge of Management theories and Human Resource practices to solve business problems through research in Global context.<br>**PO2: Decision Making Skill**<br>Foster analytical and critical thinking abilities for data-based decision-making.<br>**PO3: Ethical Value**<br>Ability to incorporate quality, ethical and legal value-based perspectives to all organizational activities.<br>**PO4: Communication Skill**<br>Ability to develop communication, managerial and interpersonal skills.<br>**PO5: Individual and Team Leadership Skill**<br>Capability to lead themselves and the team to achieve organizational |

| | |
|---|---|
| | goals.<br>**PO6: Employability Skill**<br>Inculcate contemporary business practices to enhance employability skills in the competitive environment.<br>**PO7: Entrepreneurial Skill**<br>Equip with skills and competencies to become an entrepreneur.<br>**PO8: Contribution to Society**<br>Succeed in career endeavors and contribute significantly to society.<br>**PO 9 Multicultural competence**<br>Possess knowledge of the values and beliefs of multiple cultures and<br>a global perspective.<br>**PO 10: Moral and ethical awareness/reasoning**<br>Ability to embrace moral/ethical values in conducting one's life. |
| **Programme Specific Outcomes (PSOs)** | **PSO1 – Placement**<br>To prepare the students who will demonstrate respectful engagement with others' ideas, behaviors, beliefs and apply diverse |

| | |
|---|---|
| | frames of reference to decisions and actions.<br><br>**PSO 2 - Entrepreneur**<br><br>To create effective entrepreneurs by enhancing their critical thinking, problem solving, decision making and leadership skill that will facilitate startups and high potential organizations.<br><br>**PSO3 – Research and Development**<br><br>Design and implement HR systems and practices grounded in research that comply with employment laws, leading the organization towards growth and development.<br><br>**PSO4 – Contribution to Business World**<br><br>To produce employable, ethical and innovative professionals to sustain in the dynamic business world.<br><br>**PSO 5 – Contribution to the Society**<br><br>To contribute to the development of the society by collaborating with stakeholders for mutual benefit. |

**Template for P.G., Programmes**

| Semester–I | Credit | Hours | Semester-II | Credit | Hours | Semester-III | Credit | Hours | Semester–IV | Credit | Hours |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.1. Core-I | 5 | 6 | 2.1. Core-IV | 5 | 6 | 3.1. Core-VII | 5 | 6 | 4.1. Core-XI | 5 | 6 |
| 1.2 Core-II | 5 | 6 | 2.2 Core-V | 5 | 6 | 3.2 Core-VII | 5 | 6 | 4.2 Core-XII | 5 | 6 |
| 1.3 Core – III | 4 | 6 | 2.3 Core – VI | 4 | 6 | 3.3 Core – IX | 5 | 6 | 4.3 Project with viva voce | 7 | 10 |
| 1.4 Core Practical | 2 | 4 | 2.4 Discipline Centric Elective – III | 3 | 4 | 3.4 Core – X | 4 | 6 | 4.4Elective - VI (Industry / Entrepreneurship) 20% Theory 80% Practical | 3 | 4 |
| 1.5 Discipline Centric Elective -I | 2 | 4 | 2.5 Generic Elective -IV: | 3 | 4 | 3.5 Discipline Centric Elective - V | 3 | 3 | 4.5 Skill Enhancement course / Professional Competency Skill | 2 | 4 |
| 1.6 Generic Elective-II Practical | 2 | 4 | 2.6 NME I | 2 | 4 | 3.6 NME II | 2 | 3 | 4.6 Extension Activity | 1 | |
| 1.7 SKILL ENHANCEMENT COURSE 1 | - | - | | | | 3.7 Internship/ Industrial Activity | 2 | - | | | |
| | **20** | **30** | | **22** | **30** | | **26** | **30** | | **23** | **30** |
| **Total Credit Points -91** | | | | | | | | | | | |

**Choice Based Credit System (CBCS), Learning Outcomes Based Curriculum Framework (LOCF)**
**Guideline Based Credits and Hours Distribution System**
**for all Post – Graduate Courses including Lab Hours**

**First Year – Semester – I**

| Part | List of Courses | Credits | No. of Hours |
|---|---|---|---|
| | Core – I | 5 | 6 |
| | Core – II | 5 | 6 |
| | Core – III | 4 | 6 |
| | Core – 1 Practical | 2 | 4 |
| | Elective – I | 2 | 4 |
| | Elective – II practical | 2 | 4 |
| | | **20** | **30** |

**Semester-II**

| Part | List of Courses | Credits | No. of Hours |
|---|---|---|---|
| | Core – IV | 5 | 6 |
| | Core – V | 5 | 6 |
| | Core – VI | 4 | 6 |
| | Elective – III | 3 | 4 |
| | Elective – IV | 3 | 4 |
| | Skill Enhancement Course [SEC] - I | 2 | 4 |
| | | **22** | **30** |

**Second Year – Semester – III**

| Part | List of Courses | Credits | No. of Hours |
|---|---|---|---|
| | Core – VII | 5 | 6 |
| | Core – VIII | 5 | 6 |
| | Core – IX | 5 | 6 |
| | Core (Industry Module) – X | 4 | 6 |
| | Elective – V | 3 | 3 |
| | Skill Enhancement Course - II | 2 | 3 |
| | Internship / Industrial Activity [Credits] | 2 | - |
| | | **26** | **30** |

**Semester-IV**

| Part | List of Courses | Credits | No. of Hours |
|---|---|---|---|
| | Core – XI | 5 | 6 |
| | Core – XII | 5 | 6 |
| | Project with VIVA VOCE | 7 | 10 |
| | Elective – VI (Industry Entrepreneurship) | 3 | 4 |
| | Skill Enhancement Course – III / Professional Competency Skill | 2 | 4 |
| | Extension Activity | 1 | - |
| | | **23** | **30** |

**Total 91 Credits for PG Courses**

## M.Sc., DIETETICS AND FOOD MANAGEMENT

### SEMESTER - I

| **Course status** | **Course Title** | Credits | Hours |
|---|---|---|---|
| Core-1 | Advanced Food science | 5 | 6 |
| Core -2 | Advanced Human Physiology | 5 | 6 |
| Core-3 | Macronutrients | 4 | 6 |
| Core I Practical | Advanced Food science practical | 2 | 4 |
| Elective - I | Food processing and technology/<br>Principles of Menu Planning | 2 | 4 |
| Elective – II Practical | Food processing and technology practical | 2 | 4 |
| | **Total** | **20** | **30** |

## 1.1 CORE -I-

## ADVANCED FOOD SCIENCE

**CREDIT: 4**
**SEMESTER :1**
**YEAR :1**
**HOURS PER WEEK :15**

**COURSE OBJECTIVES:**

To enable the students
Gain knowledge on the source and properties of food
Familiarize students with changes occurring in various foodstuffs as a result of processing and cooking.
Enable students to use theoretical knowledge in various applications and food preparations.

**COURSE OUTCOME:**

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

| CO No. | CO Statement |
|---|---|
| CO1 | Overview the relationship between the chemical structure and the properties of the main components in food like starch, protein and lipids. |
| CO2 | Understand the Composition and characteristics of various food commodities. |
| CO3 | Explain the cooking quality of foods and apply food science knowledge in food industries |
| CO4 | Identify and understand the nutrients and functions of foods in maintaining health |
| CO5 | Analyze the proper use of food colors and food additives in safe food preparation. |

**UNIT I**

Properties of food- Food nutrients, solids, solutions and colloids, Solutions-

Physical properties of solutions, classification of foods based on viscosity characteristics. Solutes-chemical properties, Food dispersion: Colloids- Types of colloid and properties of colloids and rheology of food dispersions; Structure, formation and stability of gels, sols, emulsion and foams.

Starch - Sources, Structure and composition of starch; Properties and characteristics of food starches; Modified food starches-Structure and composition, Effect of heat on food starch properties, gluten formation in wheat flour, influencing factors[gluten], gelatinization, gelation and retrogradation, dextrinization and factors affecting gelatinization.

**UNIT II**

Proteins-Structure and composition, Classification and properties of proteins; Effect of heat on physio-chemical properties of proteins; Role of proteins in food products; Texturized vegetable protein, protein concentrates.
Enzymes: Classification and its nature; Mechanism of action; Factors influencing enzyme activity; Role of enzymes in food products; Immobilized enzymes and its application in food industries.

**UNIT III**

Fats and oil -Structure, composition and properties of fats and oil; storage of fat, characteristics [shortening, plasticity, flavor, retention of moisture, melting point, optical activity, color, specific gravity], Hydrogenation, winterization, flavor reversion, smoking point, Rancidity-
Types, Mechanism and prevention; Role of fat/oil in food products; Fat substitutes.

Sugar and sugar products-Types of sugar, Types of granulated sugar, Physical and chemical properties, Sugar products -Types of honey, Jaggery, corn syrup, various forms of sugar used in cookery and Crystallization of sugar.

**UNIT IV**

Milk components- water, carbohydrate, milk fat, milk protein, minerals and other components in milk, Physiochemical properties of milk, Effect of physical and chemical factors on milk components [Effect of heat, protein, factors affecting coagulation, casein coagulation, minerals, Non-enzymatic browning], [Effects of acid], Effects of enzymes-renin, fermented and non-fermented milk products

Egg-proteins in Egg, microscopic structure of egg, characteristics [color, size], Nutritional qualities, quality check, functional properties- foaming, factors affecting foam formation.

**UNIT V**

Food additives- Definition, different food additives and Need for food additives. Flavour compounds in vegetables, fruits and spices; Effect of processing on food flavours; Role of colours and flavours in food products.
Sweetners- Properties, Artificial and Natural sweetners and role of sweetners in food industry.

**TEXT BOOKS:**

Srilakshmi B. (2015). Food Science.New Age International (P) Ltd.
Publishers.
S.M. Reddy (2015). Basic Food science and technology. New Age International publishers.AvantinaSharma (2017).Text book of food science and Technology. CBS Publisheres and distributes ltd. 3rd Edition.
Swaminathan A.(2018) . Handbook of Food and Nutrition, Bangalore press.
Serpil Sahin and ServetGulumSumnu.(2006).Physical properties of Foods.
Springer publications

**REFERENCES**:

Gerard L. Hasenhuettl , Richard W. Hartel. (2019).Food Emulsifiers and Their Applications.Springer publications. 3rd edition.
Vickie.A. Vaciavik. (2021). Essentials of Food science. Springer publications. 5th edition.
Dr.M.Swaminathan.(2015). Advanced text book of Food and Nutrition. volume-2.Bapco

publications.
Eskein.(2012). Biochemistry of Food. Elsievier publications.
Lyn O brienNabors.(2001).Alternative Sweetners. Taylor and Francis publications.
Janet D. Ward and Larry Ward.(2006). Principles of Food Science. Stem Publishers. 4th Edition.

**ELEARNING RESOURCES**:

www.fao.org www.wfp.org
www.foodrisk.org.
http://www.fsis.usda.gov/
https://www.fda.gov/food

**Mapping CO with PSO**

| CO/PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | PSO6 |
|---|---|---|---|---|---|---|
| **CO1** | 3 | 3 | 2 | 2 | 3 | 2 |
| **CO2** | 3 | 3 | 3 | 2 | 1 | 2 |
| **CO3** | 3 | 3 | 3 | 3 | 3 | 2 |
| **CO4** | 2 | 3 | 3 | 2 | 1 | 3 |
| **CO5** | 3 | 3 | 3 | 2 | 2 | 3 |
| **Average** | 2.8 | 3 | 2.8 | 2.2 | 2 | 2.4 |

**PEDAGOGY:**

Lecture, Case study, journal reviewing, Assignments, Group discussion, Power point presentation

## 1.2 CORE - II
## ADVANCED HUMAN PHYSIOLOGY

**CREDITS: 4**
**SEMESTER :I**
**YEAR :I**
**HOURS PER WEEK :15**

**Objectives:**
This course will enable students to:

- Advance their understanding of some of the relevant issues and topics of human physiology.
- Enable the students to understand the integrated function of the system Understand alterations of structure and function in various organs and systems in disease conditions**.**

**COURSE OUTCOME:**
On successful completion of the course the student will be able to-

| CO No. | CO STATEMENT |
|---|---|
| **CO 1** | Develop insight of normal functioning of all the organ systems of the body and their interaction. Understand the current state of knowledge about the functional organization of Human Cell and Histology. |
| **CO 2** | Understand the structural and functional organization of Blood and Cardiac System |
| **CO 3** | Understand the structural and functional organization of Respiration, Immunity and Endocrine GIT and Urinary System |
| **CO 4** | Comprehend the structural and functional organization Digestive System and Reproductive System |
| **CO 5** | Understand the structural and functional organization of Skin, Nervous and Excretory system |

**UNIT I**

**Cell**

- Structure and Function.
- Transportation across cell membrane.
- Cell theory and Cycle. Difference between Meiotic and Mitotic cell.
- Stem cells- types and functions.

**Tissue**

- Structure and Function.

**UNIT II**

**Blood**

- Composition& Functions
- Blood Group – ABO System &Rh factor.
- Blood Coagulation.

**Heart**

- Structure &Function of Heart and Blood Vessels.
- Systemic &Pulmonary circulation
- Cardiac cycle and Conduction.
- Heart rate and Cardiac output. ECG.
- Blood pressure & their regulations.

**UNIT III**

**Respiratory System**

- Structure and function.
- Gas Laws pertaining to Gas Exchange (Meaning only)-Henry's Law of Partial Pressure, Boyle - Mariotte's Law of Volume and Pressure, Dalton's Law of Partial Pressure, Charles's Law of Ideal Gas Equation and Fick's Law of Diffusion.
- Mechanism of respiration.
- Circulation and Exchange of respiratory gases. Internal and External Respiration. Chloride shift.
- Definitions of Lung volumes and Lung capacities
- Ventilation and Artificial Respiration.

**Immunity**

- Definition and types Innate and Acquire immunity.

**Endocrine System**

- Hormones and its type.
- Syndromes resulting from hypo and hyperactivity of Pituitary, Thyroid, Adrenals and Pancreas.

**UNIT IV**

**Gastrointestinal System**

- Structure and function of GI tract and its accessory organs.
- Digestion and absorption of Carbohydrates, Proteins and Fats.

**Reproductive System**

- Roll of hormones in reproduction and Lactation.
- Menstrual Cycle and Menopause.

- Invitro (I V) fertilization
- Spermatogenesis.

**UNIT V**

**NERVOUS SYSTEM**

- Structure and Function of Neuron. Afferent and Efferent Nerves.
- Conduction of Nerve Impulse- Synapses, Neurotransmitters, Summation and Action Potential.
- Sympathetic and Parasympathetic nervous System.
- Cerebrospinal fluid (CSF) – composition and function.
- Blood-brain barrier (BBB).
- Electroencephalogram (EEG)

**EXCRETORY SYSTEMS**

**Renal system**

- Organs in the Urinary System.
- Structure and functions of Nephron.
- Juxtaglomerular Cell.
- Mechanism of formation of urine,
- Role of kidney to regulate Blood pressure, Water, Electrolytes and Acid Base Balance.

**Skin**

- Structure and function**.**
- Regulation of temperature of the body.

**TEXT BOOKS**


- K. Sembulingam&PremaSembulingam (2019), Essentials of Medical Physiology. Jaypee publications. Eighth edition.
- Waugh A, Ross and Wilson (2018). Anatomy and Physiology in Health and Illness. Elsevier publications. 13ed.
- CC Chatterjee (2020). Human Physiology. CBS publishers. 13 ed.
- Indu Khurana (2020). Medical Physiology for Undergraduate Students. Elsevier Publication. 2 Edition.
- GK Pal (2019). Textbook of human physiology, Elsevier publications. 3edition.


**REFERENCES:**


- Guyton, A.G. and Hall, J.B. (2005): Text Book of Medical Physiology. W.B.Sanders Company, Prism Books (Pvt.) Ltd., Bangalore. 9th Edition.
- Wilson, K.J.W and Waugh, A. (2003): Ross and Wilson Anatomy and Physiology in Heathand Illness. Churchill Livingstone. 8th Edition.
- Jain, A.K.: Textbook of Physiology. Avichal Publishing Co., New Delhi. Vol.I and II.
- McArdle, W.D., Katch, F.I. and Katch V.L(2001): Exercise Physiology.

Energy, Nutritionand Human Performance. Williams and Wilkins, Baltimore. 4th Edition.

- Ganong, W.F. (1985): Review of Medical Physiology. lange Medical Publication. , 12th Edition.
- Moran Campell E.J., Dickinson, C.J., Slater, J.D., Edwards. C.R.W. and Sikora, K. (1984): Clinical Physiology. ELBS, Blackwell Scientific Publications. , 5th Edition.
- McArdle, W.D., Katch, F.1. and Katch, V.L. (1996): Exercise Physiology. Energy, Nutrition and Human Performance, Williams and Wilkins, Baltimore. 4th Edition.
- Jain, A.K.: Textbook of Physiology. Avichal Publishing Co., New Delhi. Vol. I and II.
- Winword. Sear's Anatomy and Physiology for nurses. London, Edward Arnell.
- Chatterjee ChandiCharan : Text Book of Medical Physiology,London W.B.

**E LEARNING CONTENT**

**https://youtu.be/MZDy0RvA52Y-Osmosis**
**https://youtu.be/TgcyiVQnVBs- Respiratory system**
**https://youtu.be/44B0ms3XPKU- nervous system**

**Mapping: (CO/PSO)**

| CO/PSO | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PSO 5 | PSO 6 |
|---|---|---|---|---|---|---|
| **CO1** | 3 | 1 | 3 | 3 | 2 | 3 |
| **CO2** | 3 | 1 | 3 | 3 | 2 | 3 |
| **CO3** | 3 | 1 | 3 | 3 | 2 | 3 |
| **CO4** | 3 | 1 | 3 | 3 | 2 | 3 |
| **CO5** | 3 | 1 | 3 | 3 | 2 | 3 |

**PEDAGOGY**

Lecture, Power Point Presentation, Demonstration, Group Discussion, Assignment, Library Visits, Seminars and Oral & Written Revision

## 1.3 CORE: III
## MACRO NUTRIENTS

**CREDITS:4**
**SEMESTER :1**
**YEAR :1**
**HOURS PER WEEK 15**

**OBJECTIVE:**

To enable the students

- To understand the relationship between lipid, carbohydrate, protein and mineral metabolism.
- To learn about the therapeutic uses of carbohydrates protein and fat in prevention of non-communicable disease.
- To get insights in the inborn errors of metabolism

**COURSE OUTCOMES:**

After studying this paper, the students would know

| CO No. | CO STATEMENT |
|---|---|
| CO1 | The essentials of nutrients in growth and development of humans |
| CO2 | The importance of major nutrients in maintaining human health and leading active lifestyle |
| CO3 | The enhancement of nutritional quality of the diet. |
| CO4 | Identify the various types & sources of food borne illness and methods of prevention. |
| CO5 | The role of nutrients in health and diseases. |

**UNIT I:**

**ENERGY**- Energy content of foods, physiological fuel value, Estimation of total energy requirements (BMR, REE and physical cost of activities) TEE, Energy balance, Basal metabolic rate, total energy requirements, BMR& RMR, Factors affecting BMR, Thermic effect of food. Changes in body weight and body composition with the changing energy balance, Regulation of food intake- role of hunger and satiety centers. Energy balance and obesity.

**UNIT II:**

**CARBOHYDRATES** – Classification , Therapeutic uses of carbohydrates, sugars in parenteral nutrition. Glycemic index of foods and its uses. Toxic effects of fructose, xylitol and galactose. Sugar alternatives, Role of dietary fiber in health and disease. Role of carbohydrates in health and disease

**UNIT III:**

**PROTEIN** – Historical review of protein metabolism, Amino acid patterns in protein & of animals and vegetable origin, critical study of methods of assessment of protein quality. Physiological functions of proteins. Essential Amino Acids, amino acid balance and imbalance, Role of protein in health and disease. Supplementation of individual amino acid.

**UNIT IV:**

**LIPIDS–**Concepts of visible and invisible fats, EFA, SFA, MUFA, PUFA, omega–6 to omega–3 ratios. – sources and physiological functions and their role in health and disease. Adipose tissue – Lipogenesis and Lipolysis, lipoproteins – types and health implication.

Storage of body fat, Effects of deficiency. Fat substitutes, Hypocholesterolaemic foods – garlic, fiber and plant proteins.

**UNIT V:**

**WATER – Sources, Function, Requirement,** Distribution of water in the body and Factors influencing distribution of body fluid. Exchange of water in the body. Water imbalance – dehydration- water intoxication, water and electrolyte mechanism – ADH,

**TEXT BOOKS:**


1. Satyanarayana, U., & Chakrapani, U. (2013). Biochemistry, Book and Allied Pvt. *Ltd., Kolkata*.
2. Wardlaw, G. M., Byrd-Bredbenner, C., Moe, G., Berning, J. R., & Kelley, D. S. (2013). *Wardlaw's perspectives in nutrition*. McGraw-Hill.
3. Williams, S. R. (2004). Nutrition and diet therapy. *Nutrition and diet therapy.*
4. Sizer, F., Whitney, E., & Webb, F. (2003). Nutrition Concepts and Controversy, Thomas Wadsworth, Australia. 9th edition.
5. Shils, M. E., Olson, J. A., &Shike, M. (2000). Modern nutrition in health and disease. Modern Nutrition in Health and Disease . Vol I and II. Lea &Febiger Philadelphia, A Waverly Company. Eighth edition.
6. Mahan, L.K., & Stump, S.E. (2002). Krause's Food Nutrition and Diet Therapy. W.B. Saunder's company, Philadelphia. 10th edition.


**REFERENCES:**


- Guthire, H.A., (2001). Introductory Nutrition. C.V. Mosby Company, St. Louis. Tenth edition.
- Bogert, J.G.V., Briggs, D.H., & Calloway, (2000). Nutrition and physical fitness. W.B. Saunders Co., Philadelphia, London, Toronto. 11th edition.
- Brown, J.E., (2002). Nutrition Now. Wadsworth Thomson Learning New York. 3rd edition.
- Toteja, G. S. (2004). *Micronutrient profile of Indian population*. Indian Council of Medical Research Publication, New Delhi.
- Swaminathan, M., (2002). Principles of Nutrition and Dietetics. BAPPCO, 88, Mysore Road. Bangalore – 560 018.
- Jain, J.L., Jain, S., & Jain, N., (2005). Fundamentals of Biochemistry. S. CHAND & COMPANY Ltd. Ram nagar, New Delhi-110 055. 6th revised edition.


**E- LEARNING RESOURCES:**

www.nutrition.gov – Service of National agricultural library, USDA
www.nal.usdfa.gov/fnic - Food and nutrition information center
www.fantaproject.org- Fanta technical assistance for nutrition

http://dietary-supplements.info.nih.gov – Officer of dietary supplements, national institute of health.

**MAPPING (CO/PSO):**

| CO/PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | PSO6 |
|---|---|---|---|---|---|---|
| **CO1** | 3 | 3 | 3 | 3 | 3 | 3 |
| **CO2** | 3 | 3 | 3 | 3 | 3 | 3 |
| **CO3** | 3 | 3 | 3 | 3 | 3 | 3 |
| **CO4** | 2 | 2 | 3 | 3 | 3 | 3 |
| **CO5** | 2 | 2 | 2 | 3 | 3 | 2 |
| **Average** | **2.6** | **2.6** | **2.8** | **3** | **3** | **2.8** |

**PEDAGOGY:**

Lecture, Journal Reviewing, Power point presentations, Assignments and Discussions

## 1.4 Core I Practical

## ADVANCED FOOD SCIENCE PRACTICAL

**CREDIT: 3**
**SEMMESTER :1**
**YEAR :1**
**HOURS PER WEEK :10**

**COURSE OBJECTIVES:**
To enable the students

Comprehend the knowledge gained on characteristics and properties of foods during cooking
Apply the properties of food in various food processing and preparations Analyse the factors affecting cooking quality of foods
Create appropriate food preparation and processing methods to ensure quality standards.

**COURSE OUTCOME:**
On successful completion of the course the students will be able to

| CO No. | CO Statement |
|---|---|
| CO1 | Gain knowledge on sensory analysis and cereal cookery concept |
| CO2 | Understand the properties of various food. |
| CO3 | Analyze the cooking quality of foods and apply knowledge in food industries. |
| CO4 | Identify and understand the Physical characteristics. |
| CO5 | Revise appropriate food preparation and processing methods to ensure standards in food industry. |

**UNIT -1**

1. Sensory method –
   Analysis of taste sensitivity-Threshold test Duo –Trio test
   Multiple sample difference

2. Starch
   Microscopic structure and gelatinization.
   Factors affecting gelatinization –sag test.
   Gluten formation

## UNIT -2

1. PULSE
   Factors affecting cooking quality
2. FRUIT
   Enzymatic browning Pectin test
   Firmness of gel

## UNIT -3

1. VEGETABLE

Various method of cooking fat soluble and water-soluble pigment.

2. MILK

Detecting the presence of starch, soda, starch, urea in milk sample. pH of milk sample.
Effect of acid on milk Maillard reaction.

## UNIT -4

1. SUGAR

Relative sweetness of sugar- sucrose, maltose, lactose, fructose, dextrose, glucose, artificial sweeteners Stages of sugar cookery
Effect of dextrose, jaggery, honey and cream of tartar on sucrose.

2. FATS AND OIL

Smoking point – Groundnut oil, coconut oil, Gingelly oil, Olive oil, Vanaspati, Ghee, Refined Sunflower oil, Rice bran oil.

Cooking temperature and fat absorption- – Groundnut oil, coconut oil, Gingelly oil, Refined Sunflower oil, Rice bran oil.

## UNIT -5

1. PHYSICAL PROPERTIES
   a. Thousand grain weight
   b. Thousand grain volume
   c. Hydration capacity
   d. Hydration index
   e. Swelling capacity
   f. Specific gravity
   g. Seed displacement test
   h. Viscosity - Line spread test,

Viscometer. 2.Adulteration

## TEXT BOOKS:

Srilakshmi B. (2015). Food Science, New Age International (P) Ltd. Publishers.

Potter N. and Hotchkiss J.H. (1996). Food Science, Fifth ed., CBS Publishers and Distributors, New Delhi

Avantinasharma (2017). Text book of food science and Technology.

CBS Publisheres and distributes ltd. 3rd Edition.

Reddy S M. (2015). Basic Food science and technology. New Age International publishers. 2ND edition.

**REFERENCES:**

Swaminathan A (1979) . Food Science And Experimental Foods, Ganesh And Company Madras. 3rd edition.

Bennion, Marion and O. Hughes (2001). Introductory Foods. Edi: mac millian N. Y. 1st edition.

Eskein . (2012). Biochemistry of Food. Elsievier publications

Desrosier, N.W. and James N. (2007). Technology of food preservation.

AVI Publishers.

Manay, S. and Shadaksharamasamy, (2004) .Food: Facts and Principles, New Age International Publishers, New Delhi. 1st edition.

**E-LEARNING RESOURCES**

http://www.fao.org/3/V5030E/V5030E00.htm
https://fmtmagazine.in/fruits-vegetables-processing-technologies/

www.fao.org
www.wfp.or
g

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**Mapping of CO with PSO:**

| CO/PSO | PSO1 | PSO2 | PSO3 | PSO 4 | PSO 5 | PSO 6 |
|---|---|---|---|---|---|---|
| **CO1** | 3 | 3 | 2 | 3 | 3 | 2 |
| **CO2** | 3 | 3 | 3 | 2 | 3 | 3 |
| **CO3** | 3 | 2 | 3 | 3 | 3 | 3 |
| **CO4** | 3 | 3 | 3 | 2 | 2 | 3 |
| **CO5** | 3 | 3 | 2 | 3 | 3 | 2 |
| **Average** | 3 | 2.8 | 2.6 | 2.8 | 2.8 | 2.6 |

**PEDAGOGY**

Experiments, Planning recipes , Group Discussion, Assignments, .

## 1.5 ELECTIVE GENERIC /DISCIPLINE CENTRIC II

## FOOD PROCESSING AND TECHNOLOGY

**CREDIT: 3**
**SEMESTER :1**
**YEAR :1**
**HOURS PER WEEK :10**

### COURSE OBJECTIVES:

To enable the students:

1. Understand the science behind processing of foods and its impact on nutritive value of food stuffs.
2. Acquire in-depth knowledge on production of processed food products and the waste utilization techniques.
3. Understand the changes in physicochemical properties of foods due to processing condition.
4. Understand the various parameters related to post-harvest technology.

### COURSE OUTCOME:

On successful completion of the course the students will be able to

| CO No. | CO Statement |
|---|---|
| CO1 | The concepts and principles of food processing. |
| CO2 | The various processed food products from plant and animal sources. |
| CO3 | The by-products utilization from food processing. |
| CO4 | The systematic knowledge of basic and applied aspects in food processing and technology. |
| CO5 | The various post-harvest technologies for different food products |

**UNIT-I**

Processing of foods: Primary, secondary and tertiary processing, historical perspective, traditional technologies used in food processing. Effects of processing on components, properties and nutritional value of foods.

Enzymes in Food Processing: Enzyme- Review of classification, enzyme inhibitors, enzymatic browning.

**UNIT-II**

**Cereal Processing and Technology:**

Rice: parboiling, milling and pearling; Processing and milling of wheat, maize, barley, oats and rye.

Millets: processing of millets;

Cereal Products: Flours and its quality; Processed products of rice, wheat and maize; By products utilization; breakfast cereals and extrusion; Effect of processing on nutritive value of cereals; changes in physiochemical properties of cereal starch and protein due to processing.

Milling process: Complete milling process, break rolls, reduction rolls, milled products and their nutritive value and applications

**Pulse Processing and Technology:**

Dals, flours, protein concentrates, isolates and hydrolysates; Byproducts utilization; Effect of processing on nutritive value and physiochemical properties of pulses.

**Nuts and Oil Seeds Processing and Technology:**

Nuts Processing methods, Oil seeds processing: Oil extraction methods and refining process; byproducts utilization; Effect of processing on nutritive value and physiochemical properties of vegetable oils.

**UNIT-III**

**Vegetables Processing and Technology:**

Pigments: Classification, effects on processing of vegetables; Preliminary processing of vegetables;

Vegetable products: Fermented and nonfermented and its shelf life; Vegetable waste utilization; Effect of processing on nutritive value and physiochemical properties of vegetable

**Fruits Processing and Technology:**

Concept of maturity, ripening and senescence; Methods of fruit processing technologies: traditional and new methods.

Fruit products: fermented and nonfermented; Effect of processing on nutritive value and physiochemical properties of fruits;

Browning reactions: types and mechanism; prevention methods; Fruit waste utilization.

**Milk Processing and Technology:**

Milk types, composition, physiochemical properties; Milk processing- Separation, centrifugal process, natural creaming, pasteurization, sterilization, homogenization. Milk storage; Effects of processing on nutritive value and physicochemical properties of milk

**UNIT-IV**

**Egg Processing and Technology:**

Egg processing and storage; Effect of processing on nutritive value and physiochemical properties of eggs; changes in egg quality during storage and preservation methods.

**Meat Processing and Technology:**

Meat processing and storage; Factors influencing meat quality; Ageing and tenderization of meat.

Poultry: Processing and storage of poultry meat; Preservation methods for poultry. Fish: Processing and storage; Preservation methods for fish. Effect of processing on nutritive value and physiochemical properties of meat, poultry and fish.

**UNIT-V**

**Introduction of post-harvest technology**

Introduction to post-harvest technology of agricultural produce; Status of Production, Losses, Need, Scope and Importance.

Post-Harvest Loss- Definition, Factors contributing to Post-harvest Loss; and Technologies and Practices to reduce Post-harvest Losses.

## TEXTBOOKS


Shakuntala Manay N ShadakCheraswamyM . (2004) Food Facts and Principles. New age publisher . 2nd edition.

Roday S. (2011) .Food Science. Oxford publication . 1st edition.

B Srilakshmi (2015)Food science. New Age Publishers. 6th edition. Fellows P.(2000). Food Processing Technology, 2nd Edition.

Woodhead Publishing Limited and CRC Press LLC. 1st edition.

Avantina Sharma. (2017).Text book of food science and Technology. CBS Publisheres and distributes ltd. 3rd edition.


## REFERENCES


Raocg . (2006 ).Essentials of food process engineering . PHI learning private ltd.

Janet D Ward and Larry Ward.(2006). Principles of Food Science .

Stem Publishers. 4th edition.

Srivastava R P and Kumar S. (2006 ) Fruits and Vegetables Preservation- Principles and Practices. International Book Distributing Co. 3rd edition.

W B Crusess.(2004). Commercial Unit and Vegetable Products.

W.V. Special Indian Edition,PubAgrobios India . 2nd edition. Forsythe S J and Hayes P R (1998). Food Hygiene,

Microbiology and HACCP. GaitersburgMaryland Aspen.

Eskein .(2012). Biochemistry of Food. Elsievier publications. 1st edition.


## ELEARNING RESOURCES:

http://www.fao.org/3/V5030E/V5030E00.htm

https://fmtmagazine.in/fruits-vegetables-processing-technologies/

https://www.actioncontrelafaim.org/wp-content/uploads/2018/01/technical_paper_phl.pdf
https://www.nutsforlife.com.au/resource/nuts-and-processing/
https://www.fssai.gov.in/

**MAPPING (CO/PSO):**

| CO/PO | PSO 1 | PSO2 | PSO 3 | PSO 4 | PSO 5 | PSO 6 |
|---|---|---|---|---|---|---|
| **CO1** | 3 | 3 | 3 | 2 | 2 | 2 |
| **CO2** | 3 | 3 | 2 | 2 | 3 | 2 |
| **CO3** | 2 | 3 | 2 | 1 | 2 | 2 |
| **CO4** | 3 | 3 | 3 | 3 | 3 | 3 |
| **CO5** | 3 | 3 | 3 | 3 | 3 | 3 |
| **Average** | 2.8 | 3 | 2.6 | 2.2 | 2.6 | 2.4 |

**PEDAGOGY:**

Lecture, Journal Reviewing, Power point presentations, Assignments and Discussions

## 1.5 ABILITY ENHANCEMENT COURSE -SOFT SKILL 1
## PRINCIPLES OF MENU PLANNING

### UNIT-I: RECOMMENDED ALLOWANCES

RDA for Indian basis for requirement, computation of allowance based on energy expenditure, components of energy expenditure. General concepts about growth and development through different stages of life.

### UNIT-II

Preschool -, Food habits and nutrient intake of preschool children. Dietary allowances and supplementary foods.

School going age -, Nutritional status of school children, school lunch program, factors to be considered in planning a menu, food habits and nutritional requirement, packed lunch.

### UNIT-III

Adolescence: Changes of growth characteristics of adolescents. Nutritional needs of the adolescents.

Adults: Nutrition for adults. Basis for requirement. Nutrition and work efficiency.

### UNIT-IV: NUTRITION IN PREGNANCY

ICMR Nutrient allowances, Dietary guidelines. Common nutrition related problem of pregnancy and Lactation.

### UNIT-V

Geriatric -Nutrition allowances - Dietary Guidelines -- psycho social and economical factors affecting eating behavior.

Infant -Rate of growth, weight as the indicator, Nutrition allowances for the infants. Breast feeding. Weaning foods suitable for infants. Premature infant and their feeding infant formulas.

**REFERENCES**

**BOOKS**

Nix .S 2016, Williams' Basic Nutrition & Diet Therapy, Fifteenth Edition, Elsevier.

Simon Langley-Evans, 2015 Nutrition, Health and Disease: A Lifespan Approach 2nd Edition, Wiley Blackwell.

Jacalyn J. McComb, Reid Norman, et al.,The Active Female: Health Issues Throughout

the Lifespan 2010, Human press.

Aleta L. Meyer and Thomas P. Gullotta., Physical Activity Across the Lifespan: Prevention and Treatment for Health and Well-Being (Issues in Children's and Families' Lives), 2012, Springer.

Antia, F.P., 1992, Clinical Dietetics and Nutrition Oxford University Press, New Delhi.

Corinne, R.H., 1996, Normal and therapeutic nutrition, Mcmallian Co., New York.

Davidson, S.R. and Passmore J.F., 1989, Human Nutrition and Dietetics, ELBS London.

Mahan, K.L., and Stump, S.E., 1996, Krauses Food, Nutrition and Diet therapy M.B. Saunders Co., USA.

Balasubramanian et al., 1998, Dietary guidelines for Indians, ICMR, New Delhi.

Passmore, AH and Adams, A.A., 1990, Clinical assessment of nutritional status – A working manual, Will and Wilson Publishing, London.

Bamji et al(1996), Textbook of Human Nutrition Oxford and IBH Publishing co. Pvt. Ltd. Delhi.

Shils.E.M, Shike .M, Ross. A.C, Cabellero.B and Cousins.R.J (2011) Modern Nutrition in Health and Disease, Eleventh Edition, Lippincott Williams and Wilkins, Philadelphia.

Mahan, K.L., and Stump, S.E., 1996, Krauses Food, Nutrition and Diet therapy M.B. Saunders Co., USA.

**E- LEARNING RESOURCES**

- www.four-h.purdue.edu
- www.ingenta.connect.com
- nal.usda.gov/fnic/lifecycle

**MAPPING (CO/PSO):**

| CO/PO | PSO 1 | PSO2 | PSO 3 | PSO 4 | PSO 5 | PSO 6 |
|---|---|---|---|---|---|---|
| **CO1** | 3 | 3 | 3 | 2 | 2 | 2 |
| **CO2** | 3 | 3 | 2 | 2 | 3 | 2 |
| **CO3** | 2 | 3 | 2 | 1 | 2 | 2 |
| **CO4** | 3 | 3 | 3 | 3 | 3 | 3 |
| **CO5** | 3 | 3 | 3 | 3 | 3 | 3 |
| **Average** | 2.8 | 3 | 2.6 | 2.2 | 2.6 | 2.4 |

**PEDAGOGY:**

Lecture, Journal Reviewing, Power point presentations, Assignments and Discussions

## 1.6 ELECTIVE GENERIC /DISCIPLINE CENTRIC II PRACTICAL

## FOOD PROCESSING AND TECHNOLOGY

1. Refrigeration and Freezing of fruits and vegetables.
2. Refrigeration and Freezing of meat and fish.
3. Sun and Oven drying of Fruits and Vegetables.
4. Preparation of Jam, Jelly, Syrup and Squash.
5. Preparation of pickles.
6. Visit to Canning and Bottling unit.
7. Visit to fish processing unit.
8. Visit to a food packaging unit.

### COURSE OUTCOMES:

On completion of the course, students will be able to

CO 1. To develop the skill to analyze the quality like sugar such as jam, jelly etc.CO 2. To explain the fermentation process such as canning and bottling unit .

CO 3. To analyze technologies in food preservation.. CO 4. To discuss preservation of foods by salt and acid.

CO 5. To evaluate the novel technologies in food preservation.

**Mapping**

| Food Processing and Preservation Practical | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO** | **PO** | | | | | **PSO** | | | | | |
| | **1** | **2** | **3** | **4** | **5** | **1** | **2** | **3** | **4** | **5** | **6** |
| **1** | **3** | **3** | **3** | **3** | **2** | **3** | **3** | **3** | **3** | **3** | **3** |
| **2** | **3** | **3** | **3** | **1** | **2** | **3** | **3** | **2** | **3** | **3** | **2** |
| **3** | **3** | **3** | **3** | **3** | **2** | **3** | **3** | **2** | **3** | **3** | **2** |
| **4** | **3** | **3** | **3** | **3** | **2** | **3** | **3** | **2** | **3** | **3** | **2** |
| **5** | **3** | **3** | **2** | **3** | **3** | **3** | **3** | **2** | **3** | **3** | **2** |

**Strongly Correlated (3); Moderately Correlated (2); Weakly Correlated (1); No Correlation (0)**

## 1.7 SKILL ENHANCEMENT COURSE 1

### Computer in Nutrition Research

### Course objective

1. Understand the basics of computer and its applications
2. Gain knowledge to use computers
3. Develop skills to apply computer based technology in Food science and Nutrition

### Course Out Comes

1. The student will gain knowledge on computer applications.

2. The knowledge on Operating system and MS Office will be enhanced

3. Acquire knowledge on computer networks.

4. To gain knowledge on computer networking system and apply in the field of food science, nutrition and research.

**UNIT I**

Introduction to Computers History of Development of Computers, Main Frame, Minis, Micros and Super Computer Systems, Binary numbers, Bits, Bytes, CPU, Input and Output Devices, Recent software's in field of food and Nutrition .

UNIT II

Operating Systems and MS Office Introduction to Operating Systems, Windows Applications MS Word, MS Excel. MS Access and MS PowerPoint

### UNIT III

Nutrition software and websites, e-journals in Food Science and Nutrition, Use of SPSS.

### UNIT IV

Application of Computers in Food Science and Nutrition -Power point presentation, nutrient and diet calculations, nutrition education and counselling,

### REFERENCES

Balagurusamy. E (2008) Computing Fundamentals and C Programming, Tata McGraw Hill Education Private Limited, New Delhi.

Bansal.S.K (2004) Text Book of Information Technology , APH, Publishing Corporation.

Andrew S. Tanenbaum (2009) IV Edition, Computer Networks, Pearson

Education And Dorling Kindersley Publishers, Delhi.

James F. Kurose and Keith W Ross (2008) III Edition, Computer Networking. A Top-Down Approach Featuring the Internet, Pearson Education and Dorling Kindersley Publishers, Delhi.

Ralf Steinmetz and KlaraNahrstedt (2011) Multimedia- Computing, Communications and Applications, Pearson Education and Dorling Kindersley Publishers, Delhi

**MAPPING (CO/PSO):**

| CO/PO | PSO 1 | PSO2 | PSO 3 | PSO 4 | PSO 5 | PSO 6 |
|---|---|---|---|---|---|---|
| **CO1** | 3 | 3 | 3 | 2 | 2 | 2 |
| **CO2** | 3 | 3 | 2 | 2 | 3 | 2 |
| **CO3** | 2 | 3 | 2 | 1 | 2 | 2 |
| **CO4** | 3 | 3 | 3 | 3 | 3 | 3 |
| **CO5** | 3 | 3 | 3 | 3 | 3 | 3 |
| **Average** | 2.8 | 3 | 2.6 | 2.2 | 2.6 | 2.4 |

**PEDAGOGY:**

Lecture, Journal Reviewing, Power point presentations, Assignments and Discussions

## Semester - II

## M.Sc. Dietetics and Food Management

### INTRODUCTION:

Outcome-Based Education is incorporated into the curriculum based on the requirements of NAAC and UGC – Quality Mandate (2018). To fulfill these requirements, the Programme Educational Objectives (PEOs), Programme Outcomes (POs) and Programme Specific Outcomes (PSOs) and Course Outcomes (COs) were framed for all programmes in alignment with the Vision, Mission and Educational Objectives of the University.

### VISION AND MISSION OF THE UNIVERSITY:

### VISION:

To provide quality education to reach the un-reached.

### MISSION:

- To conduct research, teaching and outreach programmes to improve conditions of human living.
- To create an academic environment that glorify women and men of all races, caste, creed, cultures and all atmosphere that values intellectual curiosity, pursuit of knowledge , academic freedom and integrity.
- To offer a wide variety of campus educational and training programmes, including the use of information technology to individuals and groups.
- To develop partnership with industries and government so as to improve the quality of work place and to serve as catalyst for economic and cultural development.
- To provide quality / inclusive education especially for the rural and unreached segments of economically downtrodden students including women, socially oppressed and differently abled.

### PREAMBLE:

The post graduate programme in this discipline has been designed to provide the students intensive and extensive theoretical and experiential learning. The programme allows flexibility in the choices based

credit systems. It is envisaged that the current of thrust areas, which students can select, based require trained professionals in areas such as Public Nutrition, Dietetics and Clinical Nutrition, Institutional Food Administration as well as Food Science and Quality Control.

| TANSCHE REGULATIONS ON LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK FOR POSTGRADUATE EDUCATION | |
|---|---|
| **Programme** | **M.Sc. DIETETICS AND FOOD MANAGEMENT** |
| **Programme Code** | |
| **Duration** | **2 years for PG** |
| **Programme Outcomes (Pos)** | **PO1: Problem Solving Skill**<br>Apply knowledge of Management theories and Human Resource practices to solve business problems through research in Global context.<br>**PO2: Decision Making Skill**<br>Foster analytical and critical thinking abilities for data-based decision-making.<br><br>**PO3: Ethical Value**<br>Ability to incorporate quality, ethical and legal value-based perspectives to all organizational activities.<br><br>**PO4: Communication Skill**<br>Ability to develop communication, managerial and interpersonal skills.<br><br>**PO5: Individual and Team Leadership Skill**<br>Capability to lead themselves and the team to achieve organizational goals.<br>**PO6: Employability Skill**<br>Inculcate contemporary business practices to enhance employability skills in the competitive environment.<br><br>**PO7: Entrepreneurial Skill**<br>Equip with skills and competencies to become an entrepreneur.<br><br>**PO8: Contribution to Society**<br>Succeed in career endeavors and contribute significantly to society.<br><br>**PO 9 Multicultural competence**<br>Possess knowledge of the values and beliefs of multiple cultures and a global perspective.<br><br>**PO 10: Moral and ethical awareness/reasoning**<br>Ability to embrace moral/ethical values in conducting one's life. |
| **Programme Specific Outcomes (PSOs)** | **PSO1 – Placement**<br>To prepare the students who will demonstrate respectful engagement with others' ideas, behaviors, beliefs and apply diverse frames of reference to decisions and actions.<br><br>**PSO 2 - Entrepreneur**<br>To create effective entrepreneurs by enhancing their critical thinking, problem solving, decision making and leadership skill that will facilitate startups and high potential organizations. |

| | |
|---|---|
| | **PSO3 – Research and Development**<br>Design and implement HR systems and practices grounded in research that comply with employment laws, leading the organization towards growth and development.<br><br>**PSO4 – Contribution to Business World**<br>To produce employable, ethical and innovative professionals to sustain in the dynamic business world.<br><br>**PSO 5 – Contribution to the Society**<br>To contribute to the development of the society by collaborating with stakeholders for mutual benefit. |

**SEMESTER-II**

| COURSE COMPONENT | SUBJECT | INST HOURS | CREDITS |
|---|---|---|---|
| **2.1 CORE-IV** | Research Methods in Nutrition | **6** | **5** |
| **2.2 CORE- V** | Therapeutic Dietetics | **6 (4+2)*** | **5** |
| **2.3 CORE- VI** | Therapeutic Dietetics- Practical | **6** | **4** |
| **2.4 Elective - III** | Sports Nutrition | **4** | **3** |
| **2.5 Elective - IV** | Functional Foods and Health | **4** | **3** |
| **2.6** | Skill Enhancement Course [SEC] - NME - I | **4** | **2** |
| **Total** | | **30** | **22** |

**2.1 CORE: IV**
**RESEARCH METHODS IN NUTRITION**

**CREDIT : 5** **SEMESTER :2**
**YEAR :1** **HOURS : 6**

**OBJECTIVES:**

To provide students understandings about the basic concepts, approaches and methods in conducting research thereby enabling them to appreciate and critique the nuances of designing a research study as well the ethical dimensions of conducting researches.

To explain the importance of research in food science and nutrition.

To make students understand the types of tools applicable to research problem and develop skills of preparing out line of research work and construct common data collection tools.

**COURSE OUTCOME:**

On successful completion of the course the student will be able to

| CO No. | CO STATEMENT |
|---|---|
| **CO 1** | Demonstrate knowledge of the scientific method, purpose and approaches to research and Become a qualified researcher. |
| **CO 2** | Identify and selection of the research sampling and scales of measurement |
| **CO 3** | Understand the types of tools applicable to research problem and develop skills of preparing out line of research work and construct common data collection tools |
| **CO 4** | Assess the numerical data for providing statistical evidences to support the research results and interpretation of data with the use of tables and pictorial representations |
| **CO 5** | Present research data in a scientific manner and Understand the key elements of a research report and various applications of computer in Nutrition research |

## Unit 1: Foundation of Nutrition Research

1. Meaning, Objectives and Classification of Research Designs –**Exploratory, Descriptive** – Longitudinal and Cross sectional, Observation-Participant and Non-participant, Epidemiological Surveillance, Retrospective, IN VIVO, IN VITRO and **Experimental** – Pre-Experimental, Quasi Experimental, True Experimental and Statistical Experimental designs.
2. Need of Research in Food Science and Nutrition
3. Research Process-
    - Selection and Formulation of Research Problem
    - Objectives of Research: Explanation, Control and Prediction

- Hypothesis: Definition, Importance, Types and Errors - I & II
- Deciding Variables

**Unit 2: Sampling and Sample Design**

Sampling Process and Characteristics of good Sampling

1. Classification of Sampling Techniques - Probability and Non Probability Sampling
2. Preparation of Laboratory Food Samples
3. Sampling and Non- Sampling Errors

**Measurements and Scaling -**

**1. Fundamental and Comparative Scales – Meaning and types**

- Nominal Scale
- Ordinal Scale
- Interval Scale
- Ratio Scale

**2. Non comparative Scales– Meaning and types**

1. Continuous Rating Scale
2. Itemized Rating Scale

- Likert Scale
- Semantic Differential Scale
- Stapel Scale

**Unit 3: Data Collection and Preparation**

**1. Data Collection – Tools –0**

**Primary Data**

1.Interviews -structured and unstructured
2. Case studies
3. Questionnaire
4. Surveys – Pilot & KAP
5. LaboratoryExperiments

**Secondary Data**

1. Published Sources
2. Unpublished Sources
3. **Reliability and Validity** of Tools– Meaning
4. **Data Preparation Process –**
    - Editing
    - Coding
    - Classification
    - Tabulation

**Unit 4: Statistical Methods**

1. **Parametric and Non-Parametric tests –** Difference and Applications
2. **Data Analysis Process-**

    1. **Descriptive Analysis-**
        - Graphical and Diagrammatic Presentations
        - Central Tendency – Mean, Median & Mode
        - Dispersion -Standard Deviation
    2. **Statistical Inference – Tests of Hypothesis**
        - t – test
        - ANOVA – One Way & Two Way
        - Chi- square test – Goodness of Fit &Test of Independence

**Unit 5: Reporting the Findings and Computer Applications**

1. **Report Writing –**
    - Importance
    - Types
    - Mechanics
    - Guidelines and Precautions
    - End Notes- Bibliography, Appendices, Footnotes and Glossary of terms

**2. computer applications in nutrition research -importance and uses**

**3.Applicable Statistical Analysis Software-**

- **Literature Searching-**PubMed
- **Data Analysis-** Micro Soft Excel, SPSS, Minitab
- **Plagiarism Checker** – Turnitin, Scribbr

**TEXTBOOKS**


- Kothari C R (2004). Research Methodology – Methods & Methodology. Delhi, New Age International Pvt Ltd. 2nd Ed
- Chawla,Deepak and NeenaSondhi (2018):Research Methodology-Concepts and Cases. Noida, Vikas Publishing House Pvt Ltd. 2nd Ed.
- Gupta, S P (2019). Statistical Methods. New Delhi. S Chand & Sons. 45th Ed.
- Copper, H.M. (2002). IntergratingResearch : A guide for literature reviews. California: Sage, 2nd Edition.
- Kerlinger, Foundation of Educational Research Ingle P.O. Scientific Report Writing. Nagpur, Sarla P. Ingle.

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- Ranjit Kumar (2011). Research Methodology: a step-by-step guide for beginners, SAGE Publications. 3rd edition.
- Anderson, David R and et.al.(2013) : Statistics for Business and Economics. Delhi, Cengage Learning India Pvt Ltd. 11th Ed.
- Bandarkar, P.L. and Wilkinson T.S. (2000): Methodology and Techniques of Social Research. Himalaya Publishing House, Mumbai.
- Bell, Judith (2005): Doing your Research Project – A guide for first time researchers in education, health and social science. England, Open University Press. 4th Ed.
- Danial, Wayne W and Chad L Cross (2017): Biostatistics – Basic Concepts and Methodology For the Health Sciences – International Student Version. New Delhi, ArEmmInternatonal, 10th Ed.


**Mapping: (CO/PSO)**

| CO/PSO | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PSO 5 | PSO 6 |
|---|---|---|---|---|---|---|
| **CO1** | 1 | 3 | 2 | 2 | 3 | 2 |
| **CO2** | 1 | 1 | 1 | 0 | 2 | 1 |
| **CO3** | 3 | 3 | 3 | 3 | 3 | 2 |
| **CO4** | 1 | 3 | 3 | 0 | 3 | 1 |
| **CO5** | 3 | 2 | 3 | 0 | 0 | 1 |
| **Average** | **1.8** | **2.4** | **2.4** | **1** | **2.2** | **1.4** |

**PEDAGOGY**

Lecture, Power Point Presentation, Demonstration, Group Discussion, Assignment, Seminars and Oral & Written Revision

**CORE V**

**THERAPEUTIC DIETETICS**

**CODE:**

**Time/Hours: 6 Hours (Theory)** **Year I**

**Credits 5** **Semester: II**

**LEARNING OBJECTIVES**

**This course will enable students to**

1. Understand the aetiology, physiologic& metabolic anomalies of acute and/ or chronic disease states and its effect on nutrient requirements.
2. Identify the crucial points of disease management through nutrition support.
3. Recommend appropriate nutrition therapy for various disease conditions.

**COURSE OUTCOME**

**On successful completion of the course the student will be able to:**

| CO | CO STATEMENT | KLEVEL |
|---|---|---|
| **CO1** | Explain pathophysiology, signs and symptoms and nutrition management of the various disease conditions of upper and lower Gastro Intestinal tract. | **K1,K2,K3** |
| **CO2** | Enumeratethetypes,etiology,symptomsandcomplicationsandexplainthedietarymanagementofdiseasesofliver,Biliaryandpancreaticdiseases. | **K1,K2,K3** |
| **CO3** | Comprehendthenutrientrequirementforeachdiseaseconditionincluding Cardiovascular, Renal and Lung diseases | **K1,K2,K3** |
| **CO4** | Demonstrateskillincalculatingandclassifyingthedegreesofobesityandproficiencyinidentifyingthediettherapyforweightmanagementandrelatedinterventions. | **K4,K5** |
| **CO5** | Identifytheindications,contraindications,routesofdeliveryanddevelop a monitoring system for Enteral and Parenteral Nutrition support. | **K5,K6** |
| **K1**-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create | | |

**THEORY**

| S.No. | CONTENT | HOURS |
|---|---|---|
| **Unit I** | **Medical Nutrition Therapy for Gastro intestinal Diseases**<br>a) Dietary management of Upper gastro intestinal diseases: Etiology, signs & symptoms, complications and dietary management for: Gastro-oesophageal reflux disease(GERD), Oesophagitis, Oral Cavity Cancer Stomach:Dyspepsia,Gastritis,Peptic&DuodenalUlcer,StomachCancer,Gastric Surgery, Dumping Syndrome<br>b) Dietary management of Lower gastro intestinal diseases Etiology, signs & symptoms, complications and dietary management ofFlatulence,Constipation,Diahorrea,Steatorrhea,CeliacDisease,Lactose Intolerance, Cow‟s Milk Protein Allergy, Inflammatory Bowel Disease (Ulcerative Colitis& Crohn‟s Disease), IrritableBowelSyndrome,Diverticulosis&Diverticulitis,ShortBowelSyndrome(SBS), Ileostomy, Colostomy, Protein Losing Enteropathy | **20** |
| **Unit II** | **Medical Nutrition Therapy for Liver, Biliary &Pancreatic Diseases**<br>a) Physiology,functionsofLiverandLiverfunctiontests.Dietarymanagement ofAcute&ChronicHepatitis,Non-alcoholicSteatohepatitis(NASH),Stages&ProgressionofLiverDisease,Wilson‟sDisease,HepaticEncephalopathy.<br>b) Etiology,symptomsanddietarymanagementofCholelithiasis,Cholecystitisandcholecystectomy.<br>c) Dietary management and diagnostic tests of Pancreatic disorders; Acute& Chronic Pancreatitis, Type 1 Diabetes, Type 2 Diabetes, Gestational Diabetes. | **15** |
| **Unit III** | **Medical Nutrition Therapy for Cardiovascular, Renal & Lung Diseases**<br>a) Prevalence, Pathophysiology, risk factors, diagnostic tests and dietarymanagementofcardiovasculardiseases;Atherosclerosis,Hyperlipidaemia,Hypertension,Anginapectoris,Myocardialinfarction,congestiveheartfailure.<br>b) Pathophysiology,classification,diagnostictests,riskfactorsanddietary management of renal diseases: Glomerulonephritis, NephroticSyndrome,Nephrolithiasis,AcuteKidneyInjury,ChronicKidneyDisease<br>c) Pathophysiology,riskfactorsanddietarymanagementoflungdiseases:Asthma,ChronicObstructivePulmonaryDisease(COPD),Tuberculosis, Lung Cancer | **20** |
| **Unit IV** | **Medical Nutrition Therapy for Weight Management and Other Conditions**<br>a) Etiology,classification,clinicalmanifestation,energybalance,management of Obesity: Components & regulation of Body Weight, Types & causes of Obesity, Nutritional Management, Nutrition post Bariatric Surgery<br>b) Etiology,clinicalmanifestationandDietarymanagementofUnderweight,HyperandHypothyroidism<br>c) Classification,hydrationcalculation,dietarymanagementinBurns,AIDS, Dysphagia,Stroke,Gout,Anaemia,Fever. | **20** |

| | | |
|---|---|---|
| **UnitV** | **Advanced Nutrition Intervention**<br>a) Assessment,calculation,formulation,andmonitoringofEnteralNutritionSupport:Indications,Contraindications,Routesofaccess,Types of Enteral Formulae & its composition, Nutrient Delivery &Monitoring<br>b) Assessment,calculation,formulation,andmonitoringofParenteralNutritionSupport:Indications,Contraindications,Routesofaccess,calculationofParenteralNutrition,NutrientDelivery&Monitoring | **15** |
| | | **90** |

**REFERENCES BOOKS**


- Mahan, L.K. & Escott-Stump, S. (2008) Krause's Food & the Nutrition Care Therapy,InternationalEdition,12th Edition,Saunders ElsevierPublication.
- Shils,M.E.,Olson,J.A.,Shike,M.andRoss,A.C.(1999):ModernNutritioninHealthandDisease,9thEdition,WilliamsandWilkins
- Garrow, J.S., James, W.P.T. and Ralph, A. (2000): Human Nutrition and Dietetics,10th Edition,ChurchillLivingstone
- Sue Rodwell Williams (2013) Nutrition,DietTherapy (9th ed.). WB SaundersCompany,London
- NixS.(2013)Williams'BasicNutrition&DietTherapy.14thEdition.Pub.Elsevier
- VinithaKrishnan(2013) Nutritionplanningaidforpracticingdietitians.


**JOURNAL**

- NutritionUpdateSeries
- WorldReviewofNutritionandDietetics
- JournaloftheAmericanDieteticAssociation
- AmericanJournalofClinicalNutrition
- EuropeanJournalofClinicalNutrition
- NutritionReview

**E-LEARNINGRESOURCES**

- https://www.espen.org
- https://www.nutritioncare.org/home
- https://www.idf.org
- https://ispad.org
- https://www.diabetes.org
- https://www.eatright.org

**MAPPING OF CO WITH PSO**

| CO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | PSO6 |
|---|---|---|---|---|---|---|
| **CO1** | S | S | S | M | S | S |
| **CO2** | S | S | S | M | S | S |
| **CO3** | S | S | S | M | S | S |
| **CO4** | S | S | S | M | S | S |
| **CO5** | S | S | S | M | S | S |

## CORE VI

## THERAPEUTIC DIETETICS PRACTICAL

**CODE:**

**Time/Hours: 6Hours**
**Credits 4**
**LEARNINGOBJECTIVES**
**Year I**

**Semester II**

1. Enablestudentstouse,applyandinterpretvariousmethodsofscreeningandassessme ntofnutritionalstatus.
2. Understand commonly used tests for diagnosis of various diseases
3. Apply principles of diet therapy in planning and preparation of foods for various disease conditions.
4. Evaluateandunderstandnutritionlabelstomakeinformedfoodchoicesforselfandeducatep atients.
5. Knowthevariousnutritionalsupplementsavailableandidentifyitsappropriateusage.

**COURSE OUT COME**
**On successful completion of the course, the student will be able to:**

| No. | COURSE OUT COME STATEMENT | KLEVEL |
|---|---|---|
| **CO1** | Recall and understand various methods of nutritional screening and use of assessment tools. Select the appropriate screening methods and assessment tools for the purpose on hand. Acquire the skill to accurate lyassess and interpret the nutritional status of the individual. | **K1,K2,K3** |
| **CO2** | Apply dietetic principle sin planning, preparing and evaluating meals intended for various disease conditions. | **K3,K5,K6** |
| **CO3** | Applydieteticprinciplesinplanning,preparingandevaluatingmealsint endedforpatientsrequiring modificationinconsistencyoffood-stroke,gastrointestinaldiseaseconditions. | **K3,K5,K6** |
| **CO4** | Analysenutritionlabelsofnutritionalsupplementsanddetermineitsapp ropriate usage | **K4** |
| **CO5** | Execute a market survey on nutraceuticals and nutrition supplements, analyse and prepare tube feeding formulas. | **K5,K6** |
| **K1** -Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create | | |

**CONTENT**

| S.No. | CONTENT | HOURS |
|---|---|---|
| **UnitI** | **Dietitian Skills Training–I (Steps in evolved in Nutrition Assessment & Screening)**<br>a) Nutrition Screening & Assessment Tools: Malnutrition Universal Screening Tool (MUST), Nutrition Risk Screening (NRS-2002),Mini Nutritional Assessment (MNA), Subjective Global Assessment (SGA), Global Leadership Initiative for Malnutrition (GLIM)Criteria<br>b) Bed-side assessment tools: Nutrition Focused Physical Examination (NFPE),Anthropometric Assessment, Body Mass Index (BMI), Bioelectrical Impedance Analysis (BIA), Hand-gripdynamometer, Skin-fold Thickness, Biochemical parameters & itsrelationto disease conditions<br>c) Problem, Aetiology, Signs & Symptoms (PESS) Statement – Casestudies | **25** |
| **UnitII** | **Preparation of Therapeutic Diets–I**<br>a) Planning, preparation and calculation of nutritive value of sample diet for conditions such as-Typhoid, Jaundice, Hepatitis, Cirrhosis, Pancreatitis, Cholelithiasis, COVID-19.<br>b) Planningandpreparationandcalculationofnutritivevalueofsampledie tforconditionssuchasHyperlipidaemia,Obesity, Hypertension, Stages of renal disease, Renal calculi<br>c) Carbohydrate Counting in Diabetes | **20** |
| **UnitIII** | **Preparation of Therapeutic Diets–II(Preparation of Sample Menu)**<br>a) Planning and preparation of sample diet for Anaemia<br>b) Planning,preparationandcalculationofnutritivevalueofsampledietfo r Ulcerative Colitis, Crohn‟s Disease, Lactose Intolerance, Celiac Disease<br>c) Menu Planning for Dysphagiain Stroke, Constipation, Diahorrea. | **15** |
| **UnitIV** | **Dietitian Skills Training–II**<br>a) Construction of an Exchange List for Calorie, Carbohydrate and Potassium.<br>b) Understanding Nutrition Labelling, Market Survey and evaluation of food products. | **15** |
| **UnitV** | **Advanced Nutrition Intervention**<br>a) Familiarisingandanalysingthenutritionsupplementsavailableforvari ous disease conditions.<br>b) Planning and Preparation of tube feeds based on case study. | **15** |
| | | **90** |

**REFERENCES BOOKS**


- Mahan, L.K. & Escott-Stump, S. (2008) Krause's Food & the Nutrition Care Therapy,InternationalEdition,12th Edition,Saunders ElsevierPublication.
- Shils,M.E.,Olson,J.A.,Shike,M.andRoss,A.C.(1999):ModernNutritioninHealthandDisease,9thEdition,WilliamsandWilkins
- Garrow,J.S.,James,W.P.T.andRalph,A.(2000):HumanNutritionandDietetics,10th Edition,ChurchillLivingstone
- Sue Rodwell Williams (2013) Nutrition,DietTherapy (9th ed.). WB SaundersCompany,London
- NixS.(2013)Williams'BasicNutrition&DietTherapy.14thEdition.Pub.Elsevier
- VinithaKrishnan(2013)Nutritionplanningaidforpracticingdietitians.


**JOURNALS**

- NutritionUpdateSeries
- WorldReviewofNutritionandDietetics
- JournaloftheAmericanDieteticAssociation
- AmericanJournalofClinicalNutrition
- EuropeanJournalofClinicalNutrition
- NutritionReview

**E-LEARNING RESOURCES**

- https://www.espen.org
- https://www.nutritioncare.org/home
- https://www.idf.org
- https://ispad.org
- https://www.diabetes.org
- https://www.eatright.org

**MAPPING OF CO WITH PSO**

| CO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | PSO6 |
|---|---|---|---|---|---|---|
| **CO1** | S | S | S | S | S | S |
| **CO2** | S | S | S | S | S | S |
| **CO3** | S | S | S | M | S | S |
| **CO4** | S | S | S | M | S | S |
| **CO5** | S | S | S | M | S | S |

## ELECTIVE III – SPORTS NUTRITION

**CODE:**

**Time/Hours: 4 Hours (Theory)** **Year I**

**Credits 3** **Semester:II**

**LEARNING OBJECTIVES**

**To enable the students to**

1. Learn the effects of exercise on the physiological and energy systems of the body.
2. Understand the link between exercise and the demand it places on the nutrients in the body
3. Translatenutrientgoalsofanathleteintoappropriatedietplansthatcanenhanceperformance

**COURSE OUT COME**

**On successful completion of the course the student will be able to:**

| CO | CO STATEMENT | KLEVEL |
|---|---|---|
| **CO1** | Recall the principles of exercise training, distinguish between various types of athletes and methods of body assessment, relatebodycompositiontoperformanceandidentifysuitabletrainingand eating plans for weight management | **K1,K2,K3** |
| **CO2** | Explain the structure of muscle fiber, process of skeletal muscle contraction. Discuss muscular plasticity, cardio pulmonary adaptation and endocrinal response to exercise | **K2** |
| **CO3** | Demonstratetheskilltochoosefoodsandcreatemealplansbefore,during andafterexerciseorcompetitionwhichenhanceperformance | **K4,K6** |
| **CO4** | Identify and include foods in daily eating plans that meet the enhanced micronutrient requirements of anathlete | **K3** |
| **CO5** | Analysehydrationandelectrolyterequirementsofanathleteandevaluate dietarysupplements for recommendation to athletes | **K3,K5** |
| **K1**-Remember;**K2**-Understand;**K3**-Apply;**K4** -Analyze;**K5**-Evaluate; **K6**–Create | | |

**THEORY**

| S.No | CONTENT | No ofhours |
|---|---|---|
| **UnitI** | **Exercise–Principles, Assessment and Weight Management**<br>a. Definition of Exercise, Types of exercise, Principles of Exercisetraining.TypeofAthlete-Resistance,EnduranceandPowerathlete<br>b. Assessment- Methods of assessment of Body Composition, Relationship between body composition and performance<br>c. WeightManagement-Weightlossandweightgainaspreparationforcompetition | **15** |
| **UnitII** | **Exercise Physiology and Energy Systems**<br>a. Muscle Physiology- Structure of skeletal muscle, muscle fiber types,musculararcontraction,muscularadaptationtoexercise;Cardiopulmonaryresponseand adaptation to exercise;<br>Exercise training and endocrine system<br>b. Energy system for exercise-Creatinine Phosphate energy system, anerobicglycolyticsystem,aerobicenergysystem-oxidativephosphorylation | **15** |
| **UnitIII** | **Fuelling for exercise**<br>a. Carbohydrate-utilizationofcarbohydrateduringexercise,carbohydrate recommendations for athlete, guidelines for intake before, during and after exercise; carbohydrate loading<br>b. Protein- protein recommendation for athletes, timing of protein intake, effects of inadequate and excessive protein intake on performance and health, use of protein and amino acid supplements, consideration of protein intake for vegetarian athletes.<br>c. Fat- Fat as source of energy for exercise, fat loading, fatrecommendationforathlete,effectofinadequateintakeoffatonperformanceandhealth | **15** |
| **UnitIV** | **Role of Vitamins and Minerals**<br>a. Vitamins-recommendedintakeofvitaminsforathletes,Influenceofexerciseonvitaminrequirements,antioxidantfunction<br>b. Minerals–recommendedintakeofmineralsforathlete;importanceofCa.Fe,Zincand Mginanathlete‟s diet; female athletic triad | **15** |
| **UnitV** | **Role of Fluid, Electrolytes and Nutritional Supplements**<br>a. Effect of exercise on fluid and electrolyte balance; hypohydration,hyperhydration,hyponatremia,maintenanceofhydrationbefore,duringandafterexercise.Useofsports drinks<br>b. Definition of nutritional ergogenicaids and dietary supplements. Types of dietary supplements most frequently used by athletes, benefitsand/orrisksintheuseofsupplements,mechanismofactionandsupplementprotocol. | **15** |
| | | **75** |

**REFERENCES BOOKS**


- BeanA(2000),,Thecomplexguidetosportsnutrition"A&CBlackPublishers,London
- ClarkN(2003),,SportsNutritionGuidebook",HumanKinetics,U.S.A.
- DunfordMandDoyleAJ,NutritionforSportandExercise,ThomsonWadsworth,Australia.
- FinkHH,MikeskyAE,Burgoon LA(2012)PracticalApplicationsinSportsNutrition,JonesandBarlettLearning,U.S.A.
- BagchiD.,NairS.,SenC.K.,Ed.,(2013)Nutrition andEnhancedSportsPerformance-MuslceBuilding,EnduranceandStrength,Elseveir,AcademicPress,UK,USA.
- SrilakshmiB,Suganthi.,AshokC.K.,(2016)-ExercisePhysiology,FitnessandSportsNutrition,New AgeInternational PrivateLimited


**E-LEARNING RESOURCES**

- http://www.aco.org.nz/pdf/nutrition-for-sports
- https://www.researchgate.net/publication/258630492_Sports_Nutrition_Book_2013http://themedicalbiochemistrypage.org

**MAPPING OF CO WITH PSO**

| CO/PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | PSO6 |
|---|---|---|---|---|---|---|
| **CO1** | S | S | S | S | S | S |
| **CO2** | S | S | S | S | S | S |
| **CO3** | S | S | S | S | S | S |
| **CO4** | S | S | S | S | S | S |
| **CO5** | S | S | S | S | S | S |

**ELECTIVE IV**

**FUNCTIONAL FOODS AND HEALTH**

**CODE:**

**Time/Hours: 4Hours (Theory)** **Year I**

**Credits 3** **Semester:II**

**LEARNING OBJECTIVES**

**To enable the students to**

1. Get an overview of the field of functional foods, nutraceuticals and natural health products.
2. Understandthefunctionalfoodconceptasrelatedtoingredientefficacyandsafety.
3. Getfamiliarwithexamplesofbioactiveingredient-diseaserelationships

**COURSE OUTCOME**

| CO | CO STATEMENT | KLEVEL |
|---|---|---|
| **CO1** | Describe components of nutraceutical and functional foods. Distinguish between conventional foods vs. functional foods as well as Nutraceuticals vs. pharmaceuticals. | **K1,K2,K3** |
| **CO2** | Critically evaluate the health benefits of different types of Nutraceuticals | **K2,K5** |
| **CO3** | Distinguishbetweenprebioticandprobioticfoods,theirsources,health effectsandpotential for risk reduction of diseases | **K4,K6** |
| **CO4** | Discussthetherapeuticpotentialoffunctionalfoodsbasedonthebioactiveingredients present in them. | **K5** |
| **CO5** | Recall the functional properties of Indian Super foods and recommend their appropriate usage | **K2,K3** |
| **K1**-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate; **K6**–Create | | |

**THEORY**

| S.No | CONTENT | No ofhours |
|---|---|---|
| **Unit I** | **Concept of functional foods and nutraceuticals**<br>a. FunctionalFoodandNutraceuticals-Definition,history,typesandclassification.<br>b. Benefits of functional foods and nutraceuticals<br>c. Criteriatodiscriminatebetweenconventionalandfunctionalfoods.Roleof functional foods in health promotion and disease prevention. Market for functional foods and factors driving their growth | **15** |
| **Unit II** | **Probiotics**<br>a. Definitionandimportantfeaturesofprobioticmicro-organisms,Healtheffects of probiotics.<br>b. Probioticsinvariousfoods:fermentedmilkproducts,non-milkproductsandsafetyaspectsofprobiotics. | **15** |
| **Unit III** | **Prebiotics**<br>a. Definition,sources,effectofprocessing,physiologicaleffects,effectsonhumanhealthandpotentialapplicationsinriskreductionofdiseases.<br>b. Food applications of – non-digestible carbohydrates /oligosaccharides, Dietary fibre, Resistant starch, Gums. | **15** |
| **Unit IV** | **Functional foods and bioactive ingredients for risk reduction of diseases**<br>a. Bioactive compounds in foods- Polyphenols, Flavonoids, catechins, isoflavones, tannins, Phytoesterogens, Phytosterols, Glucosinolates,OrganosulphurCompounds,Othercomponents–Phytates,Protease.<br>b. Definition, sources, effects on human health and potential applications in risk reduction of diseases. | **15** |
| **UnitV** | **Therapeutic potential of Indian Super foods**<br>a. Spices and Condiments<br>b. Herbs and medicinal plants<br>c. Millets and traditional rice varieties, spirulina, chlorella | **15** |
| | | **75** |

**REFERENCES BOOKS**


- Aluko, Rotimi,Functional Foods and Nutraceuticals,Springer-Verlag New YorkInc.,2012.
- SatinderKaurBrar,SurinderKaurandGurpreetSinghDhillon,NutraceuticalsFunctionalFoods,2014.
- RobertE.C.Wildman,Robert,Wildman,TaylorC,HandbookofNutraceuticalsand FunctionalFoods, ThirdEdition,Wallace,2002.


**E-LEARNING RESOURCES**

- http://www.aco.org.nz/pdf/nutrition-for-sports
- https://www.researchgate.net/publication/258630492_Sports_Nutrition_Book_2013http://themedicalbiochemistrypage.org

**MAPPING OF CO WITH PSO**

| CO/PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | PSO6 |
|---|---|---|---|---|---|---|
| **CO1** | M | M | M | M | S | S |
| **CO2** | M | M | M | M | S | S |
| **CO3** | M | M | M | M | S | S |
| **CO4** | M | M | M | M | S | S |
| **CO5** | M | M | M | M | S | S |

## 2.6 SKILL ENHANCEMENT COURSE -SOFT SKILL –NME - 1

## NUTRITION IN SPECIAL CONDITION

**CREDIT-2**
**SEMESTER-II**
**YEAR -I**
**HOURS - 4**

**Course objective**

- To acquire knowledge on physiological changes during extreme climatric changes.
- To understand the diet pattern and food choice in special condition
- To develop the skill of planning menu for military ration.

**COURSE OUTCOME**

- Asses the physiological condition during special condition
- Design a space food and military ration
- Understand different techniques of maintain health in extreme condition
- Comprehend the dietary requirements of various climatic condition
- Plan a balanced diet for polar , hot and sea voyage condition

**UNIT 1 Space Nutrition**

Physiological changes during space flight, types of space food, essential quality and criteria required for space food

**UNIT 2 Nutrition in extreme condition**

Physiological changes , Nutritional requirement in cold polar and hot environment , food supplements .

**UNIT 3 Sea voyage**

Stress in daily life aboard, Legal background for catering , cause of malnutrition in sea voyage, Limitation in food choice and diet pattern.

**UNIT 4 Military Nutrition**

Dietary guidelines , Food choice, nutrient supplements and ration developed in militaty

**REFERENCES**


- Jacalyn J. McComb, Reid Norman, et al.,The Active Female: Health Issues Throughout the Lifespan 2010, Human press.
- Aleta L. Meyer and Thomas P. Gullotta., Physical Activity Across the Lifespan: Prevention and Treatment for Health and Well-Being (Issues in Children's and Families' Lives), 2012, Springer.
- Antia, F.P., 1992, Clinical Dietetics and Nutrition Oxford University Press, New Delhi.

Corinne, R.H., 1996, Normal and therapeutic nutrition, Mcmallian Co., New York.

**Mapping of Co with PSO:**

| CO/PSO | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PSO5 | PSO6 |
|---|---|---|---|---|---|---|
| **CO1** | 3 | 3 | 2 | 3 | 1 | 2 |
| **CO2** | 2 | 3 | 3 | 3 | 1 | 2 |
| **CO3** | 3 | 3 | 3 | 3 | 1 | 3 |
| **CO4** | 2 | 3 | 3 | 3 | 1 | 2 |
| **CO5** | 3 | 3 | 3 | 3 | 1 | 3 |
| **Average** | 2.6 | 3 | 2.8 | 3 | 1 | 2.4 |

**PEDAGOGY**

Lecture, journal reviewing, Assignments, Power point presentations, video presentations.