MANONMANIAM SUNDARANAR UNIVERSITY

TIRUNELVELI – 12

M.Sc. NUTRITION AND DIETETICS WITH HOSPITALITY MANAGEMENT

TAMILNADU STATE COUNCIL FOR HIGHER EDUCATION, CHENNAI – 600 005

FROM THE ACADEMIC YEAR 2023 – 2024 onwards

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

	PSO 2 - Entrepreneur 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** Design and implement HR systems and practices grounded in research that comply with employment laws, leading the organization towards growth and development. **PSO4 – Contribution to Business World** To produce employable, ethical and innovative professionals to sustain in the dynamic business world. **PSO 5 – Contribution to the Society** 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
Core-I	5	7	. Core-IV	5	6	Core-VII	5	6	Core-XI	5	6
Core-II	5	7	Core-V	5	6	Core-VIII	5	6	Core-XII	5	6
Core – III	4	6	Core – VI	4	6	Core – IX	5	6	Project with viva voce	7	10
Elective - I Discipline Centric	3	5	Elective – III Discipline Centric	3	4	Core – X	4	6	Elective - VI (Industry / Entrepreneurship) 20% Theory 80% Practical	3	4
Elective- II Generic:	3	5	Elective - IV Generic:	3	4	Elective - V Discipline Centric	3	3	Skill Enhancement course / Professional Competency Skill	2	4

			Skill Enhancement I	2	4	3.6 Skill Enhancement II	2	3	Extension	1	
									Activity		
						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] – NME - 1	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., NUTRITION & DIETETICS WITH HOSPITALITY MANAGEMENT

SEMESTER - I

Course status	Course Title	Credits	Hours
Core-I	Advanced Food Science	5	6
Core –II	Advanced Human Physiology	5	6
Core-III	Hospital Administration	4	6
Core- Practical	Advanced Food Science Practical	2	4
Elective - I	Food Processing and Technology/ Principles of Menu Planning	2	4
Elective - II	Food Processing and Technology- Practical	2	4
	Total	**20**	**30**

SEMESTER - II

Course status	Course Title	Credits	Hours
Core IV	Research Methods in Nutrition	5	6
Core V	Advanced Dietetics	5	6
Core VI	Advanced Dietetics- Practical	4	6
Elective III	Nutritional Biochemistry	3	4
Elective IV	Perspectives of Home science	3	4
Skill Enhancement Course [SEC] – I NME	Food Preservation	2	4
	Total	**22**	**30**

SEMESTER - III

Course status	Course Title	Credits	Hours
Core VII	Macronutrients	5	6
Core VIII	Resource Management	5	6
Core IX	Food Biotechnology	5	6
Core X (Industry Module)	Nutrition for Fitness	4	6
Elective V	Research Writing and Presentation	3	3
Skill Enhancement Course - II	Techniques in Food analysis	2	3
	Internship / Industrial Activity	2	-
	Total	**26**	**30**

SEMESTER - IV

Course status	Course Title	Credits	Hours
Core XI	Micronutrients	5	6
Core XII	Biochemical Techniques	5	6
Core XIII	Project Work with Viva voce	7	10
Elective VI	Functional Foods and Health	3	4
Skill Enhancement Course – III / Professional Competency Skill	Biochemical Techniques- Practical	2	4
Extension Activity		1	-
	Total	**23**	**30**

Total Credits - 91

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 foodstarches; 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

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 (IV) 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 the 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 ScientificPublications. , 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

CORE: III

HOSPITAL ADMINISTRATION

Time/Hours: 5 Hours **Credits 4**

Year I **Semester I**

LEARNING OBJECTIVES

To enable the students to:

1. Learn about the different types of hospitals and their administration
2. Gain knowledge about the ethics and standards followed in hospitals
3. Get familiar with healthcare policies and community health management

COURSE OUTCOME

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

CO	COSTATEMENT	KLEVEL
CO1	Distinguishbetweenthetypesofhospitalsandthedepartmentsandtheir organizationalstructure	**K1,K2**
CO2	Describe the code of ethics followed in hospitals and Explaintherolesandresponsibilitiesofhealthprofessionals	**K1,K2**
CO3	Recalllegal lawsandidentifymedical malpractices andEvaluatethequalityandsafetyin hospitalsthroughuseofappropriatemeasures	**K3,K5**
CO4	Analyzethebudgetingandfundflowmanagementinhospitals	**K4**
CO5	DiscusstheNationalHealthpolicyandcommunitybasedhealthdevelopmentinru ralareas	**K3,K5**
K1-Remember; **K2**-Understand;**K3**-Apply;**K4** - Analyze;**K5**-Evaluate; **K6**–Create		

THEORY

S.No	CONTENT
UnitI	**Introduction to Hospital Administration:** Concept of Hospitals, Different types of Hospitals, Problems and constraints in different types of Hospitals, History of Hospital Development, Departmentation and organization structure of different types of hospitals.

UnitII	**Code of Ethics, Duties of Healthcare professionals -** Doctors, Nurses, Nutritionists, and Dietitians (in brief) to their patients, profession at large, profession in consultation, and to the community - Breach of ethics and code of conduct
UnitIII	**Legal framework in Hospitals, Patient's rights & provider's responsibility :**Medical Malpractices, Disciplinary Action, Management of Hazard and Safety in a Hospital Setup, Bio-Medical Waste Management - Benefits of Health Insurance and Managing Health Care, Medical audit to meet legal requirements of Hospitals
UnitIV	**Accounting and financial Management in Hospitals:** Principles, analysis and interpretation of financial reports, Preparation and use of budgets, Capital budgeting, Fund flow management, and budgetary control
UnitV	**Health Planning & Management:** National Health Policy, Provision of medical care, Primary healthcare, Health for All, Encouragement of indigenous systems of medicine, Process of health planning in India.

REFERENCES

BOOKS

- Davidson S.R.andPassmore J.F., 1975, HumanNutritionandDieteics.Vol.I,IIEdition.
- Francis,C.MandD"Souza,M.C.,2000,HospitalAdministration.JayBrothers.
- GillespieS.McNeiG.,1992,HospitalManagementMacmillanandCo.,NewYork.
- Mitchelletal.,1987,NutritioninHealth&disease,PitmanM.Edu.PublishingCo.
- Robinsonet.al.,1986,NormalandTherapeuticNutrition.MacmillanCo.,NewYork.

E-LEARNINGRESOURCES

- www.ingenta.connect.com-FoodandFoodways.
- www.fda.gov/search.html

- www.wodswrth.com/nutrition
- www.elsevier.com- IndianJournalofNutritionandfoodmicrobiology.

MAPPING OF CO WITH PSO

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	S	M	S	S	M	M
CO2	S	M	S	S	M	M
CO3	S	M	S	W	M	M
CO4	S	M	S	W	M	M
CO5	S	M	S	S	S	S

PEDAGOGY:

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

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.

SENSORY METHOD

1. Analysis of taste sensitivity
2. Threshold test
3. Duo-Trio test
4. Multiple sample difference

STARCH

5. Microscopic structure and gelatinization
6. Factors affecting gelatinization
7. Sag test
8. Gluten formation

PULSES

9. Factors affecting cooking quality

FRUIT

10. Enzymatic browning
11. Pectin test

12. Firmness of gel

13. VEGETABLE

14. Various methods of cooking

15. Fat-soluble and water-soluble pigments

MILK

16. Detecting the presence of starch, soda, urea in milk sample

17. pH of milk sample

18. Effect of acid on milk

19. Maillard reaction

SUGAR

20. Relative sweetness of sugars: sucrose, maltose, lactose, fructose, dextrose, glucose, artificial sweeteners

21. Stages of sugar cookery

22. Effect of dextrose, jaggery, honey, and cream of tartar on sucrose

FATS AND OILS

23. Smoking point of various oils: Groundnut oil, coconut oil, Gingelly oil, Olive oil, Vanaspati, Ghee, Refined Sunflower oil, Rice bran oil

24. Cooking temperature and fat absorption: Groundnut oil, coconut oil, Gingelly oil, Refined Sunflower oil, Rice bran oil

PHYSICAL PROPERTIES

25. Thousand-grain weight

26. Thousand-grain volume

27. Hydration capacity

28. Hydration index

29. Swelling capacity

30. Specific gravity

31. Seed displacement test

32. Viscosity: Line spread test, Viscometer

33. Food Adulteration

TEXT BOOKS:

1. Srilakshmi B. (2015). Food Science, New Age International (P) Ltd.
2. Publishers.
3. Potter N. and Hotchkiss J.H. (1996). Food Science, Fifth ed., CBS Publishers and Distributors, New Delhi
4. Avantina sharma (2017). Textbook of Food Science and Technology. CBS Publishers and Distributors Ltd. 3rd Edition.
5. Reddy S M. (2015). Basic Food science and technology. New Age International publishers. 2ND edition.

REFERENCES:

1. Swaminathan A (1979) . Food Science And Experimental Foods, Ganesh And Company Madras. 3rd edition.
2. Bennion, Marion and O. Hughes (2001). Introductory Foods. Edi: Macmillian N. Y. 1st edition.
3. Eskein . (2012). Biochemistry of Food. Elsevier publications
4. Desrosier, N.W. and James N. (2007). Technology of food preservation. AVI Publishers.
5. 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.org

Learn Microbiology with Online Courses and Classes | edX

Mapping of CO with PSO:

CO/PSO	PSO 1	PSO 2	PSO 3	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, .

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

1. Shakuntala Manay N Shadakhsaraswamy M . (2004) Food Facts and Principles. New Age Publisher. 2nd edition.
2. Roday S. (2011) .Food Science. Oxford publication. 1st edition.
3. B Srilakshmi (2015) Food science. New Age Publishers. 6th edition. Fellows P.(2000). Food Processing Technology, 2nd Edition.
4. Woodhead Publishing Limited and CRC Press LLC. 1st edition.
5. Avantina Sharma. (2017). Textbook of Food Science and Technology. CBS Publishers and Distributes Ltd. 3rd edition.

REFERENCES

1. Rao CG. (2006). Essentials of food process engineering. PHI Learning Private Ltd.
2. Janet D Ward and Larry Ward. (2006). Principles of Food Science. Stem Publishers. 4th edition.
3. Srivastava R P and Kumar S. (2006) Fruits and Vegetables Preservation- Principles and Practices. International Book Distributing Co. 3rd edition.
4. W B Crusess.(2004). Commercial Unit and Vegetable Products.
5. W.V. Special Indian Edition , PubAgrobios India . 2nd edition.
6. Forsythe S J and Hayes P R (1998). Food Hygiene, Microbiology and HACCP. Gaiters burg Maryland Aspen.
7. Eskein .(2012). Biochemistry of Food. Elsevier 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	PSO 2	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

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 allowancesand 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 theadolescents.

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

1. 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.
2. Jacalyn J. McComb, Reid Norman, et al.,The Active Female: Health Issues Throughout the Lifespan 2010, Human Press.
3. 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.
4. Antia, F.P., 1992, Clinical Dietetics and Nutrition Oxford University Press, New Delhi.
5. 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.
6. Mahan, K.L., and Stump, S.E., 1996, Krauses Food, Nutrition and Diet therapy M.B. Saunders Co., USA.
7. 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, and Wilson Publishing, London.
8. Bamji et al(1996), Textbook of Human Nutrition Oxford and IBH Publishing co. Pvt. Ltd. Delhi.
9. Shils.E.M, Shike .M, Ross. A.C, Cabellero.B and Cousins.R.J (2011) Modern Nutritionin Health and Disease, Eleventh Edition, Lippincott Williams and Wilkins, Philadelphia.
10. 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	PSO 2	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

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)

SKILL ENHANCEMENT COURSE 1
COMPUTER IN NUTRITION RESEARCH

Course objectives

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 in 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 -PowerPoint presentation, nutrient and diet calculations, nutrition education and counselling

Unit V

Research Problem: defining a research problem, selecting the problem, and technique involved in defining a problem. Thrust areas in research in Food Science.

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	PSO 2	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

CORE: IV
RESEARCH METHODS IN NUTRITION

CREDIT :5
SEMESTER :2

YEAR :1
HOURS PER WEEK :15

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 I: 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 II: 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 III: 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 IV: 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

UnitV 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.

REFERENCES

- 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	PSO6
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
ADVANCED DIETETICS

CREDIT: 5

SEMESTER :II

YEAR:1

HOURS PER WEEK :15

COURSE OBJECTIVES:

- To acquire Knowledge regarding the effect of various diseases on nutritional status and nutrient requirement
- To understand the modifications in nutrients and dietary requirements for therapeutic condition.
- To Learn recent concepts in dietary management of different diseases.

COURSE OUTCOME:

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

CO No.	CO Statement
CO1	Critique the Nutritional screening technique
CO2	Comprehend the current concepts of therapeutic diets and critically ill
CO3	Implement the dietary principles on various disorders.
CO4	Acquire the knowledge of diet counseling skills.
CO5	Apply the dietary principles to manage the lifestyle disorders in the society

UNIT I

- Nutritional screening, Nutritional care process, Nutritional Assessment, Nutritional diagnosis , Nutritional Intervention , Monitoring and evaluation.
- Basic concepts of diet therapy – Therapeutic adaptations of Normal diet, Principles and classification of therapeutic diets. Routine Hospital diets – Regular, soft, fluid diet
- Nutritional Management in critical care -Nutritional screening and nutritional Status assessment of critically ill, Nutritional requirement according to the critical condition
- Nutritional support systems: Enteral and parenteral nutrition support- Types, composition and complications.

UNIT II

- **Medical Nutrition therapy for gastrointestinal and liver disorders** Upper Gastrointestinal tract Diseases – Nutritional care and diet therapy in Diseases of oesophagus - Oesophagitis, Gastro esophageal reflux disease [GERD] and Hiatus hernia.
- Disorders of stomach: Indigestion, Gastritis, Gastric and duodenal ulcers, and dumping syndrome
- Lower gastrointestinal tract Diseases/Disorders-Common Symptoms of Intestinal dysfunction - Flatulence, constipation, haemorhoids, diarrhoea, steatorrhoea, Diseases of the large intestine-Diverticular disease, Irritable bowel syndrome, inflammatory bowel disease
- Diseases of Small intestine-Celiac disease, tropical sprue, intestinal brush border enzyme deficiencies.
- Diseases of the Liver- hepatitis, hepatic coma, cirrhosis, cholecystits, cholelithiasis and pancreatitis, Zollinger Ellison syndrome and Biliary dyskinesia.

UNIT III

- Medical Nutrition therapy for Pulmonary disease-Effect of Malnutrition on pulmonary system, effect of pulmonary disease on nutritional status, chronic pulmonary diseases-Asthma, cystic fibrosis, chronic obstructive pulmonary disease and Pneumonia-Pathophysiology and dietary management.

- Medical Nutrition therapy for[3] Rheumatic disease- Etiology, Pathophysiology of Inflammation of Rheumatic diseases, Rheumatoid Arthritis, Osteoarthritis and sjogren syndrome.
- Nutritional management of physiological stress- Classification, Complications, Metabolic changes in protein and electrolytes and Dietary management of burns, dietary management of trauma and stress.

UNIT IV

- Nutritional Management on Weight imbalance -Regulation of food intake and pathogenesis of obesity and malnutrition and starvation; Weight Imbalance: prevalence and classification.
- Underweight -Etiology and Dietary management**;** Obesity-Etiology, classification, Energy balance, dietary modifications and Bariatric surgery- types and dietary modifications of pre and post bariatricsurgery.
- Nutritional Management in metabolic disorders- Prevalence, Etiology, risk factors, complications and dietary modifications of diabetes mellitus.

UNIT V

- Nutritional management of cardiovascular diseases-etiology, risk factors, clinical features and dietary modifications of Dyslipidemias, Atherosclerosis , Hypertension, Ischemic heart disease, Congestive cardiac failure.
- Nutrition Management of Renal Disease -Etiology, Clinical and metabolic manifestations, Diagnostic tests, Types-Glomerulonephritis, Nephrotic syndrome , Renal Failure: Acute and chronic, ESRD, Nephrolithiasis and Dietary modifications.
- Nutritional management in cancer- Pathogenesis and progression of cancer, types
- ,Symptoms and Dietary management.

TEXT BOOKS:

- Mahan L.K., Sylvia Escott-Stump.(2000).Krause‟s Food Nutrition and Diet Therapy.W.B. Saunders Company London. 10th edition.
- B. Srilakshmi. (2007).Dietetics. K.K. Gupta For New age International Pvt. Ltd. New Delhi Publisher.
- Antia F.P. And Philip Abraham.(2001).Clinical Nutrition and Dietetics.Oxford Publishing Company.
- Passmore P. And M.A. East Wood.(Digitised in 2010).Human Nutrition And Dietetics.Churchill Living Stone.
- S.R.Mudambi.M.K.Rajagopal.(2009).Fundamentals, Food Nutrition and Diet therapy.New Age Publishers. 5th edition.

- Robinson Ch., M.B. Lawlea, W.L., Chenoweth, And A.E., Carwick.(1990).Basic Nutrition and Diet therapy, Macmillan Publishing Company.

REFERENCES:

- Garrow JS, James WPT, Ralph A.(2000). Human Nutrition and Dietetics.Churchill Livingstone, NY. 10th edition.
- Groff L James, Gropper S Sareen.(2000). Advanced Nutrition and Human Metabolism.West / Wadsworth, UK. 3rd edition.
- Sue Rodwell Williams. (1993).Nutrition, Diet Therapy.W.B. Saunders Company London. 7th edition.
- Whitney, E. N. and C. B..Cataldo.(1983). Understanding Normal and Clinical Nutrition. West Pub. S1. Paul.

E-LEARNING RESOURCES:

- www.nutrition.gov - Service of National agricultural library, USDA.
- www.nal.usda.gov/fnic -Food and Nutrition information centre.
- www.healthyeating.org.
- www.eatrightpro.org. https://www.globalhealthlearning.org.

Mapping of Co with PSO:

CO/PSO	PSO 1	PSO2	PSO3	PSO4	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.

CORE VI
ADVANCED DIETETICS PRACTICAL

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

COURSE OBJECTIVES:

- To acquire Knowledge in planning diets for various disorders
- To gain knowledge in diet counselling and educating patients.
- To understand the therapeutic modifications of diet.

COURSE OUTCOME:

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

CO No.	CO Statement
CO1	Evaluate various therapeutic diets
CO2	Identify the requirements for disease conditions and critically ill patients.
CO3	Assess and plan the diets for various disease conditions.
CO4	Create Knowledge in nutrient calculations and dietary principles.
CO5	Design the personalized diets for different individuals in the society

1. Routine hospital diet : Regular diet, Clear liquid, Soft diet, Full liquid diet and Planning and preparing Enteral feed plan [8hrs].
2. Assessing requirements and planning diet for obese and underweight individual[6hrs]
3. Planning and preparing diet for Diabetes Mellitus [IDDM and NIDDM] [6hrs].
4. Planning and preparation of diet for Atherosclerosis with hypertension [6hrs]
5. Assessing and planning diets for the following conditions[13hrs]
    - Celiac disease
    - Lactose intolerance.
    - GERD
    - Peptic ulcer
    - Hepatitis
    - Cirrhosis
6. Planning and preparing diet for Pneumonia [6hrs]

7. Planning and preparing diet for Rheumatic arthritis[6hrs]
8. Planning and preparation of diet for Glomerulonephritis[6hrs]
9. Planning and preparation of diet for cancer according to the condition.[6hr]
10. Planning and Preparing diet for pre and post Bariatric surgery patients.[6hrs]
11. Assessment and planning diet for post burn condition[6hrs].

TEXTBOOKS:

- Stump SE.(2012).Nutrition and diagnosis related care. Lippincott Williams and Wilkins. Canada.7th edition.
- Width.M&Reinhardt.T. (2018).The Essential Pocket Guide for Clinical Nutrition.Wolters Kluwer Publishers. 2nd edition.
- Whitney EN and RolfesSR.(2002). Understanding Nutrition, 9th edition, West/Wordsworth.Guthrie H.(2002). Introductory Nutrition. CV Mosby Co.St. Louis. Elia M, Ljunggvist O, Stratton RJ, Lanham SA.(2013). Clinical Nutrition.
- The Nutrition Society Textbook.Wiley Blackwell Publishers.2nd edition. Mitch, W. and Ikizler, Alp.(2010). Handbook of Nutrition and the Kidney.Lippincott Williams and Wilkins, New Delhi.6th edition.
- Mahan LK, Stump SE and Raymond JL.(2012). Krause's Food and Nutrition Care Process.Elsevier aunders.Missouri.13th edition.

REFERENCES:

- Gopalan C., Ram Sastri B.V. And BalSubramaniam S.C. (2006). Nutritive Value of Indian Foods. Hydrabad, National Institute of Nutrition. Indian Council of Medical Research.
- Clinical Dietetics Manual.(2018). Indian Dietetic Association. 2nd edition. Peggy Stanfield.Y.H.Hui.(2010). Nutrition and Diet therapy. Jones and Bartlett publishers.
- William's. (2012).Basic Nutrition and Diet therapy.14th Edition.

E-LEARNING RESOURCES:

- www.nutrition.gov - Service of National agricultural library, USDA.
- www.nal.usda.gov/fnic -Food and Nutrition information centre.
- www.healthyeating.org.
- www.eatrightpro.org.
- https://www.globalhealthlearning.org.

4 Mapping: (CO/PSO)

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO 5	PSO6
CO1	2	3	3	3	1	2
CO2	3	3	3	3	1	3
CO3	3	2	3	3	2	3
CO4	3	2	3	3	3	2
CO5	3	3	3	3	3	3
Average	**2.8**	**2.6**	**3**	**3**	**2**	**2.6**

PEDAGOGY

Group Discussion, Case study, Assignments, Planning menus in charts.

ELECTIVE (GENERIC/DISPILINE CENTRIC)- III

NUTRITIONAL BIOCHEMISTRY

CREDIT:3

SEMESTER :II

YEAR :I

HOURS PER WEEK :10

COURSE OBJECTIVES

1. Understand the need for the study of biochemistry as the basis for nutritional sciences.
2. Make students aware of metabolism of proximate principles and others.
3. A basic understanding of the functions of biological systems in relation to Nutritional biochemistry.

COURSE OUTCOME:

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

CO No.	CO Statement
CO1	Understand the role of enzymes and co enzymes in biological oxidation.
CO2	Gain knowledge on metabolism and regulation of carbohydrate.
CO3	Understand the concept of metabolism and bioenergetics of lipids.

CO4	Discuss 4 the classification, structure, organization and metabolic pathway of protein.
CO5	Comprehend the biological metabolism and functions of nucleic acid and understand recent concepts in biochemistry.

UNIT I

- Biological oxidation and enzymes
- Biological oxidation, Electron transport chain and Oxidative Phosphorylation.

  Enzymes – Definition, Types , mechanism of action, factors affecting enzyme activity, coenzyme, role of b vitamin as coenzyme.
- Free radicals – definition, formation in biological systems. Antioxidants – definition, Role of antioxidants in prevention of degenerative disorders

UNIT II

- Metabolism of Carbohydrates: Glycolysis, The Citric Acid Cycleglycogenesis, glycogenolysis, gluconeogenesis, The Hexose Monophosphate Shunt and bioenergetics.
- Hormonal regulations of blood glucose homeostasis

UNIT III

- Protein and amino acid metabolism
- Classification of amino acids, Oxidative Deamination, decarboxylation, transamination and transmethylation of amino acids, urea cycle, biosynthesis of non-essential amino acids, catabolism of essential amino acids. Protein biosynthesis.

UNIT IV

- Metabolism of Lipids:
- Classification of fatty acid, Biosynthesis of fatty acids, beta oxidation of fatty acids and ketone bodies. Essential fatty acids – types and functions. Metabolism of phospholipids, and cholesterol. Lipo proteins – classification and function.

UNIT V

- Overview of intermediary metabolism of carbohydrates, protein and lipid.

  Hormonal regulation of carbohydrate protein and fat metabolism
- Structural components and functions of nucleic acid, Structure of DNA, DNA Replication, RNA synthesis – types and functions and metabolism, translation.
- Recombinant DNA technology, Metabolism of Xenobiotics, Nutrigenomics

TEXT BOOKS

- Jain, J.L., Jain, S., & Jain, N., (2005). Fundamentals of Biochemistry. S. CHAND & COMPANY Ltd. Ram nagar, New Delhi-110 055. 6th revised edition.

- Bettelheim, F. A., Brown, W. H., Campbell, M. K., & Farrell, S. O. (2009). *General, Organic & Biochemistry*. Brooks/Cole Cengage Learning.
- Champe, P. C., Harvey, R. A., & Ferrier, D. R. (2005). *Biochemistry*. Lippincott Williams & Wilkins, 6th Edition, Wolters Kluwer, London.
- Talwar, G. P., & Srivastava, L. M. (2002). *Textbook of biochemistry and human biology*. PHI Learning Pvt. Ltd..
- Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2000): 25th Ed. Harpers Biochemistry.Macmillan worth publishers.

REFERENCE BOOK

- Marshall, W. J., Lapsley, M., Day, A., &Ayling, R. (2014). Clinical Biochemistry E-Book: Metabolic and Clinical Aspects. Elsevier Health Sciences.
- Bender, D. A. (2003). Nutritional biochemistry of the vitamins. Cambridge university press.
- Albanese, A. (Ed.). (2012). Newer methods of nutritional biochemistry V3: With applications and interpretations. Elsevier.
- Champe, P. C., Harvey, R. A., & Ferrier, D. R. (2005). Biochemistry. Lippincott Williams & Wilkins.
- Lieberman, M., & Ricer, R. E. (2009). Lippincott's Illustrated Q&A Review of Biochemistry. Lippincott Williams & Wilkins.

E-LEARNING RESOURCES:

- https://www.udemy.com/share/1027yA/

  https://www.classcentral.com/course/swayam-biochemistry-5229
- https://www.classcentral.com/course/edx-biochemistry-biomolecules-metho ds-and-mechanisms-12585
- https://www.classcentral.com/course/swayam-experimental-biochemistry-12 909
- https://youtu.be/y6YGZfcAegw

Mapping of CO with PSO:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO4	PSO 5	PSO 6
CO1	3	3	2	1	1	3
CO2	3	3	2	1	1	3
CO3	3	3	2	1	1	3
CO4	3	3	2	1	1	3
CO5	3	3	3	1	1	3
Average	**3**	**3**	**2.2**	**1**	**1**	**3**

PEDAGOGY (TEACHING METHODOLOGY):

Group Discussion, Case study, seminar, journal reviewing, Assignments, Power point presentations.

ELECTIVE (GENERIC/DISCIPLINE CENTRIC) - IV
PERSPECTIVES OF HOME SCIENCE

CREDITS:3

SEMESTER :II, YEAR :I
HOURS PER WEEK :10

OBJECTIVES:

To enable students to have a sound knowledge in various branches of Home Science for strengthening the extension and research base.

SPECIFIC OBJECTIVES OF LEARNING:

On successful completion of these units, students are expected :

- To describe the importance of each branch of Home Science
- To understand the essence of each subject
- To prepare them for UGC NET, SLET and ASRB

COURSE OUTCOME:

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

CO No.	CO STATEMENT
CO 1	Understand the concept of Extension Education and its importance
CO 2	Comprehend the key aspects of human growth and development and realize the importance of mastering developmental tasks of each life span stage
CO 3	Understand the basic concepts of Textile and Clothing
CO 4	List personal goals and values, set living standards
CO 5	Understand the meaning of Guidance and Counselling and Career perspectives in Home Science

UNIT – I Extension Education

- Meaning, Definition, objectives, characteristics, principles
- Extension teaching methods- types and methods
- Qualities of a good Extension Worker
- Communication, Innovation and Social change

UNIT – II Human Development

- Growth, Development, Maturation and Learning
- Principles and Developmental stages &Task
- Parental Disciplinary Techniques – merits and demerits
- Early Childhood Education – Objectives. Types of Nursery Schools.
- Exceptional children – Deaf, Blindness, Physical Impairment, Mental Retarded and Giftedness

. Rehabilitation.

UNIT – III Textiles and Clothing

- Classification and General properties textile fibres.
- Processing and manufacture of Cotton, Silk, Wool and Rayon fibres.
- Yarn: Classification.
- Fabric construction - woven, non-woven and knitted fabric
- Clothing: selection for the family.

UNIT – IV Family Resource Management

- Home Management – Meaning, objectives and process
- Resources - Classification and characteristics
- Time, Money and Energy management
- Decision making - Steps and Methods of resolving conflicts
- Work simplification - Importance of work simplification. Mundel's classes of Change
- Principles and Elements of Interior design, Various colours and colour schemes.

UNIT – V-Guidance and Counselling

- Meaning, nature, types and scope of guidance and counselling
- Various steps and techniques of Guidance and counselling
- Need and importance of educational guidance.

TEXTBOOKS:

1. Jha, J.K. (2002). Encyclopaedia of Teaching of Home Science, Vol.I,II and III . New Delhi: Anmol Publications.
2. Suriakanthi.A., (2002).Child Development - An Introduction Gandhigram: Kavitha Publications.
3. Srilakshmi.B. (2015). Food Science. New Delhi. New Age International Pvt.Ltd. PremlataMullick (2016), 4TH edition, Kalyani Publishers.

REFERENCES:

1. Serene and Ahlawat Santos Shekhar (2013), Textbook of Home Science Extension Education.
2. Tami James Moore and Sylvia M.Asay (2008), Family Resource Management, Sage Publications.
3. Diane E. Papalia (2004), 9th edition, Human Development, McGraw Hill India.
4. Rani K. Sudha and Srivastava Sushila, Textbook of Human Development: A lifespan development approach, S. Chand & Co Ltd.

Mapping: (CO/PSO)

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	1	3	3	1	3
CO2	3	2	3	3	2	3
CO3	3	2	3	3	1	3
CO4	3	2	3	3	1	3
CO5	3	1	3	3	1	3
Average	**3**	**1.6**	**3**	**3**	**1.2**	**3**

PEDAGOGY

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

SKILL ENHANCEMENT COURSE SEC – NME - I

FOOD PRESERVATION

CREDIT:2
SEMESTER: 2

YEAR :1

HOURS PER WEEK:2

LEARNING OBJECTIVES

To enable students to

- Learn the basic concepts and importance of Food Preservation
- Understand the different methods of Food Preservation
- Choose appropriate food handling and storage techniques

COURSE OUTCOME

- Describe the basic concepts and principles of Food Preservation
- Identify the best methods of storage of different foods based on their shelf life. Recommend appropriatepostharvest technology procedures that increase shelf life of food
- Analyze the use of low and high temperature to preserve food and identify the appropriate method topreserve different foods
- Discuss the use and effects of different preservatives on the quality of foods
- Appreciate the use of modern technology in food preservation and managing food wastage.

Unit I Introduction to Food Preservation

- Concept, the importance of food preservation., Common terms used in food preservation. Differentmethods and Principles of preservation.

Unit II Preservation by Low Temperature

- Use of Cold and Refrigerated Storage ,Use of Freezing temperatures: Slow and fast freezing of foodsand Cryogenic freezing of foods, dehydro freezing, Frozen storage and thawing of foods

Unit III Preservation by High Temperature

- Preservation of foods by high temperatures. Blanching, Pasteurization and Sterilization of foods.General process of caning of foods

Unit IV Preservation by Drying

- Principles and application of drying and dehydration of foods Different types of drying and dryers.

Unit V: Preservation by Chemical Methods

Preservation by Chemical Methods: Use of preservatives (e.g., salts, sugars, acids) and chemical additives in food preservation.

Application of chemical preservatives in different types of foods.

REFERENCES BOOKS

- PrakashTriveni (2010) : Food Preservation, Aadi Publication, Delhi.
- M. ShafiurRahman (2007): Hand Book of Food Preservation, Marcel Dekker Inc, Newyork.
- McWillims and Paine (2009) : Modern Food Preservation, Surjeet Publications
- Karnal, Marcus and D.B. Lund (2003)
- "Physical Principles of Food Preservation". Rutledge.VanGarde,S.J. and Woodburn.M(2001) "FoodPreservation and Safety Principles and Practice". SurbhiPublications
- Sivasankar, B (2002). "Food Processing & Preservation", Prentice Hall of India
- Khetarpaul, Neelam (2005)"Food Processing and Preservation", Daya Publications
- Norman N. Potter, Joseph H. Hotchkiss: Food science, 5th ed.New York : Chapman & Hall

E-LEARNING RESOURCES

- https:// www.embibe .com/food -preservation/
- https://agripathshala.com/lessons/principles-of-food-preservation
- www.onlinebiologynotes.com/food-preservation-from-microbial-spoilage-principles
- https://www.researchgate.net/publication/347909697_FOOD_PRESERVATION

Mapping of Co with PSO:

CO/PSO	PSO 1	PSO2	PSO3	PSO4	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, videopresentations.

1.3 CORE: III
MACRO NUTRIENTS

CREDITS: 5
SEMESTER: III
YEAR: II
HOURS PER WEEK: 6

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

CORE 10
RESOURCE MANAGEMENT

CREDITS: 5
SEMESTER: III
YEAR: II

HOURS PER WEEK: 6

LEARNING OBJECTIVES

To enable the students to

1. Understand the Concepts, Significance and Principles of Resource Management.
2. Apply the skills in efficient use and management of time, energy and Money.
3. Understand Consumer behaviors, Problems and learn the importance of consumerprotection.

COURSE OUTCOME

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

CO	CO STATEMENT	K LEVEL
CO1	Identify and analyze the need for resources and apply decision makingskills.	**K2, K3, K4**
CO2	Understand the role of resource and apply the same to prepare time plans.	**K2, K3, K6**
CO3	Apply work simplification techniques for efficient use of energy.	**K3**
CO4	Develop skills to prepare a budget within the available income and tomaintain accounts.	**K1, K6**
CO5	Highlight the need of consumer protection by understanding and identifying the consumer behavior & problems.	**K1, K2**
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create		

THEORY

UNIT	CONTENT	HOURS
UNIT I	**Management Process** – Definition, concept, characteristics, Motivating factors in management – Values, Goals and Standards. Management process - Planning, Organizing, Controlling and Evaluation. **Decision making** - Meaning and its importance, Kinds of decisions, Steps in Decision making process, Factors affecting Decision making process, Methods of resolving conflicts.	**20**

UNIT II	**Resources** - Definition, Role of resource in management, Classification of resources, Factors affecting the use of resources, Maximizing the use of family resources, Conservation of resources. **Time management** – Definition, concept, Tools in time management - Peak loads, WorkCurve and rest periods. Time management process – Steps in making time plans - Controlling the planning action - Evaluation. Time demands during different stages of the family life cycle.	**15**
UNIT III	**Energy Management** - Energy requirements for household activities, Fatigue-concepts, Types - Physiological and Psychological fatigue, Remedies to overcome fatigue and Managerial process applied to energy. **Work Simplification** - Definition, Importance, Techniques – Formal and Informal Techniques - Mundel's Classes of change.	**15**
UNIT IV	**Money management** – Concept of Income, Sources and types of family income, Methods of supplementing family income, Steps in money management, Methods of handling money income, Budgeting, Steps in making budget, Controlling the use of income, Types of Records, Evaluation, Savings and its advantages.	**15**
UNIT V	**Consumer** - Definition, Role, Rights and Responsibilities, Consumer behavior, Consumer problems, Education and Empowerment. Consumer protection, consumer organization, cooperatives, alternative redressal, standardization, standard marks, quality control, buying aids, consumer legislation.	**10**
	Total	**75**

REFERENCES

1. Bela Bhargava (2005), "Family resource Management & Interior Decoration",University bookhouse pvt ltd, ISBN-13: 978-8187339229
2. Marion Giordan(2016), "Consumer Education: A handbook for Teachers", Routledge;1st edition,ISBN-13: 978-1138839151
3. Nickell & Dorsey (2002), "Management in Family Living", CBS; 4th edition, ISBN-13: 978-8123908519
4. Rao (2020), "Taxmann's Human Resource Management", Taxmann Publications Pvt.Ltd.; 2ndedition, ISBN-13: 978-9390128396
5. Ready GB (2021), "EBC consumer Protection Act", LAW BOOKS, ASIN: B097TQ64QV Seetharaman P, (2019), "An Introduction to Family Resource Management", CBS (11July 1905); 01149344934, ISBN-13: 978-8123911861
6. Steven, D.S, (2016). Consumer Economics: A Practical Overview", NewYork:Routledge Taylorand Francis group.
7. Sudhir Dixit (2018), "Time Management", Manjul Publishing House, ISBN-13: 978-9388241106

E- LEARNING RESOURCES

- Saviom (2022), "What is Resource Management and its Importance",https://www.saviom.com

/blog/what-is-resource-management/

- Jason Westland (2022), "Resource Management: Process, Tools & Techniques",https://www.projectmanager.com/blog/quick-guide-resource-management
- eGyanKosh, "Work Simplification", file:///C:/Users/sysmz/Downloads/Unit-19%20(1).pdf
- Shalu Gupta, "Work simplification", http://homescience10.ac.in/storage /pages /ecurriculum

/Bsc_Hsc_Sem_2/Work%20sim plification.pdf

- Consumer Education in Resource management, https://www.nios.ac.in/ media/doc

MAPPING OF COs WITH PSOs

CO/PSO	SO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	W	W	S	M	S
CO2	M	W	W	S	M	S
CO3	M	W	W	S	M	S
CO4	M	W	W	S	M	S
CO5	M	W	W	S	M	S

FOOD BIOTECHNOLOGY

CREDITS: 5
SEMESTER: III
YEAR: II
HOURS PER WEEK: 6

LEARNING OBJECTIVES

To enable the students to

1. To develop students knowledge, understanding and skills infoodbiotechnology.
2. To enhance students ability to identify current and futureresearch directions in food biotechnology.

COURSE OUTCOMES

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

CO No.	CO Statement
CO1	Identify the Media composition & production culture.

CO2	Identify the composition & production culture.
CO3	Apply Modification of starch & protein, development of novel sweeteners.
CO4	Appraise Enzyme technology, micro encapsulation.
CO5	Interpret GM Foods production, biosafety & risk management.

UNIT	CONTENT	HOURS
UNIT-I	Important industrial microorganism. Media for industrial fermentations, criteria used in media formulation, medium composition–energy, carbon, nitrogen and other growth factors–buffering and antifoam agents. Production of culture, maintenance and preparation, bacterial culture, yeast culture and mold culture.	
UNIT-II	Food Fermentation–Batch and continuous process, Ferment or design–solid substrate fermentation, downstream processing, instrumentation and control. Alcoholic beverages: Beer, wine: Non alcoholic beverages: tea, coffee,cocoa, Dairy products.	
UNIT-III	Fermented vegetables-sauerkraut, soya based foods – tofu, temphe, yogurt; meat fermentation- sausage; Vinegar.Development of novel sweeteners, production of fats- Lard, amino acids-L-aspartate, Development and formulation of probiotic foods. Isolation & purification of starch, Starch in food industry, Modification of starch. Isolation of protein from soyabean, milk, egg; Protein hydrolysates; Modification of protein.	

UNIT-IV	Enzyme technology in food industry: industrial enzymes and its applications (with respect to food processing industry). Micro encapsulation, List of industrial enzymes and their applications in food industry, Production of food industrial enzymes. Immobilization of enzymes- method of immobilization, advantage and disadvantage of immobilization. Uses of immobilized enzymes- High fructose corn syrup preparation.	
UNIT-V	Ethical issues concerning GM foods; testing for GM foods; current guidelines for the production, release and movementof GM foods; labeling and traceability; trade related aspects; biosafety; risk assessment and risk management. Public perception of GM foods. IPR. GMO Act 2004. (Genetically Modified Crops Management Act 2004).	

Recommended Texts:

1. Owen Pward (1989), Fermentation Biotechnology Principles, Processes And Products, Prentice H New Jersey.
2. Solomons, G.L. (1983), Single Cell Proteins - Critical Reviews of Biotechnology, Moo Young Compressive Biotechnology Scientists Foundations, Engineering Consideration.
3. Prescot (1987), Industrial Food Preservation, John Willey And Sons. Hill Publishing Company Ltd, New Delhi.
4. Dubey, R.C. (2001), Text Book Biotechnology S.Chand And Co Ltd, New Delhi.
5. Frazier And WestHoff (1995), Food Microbiology, Tata Mcgraw

Reference Books:

1. Gupta, P.K. (1996), Elements of Biotechnology, Rostogi And Co, Meerut.
2. Paul, P.C. and Palmer (1972), Food Theory And application John Wiley Sons, New York.
3. Gary Walsh And Denis R. Headen, Protein Biotechnology, S.Chand And Co, Ltd, New Delhi.
4. Dubey, R.C. And Maheswari, D.K. A Text Book of Microbiology, S.Chand And Co, Ltd, New Delhi.
5. Food Science And Food Biotechnology, 2003, Gustara F. Gutierrez-Lopez.
6. Lee, B.H. Fundamentals of Food Biotechnology. VCH. 2006

Website ande-learning source

- https://g.co/kgs/5J7wnE
- https://content.kopykitab.com/ebooks/2016/07/8081/sample/sample_8081.pdf

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	3	3	3	3	3	3
CO5	3	3	3	3	3	3
Average	**3**	**3**	**3**	**3**	**3**	**3**

PEDAGOGY:

Lecture, Journal Reviewing, Powerpoint presentations, Assignments and Discussions

NUTRITION FOR FITNESS

CREDITS: 4
SEMESTER: III
YEAR: II
HOURS PER WEEK: 6

LEARNING OBJECTIVES (LOs)

This course will prepare the students to:

- Understand the components of health and fitness and the role of nutrition.
- Make nutritional, dietary and physical activity recommendations to achieve fitnessand well –being.
- Develop ability to evaluate fitness and well - being

Unit I

Definition, components and assessment criteria of age: Specific fitness and health status. Holistic approach to the management of fitness and health: Energy input and output Diet and Exercise. Effect of specific nutrition on work performance and physical fitness, nutrition, exercise, physical fitness and health inter-relationship.

Unit II

Different energy systems for endurance and power activity: Fuels and nutrients to support physicalactivity . Shifts in carbohydrate and fat metabolism, mobilization of fat stores during exercise. Nutrition inSports: Sports specific requirement. Diet manipulation, Pre- game and post game meals. Assessment of different nutragenic aids and commercial supplements. Diets for persons with high energyrequirements, stress, fracture and injury.

Unit III

Significance of physical fitness and nutrition in the prevention and management of weight control ,fat reduction and obesity. Exercise and Weight control - fundamentals of aerobics, Nutrition guidance on balanced eating and nutritional advice to clients for obesity, skin nourishment, hair treatment.

Unit IV

Yoga- Meaning, Aims, Objectives, significance, Systems of Yoga - Eight limbs of yoga.

Unit V

Asanas - Classification, difference between physical exercise and yogic exercise, Guidelines for practicing Asanas. Meditation - Meaning, types, benefits.

References

1. B.K.S. Iyengar, Light on yoga, London University, in paperback, 1989.
2. Yogeshwar, Text Book of Yoga, Madras Yoga Centre.
3. K.Chandrasekar, Sound health through Yoga" PremKalyan Publication, Sedapatti, 1999.
4. Ira Wolinsky 1998 .Nutrition in Exercise and sports , 3rd edition, CRC Press.
5. Sizer, F.& Whitney , E(2000) Nutrition - Concepts & Controversies, 8th Edition , Wadsworth Thomson Learning.

COURSE OUTCOMES:

On completion of the course, students will be able to

CO 1. Identify the major muscle groups of the body that are used with cycling.

CO2. Students will acquire knowledge and demonstrate skills to safely engage in physical activity.

CO 3. Students will understand the principles of lifetime fitness and will incorporate fitness activities into ahealthy and active lifestyle.

CO 4. Students will use basic principles of health and wellness to develop an informed, personal approachto mental and physical health. Students will acquire knowledge and demonstrate skills to safely engage in physical activity.

CO 5. Students will demonstrate and value knowledge of psychological and sociological concepts, principles, and strategies that apply to physical activity and sport.

Mapping

Core – Nutrition for fitness											
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**	**3**	**2**	**3**	**3**	**2**	**3**	**3**	**2**
3	**3**	**3**	**3**	**3**	**1**	**3**	**3**	**2**	**3**	**3**	**2**
4	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**1**	**3**	**3**	**1**

5	**3**	**3**	**3**	**3**	**1**	**3**	**3**	**2**	**3**	**3**	**2**

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

ELECTIVE
RESEARCH WRITING & PRESENTATION

CREDITS: 3
SEMESTER: III
YEAR: II
HOURS PER WEEK: 3

LEARNING OBJECTIVES

To enable the students to

1. Introduce the importance of critical inquiry as a way of gaining knowledge and adding to it through research.
2. Exposure to the various forms of research and research methodology processes.

COURSE OUTCOME

CO	CO STATEMENT	K LEVEL
CO1	Demonstrate an understanding of the purpose and significance of research.	**K2, K3**
CO2	Formulate clear and focused research questions that address specific gaps or areas of inquiry within a given field of study.	**K5, K6**
CO3	Develop well-structured and reliable data collection instruments, such as questionnaires, interview guides, and observation protocols.	**K4, K6**
CO4	Analyze and interpret research findings accurately, considering the research objectives and the data analysis results.	**K4, K5**
CO5	Write clear, concise, and coherent reports that effectively communicate the intended message.	**K1, K3**
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create		

THEORY:

UNIT	CONTENT	HOURS
UNIT I	**UNDERSTANDING RESEARCH** Explore the purpose, significance and types of research, including qualitative, quantitative and mixed methods approaches.	**10**
UNIT II	**RESEARCH QUESTIONS** Formulate clear and focused research questions. Develop skills in conducting a thorough literature review. **Research Ethics**: Discuss the importance of ethical considerations in research, plagiarism avoidance and ensuring participant confidentiality.	**10**
UNIT III	**DATA COLLECTION:** Methods of data collection- Primary sources: observation and recording, interviews structured and unstructured, questionnaire, open ended and close ended questions and the advantages of the sampling. Collecting data from secondary sources.	**15**
UNIT IV	**DATA ANALYSIS AND INTERPRETATION: Data Analysis Techniques**: Learn quantitative and qualitative data analysis techniques. **Results Interpretation:** Develop skills in interpreting research findings and effectively communicating the significance and implications of the results.	**10**
UNIT V	**REPORT WRITING: Writing Process**: Understand the stages of the writing process, including prewriting, drafting, revising and editing, to produce coherent and well-structured research. **Citation and Referencing:** Learn and apply appropriate citation styles, such as APA format.	**15**
	TOTAL	**60**

REFERENCES

1. Panneer Selvam, Research Methodology, 2nd Edition, Asoke Ghosh publications, Delhi. 2014.

2. Pagadala Suganda Devi, Research Methodology A Handbook for Beginners, Notion Press 2017

3. Dr. Shanti and Dr. Shashi, Handbook of Research Methodology, Educreation Publishing, 2011

4. Linda Groat and David Wang, 'Architectural Research Methods', 2nd edition, John Wiley and Sons Inc, Hoboken, New Jersey, US, 2013.

5. Wayne C Booth, Joseph M Williams Gregory G. Colomb, 'The Craft of Research', 3 rd Edition, Chicago Guides to Writing, Editing and Publishing, 2008.

6. Iain Borden and Katerina Ruedi, 'The Dissertation: An Architecture Student's Handbook', Edition 2, Architectural Press, 2005

7. Ranjith Kumar, 'Research Methodology- A Step by Step guide for Beginners', 4th Edition, Sage Publications, 2014. 5. John W Creswell, 'Research Design: Qualitative, Quantitative and Mixed Methods Approaches', Sage Publications, 2013.

8. JA Smith, P Flowers, M Larkin, 'Interpretative Phenomenological Analysis: Theory, Method and Research (English),I Edition, Sage Publications, 2009.

E- LEARNING RESOURCES

- www.socialresearchmethods.net
- www.psych-it.com.au
- www.skillsyouneed.com
- https://southcampus.uok.edu.in/Files/Link/DownloadLink/RM%20U1%20P1.pdf
- https://ccsuniversity.ac.in/bridge-library/pdf/Research-Methodology-CRKothari.pdf
- https://www.researchgate.net/publication/303381524_Fundamentals_of_research_m et hodology_and_data_collection
- https://www.researchgate.net/publication/333015026_Chapter_3_-_Research _Methodology_and_Research_Method

MAPPING OF COs WITH PSOs

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	M	M	M	S	M	M
CO5	S	S	S	S	S	S

SKILL ENHANCEMENT COURSE

TECHNIQUES IN FOOD ANALYSIS

CREDITS:2
SEMESTER:III
YEAR:II
HOURS PER WEEK:3

OBJECTIVES:
To enable students to:

- Learn the techniques of estimating the quantity of different nutrients present in food.
- To enable the students to get practical experience in the laboratory and develop the skills to undertake research work

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

CO No.	CO STATEMENT
CO 1	Understand safety rules for the laboratory and demonstrate various instruments used for food analysis.
CO 2	Acquire skills to prepare and standardize various solutions to conduct experiments for food analysis.
CO 3	Acquire skills in ashing of foods and prepare ash solution to analyse mineral contents in food.
CO 4	Demonstrate quantitative analysis of various nutrients in foods i.e. crude fibre, moisture, Vit -C, calcium, phosphorus, iron, etc.
CO 5	Demonstrate experiments to check estimation of protein, fat content and Pigment Analysis

Unit – I (15 HRS)

1. **Introduction to Laboratory Practices**

2. **Instrumental Techniques –**
   - Autoclave
   - Hot Air Oven
   - pH Meter
   - Electronic Weighing Balance
   - Centrifuges
   - Hot Plate
   - Spectrophotometer
   - Water Bath
   - Muffle Furnace
   - Viscometer
   - IR Moisture Analyzer

- Colorimeter

Unit – II **(8 HRS)**

Preparation and Standardization of Solution

Unit – III **(12 HRS)**

Ashing of Food (Thermogravimetric Method**) and Preparation of Ash Solution**

Unit – IV **(25 HRS)**

Food Analysis Experiments – Estimation of –

- Moisture Content – Thermogravimetric Analysis -Air Oven Method and Infrared Radiation(IR) Moisture Analyzer Method
- Crude Fibre–Gravimetric Method
- Iodine Number of oils – Wij's Method
- Acid Number of oils - Titrimetric Method
- Peroxide Value of oils - Titrimetric Method
- Ascorbic Acid – 2, 6- Dichloroindophenol Titrimetric Method
- Calcium -Precipitation Titrimetric Method
- Iron – Wong's Method
- Phosphorus–Colorimetric Method

Unit –V **(15 HRS)**
Demonstration Experiments

- Estimation of protein content in food by Kjeldahl method
- Estimation of fat content in food by Soxhlet method
- Pigment Analysis by Paper Chromatography Techniques

TEXT BOOKS AND REFERENCES:

1. S. Suzanne Nielsen (2017). Food Analysis Laboratory Manual. Springer International Publishing. Third Edition.
2. S. Suzanne Nielsen (2017). Food Analysis. Springer International Publishing. Fifth Edition.
3. Otles, S. (2005). "Methods of Analysis of Food Components and Additives" CRC Press, USA.
4. Ranganna, S. (2001). "Handbook of Analysis and Quality Control for Fruit and Vegetable Products". Tata-McGraw- Hill, India. 2nd edition.
5. Sadasivam, S and Manickam, A (1997). "Biochemical Methods". New Age International Publishers, New Delhi. 2nd Edition.
6. Jayaram, I, (1996), "Laboratory Manual in Biochemistry", New Age International Publishers, New Delhi. Fifth ed.
7. Raghuramulu, N, Nair K.M &Kalayanasundaram, S.A, (1983), "Manual of Laboratory Techniques", National Institute of Nutrition, ICMR.

Mapping: (CO/PSO)

CO/PSO	PSO	PSO	PSO	PSO	PSO	PSO
CO1	3	2	3	0	3	2
CO2	2	3	3	0	3	1
CO3	2	3	3	0	3	1
CO4	3	3	3	1	3	3
CO5	3	3	3	1	3	3
Average	2.6	2.8	3	2	3	2

PEDAGOGY: Demonstration, Experiments, Activities as assignment, Group Discussion, Observation and Interpretation

INTERNSHIP TRAINING IN HOSPITALS (ONE MONTH):

CREDITS:2
SEMESTER:III
YEAR:II
HOURS PER WEEK:0

- The Dietetic Internship is to provide a high quality education and a variety of supervised practice experiences to prepare interns to be effective entry-level dietitian nutritionists.
- A summary of the Internship shall be submitted to the department and viva voce shall be conducted for student individually

COURSE OUTCOME

CO: 1 Analyze the internship training in the hospital
CO: 2 Experience in the hospitals has the opportunity to observe in action
CO: 3 Internships can speed up the process of moving towards the career goals.
CO: 4 Students will develop professional aptitude, strengthen personal character, and provide a greaterdoor to opportunity
CO:5 Understand about the internships are way to show commitment to professionalism, selfimprovement, and excellence

Mapping

Internship Training											
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)

SEMESTER IV

CORE – XI

MICRONUTRIENTS

CREDITS: 5

SEMESTER: IV

YEAR: II

HOURS PER WEEK: 6

COURSE OBJECTIVES

To enables the students

- To learn the functions, deficiency symptoms, food sources and requirements of the different micro nutrients.
- To Gain knowledge of nutrients requirement and management of micronutrients during various stages of life and disease
- To gain insight about recent concept and findings in field of nutrition and application of the same to prevent disease

COURSE OUTCOMES:

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

CO No.	CO Statement
CO1	Evaluate the specific role of functional foods and nutraceuticals in prevention of degenerative disease.

CO2	Understand the importance of micronutrients in growth and development of humans.
CO3	Analyse the importance of diet in maintaining human health to combat nutrient deficiency in the community
CO4	Gain in-depth knowledge of the physiological and metabolic functions of vitamins and minerals and their implications
CO5	Analyse the recent advances in the field of micronutrient and research for the welfare of the community

UNIT I: 15 hours

Distribution in the body; functions, effects of deficiency, food sources, requirement and recent research of macro minerals - Calcium, Phosporous, Magnesium, Potassium, Sodium and Chloride.

UNIT – II 15 hours

Distribution in the body, functions, food sources, requirement deficiency, toxicity and recent research of micro minerals and trace minerals. Micro minerals - – iron, zinc, fluoride, copper, iodine and manganese. Trace Minerals -Selenium, cobalt, chromium, silicon, boron and nickel Selenium and Vitamin E relationship, Chromium and glucose tolerance factor.

UNIT III: 15 hours

Distribution in the body, functions, food sources, requirement deficiency, toxicity and recent research of Fat Soluble Vitamins A,D,E and K

UNIT IV: 15 hours

Distribution in the body, functions, food sources, requirement deficiency, toxicity and recent research of Water soluble vitamins – Water soluble vitamins: vitamin C, thiamine, riboflavin, niacin, pantothenic acid, biotin, folic acid, vitamin B12, vitamin B 6, choline and inositol.

UNIT V: 15 hours

RECENT CONCEPTS IN NUTRITION:

Immuno-nutrients and Antioxidants Definition, classification and function of functional food and nutraceuticals. Antinutrients present in various food groups – Cereals , legumes and nuts and oilseeds. Food and drug interaction.

TEXT BOOKS

1. Guthrie, H.A. (2001) – "Introductory Nutrition", Tenth edition, C.V. Mosby Company, St. Louis.
2. Bogert, J.G.V., Briggs,D.H, Calloway, (2000). "Nutrition and physical fitness", 11th edition W.B. Saunders Co., Philadelphia, London, Toronto.
3. Wardlaw, G.M and Kessel, M, (2002) "Perspective in Nutrition", 5thedition, Mc Graw Hill, New York, New Delhi.
4. Willium, S. R. (2000), "Nutrition and Diet Therapy", Mosby Co., St. Louis.
5. Sizer, F.S and Whitney E. R. (2003), "Nutrition, Concepts and

Controversies" 9th edition, Thomas Wadsworth, Australia.

REFERENCE BOOK

1. Brown, J.E. (2002), "Nutrition Now", 3rd edition, Wadsworth Thomson Learning New York.
2. Maurice, E. Shils, James A. Obson, Moshe shike, (2000), "Modern Nutrition in Health and Disease", 8th Edition, Vol I and II, Lea &Febiger Philadelphia, A Waverly Company.
3. Mahan L.K. and Stamp, S.E (2000), "Krause's Food Nutrition and Diet Therapy", 11th edition, W.B. saunder's Company, Philadelphia.
4. Toteja, G.S and Singh P (2004), "Micronutrient Profile of Indian Population", ICMR Publication, New Delhi.
5. D. M. Swaminathan (2002), "Principles of Nutrition and Dietetics", BAPPCO, 88, Mysore RoadBangalore – 560 018.

E-LEARNINGRESOURCES:

https://www.udemy.com/share/1027yA/

WHO | The e-learning platform Nutrition Knowledge Hub launch

WFP Nutrition's Learning Platform - UN World Food Programme

Nutrition Online Courses | Coursera

E-Learning Programs (nestlenutrition-institute.org)

WFP Nutrition's Learning Platform | Humanitarian Library

Mapping: (CO/PSO)

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

PEDAGOGY (TEACHING METHODOLOGY):

Group Discussion, Case study, seminar, journal reviewing, Assignments, Power point presentations.

BIOCHEMICAL TECHNIQUES

CREDITS: 5
SEMESTER: III
YEAR: II
HOURS PER WEEK: 6

LEARNING OBJECTIVES (LOs)

The objectives of the course enable the student to

- To recognize various equipment and apparatus available in biochemistry laboratory.
- To describe the working of each of these instruments / apparatuses and practice the general andsafety measures recommended for working in a laboratory.
- To provide an explanation of the components of qualitative and quantitative analysis of foodsamples.

Unit I:

Introduction to Laboratory Equipment and Basic Laboratory Operations: Identification and use of common laboratory glassware and equipment. Techniques of simple laboratory operation, Laboratory reagents, Use and care of common laboratory instruments, Basic needs ofa clinical laboratory.

Unit II:

General Comments on Specimen Collection: General consideration, Blood, Urine, Sputum, Throat swab, stool, Cerebrospinal fluid, miscellaneous specimens. Specimen collection for hematological studies, cleaning of laboratory glassware in hematology

Unit III:

Collection and processing of Blood for Transfusion, Urine and Semen Analysis: Preparation for blood collection, Transportation of blood after collection, storage of blood, preparation and use of blood components. Urine Analysis: Indication, Composition and methods of collection of urine, Routine Urine Examination- Physical, chemical, microscopic examination, evaluation of Renal function tests. Semen Analysis: Clinical significance, Specimen collection, Laboratory investigation, examination of semen.

Unit IV:

Chromatography and Radio chemical Methods: Chromatographic Separations: Liquid, GC and TLC. Super critical fluid extraction chromatography. Radiochemical Methods: Use of radio isotopes.

Unit V:

Routine Biochemical Tests

Glucose, Protein, Albumin, Urea. Creatinine, Uric Acid, Bilirubin, Triglycerides, Cholesterol.

REFERENCE:

1. Wilson and Walker's Principles and Techniques of Biochemistry and Molecular Biology
2. John. F. Robyt, Bernard J.Whik. Biochemical Techniques, Published 1987.
3. Hclmut Gunzler Alex Williams, Hand book of Analytical Techniques. March 2001

COURSE OUTCOMES

On completion of the course, students will be able to
CO 1. Outline the basic knowledge of biochemical Techniques and the instruments.
CO 2. Find out the working principles of various biochemical instruments used in the laboratory.
CO 3. Analyse the applications of biochemical techniques and instruments.
CO 4. Recommend the various biochemical techniques to find out the abnormalities.
CO 5. Compile and predict the normal and abnormal biochemical aspects.

Mapping

Core – Biochemical Techniques											
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**	**3**	**2**	**3**	**3**	**2**	**3**	**3**	**2**
3	**3**	**3**	**3**	**3**	**1**	**3**	**3**	**2**	**3**	**3**	**2**
4	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**1**	**3**	**3**	**1**
5	**3**	**3**	**3**	**3**	**1**	**3**	**3**	**2**	**3**	**3**	**2**

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

PROJECT & VIVA-VOCE:

CREDITS: 7
SEMESTER: III
YEAR: II
HOURS PER WEEK: 10

Students are encouraged to work on Individual Project to get acquaintance to real life problem solving and hands -on experience. The projects' outcomes will be submitted as a report, followed by an individual viva voce.

COURSE OUTCOME

CO: 1 The project gives students the opportunity to experience real research
CO:2 Students will have a greater problem solving skills.
CO:3 Students will gain better understanding of research methods.
CO:4 Deeper understanding of the discipline of the research
CO: 5 Better understanding of career and education path.

Project Viva Voce											
CO	**PO**					**PSO**					
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**
1	**2**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
2	**3**	**3**	**3**	**2**	**2**	**3**	**3**	**2**	**3**	**3**	**2**
3	**3**	**2**	**3**	**3**	**2**	**3**	**3**	**2**	**3**	**3**	**2**
4	**3**	**3**	**3**	**1**	**2**	**3**	**3**	**2**	**3**	**3**	**2**
5	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**2**

Mapping

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

ELECTIVE VI

FUNCTIONAL FOODS AND HEALTH

CREDITS: 7
SEMESTER: III
YEAR: II

HOURS PER WEEK: 10

LEARNING OBJECTIVES
To enable the students to

1. Get an overview of the field of functional foods, nutraceuticals and natural health products.
2. Understand the functional food concept as related to ingredient efficacy and safety.
3. Get familiar with examples of bioactive ingredient-disease relationships

COURSEOUTCOME

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	Distinguish between prebiotic and probiotic foods, their sources, health effects and potential for risk reduction of diseases	**K4,K6**
CO4	Discuss the therapeutic potential of functional foods based on the bioactive ingredients 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** a. Functional Food and Nutraceuticals Definition, history, types and classification. b. Benefits of functional foods and nutraceuticals c. Criteria to discriminate between conventional and functional foods. Role of functional foods in health promotion and disease prevention. Market for functional foods and factors driving their growth	**15**
Unit II	**Probiotics** a. Definition and important features of probiotic micro- organisms, Health effects of probiotics. b. Probiotics in various foods: fermented milk products, non- milk products and safety aspects of probiotics.	**15**
Unit III	**Prebiotics** a. Definition, sources, effect of processing, physiological effects, effects on human health and potential applications in risk reduction of diseases. 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** a. Bioactive compounds in foods- Polyphenols, Flavonoids, catechins, isoflavones, tannins, Phytoesterogens, Phytosterols, Glucosinolates, Organo sulphur Compounds, Other components– Phytates, Protease. b. Definition, sources, effects on human health and potential applications in risk reduction of diseases.	**15**
UnitV	**Therapeutic potential of Indian Super foods** a. Spices and Condiments b. Herbs and medicinal plants c. Millets and traditional rice varieties, spirulina, chlorella	**15**
		75

REFERENCES BOOKS

- Aluko, Rotimi, Functional Foods and Nutraceuticals, Springer-Verlag New York Inc., 2012.
- Satinder Kaur Brar, Surinder Kaur and Gurpreet Singh Dhillon, Nutraceuticals Functional Foods, 2014.
- Robert E.C.Wildman, Robert, Wildman, Taylor C, Handbook of Nutraceuticals and Functional Foods, Third Edition,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

SKILL ENHANCEMENT COURSE

BIOCHEMICAL TECHNIQUES- PRACTICAL

CREDITS: 1
SEMESTER: III
YEAR: II
HOURS PER WEEK: 04

1. Demonstration of Qualitative analysis of urine
2. Determination of iron and Hemoglobin in blood
3. Estimation of urea in blood
4. Estimation of glucose in blood
5. Estimation of cholesterol in blood.
6. Determination of moisture, Ash - total, acid soluble and insoluble
7. Determination of Protein in foods by Micro-Kjeldahl method.
8. Carbohydrates Starch – Digestible and Resistant Starches, Dietary fiber – Soluble and insoluble.

COURSE OUTCOMES:

On completion of the course, students will be able to
CO 1. Demonstrate isolate and estimate the amount of biomolecules in general.CO2. Demonstrate separation of protein by electrophoresis..
CO 3. Analyze blood for glucose level
CO 4. Gain knowledge of biological samples and their collection procedures.
CO 5. Assess presence and absence of normal and abnormal constituents in urine by performing qualitative urine analysis

Mapping

Biochemical Techniques 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)