ETHIRAJ COLLEGE FOR WOMEN, (AUTONOMOUS)

CHENNAI-600008

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

(Self- Supporting)

PG SYLLABUS

M.Sc FOOD AND NUTRITION

CHOICE BASED CREDIT SYSTEM

OUTCOME BASED EDUCATION

(OFFERED FROM THE ACADEMIC YEAR 2021-2022)

INDEX

SYLLABUS INDEX

ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS), CHENNAI

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS
M. SC FOOD AND NUTRITION
SYLLABUS FROM JUNE 2021 ONWARDS

Department of Clinical Nutrition and Dietetics – M.Sc Food and Nutrition is revising syllabi with effect from the academic year 2021-22, by introducing CBCS as specified by the Government of Tamil Nadu to build the capacity of the students and provide inputs for his or her social service and social analysis capabilities.

Every academic year is divided into two semester sessions. Each semester will have a minimum of 90 working days and each day will have five working hours. Teaching is organized into a modular pattern of credit courses. Credit is normally related to the number of hours a teacher teaches a particular subject. It is also related to the number of hours a student spends learning a subject or carrying out an activity.

REGULATIONS

1. ELIGIBILITY FOR ADMISSION:

Candidates for admission to the first year of the Degree of M.Sc Food and Nutrition course shall be required to have passed the B.Sc Nutrition, FSM and Dietetics/Home science/Food science and Management/Clinical Nutrition and Dietetics from any recognized university.

2. ELIGIBILITY FOR THE AWARD OF THE DEGREE:

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

3. COURSE OF STUDY:

The Master of Science degree shall consist of the following:

- Core and Elective Courses
- Interdisciplinary Elective papers offered to other major Department students
- Research
- Self-study paper for advanced learners
- Soft skills are offered for all four semesters
  - Personality Enrichment for Women – Soft skill course in the first semester.
  - The communication skills in English / French for Beginners / German for Beginners – soft skill course for second semester
  - Computing skills – soft skill course for third semester
  - Scientific Writings – soft skill course for fourth semester

4. PASSING MINIMUM:

A candidate shall be declared to have passed in each paper/ practical of the main subject of study wherever prescribed, if she secured NOT LESS THAN 50% of the marks prescribed for the examination.

5. CLASSIFICATION OF SUCCESSFUL CANDIDATES:

Successful candidates passing the examination and securing the marks (i) 75 percent and above (ii) 60 percent and above and (ii) 50 percent and above but below 60 percent, in the aggregate shall be declared to have passed the examination in the DISTINCTION, FIRST and SECOND class respectively. Candidates who pass all the examinations prescribed for the course in the FIRST ATTEMPT ALONE are eligible for ranking.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

On obtaining a postgraduate degree the students will be able to:

PEO1: Display higher order thinking in the knowledge domain and demonstrate professional skills

PEO2: Contribute to the advancement and application of relevant knowledge by self-directed learning

PEO3: Extend and integrate knowledge and skills to design and develop novel products and explore innovative solutions to national and international goals of development.

PEO4: Exercise management skills and develop social interactions in a responsive, ethical and constructive way to meet global standards of excellence in all spheres of activity.

PEO5: Strive for social and economic equity based on the need for gender parity and ecological sustainability.

PROGRAMME OUTCOMES (POs)

1. **PO1:** To acquire advanced conceptual knowledge and comprehensive understanding of the fundamental principles in respective discipline.
2. **PO2:** To apply knowledge and critically evaluate the concepts and scientific developments to take up any challenge.
3. **PO3:** To visualize and work on laboratory multidisciplinary tasks related to current research in the fields of mathematical, physical and life sciences.
4. **PO4:** To acquire research based knowledge and design methods to conduct investigations of complex problems in research/ industrial field and achieve employability/ self -employment.
5. **PO5:** To communicate effectively ideas verbally in English, leading to entrepreneurship ventures such as consultancy and training.
6. **PO6:** Employ innovative and environmental friendly methods, novel ideas to solve complex and challenging societal and environmental issues.

M.Sc Food and Nutrition

PROGRAMME SPECIFIC OUTCOME (PSOs)

*After completion of the specific programme, the **post graduate** students will be able to*

PSO1: Acquire in-depth knowledge on the principles, theory and its application in food science, product development cycle**,** food preservation, physiology, clinical and nutritional biochemistry, food microbiology, advanced studies in human nutrition; food-drug interaction and medical nutrition therapy for health and fitness

PSO2: Demonstrate the understanding of skills and knowledge acquired in the various areas of food and nutrition for the wellness of the community and sustainable development of the society.

PSO3: Apply the skills of creativity, comprehension, critical thinking and communication, to eradicate the problems of malnutrition by disseminating knowledge on holistic nutrition, fitness, and wellness.

PSO4: Recognize, understand and undertake innovative research in the field of food and nutrition, based on the current scenario for the betterment of the community.

PSO5: Plan, prepare, and excel in the field of nutrition, food science, food standardization, diet planning and counseling, scientific writing and reporting skills

PSO6: Develop the need for evidence based clinical studies; new techniques in assessing nutritional status and novel food products to become professionally competent dieticians, nutritionists or entrepreneurs and take up careers in academics, health care and service industry.

PROGRAMME PROFILE –M.Sc FOOD AND NUTRITION

Sem	Course code	Title of the paper	Credits	Hours /wk	Total hours	CA	SE	Total
I	13SP21/1C/BIM	Biomolecules and Intermediary Metabolism	4	6	90	40	60	100
I	13SP21/1C/AM1	Advanced Medical Nutrition Therapy I	4	6	90	40	60	100
I	13SP21/1E1/NUT	Nutraceuticals	3	5	75	40	60	100
I	13SP21/1E2/EOP or 13SP21/1E2/EPS	Essentials of Physiology or Exercise Physiology and Sports Nutrition	3	5	75	40	60	100
I	13SP21/1C/PR1	Analytical Techniques in Nutrition	4	6	90	40	60	100
I		Personality enrichment for Women	2	2		40	60	100
II	13SP21/2C/ADF	Advanced Food Science	4	5	75	40	60	100
II	13SP21/2C/ASR	Applied Statistics and Research Methodology	4	5	75	40	60	100
II	13SP21/2C/AM2	Advanced Medical Nutrition Therapy II	4	4	60	40	60	100
II	13SP21/2E/NSP	Nutrition in Special Needs	3	4	60	40	60	100
II	13SP21/2E/FPR	Food Preservation	3	4	60	40	60	100
II	13SP21/2C/PR2	Advanced Food	4	6	90	40	60	100

		Science Practical						
		Communication skill in English/German/ French	2	2		40	60	100
III	13SP21/3C/ACL	Advanced Studies in Carbohydrates and Lipids	4	5	75	40	60	100
III	13SP21/3C/AMV	Advanced Studies in Minerals and Vitamins	4	5	75	40	60	100
III	13SP21/3C/CBC	Clinical Biochemistry	4	4	60	40	60	100
III	13SP21/3E/FAD	Food and Drug Interaction	3	4	60	40	60	100
III	13SP21/3E/NAP	Nutrition and Physical Fitness	3	4	60	40	60	100
III	13SP21/3C/PR3	Innovative Food Product Development	4	6	90	40	60	100
III	13SP21/3S/COS	Computing skills	2	2	30	40	60	100
III		Self-study- Advanced paper for Registered Dietitian credential and competitive examinations	2 **(Extra credit)**	-	-	-	100	100
IV	13SP21/4C/AEP	Advanced Studies in Energy and Protein	4	6	90	40	60	100
IV	13SP21/4C/PUH	Public Health Nutrition	4	6	90	40	60	100
IV	13SP21/4C/ PRT	Project	4	6	90	40	60	100

IV	13SP21/4E/ FOM	Food Microbiology	3	4	60	40	60	100
IV	13SP21/4C/PR4	Public Health Nutrition Practical	4	6	90	40	60	100
IV	13SP21/4S/SPS	Scientific writing and presentation skills	2	2	30	40	60	100
IV	13SP21/4I/INT	Internship	2 **(Extra Credit)**	-	-	-	-	50

CONTINUOUS ASSESSMENT EVALUATION PATTERN

INTERNAL VALUATION BY COURSE TEACHER/S

CORE/ELECTIVE/PROJECT-THEORY PAPERS

Component	Time	Total marks	CA
Test I	2 hours	50 marks	10 marks
Test II	2 hours	50 marks	10 marks
Quiz / Assignment / Seminar / Field visit			10 marks
Participatory Learning			10 marks
Total			**40 marks**

EVALUATION PATTERN - THEORY

Semester	Paper Code	Title of the Paper	Continuous Assessment				
			Test I	Test II	Quiz/Assignment Seminar / Field Visit	Participatory Learning	Total
I	13SP21/1C/BIM	Biomolecules and Intermediary Metabolism	10	10	10	10	40
I	13SP21/1C/AM1	Advanced Medical Nutrition Therapy I	10	10	10	10	40
I	13SP21/1E/NUT	Nutraceuticals	10	10	10	10	40
I	13SP21/1E2/EOP or 13SP21/1E2/EPS	Essentials of Physiology or Exercise Physiology and Sports Nutrition	10	10	10	10	40
II	13SP21/2C/ADF	Advanced Food Science	10	10	10	10	40
II	13SP21/2C/ASR	Applied Statistics and Research Methodology	10	10	10	10	40
II	13SP21/2C/AM2	Advanced Medical Nutrition Therapy II	10	10	10	10	40
II	13SP21/2E/NSP	Nutrition in Special Needs	10	10	10	10	40
II	13SP21/2E/FPR	Food Preservation	10	10	10	10	40

III	13SP21/3C/ACL	Advanced Studies in Carbohydrates and Lipids	10	10	10	10	40
III	13SP21/3C/AMV	Advanced Studies in Minerals and Vitamins	10	10	10	10	40
III	13SP21/3C/CBC	Clinical Biochemistry	10	10	10	10	40
III	13SP21/3E/FAD	Food and Drug Interaction	10	10	10	10	40
III	13SP21/3E/NAP	Nutrition and Physical Fitness	10	10	10	10	40
IV	13SP21/4C/AEP	Advanced Studies in Energy and Protein	10	10	10	10	40
IV	13SP21/4C/PUH	Public Health Nutrition	10	10	10	10	40
IV	13SP21/4E/FOM	Food Microbiology	10	10	10	10	40

CORE/ELECTIVE-PRACTICAL PAPERS

Semester	Paper Code	Title of the Paper	Continuous Assessment			
			Model	**Participation**	**Record**	**Total**
I	13SP21/1C/PR1	Analytical Techniques in Nutrition	20	10	10	40
II	13SP21/2C/PR2	Advanced Food Science Practical	20	10	10	40
III	13SP21/3C/PR3	Innovative Food Product Development	20	10	10	40
IV	13SP21/4C/PR4	Public Health Nutrition Practical	20	10	10	40

PROJECT

Semester	Paper Code	Title of the Paper	Continuous Assessment				
			Research Design	Originality	Literature Survey	Submission of Periodic Reports	Total
IV	13SP21/4C/PRT	Project	10	10	10	10	40

EVALUATION PATTERN- INTERNSHIP

Semester	Paper Code	Title of the Paper	Continuous Assessment		
			Marks from Hospital	Report submitted	Total
IV	13SP21/4I/INT	Internship in Multi-specialty hospital	25	25	50

RUBRICS FOR CONTINUOUS ASSESSMENT EVALUATION

Assignment	Content/originality/Presentation/Schematic Representation and Diagram/Bibliography
Seminar	Organisation/Subject Knowledge/Visual Aids/Confidence level/presentation-Communication and Language
Field Visit	Participation/Preparation/Attitude/Leadership
Participation	Answering Questions/Clearing Doubts/Participating in Group Discussions/Regular Attendance
Case Study	Finding the Problem/Analysis/Solution/Justification
Problem Solving	Understanding Concepts/Formula and Variable Identification/Logical Sequence/Answer
Group Discussion	Preparation/Situation Analysis/Relationship Management/Information Exchange/Delivery Skills
Flipped/Blended Learning	Preparation/Information Exchange/ Group interaction/Clearing doubts

CA QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K1, K2, K3	A- 7x2 marks	50	14	50
K 4	A-2/4x8 marks	500	16	
K4. K 5	B-2/3x20 marks	1200	20	

END SEMESTER QUESTION PAPER PATTERN-PG

Knowledge Level	Section	Word Limit	Marks	Total
K1, K2	**A=10X2 marks**	**50**	**20**	**100**
K 3, K4	**B-5X8 marks**	**500**	**40**	
K4, K5, K6	**C-2x20 marks**	**1500**	**40**	

- Part A: Definition 10 questions, two from each unit.
- Part B: Five out of eight questions to be answered carrying 8 marks each. One question from each unit and remaining three from mentioned units.
- Part C: Two out of four questions to be answered carrying 20 marks each.

*Practical examinations will be conducted internally.
NO EXTERNAL EXAMINER.

END SEMESTER EVALUATION PATTERN-PG

THEORY PAPERS

SEMSTER I/II/III/IV

DOUBLE VALUATION BY COURSE TEACHER AND EXTERNAL EXAMINER

MAXIMUM MARKS: **100 TO BE CONVERTED TO 60**

PASSING MARKS: **50/100, 30/60**

PRACTICAL PAPERS

SEMSTER I/II/III/IV

DOUBLE VALUATION BY COURSE TEACHER AND EXTERNAL EXAMINER

MAXIMUM MARKS: **100 TO BE CONVERTED TO 60**

PASSING MARK: **30/60**

SOFT SKILLS PAPERS

SEMESTER I/II/III/IV

SINGLE VALUATION BY COURSE TEACHER

MAXIMUM MARKS: **50**

PASSING MARKS: **25/50**

PROJECT PAPER

SEMESTER: IV

DOUBLE VALUATION BY RESEARCH SUPERVISOR AND EXTERNAL EXAMINER

DISSERTATION:

MAXIMUM MARKS: 100
PASSING MARKS: 50

COURSE PROFILE

SEMESTER I

COURSE CODE	Title of the paper	Credits	Hours / Week	Total hours	L-T-P	CA	SA	Total
13SP21/1C/BIM	**Paper 1-**(Core 1) Biomolecules and Intermediary Metabolism	4	6	90	4-2-0	40	60	100
13SP21/1C/AM1	**Paper 2-**(Core 2) Advanced Medical Nutrition Therapy I	4	6	90	4-2-0	40	60	100
13SP21/1E1/NUT	**Paper 3- (**Elective1) Nutraceuticals	3	5	75	3-2-0	40	60	100
13SP21/1E2/EOP Or 13SP21/1E2/EPS	**Paper 4- (**Elective2) Essentials of Physiology Or Exercise Physiology and Sports Nutrition	3	5	75	3-2-0	40	60	100
13SP21/1C/PR1*	**Practical 1**- (Core 3) Analytical Techniques in Nutrition	-	6	90	0-0-6	-	-	-
	Soft Skill 1 Personality Enrichment for Women	2	2	30		-	50	50
TOTAL		**C+E+S 8+6+2**	**28+2**					
***Practical examination (13SP21/1C/PR1) - Practical will be conducted in the second semester.**								

COURSE PROFILE

SEMESTER II

COURSE CODE	Title of the paper	Credits	Hours/ Week	Total hours	L-T-P	CA	SA	Total
13SP21/2C/ADF	**Paper 1-**(Core 4) Advanced Food Science	4	5	75	3-2-0	40	60	100
13SP21/2C/ASR	**Paper 2-**(Core 5) Applied Statistics and Research Methodology	4	5	75	3-2-0	40	60	100
13SP21/2C/AM2	**Paper 3-**(Core 6) Advanced Medical Nutrition Therapy II	4	4	60	3-1-0	40	60	100
13SP21/2E/NSP	**Paper 4-(**Elective3) Nutrition in Special Needs	3	4	60	3-1-0	40	60	100
13SP21/2E/FPR	**Paper 5-(**Elective4) **(**Interdisciplinary) Food Preservation	3	4	60	4-0-0	40	60	100
13SP21/1C/PR1*	**Practical 1-**(Core 3) Analytical Techniques in Nutrition	4	6			40	60	100
13SP21/2C/PR2	**Practical 2-**(Core 7) Advanced Food Science Practical	4	6	90	0-0-6	40	60	100
	Soft Skill 2 The Communication skills in English/ French for Beginners/ German for Beginners	2	2	30		-	50	50
		C+E+S 20+6+2	**28+2**					

***Practical examination (13SP21/1C/PR1) - Practical will be conducted in the second semester.**

COURSE PROFILE

SEMESTER III

COURSE CODE	Title of the paper	Credits	Hours/ Week	Total hours	L-T-P	CA	SA	Total
13SP21/3C/ACL	**Paper 1-**(Core 8) Advanced Studies in Carbohydrates and Lipids	4	5	75	4-1-0	40	60	100
13SP21/3C/AMV	**Paper 2-**(Core 9) Advanced Studies in Minerals and Vitamins	4	5	75	4-1-0	40	60	100
13SP21/3C/CBC	**Paper 3-**(Core 10) Clinical Biochemistry	4	4	60	3-1-0	40	60	100
13SP21/3E/FAD	**Paper 4-**(Elective 5) Food and Drug Interaction	3	4	60	3-1-0	40	60	100
13SP21/3E/NAP	**Paper 5-**(Elective 6) (Interdisciplinary) Nutrition and Physical Fitness	3	4	60	4-0-0	40	60	100
13SP21/3C/PR3*	**Practical 3-**(Core 11) Innovative Food Product Development	-	6	75	0-0-6	-	-	-
13SP21/3S/COS	**Soft skill 3** Computing skills	2	2	30	2-0-0	-	50	50
		C+E+S 12+6+2	**28+2**					
13SP/3SS/ARD	**Self- study-** Advanced paper for Registered Dietitian credential and competitive examinations	2 **(extra credits)**	-	-	-	-	100	100
***Practical examination (13SP21/3C/PR3) - Practical will be conducted in the fourth semester.**								

COURSE PROFILE

SEMESTER IV

COURSE CODE	Title of the paper	Credits	Hours / Week	Total hours	L-T-P	CA	SA	Total
13SP21/4C/AEP	**Paper 1-**(Core 12) Advanced Studies in Energy and Protein	4	6	90	4-2-0	40	60	100
13SP21/4C/PUH	**Paper 2-**(Core 13) Public Health Nutrition	4	6	90	4-2-0	40	60	100
13SP21/4C/PRT	**Paper 3-**(Core 14) Project	4	6	90	0-6-0	40	60	100
13SP21/4E/ FOM	**Paper 4-**(Elective 7) Food Microbiology	3	4	60	3-1-0	40	60	100
13SP21/3C/PR3*	**Practical 3-**(Core 11) Innovative Food Product Development	4	-			40	60	100
13SP21/4C/PR4	**Practical 4-**(Core 15) Public Health Nutrition Practical	4	6	90	0-0-6	40	60	100
13SP21/4S/SPS	**Soft skill 4** Scientific Writing and Presentation Skills	2	2	30	2-0-0	-	50	50
13SP21/4I/INT	**Internship (1 month)**	2 **(Extra credits)**	-			50	-	50
TOTAL		**C+E+S +I 20+3+2 +2**	**28+2**					
***Practical examination (13SP21/3C/PR3) - Practical will be conducted in the fourth semester.**								

CREDIT ALLOTMENT FOR THE CORE AND ELECTIVE PAPERS

S.NO	SEMESTER	CORE CREDITS	ELECTIVE CREDITS	SOFT SKILL	INTERNSHIP CREDIT	TOTAL
1	I	8	6	2	-	16
2	II	20	6	2	-	28
3	III	12	6	2	-	20
4	IV	20	3	2	2	25+2
	TOTAL	**60**	**21**	**8**	**2**	**89+2**

SELF-STUDY PAPER (CRITERIA FOR ADVANCED LEARNER)–

- Student with overall distinction in the two semesters of study (without any arrears)
- Optional course with 2 credits (extra).
- Single valuation/No continuous assessment.

SEMESTER I

BIOMOLECULES AND INTERMEDIARY METABOLISM

TOTAL HOURS: 90 hours **COURSE CODE: 13SP21/1C/BIM**

CREDITS: 4 **L-T-P: 4-2-0**

COURSE OBJECTIVES

To introduce the students to

- ✓ To understand the principles of Biochemistry as a basis for nutritional sciences
- ✓ To apply the knowledge acquired to human nutrition and biochemistry
- ✓ To learn the structures and properties of nutrients.
- ✓ To impart knowledge on processes involved in digestion and absorption of nutrients
- ✓ To learn major metabolic pathways and key mechanisms regulating these pathways.

COURSE OUTLINE

UNIT I: Metabolism of Carbohydrates- An overview of aerobic and anaerobic carbohydrate metabolism- Glycolysis, feeder pathways and catabolism of hexoses and regulation ,Utilization of glycogen, Gluconeogenesis, Citric acid cycle and Anaplerosis ,regulation . Hexose- Mono phosphate Shunt.

(20HOURS)

UNIT II: Metabolism of Protein and Aminoacids – Definition and nutritional classification of amino acids – essential, non-essential and conditionally essential amino acids. Functions of individual amino acids in the body – aromatic aminoacids, sulphur containing amino acids, branched chain aminoacids. Deamination, Decarboxylation, Transamination of Amino acids. Pathways of Synthesis and catabolism of nutritionally non-essential amino acids (No Structures), catabolism of amino acid nitrogen and biosynthesis of urea. (20 HOURS)

UNIT III: Metabolism of Lipids and its regulation- Biosynthesis and oxidation of saturated and unsaturated fatty acids, essential fatty acids; Biosynthesis and oxidation of triglycerides, phospholipids, cholesterol, ketone bodies.

(20 HOURS).

UNIT IV: Biological oxidation- Basic classification of enzymes, biochemical role of minerals and vitamins as cofactors and coenzymes Enzymes and Coenzymes involved in oxidation and reduction, respiratory chain, Role of ATP in energy capture, Oxidative phosphorylation, inhibitors and uncouplers.

(15 HOURS)

UNIT V: Metabolism of Nucleic acids and its regulation- Biosynthesis and regulation of Purine and pyrimidine, Nucleotides Regulation and biosynthesis and conversion to deoxy Nucleotide, Nucleic acid structure and function, RNA synthesis-types and functions, metabolism, protein synthesis**,** Biosynthesis and catabolism of hemoglobin. (15 HOURS)

RECOMMENDED TEXTBOOKS

1. Harper H,*A Review of Physiological Chemistry*, Large Medical Publication, 21st edition, Los Angles,
2. Lehninger.AL, *Biochemistry*: *The Molecular Basis of Cell Structure and Function*,Kalyani Publishers, New Delhi

REFERENCE BOOKS

1. Ramadevi K, Ed: *AmbikaShanmugam's Fundamentals of biochemistry for medical students*, 8th edition, Wolters Kluwer Health, India, 2016
2. Rodwell V, Bender D, Botham KM, Kennelly PJ, Weil PA, *Harper's Illustrated Biochemistry*, 30th Edition, McGraw hill Education, 2015
3. Sulochana H, *Principles of Biochemistry*, PBS enterprises, Chennai, 2010
4. Cox MM and Nelson DL, *Lehninger's Principles of biochemistry*, 5th edition, EH Freman& Company, New york, 2008
5. Vasudevan DM, Sreekumari S, *Textbook of Biochemistry*, 5th edition, Jaypee Publishers, New Delhi, 2007
6. Veerakumari L, *Biochemistry*, 1st edition, MJP Publishers, 2005
7. Murray RK, Granner DK, Mayes PA, Rodwell VW, Harper's Illustrated *Biochemistry*, 26th edition, Mcgraw hill publishing house,.2003
8. West T and Bruggan V, *Text book of Biochemistry*,4th edition, The Macmillan Co, New York, 1996
9. Montgomery R, Conway TW, Spector AA, *Biochemistry-A care oriented Approach*. Mosby Company, 1990

JOURNALS

1. Indian Journal of medical Biochemistry
2. Annual review of Nutrition

E-LEARNING RESOURCES

https://www.youtube.com/watch?v=DhwAp6yQHQI&list=PLRdQ4XybtNjRjlIIVcoCMcwN36BIgPDqw
https://www.youtube.com/watch?v=jLyi2K-29xU
https://www.youtube.com/watch?v=YWEiQlEUFak
https://www.youtube.com/watch?v=iuW3nk5EADg

COURSE OUTCOME

S.No.	CO Statement	Knowledge level
CO1	State and classify the functions of individual nutrients	K1 & K3
CO2	Illustrate the structure, types and functions of nucleic acids	K2
CO3	Describe and determine the metabolism of macronutrients, hemoglobin and nucleic acids	K2 & K4
CO4	Assess the formation of high energy bonds in metabolic pathways	K5
CO5	Integrate the role of enzymes and coenzymes in metabolism pathways	K6

Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	2	3	3	3	3	3
CO3	3	2	2	2	2	2
CO4	3	3	3	3	3	3
CO5	3	3	2	2	2	2
AVERAGE	2.8	2.8	2.6	2.8	2.8	2.8

TEACHING METHODOLOGY

1. Lecture (Chalk and Talk-OHP-LCD)
2. Flipped Learning/Blended Classroom-E Content, Videos
3. Problem Solving-Group Discussion-Role Modelling
4. Quiz-Seminar
5. Peer Learning

QUESTION PAPER TEMPLATE
ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008
(For candidates admitted from the academic year 2021)

MSC FOOD AND NUTRITION

I YEAR- I SEMESTER

Title of the Paper: Biomolecules and Intermediary Metabolism **Max. Marks: 100**
Paper Code: 13SP21/1C/BIM **Time: 3 Hours**

SECTION A

Definition (Answer all) **(10x2=20 marks)**
Two questions from each unit

SECTION B

Answer any FIVE questions. **(5x8= 40 marks)**
Each answer should not exceed 300 words.
One question from each unit and the remaining three questions from Unit II, Unit III and UnitV respectively
(Understanding/Description/Problems)
Each question carrieseight marks

SECTION C

Answer any TWO questions. **(2X20=40 marks)**
Each answer should not exceed 1500 words.
Four questions covering all five units. (Application/Analysis/Synthesis/Evaluation)
Sub divisions may be given.
Each question carries twenty marks

SEMESTER I

ADVANCED MEDICAL NUTRITION THERAPY - I

TOTAL HOURS: 90 hours **COURSE CODE: 13SP21/1C/AM1**

CREDITS: 4 **L-T-P: 4-2-0**

COURSE OBJECTIVES

- ✓ To impart knowledge on pathophysiology of diseases.
- ✓ To introduce the current protocol and guidelines of nutrition care process
- ✓ To study the various feeding methods for patients.
- ✓ To enable them to learn the evidence based dietary and behavioural therapy for eating disorders, infections, gastrointestinal and liver disorders and pancreas and gall bladder diseases.

COURSE OUTLINE

UNIT I: Nutrition Care Process (NCP)

(i) NCP Model: Nutritional Screening and Assessment, Nutrition Diagnosis, Nutrition intervention, Monitoring and Follow up

(ii) Role of dietitian in health care

(iii) Diet Counseling- Importance, types and steps in diet counseling; Need for Nutrition Education. Online Counselling – Using Website, Application and Blog

Pediatric Assessment

(i) Assessment of physical growth and development of infant and children, standardized growth charts

(ii) Pediatric Malnutrition –VLBW, LBW, SGA babies, premature babies, stunting, and wasting; Failure to thrive, Calculation of Energy needs for catch up growth

(15 HOURS)

UNIT II: Nutritional support for critically ill patients

(i) Oral Feeding - Routine hospital diets and therapeutic diets

(ii) Enteral Feeding – Route of Enteral Nutrition, Types of enteral tubes, Formula Delivery Methods, Enteral Formula Compositions, Disease specific formulas, Developing of EN plan and Complications

(iii) Parenteral feeding – Types, PN Administration, PN Formulation, Monitoring and complications, home parenteral nutrition.

(15 HOURS)

UNIT III: Nutrition and Infection

Classification, Stages of Infection, Pathophysiology, Signs and Symptoms, Diagnostic Tests, Medical Treatment and Medical Nutrition Therapy in

(i) Fevers - Influenza, typhoid, tuberculosis, Malaria, Dengue, Leptospirosis and swine flu.
(ii) HIV and AIDS
(iii) Food Allergy

Nutrition in Pulmonary diseases

Etiology, Pathophysiology, Signs and Symptoms, Diagnostic Tests, Medical Treatment and Medical Nutrition Therapy in

(i) Pneumonia, COPD and Chronic Bronchitis.

(25 HOURS)

UNIT IV: Nutrition in Gastro intestinal disorders

Etiology, Signs and Symptoms, Diagnostic Tests, Medical Treatment and Medical Nutrition Therapy of

(i) Diseases of the esophagus, stomach and duodenum:

Esophagitis, GERD, Hiatus Hernia, Gastritis and Peptic Ulcer.

(ii) Diseases of the small intestine and colon:

Diarrhea, Constipation, IBS, IBD and Malabsorption syndrome-lactose intolerance, gluten enteropathy, tropical sprue.

(iii) Diseases of the Liver, Gall Bladder and Pancreas

Hepatitis, Alcoholic liver disease, Cirrhosis, Hepatic encephalopathy, Cholecystitis – acute and chronic, Cholelithiasis and Pancreatitis- acute and chronic.

(25 HOURS)

UNIT V Nutrition in Eating disorders

Etiology, Signs and Symptoms, Diagnostic criteria, Medical and Psychological Management and Medical Nutrition Therapy of

(i) Anorexia Nervosa
(ii) Bulimia Nervosa
(iii) Binge Eating disorder

(10 HOURS)

Related Experience:

- Visit to multi-specialty hospital or observe and report the different areas of dietary kitchen, order taking, quality checking, tray tagging and food service in different hospitals
- Guest Lecture or certificate course on different conditions collaborating with practicing dietitians
- Report on Infant Feeding Practices: Breast Feeding, Formula Feeding and Weaning (Assignment)
- Creating a website or blog for online nutrition awareness or counselling

RECOMMENDED TEXTBOOKS

1. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13th Edition, Elsevier Saunders, Missouri, 2012

2. Kane K and Prelack K, Advanced Medical Nutrition Therapy, First Edition, Jones and Barlett learning, Burlington, 2019

REFERENCE BOOKS

1. Verma P, *Food ,Nutrition & Dietetics*, 1st edition, CBS publishers & distributors PVT Ltd, New Delhi, 2015
2. Edelstein S, *Lifecycle Nutrition- An evidence based approach*, 2nd edition, Jones & Bartlett learning publications, 2015,
3. Elia M, Ljunggvist O, Stratton RJ, Lanham SA, *Clinical Nutrition (The Nutrition Society Textbook)*, 2nd edition, Wiley Blackwell Publishers, 2013
4. Stump SE, *Nutrition and diagnosis related care*, 7th edition, Lippincott Williams and Wilkins, Canada, 2012
5. Srilakshmi B, *Dietetics*, sixth edition, New age Publishing Press, New Delhi, 2011.
6. **Skipper A, Advanced Medical Nutrition Therapy Practice,** Jones and Barlett Learning, MA, 2008
7. Marian M et al., *Clinical Nutrition for surgical patients*, Jones and Bartlett Publishers, Canada, 2008
8. Joshi Y.K, *Basics of Clinical Nutrition*, 2nd edition, JP Medical Publishers Pvt Ltd, New Delhi, 2008
9. Stacy N, *William's Basic Nutrition and Diet Therapy*, 12th edition, Elseivier publications, UK, 2005
10. Gibney MJ, Elia M, Ljunggvist O, ***Clinical Nutrition (The Nutrition Society Textbook)*** Wiley Blackwell Publishers, 2005
11. Whitney EN and Rolfes SR, *Understanding Nutrition,* 9th edition, West/Wordsworth, 2002
12. Williams SR, *Nutrition & Diet Therapy*, CV. Mosby St. Louis, 2001
13. Garrow JS, James WPT, Ralph A, *Human Nutrition and Dietetics* 10th edition, Churchill Livingstone, NY, 2000
14. Shils ME, Obson JA, Shike M, *Modern Nutrition in Health and Disease*, Eighth edition, Volume I and II , Lea and Febiger Philadelphia, A Waverly Company, 2000
15. Cataldo, DeBruyne and Whitney, *Nutrition and Diet therapy– Principles and Practice* 5th edition, West/ Wadsworth, London. 1999
16. Antia, F.P. and Abraham P, *Clinical Dietetics and Nutrition*,.4th edition, Oxford University Press, Delhi,
17. Carroll AL &Rutherford K,*Nutrition and Diet Therapy* 2nd edition, F.A. Davis Company, Philadelphia
18. Ruth A., Townsend CE, *Nutrition and Diet Therapy* 8thedition,Thomson Delmar Learning

JOURNALS

1. International journal of Clinical Nutrition and Dietetics
2. International journal of Food, Nutrition and Dietetics
3. Food and nutrition bulletin

E- LEARNING RESOURCES:

- https://www.youtube.com/watch?v=8vC7Jro4HRQ
- https://www.youtube.com/watch?v=IxfNM6v3Ef4
- https://www.youtube.com/watch?v=yD6UF3ogn_U

- https://www.youtube.com/watch?v=jmF12JYPgoQ
- https://www.youtube.com/watch?v=Haz8k8Rh6UQ
- https://www.youtube.com/watch?v=Rcb6I7gsl-Y
- https://www.youtube.com/watch?v=P9hBjrjMcSw
- https://www.youtube.com/watch?v=y-shOXdsJeA
- https://www.youtube.com/watch?v=iefghc2g91M
- https://www.youtube.com/watch?v=chSyQPKsNk4
- https://www.youtube.com/watch?v=Ueqs7pl5OAY
- https://www.youtube.com/watch?v=XJQn8MXnTWg
- https://www.youtube.com/watch?v=f-Fxlsb2dtQ&t=169s
- https://www.youtube.com/watch?v=Hwi9dsFBuhg
- https://www.youtube.com/watch?v=PGB6dN1KlwQ
- https://www.youtube.com/watch?v=bFdTgty0T0I
- https://www.youtube.com/watch?v=LcNQdo15lF8
- https://www.youtube.com/watch?v=st7G2vyLSiY
- https://www.youtube.com/watch?v=gE5gSU_8oHs

COURSE OUTCOMES

CO No.	CO Statement	Knowledge Level
CO 1	Identify the role of dietitian and describe the processes involved in delivering quality food and nutrition services for clinical conditions.	K1 & K2
CO 2	Demonstrate understanding of physiology, biochemistry, nutrient metabolism, nutrient – nutrient interaction and drug therapy.	K2
CO 3	Interpret, evaluate and use of current protocols and guidelines to make practical decisions in the treatment of critically ill patients.	K2 & K5
CO 4	Apply the knowledge of nutrition assessment and evidence-based nutrition intervention for diseases and conditions.	K3
CO 5	Analyze the pathophysiology of nutrition-related clinical conditions and evaluate the role of diet therapy	K4 & K5
CO6	Discuss and develop disease specific prevention and treatment strategies of various communicable diseases, gastrointestinal, liver, pancreas and gallbladder diseases based on the current nutrition research.	K6

Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	2	1	3	2
CO2	3	3	2	2	3	2
CO3	3	3	3	3	3	3
CO4	3	3	2	3	3	3
CO5	3	3	2	2	3	2
CO6	3	3	3	3	3	3
AVERAGE	2.83	3.00	2.33	2.33	3.00	2.50

TEACHING METHODOLOGY

1. Lecture (Chalk and Talk-OHP-LCD)
2. Flipped Learning/Blended Classroom-E Content, Videos
3. Problem Solving-Group Discussion-Role Modeling
4. Quiz-Seminar
5. Peer Learning

QUESTION PAPER TEMPLATE
ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008
(For candidates admitted from the academic year 2021)

MSC FOOD AND NUTRITION

I YEAR- I SEMESTER

Title of the paper: Advanced Medical Nutrition Therapy I **Max. Marks: 100**
Paper Code: 13SP21/1C/AM1 **Time: 3 hours**

SECTION A

Definition (Answer all) **(10x2=20 marks)**
Two questions from each unit

SECTION B

Answer any FIVE questions. **(5x8= 40 marks)**
Each answer should not exceed 300 words.
One question from each unit and the remaining three questions from Unit II, Unit III and Unit IV respectively
(Understanding/Description/Problems)
Each question carries eight marks

SECTION C

Answer any TWO questions. **(2X20=40 marks)**
Each answer should not exceed 1500 words.
Four questions covering all five units.
(Application/ Analysis/Synthesis/Evaluation)
Sub divisions may be given.
Each question carries twenty marks

SEMESTER I

NUTRACEUTICALS

Elective 1

TOTAL HOURS: 75 hours **COURSE CODE: 13SP21/1E1/NUT**

CREDITS: 3 **L-T-P: 3-2-0**

COURSE OBJECTIVES

- ✓ Understand the history, concepts of nutraceuticals.
- ✓ Classify the nutraceuticals based on origin, chemical composition and mechanism of action.
- ✓ Learn the health benefits of nutraceuticals from various sources.
- ✓ Learn the various aspects of food as preventive drug or supplement.
- ✓ Discuss the concepts of technologies in functional food industry.

COURSE OUTLINE

UNIT I: Nutraceuticals - History, Evolution, and Definition, Concept, Classification and General Mechanism of Action. (15 HOURS)

UNIT II: Functional foods – Definition, Development of functional foods. Health Claims on functional foods – FDA Claims, European Commission and European Food Safety Authority Claims. (15 HOURS)

UNIT III: Nutraceuticals with potential health benefits from plant phytochemicals, animal products, Novel food sources & dietary fiber. Role of Prebiotics &Probiotics as Nutraceuticals and commercial availability. (15 HOURS)

UNIT IV: Significance of Nutraceuticals and Functional foods in the management of cancer, diabetes mellitus, cardiovascular disease, obesity, bone health and mental health. (15 HOURS).

UNIT V: Nutrigenomics –Relationship between Nutritional supplementation, gene expression and disease prevention. Application of technologies in Functional food Industry. (15 HOURS**)**

RECOMMENDED TEXTBOOKS

1. Wildman, R.E.C, *Handbook of Nutraceuticals and Functional Foods*, Second Edition, CRC Press.
2. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13th Edition, Elsevier Saunders, Missouri, 2012

REFERENCE BOOKS

1. Kramer K, Hoppe PP, Packer L, *Nutraceuticals in Health and Disease Prevention*, 1st edition, CRC Press, 2001
2. Groff JL, Gropper SS, *Advanced Nutrition and Human Metabolism* 3rd edition, West Wadsworth, UK. 2000
3. Gibson GR & William CM, *Functional foods : Designer Foods*, Pharma Foods, 2004
4. Flohe, J &Joost HG, *Nutritional Genomics : Impact on Health and Disease*, Wiley VCH
5. Cupp& Tracy TS, *Dietary Supplements: Toxicology and Clinical Pharmacology*, Humana Press

JOURNALS

1. Journal of nutraceuticals and food science
2. Annual review of Nutrition

E-LEARNING RESOURCES

1. https://www.nutraceuticalsworld.com
2. https://divisnutraceuticals.com
3. https://fssai.gov.in/cms/health-supplements.php
4. https://www.nutraceuticalseurope.com
5. http://www.chemistryindustry.biz/nutraceuticals.html
6. https://www.nutraingredients-asia.com

COURSE OUTCOME

CO No.	CO Statement	Knowledge Level
CO1	Identify the history, concept of nutraceuticals	K1
CO2	Explain the classification, mechanism of action of nutraceuticals	K2
CO3	Classify the health benefits of nutraceuticals from various sources	K3
CO4	Determine the significance of nutraceuticals in various disease condition	K4

CO5	Assess the relationship between nutrient supplementation, gene expression and disease prevention	K5
CO6	Compile the concepts of technologies in functional food industry	K6

Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	2	2	2
CO2	3	3	2	2	2	2
CO3	3	3	2	2	3	2
CO4	3	3	3	2	3	2
CO5	3	3	3	2	2	2
CO6	3	2	2	3	2	3
AVERAGE	3	2.6	2.5	2.2	2.3	2.2

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY

1. Lecture (Chalk and Talk-OHP-LCD)
2. Flipped Learning/Blended Classroom-E Content, Videos
3. Problem Solving-Group Discussion-Role Modelling
4. Quiz-Seminar
5. Peer Learning

QUESTION PAPER TEMPLATE
ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008
(For candidates admitted from the academic year 2021)

MSC FOOD AND NUTRITION

I YEAR- I SEMESTER

Title of the paper: NUTRACEUTICALS **Max. Marks: 100**

Paper Code: 13SP21/1E1/NUT **Time: 3 hours**

SECTION A

Definition (Answer all) **(10x2=20 marks)**
Two questions from each unit

SECTION B

Answer any FIVE questions. **(5x8= 40 marks)**
Each answer should not exceed 300 words.
One question from each unit and the remaining three questions from Unit II, Unit III and Unit IV respectively
(Understanding/Description/Problems)
Each question carries eight marks

SECTION C

Answer any TWO questions. **(2X20=40 marks)**
Each answer should not exceed 1500 words.

Four questions covering all five units.
(Application/ Analysis/Synthesis/ Evaluation)
Sub divisions may be given.
Each question carries twenty marks

SEMESTER I

ESSENTIALS OF PHYSIOLOGY

Elective 2

TOTAL HOURS: 75 hours **COURSE CODE: 13SP21/1E2/EOP**

CREDITS: 3 **L-T-P: 3-2-0**

COURSE OBJECTIVES

To enable the students to

- ✓ To learn the structure of different organ systems
- ✓ To understand the functions of physiological systems in the body
- ✓ To correlate with the pathological condition related to nutritional disorders
- ✓ To understand the utilisation of nutrients in the various organs of the body
- ✓ To relate physiology with health and disease

COURSE OUTLINE

UNIT I: **General and Cellular Basis for Physiology**:
Cell as structural & functional unit; Intercellular communication; Homeostasis; Aging
Circulatory and Cardiovascular Physiology:
Circulating body fluids; Blood & Lymph; Heart – structure, origin and conduction of heart beat, cardiac cycle, Blood pressure; ECG–interpretation, Angioplasty, Angiogram
Immune system:
Types of Immunity; Antigen–Antibody reaction; Role of lymphocytes (15 HOURS)

UNIT II: **Nerve-Muscle Physiology:**
Nerve – Structure, nerve impulse conduction – potential, muscle tissue – structure, molecular basis of skeletal muscle contraction, neuromuscular transmission- Reflexes - stretch reflex, withdrawal reflex.
Brain; Structure & functions – spinal cord; spinal nerves – reflex Action; Control of posture & balance; ANS; Electroencephalogram. (15 HOURS)

UNIT III: **Respiratory Physiology:**
Respiratory organs – Pulmonary function – Gaseous transport in lungs and tissues – regulation – respiratory adjustment in health and diseases.
Gastro-intestinal System:
Digestive system – Organs and its functions**,** Digestion & absorption of carbohydrates, proteins and fat; Regulation & GI function. (15 HOURS)

UNIT IV: **Renal Physiology and Fluid balance:**

Structure and functions of Kidney and Nephron Urine formation -Regulation of extracellular sodium and osmolarity; Micturition, Body fluid compartments, Electrolyte, pH and Water balance: regulation of fluid balance.

Integumentary system:Structure and functions;Body temperature and its regulation (15 HOURS)

UNIT V: **Endocrine system:**

Pituitary, Thyroid, Pancreas, Adrenal Glands – structure & functions

Reproductive Physiology:

Structure and functions of male and female reproductive organs; Menstrual cycle, pregnancy, parturition, lactation; menopause-role of hormones; Contraceptive methods (15 HOURS)

RECOMMENDED TEXTBOOKS

1. Tortora. G&Grabowski, S.R. *Principles of Anatomy & Physiology*,10thEdition, John Wiley & Sons, USA,2003.
2. Chatterjee CC, *Human Physiology*, Volume I, 11th Edition, CBS Publishers, New Delhi, 2016
3. Chatterjee CC, *Human Physiology*, Volume II, 11th Edition, CBS Publishers, New Delhi, 2016

REFERENCE BOOKS

1. Waugh A &Grant A, *Ross & Wilson Anatomy and Physiology in Health and Illness*,12th Edition,Churchill Livingstone Elsevier evolve, 2014
2. Sathya P and Devanand V, *Textbook of Physiology*, First edition, CBS Publishers and Distributers Pvt Ltd, New Delhi, 2013
3. Sembulingam K, *Essentials of Medical Physiology*, 6th edition, Jaypee Medical Publishers, New Delhi, 2013
4. Boron WF and Boulpaep EL, *Medical Physiology*, II edition, Saunders Elseivier, 2009
5. Marieb EN,*Human Anatomy and Physiology,* VI edition, Pearson edition, 2004
6. Ganong, WF, *Review of Medical Physiology*,21st Edition, McGraw Hill Publishers, 2003
7. Jain, A.K. *Textbook of Physiology*, Arichal publishing Co. Latest Edition, 2003.
8. Solomon E, *Introduction to Human Anatomy and Physiology*, 2nd edition. Saunders Publishing and Co,2003.
9. Guyton AC & Hall JE, *Textbook of Medical Physiology*, 10th Edition, Harcourt Asia P. Ltd Singapore, 2001
10. Chaudhuri, A.R. *Textbook of Practical Physiology*, Paras Publishing, Hyderabad, 2000.
11. Joshi, VD, *Physiology – Preparation Manual for Undergraduates*, Churchill Livingstone. New Delhi, 1995
12. Chakrabarti et al., *Human Physiology*, The New Book Stall, Calcutta, 1994

JOURNALS

1. American Journal of physiology
2. Journal of anatomy

E-LEARNING RESOURCES:

1. https://www.youtube.com/watch?v=vii3YLGouv0
2. https://www.youtube.com/watch?v=PLFq-1h4870
3. https://www.youtube.com/watch?v=Evsqy0a_Lrk
4. https://www.youtube.com/watch?v=sUXwG5XVoMs
5. https://www.youtube.com/watch?v=k60M1h-DKVY

COURSE OUTCOME

S.No.	CO Statement	Knowledge level
CO1	Outline cell and state the homeostasis mechanisms in the body	K1
CO2	Explain and relate the structure, functions and mechanism of each organ system in the body	K2
CO3	Apply the knowledge on interrelations of organ systems to each other	K3
CO4	Examine the integrated responses of the organ systems of the body to physiological and pathological stresses	K4
CO5	Assess the pathophysiology of common diseases related to the organ systems of the body	K5
CO6	Integrate physiologic conditions to health and disease	K6

Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	2	2	2	2
CO2	3	3	3	3	2	2
CO3	3	2	2	3	3	3
CO4	3	2	2	2	2	2
CO5	3	2	2	2	2	2
CO6	3	3	3	3	3	3
AVERAGE	2.8	2.3	2.3	2.5	2.3	2.3

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY

Lecture (Chalk and Talk-OHP-LCD)
Flipped Learning/Blended Classroom-E Content, Videos
Problem Solving-Group Discussion-Role Modelling
Quiz-Seminar
Peer Learning

QUESTION PAPER TEMPLATE

ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008
(For candidates admitted from the academic year 2021)

MSC FOOD AND NUTRITION

I YEAR- I SEMESTER

Title of the paper: ESSENTIALS OF PHYSIOLOGY **Max. Marks: 100**

Paper Code: 13SP21/1E2/EOP **Time: 3 hours**

SECTION A

Definition (Answer all) **(10x2=20 marks)**
Two questions from each unit

SECTION B

Answer any FIVE questions. **(5x8= 40 marks)**
Each answer should not exceed 300 words.
One question from each unit and the remaining three questions from Unit I, Unit II and Unit III respectively
(Understanding/Description / Problems)
Each question carries eight marks

SECTION C

Answer any TWO questions. **(2X20=40 marks)**
Each answer should not exceed 1500 words.

Four questions covering all five units.
(Application/ Analysis/Synthesis/ Evaluation)
Sub divisions may be given.
Each question carries twenty marks

EXERCISE PHYSIOLOGY AND SPORTS NUTRITION

ELECTIVE 2

TOTAL HOURS: 75 hours **COURSE CODE: 13SP21/1E2/EPS**

CREDITS: 3 **L-T-P: 3-2-0**

COURSE OBJECTIVES

- ✓ To understand the concepts of Fitness in Sports person.
- ✓ To Gain insight on the role of nutrients in performance.
- ✓ To understand the nutritional disorders and intervention for sports person.
- ✓ To apply nutrition intervention for specific health issues in sports person.

COURSE OUTLINE

Unit I: **Introduction-** Sports, Games and Exercise, Types and description. Principles of exercise, importance, advantages and disadvantages. Types of exercises including Aerobics, yoga, Resistance exercise, isometric and isotonic exercise. (15 HOURS)

Unit II: **Physical fitness assessment-**

- Body composition, assessment of obesity, body fat percentage, Somatotyping, BMI, Ideal body weight. Assessment of Muscle Mass and Bone mass, assessment of Flexibility, Muscular endurance, Strength , Power. Kinanthropometry.
- Cardio-respiratory fitness - Max aerobic capacity using modified Harvard test (Queens college test) , Nine minute walk / run test, One mile walk Assessment of Physical work capacity (PWC), Physiological response on Bicycle ergometer/ treadmill.

(15 HOURS)

Unit III: **Effect of exercise on -**

- The Cardio Respiratory system –Athletic heart. Acute and chronic adaptation (effect of different types of exercise), Index of training, Importance of heart rate monitoring, over training and detraining.
- Respiratory system- control during physical exercise. Effect of training on heart and lung performance, chronic and acute adaptation, Hypoxia and hypercapnia. Lung function test and its importance,
- Skeletal muscle types, relation with different types of activities. Physiological adaptations to strength training. Effects of over training and detection, Muscle fatigue, prevention and recovery sports injury and rehabilitation. Doping and its control. Effects of exercise on nervous system. (15 HPOURS)

Unit IV: **Macronutrient requirements for exercise**

- Macro Nutrients-Carbohydrate as an energy source for sport and exercise, Carbohydrate Loading, carbohydrate for pre exercise, during and recovery period.
- Role of Fat as an energy source for sports and exercise. Factors affecting fat oxidation -intensity, duration and training status.
- Protein requirement and metabolism during endurance exercise, resistance exercise and recovery process. (15 HOURS)

Unit V: **Micronutrient requirements, antioxidants, fluid for exercise-** Requirements for B complex vitamin, calcium, iron for sports. Exercise induced oxidative stress and role of antioxidants. Fluid balance in sports and exercise, symptoms and prevention of dehydration.

(15 HOURS)

RECOMMENDED TEXT BOOKS

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

REFERENCE BOOKS

1. Dunford M, *Fundamentals Of Sports And Exercise Nutrition,* **Human Kinetics, Illinois, 2010**
2. Jeukendrup A and Gleeson M, *Sports Nutrition: An introduction to energy production and performance,* Human Kinetics publishers, 2004
3. Maughan RJ, Burke LM, Handbook of Sports Medicine & Science- Sports Nutrition, Blackwell Science publications, 2002
4. Williams MH, *Nutrition For Health, Fitness And Sport*, 5th edition, McGraw Hill, Boston, 1999
5. William D, McArdle, Frank I, Katch and Katch VL, *Sports and Exercise Nutrition,* 4thedition, Lippincott Williams and Wilkins, 1999

Journals

1. Journal of international society of sports nutrition

2. International journal of sports nutrition and exercise metabolism

E-LEARNING RESOURCES

- **https://fssai.gov.in/upload/uploadfiles/files/Guidance_Document_Sport sperson_10_0 7_2019.pdf**
- **https://www.opensciencepublicatio**

ns.com/wp- content/uploads/IJN-2395-2326-3- 147.pdf

- **https://iriponline.com/admin/php/uploads/2345_pdf.pdf**
- **https://indianathletics.in/wp-content/uploads/2019/07/IAAF- Practical-Guide-to- Nutrition-May-2013.pdf**

COURSE OUTCOME

CO Number	CO STATEMENT	KNOWLEDGE LEVEL
CO 1	Outline the nutritional guidelines for optimal health and performance enhancement	K1
CO 2	Discuss the different types of assessment of body composition.	K2
CO 3	Plan diets for various sports events	K3
CO 4	Assess, evaluate and analyse appropriate use of nutritional supplements and ergogenic aids	K4 & K5
CO 5	Explain the nutritional concerns of female athletes and specific health issues in sports person	K2
CO6	Develop and justify the preparation of sports drinks	K4 & K5

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	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	1	3	3	3	3	3
AVERAGE	2.6	3	3	3	3	3

Key: Strongly Corelated-3 Moderately Corelated-2 Weakly Corelated-1 No Corelation-0

QUESTION PAPER TEMPLATE
ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008
(For candidates admitted from the academic year 2021)

MSC FOOD AND NUTRITION

I YEAR- I SEMESTER

Title of the paper: EXERCISE PHYSIOLOGY AND SPORTS NUTRITION Max. Marks: 100

Paper Code: 13SP21/1E2/EPS **Time: 3 hours**

SECTION A

Definition (Answer all) **(10x2=20 marks)**
Two questions from each unit

SECTION B

Answer any FIVE questions. **(5x8= 40 marks)**
Each answer should not exceed 300 words.
One question from each unit and the remaining three questions from Unit I, Unit II and Unit III respectively
(Understanding/Description / Problems)
Each question carries eight marks

SECTION C

Answer any TWO questions. **(2X20=40 marks)**
Each answer should not exceed 1500 words.

Four questions covering all five units.
(Application/ Analysis/Synthesis/ Evaluation)
Sub divisions may be given.
SEach question carries twenty marks

SEMESTER I

ANALYTICAL TECHNIQUES IN NUTRITION
Practical – 1
CORE -3

TOTAL HOURS: 90 hours **COURSE CODE: 13SP21/1C/PR1**

CREDITS: 4 **L-T-P: 0-0-6**

COURSE OBJECTIVES

To enable the students to

- ✓ To learn skills in weighing and processing of samples
- ✓ To learn skills in reagent preparation, technique and instrumentation
- ✓ To analyse the nutritive value of food samples
- ✓ To determine the biochemical parameters in blood/ serum & urine sample
- ✓ Quantitative estimation by applying standardized procedures and systematic formula

COURSE OUTLINE

PRACTICAL:

1. Estimation of proteins using macrokjeldhal method (10 HOURS)
2. Estimation of fat content in egg yolk using soxhlet extraction method
   Estimation of saponification value,
   Estimation of Iodine value in oil/fat
   Estimation of Acid value in oil/fat (15 HOURS)
3. Mineral Estimation in foods:
   Estimation of calcium (titrimetric)
   Estimation of Iron (spectrophotometry)
   Estimation of Phosphorous (colorimetry) (10 HOURS)
4. Vitamin estimation in foods:
   Estimation of Vitamin C (dye method),
   Estimation of Beta carotene (Column Chromatography) (10 HOURS)
5. Estimation of urinary calcium,
   Estimation of urinary creatinine (12 HOURS)
6. Estimation of hemoglobin in blood,
   Estimation of blood glucose using colorimetry and glucometer
   Estimation of glucose by glucose oxidase method (8 HOURS)
7. Estimation of protein in serum using Biuret reagent (10 HOURS)
8. Estimation of serum sodium ,
   Estimation of serum potassium (5 HOURS)
9. Demonstration on food analysis using HPLC (5 HOURS)
10. Quantative analysis of aminoacids by ninhydrin (5 HOURS)

RECOMMENDED TEXTBOOKS

1. Nielson S, *Food Analysis Laboratory Manual*, 3rd edition, Springer International Publishing, 2017
2. Cheung PCK and Mehta BM (Eds), Handbook of Food chemistry, 1st edition, Springer-Verlag Berlin Heidelberg, 2015
3. James CS, *Analytical chemistry of Foods*, 1st edition Springer US, 1995

JOURNALS

1. Food analytical methods
2. Journal of food composition and analysis

E-LEARNING RESOURCES:

1. https://www.youtube.com/results?search_query=analytical+techniques+swayam
2. https://www.youtube.com/watch?v=-GR8Z3UerE0
3. https://www.youtube.com/watch?v=tXVDY1HvrVU
4. https://www.youtube.com/watch?v=FX-NiPVsYPM
5. https://youtu.be/qgqoM0y85Mw
6. http://biotech01.vlabs.ac.in/bio-chemistry/Estimation_of_Iodine_Value_of_Fats_and_Oils/
7. http://biotech01.vlabs.ac.in/bio-chemistry/Estimation_of_Blood_Glucose_by_Glucose_Oxidase_Method/
8. http://biotech01.vlabs.ac.in/bio-chemistry/Estimation_of_Saponification_Value_of_Fats_or_Oils/

COURSE OUTCOME

S.No.	CO Statement	Knowledge level
CO1	Repeat the experimentation for standardisation of procedures	K1
CO2	Estimate the nutritive value of food samples	K2
CO3	Apply standardised procedures and report the results in respective units	K3
CO4	Analyze and compare various biochemical parameters in blood, serum, urine and unknown sample with standard values	K4
CO5	Compare the nutrient composition food samples with Indian food composition table	K5
CO6	Compilation of experimentation with documentation of results	K6

Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	3	2	2	2	2	2
CO3	2	2	2	2	2	2
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3
CO6	3	2	2	1	1	1
AVERAGE	2.7	2.5	2.5	2.3	2.3	2.3

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY

Lecture (Chalk and Talk-OHP-LCD)
Flipped Learning/Blended Classroom-E Content, Videos
Problem Solving-Group Discussion-Role Modelling
Quiz-Seminar
Peer Learning

SEMESTER II

ADVANCED FOOD SCIENCE
CORE - 4

TOTAL HOURS: 75 hours **COURSE CODE: 13SP21/2C/ADF**

CREDITS: 4 **L-T-P: 3-2-0**

COURSE OBJECTIVES

To enable students to

- ✓ understand the composition, nutritive value and the effect of cooking on various food components
- ✓ Gain knowledge on food labelling , food quality and standards
- ✓ Develop skills on subjective and objective evaluation
- ✓ Learn the emerging trends in food science.
- ✓ Acquire knowledge on post-harvest technology and food processing techniques

COURSE OUTLINE

UNIT I: **Cereals and Pulses:**

Cereals: Structure, composition and processing of rice, wheat, maize, sorghum and barley. Composition and nutritive value of Ragi, Bajra, foxtail millet and kodo millet; Cereal Cookery: Gelatinization, factors affecting gelatinization, gel formation, Retrogradation, Synersis and Dextrinisation; Gluten formation. Cereal products: Products of rice, wheat, maize and other cereal products and baked products; Modified starch

Pulses:Composition, nutritive value, processing, toxic constituents, effect of cooking on pulses. (15 HOURS)

UNIT II: **Vegetables and Fruits**: Composition, nutritive value, effect of cooking on pigments and polyphenols and vegetables and fruit preserves.

Fats and Sugars:

Fat: Types, composition, processing and changes during cooking and storage; Rancidity of fats; Modified Fats; Functions of fats and oils in food, Emulsion – Types.

Sugar and Jaggery: Types, nutritive value, manufacture, sugar cookery-crystallization and stages.

Browning of foods: Enzymatic and Non-enzymatic browning of foods (15 HOURS)

UNIT III: **Milk and Meat:**

Milk: Composition, nutritive value, processing, physical and functional properties of milk. Milk Cookery, Milk products-types and processing.

Egg: Structure, composition, nutritive value of egg; Egg quality; Egg Foams and Egg cookery.

Meat: Composition and nutritive value of meat, classes, cuts and grades of meat, post mortem changes in meat, tenderizing meat and meat cookery. Gelatin

Poultry: Classification, composition, nutritive value and processing

Fish: Classification, composition, nutritive value, selection, preservation and processing and fish cookery. (25 HOURS)

UNIT IV: Food Quality and Food Labeling:

Evaluation of Food Quality: Sensory evaluation and Objective evaluation
Adulteration- definition, types and methods of detection;
Food Labeling: Definition, requirements and use of food labeling.
Food standards – National and international standards – FSSAI, HACCP, ISO series (10 HOURS)

UNIT V: Emerging trends in Food Science:

Recent trends in post-harvest technology in foods- cereals, pulses, vegetables and fruits; Food Composition Databases, Organic foods, processed and convenience foods; GM foods; Food fortification and Food Enrichment;
Enzymes in food Industry: Classification, properties, Enzyme applications and new developments. (10 HOURS)

RECOMMENDED TEXTBOOKS

1. Manay S and Swamy S, *Food Facts and Principles*, New Age International (P) Ltd Publishers, New Delhi, 2001
2. Potter NM and Hotchkiss JH, *Food Science*, C.B.S. Publishers, New Delhi,1995

REFERENCE BOOKS

1. Reddy SM, *Basic Food science and Technology*, New Age Publishers, New Delhi, 2015
2. Lowe B, *Experimental cookery from chemical and physical stand point*, Forgotten books, UK, 2015
3. Srilakshmi B, *Food Science*, Sixth Edition, New Age International Ltd Publishers, New Delhi, 2015
4. Roday S, *Food science and Nutrition*, Oxford university press, New Delhi, 2007
5. KhetarPaul N; Grewal, R and Jood, S, *Bakery Science and Cereal Technology*, Dia publishing house, Delhi. 2005
6. McCance and Widdowson, *Composition of food*, 6th Edition, Food Standards Agency, 2004
7. Swaminathan .N, *Food Science and Experimental Foods*, Ganesh Publications, Madras, 2004
8. Vaclavik, V, *Dimensions of Food*, 5th Edition CRC press USA, 2002
9. Aylward, F, *Food technology Processing and laboratory control*,Agrobios Publishing, Jodhpur, 2001
10. Subramani A, *Concise Food Science*, Soundarya Publications, 1998
11. Meyers, L.M., *Food Chemistry*; Van Nonstrand Reinhold Co., New York,

JOURNALS

1. Journal of food science
2. Journal of food science and technology
3. Journal of nutrition and food science

4. International journal of food science and nutrition

E-LEARNING RESOURCES

1. https://en.wikipedia.org/wiki/Food_quality
2. https://www,science direct,com
3. https://www.eufic.org/food production/ processed-food

COURSE OUTCOME

CO No.	CO Statement	Knowledge Level
CO1	Outline and explain the structure, composition and the nutritive value of food groups	K1 &K2
CO2	Discuss the processing techniques and the effect of cooking on various food components	K2
CO3	Apply the principles of subjective and in objective methods and evaluate the quality of foods.	K3 &K5
CO4	Analyse the emerging trends in food science and gain detail insight on food quality and standards	K4 & K1
CO5	Develop skills to undertake research in the field of food science and career in food industry	K6

Mapping of CO with PSO

CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**
CO1	3	3	2	3	3	1
CO2	3	3	3	1	3	3
CO3	3	3	3	3	3	3
CO4	3	3	2	3	3	3
CO5	3	3	3	3	3	3
AVERAGE	3.0	3.0	2.6	2.6	3	2.6

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY

Lecture method, Power point presentation, Over Head Projector, Group discussion, Assignment, Seminar, Survey, Quiz.

QUESTION PAPER TEMPLATE

ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008
(For candidates admitted from the academic year 2021)

MSC FOOD AND NUTRITION
I YEAR- II SEMESTER

Title of the paper: ADVANCED FOOD SCIENCE **Max. Marks: 100**
Paper Code: 13SP21/2C/ADF **Time: 3 hours**

SECTION A

Definition (Answer all) **(10x2=20 marks)**
Two questions from each unit

SECTION B

Answer any FIVE questions. **(5x8= 40 marks)**
Each answer should not exceed 300 words.
One question from each unit and the remaining three questions from Unit II, Unit III and Unit IV respectively
(Understanding/Description / Problems)
Each question carrieseight marks

SECTION C

Answer any TWO questions. **(2X20=40 marks)**
Each answer should not exceed 1500 words.

Four questions covering all five units.
(Application/ Analysis/Synthesis/ Evaluation)
Sub divisions may be given.
Each question carries twenty marks

SEMESTER II

APPLIED STATISTICS AND RESEARCH METHODOLOGY

CORE - 5

TOTAL HOURS: 75 hours **COURSE CODE: 13SP21/2C/ASR**

CREDITS: 4 **L-T-P: 3-2-0**

COURSE OBJECTIVES

- ✓ To define the principles of research and recall the methodologies in conducting a research
- ✓ To demonstrate their understanding of facts and principles to formulate research designs
- ✓ To identify the basic theories and techniques of research methodology
- ✓ To analyze and examine numerical data applying statistical procedures appropriate to the area of research
- ✓ To evaluate and discuss the results obtained and draw inferences to provide solutions to problems related to the field of nutrition
- ✓ To compile the data and discover new facts and theories from the research undertaken

COURSE OUTLINE

UNIT I: Meaning of research, Purposes of research, Types of research;
Selecting a research problem and preparing a research proposal-The academic research problem, using the library, sending related literature, Note taking;Preparation of a research proposal for getting funds for the research;
Ethical Issues- Ethical importance of consent in research, Regulations and Guidelines for research on human subjects; Intellectual Property Rights
Experimental and quasi experimental research- Principles of experimental research experimental and control groups, variables, controlling extraneous variables, experimental validity, experimental designs, pre, post, true and quasi experimental design, Factorial design, Theory and hypothesis, experimental control. (10 HOURS)

UNIT II: Sampling and Sample Designs-Census and sample methods-Theoretical basis of sampling, law of statistical regularity, law of inertia of large numbers, essentials of sampling.
Sampling from infinite population-concept of sampling distribution and standard error, relationship between sample size and standard error; Standard errors of sample mean. Sample variance, sample standard deviation and sample mean, sample standard deviation and sample proportion and the differences in these values

Methods of sampling Non-probability sampling methods, advantages, Limitation of probability sampling; Probability sampling methods –Types, Selection of appropriate method of sampling, size of sample, merits and limitations of sampling, sampling and non-sampling errors. (10 HOURS)

UNIT III: Collection of Data-Primary and secondary data, sources, published and unpublished sources, Editing primary and secondary data, and precautions in the use of secondary data.

Organization of data collection –Limitations and sources of error, Tools of research- Quantitative and Qualitative studies.Observation, Questionnaire, Opinionnaire- various methods and techniques; Reliability and validity of research tools

Classification and tabulation of Data-Meaning and objectives of classification, objects of classification, Types of classification, formation of frequency distribution, typessymmetric and asymmetric distribution considerations in the construction of frequency distribution

Tabulation of data-Difference between classification and tabulation of data, Role of tabulation Parts of the table, general rules of tabulation Review of a table types of tables, machine tabulation. Editing and coding of data records.

Diagrammatic and graphicalrepresentation Significance of diagrams and graphs, comparison of tabular and diagrammatic presentation types of diagrams. Graphs-Techniques of constructing graphs, graphs of time series or line graphs Rules for constructing the line graph or natural scale, types of graphs, graphs of frequency distribution-Histogram, frequency polygon, smoothed frequency curve, cumulative frequency curves or gives, limitations of diagrams and graphs. (10 HOURS)

UNIT IV: Meaning of statistics, scope and limitations of statistic as a tool for decision making under uncertainty

Measures of central tendency –mean, median, mode and their relative merits finding combined mean, weighted mean, finding median and mode graphically.

Measures of variation-absolute and relative measures-range standard deviation of mean, combined standard deviation given the SD's of two distribution, coefficient of variation, percentiles and their applications

Correlationmethods-meaning, product moment, coefficient of correlation, rank correlation, scatter diagram and regression lines and their uses. Concepts of partial and multiple correlations

Test of significance-hypothesis testing, tests involving normal distribution, tests for large and small samplest tests-A tests to compare means of population and sample means of two independent samples c means of two dependent samples ,F tests-comparison of SD's of two samples ,analysis of variance , non-parametric tests-chi square test. (35 HOURS)

UNIT V: Report Writing -style manual, format of the research report ,The thesis or dissertation- style of writing, typing a report, reference form (Bibliography)-Pagination, tables, figures-Evaluating a research report-Foot notes plagiarism, Technical and popular reports. (10 HOURS)

RECOMMENDED TEXTBOOKS

1. Gupta. S.P, *Statistical Methods*, S Chand & Sons,, New Delhi, 2008
2. Kothari, C. and Garg, G, *Research methodology Methods and Techniques* 3rd edition, New Delhi: New Age International (P) Ltd, 2014

REFERENCE BOOKS

1. Singh, Y.K, *Fundamental of Research Methodology and Statistic*. New Age International (P) Ltd., Publishers. New Delhi, 2015
2. Saravanavel, P, *Research Methodology*, KitabMahal Agencies, New Delhi, 2005
3. Elhance .D.N, Veenaand and Agarwal .B.M, *Fundamental of statistics*,48thEdition, KitabMahal, Allahabad, 2005
4. Best JW and Kahn JV, *Research in Education*, Prentice Hall of India Pvt. Ltd., New Delhi, 1996
5. Koul L, *Methodology of Educational Research*,3rd edition Vikas publishing House Pvt.Ltd,New Delhi
6. William Giles Campbell, *Form and style in Thesis writing*, Houghton Mifflin Company, Boston.
7. Sadhu A.N andSingh A,*Research Methodology in Social Sciences*, Himalaya Publishing House, Mumbai,

JOURNALS

1. International journal of social research methodology
2. Journal of research practice

COURSE OUTCOME

CO No.	CO Statement	Knowledge Level
CO1	To recall the definitions , theories and statistical procedures and gain critical thinking skills to effectively undertake research	K1& k2
CO2	To demonstrate understanding of the concept of research and acquire the necessary skills to formulate research outline.	K2 & K1
CO3	To implement the skills in employing appropriate tools and techniques in structuring the research designs and solving the research problem.	K3 &K2
CO4	To analyze and classify the data collected using the principles of research methodology and draw conclusions by subjecting it to various statistical treatments	K4
CO5	To interpret and make valid judgements determining the statistical significance obtained	K5
CO6	To compile the information, develop new theories and propose alternative solutions based on the outcomes of the research.	K6

Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	2
CO2	3	3	2	3	3	3
CO3	3	3	3	2	2	2
CO4	2	3	3	2	2	3
CO5	2	2	3	3	2	3
CO6	2	2	3	3	3	3
AVERAGE	**2.5**	**2.6**	**2.8**	**2.5**	**2.5**	**2.5**

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY

Lecture (Chalk and Talk-OHP-LCD)
Flipped Learning/Blended Classroom-E Content, Videos
Problem Solving-Group Discussion-Role Modelling, Quiz-Seminar, Peer Learning

QUESTION PAPER TEMPLATE
ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008
(For candidates admitted from the academic year 2021)

MSC FOOD AND NUTRITION
I YEAR- II SEMESTER

Title of the paper: Applied Statistics and Research Methodology **Max. Marks: 100**
Paper Code: 13SP21/2C/ASR **Time: 3 hours**

SECTION A

Definition (Answer all) **(10x2=20 marks)**
Two questions from each unit

SECTION B

Answer any FIVE questions. **(5x8= 40 marks)**
Each answer should not exceed 300 words.
One question from each unit and the remaining three questions from Unit II, Unit III and Unit IV respectively
(Understanding/Description / Problems)
Each question carrieseight marks

SECTION C

Answer any TWO questions. **(2X20=40 marks)**
Each answer should not exceed 1500 words.

Four questions covering all five units.
(Application/ Analysis/Synthesis/ Evaluation)
Sub divisions may be given.
Each question carries twenty marks

SEMESTER II

ADVANCED MEDICAL NUTRITION THERAPY – II

CORE - 6

TOTAL HOURS: 60 hours **COURSE CODE: 13SP21/2C/AM2**

CREDITS: 4 **L-T-P: 3-1-0**

COURSE OBJECTIVES

- ✓ To impart knowledge on weight management.
- ✓ To introduce the current protocol for nutrition care process in renal diseases, trauma, burns and surgery
- ✓ To enable the students to learn the evidence-based diet therapy and lifestyle modification for non-communicable diseases like obesity, diabetes mellitus, cardiovascular disorders and cancer

COURSE OUTLINE

UNIT I **Nutritional Management of Obesity**

Etiology, Nutritional Assessment (Review), Role of hormones (leptin and ghrelin), Obesity Management – Comprehensive lifestyle Intervention, Behavior therapy, Physical Activity, Medical Treatment and Medical Nutrition Therapy in Obesity

Nutrition for Leanness: Etiology, Assessment and Medical Nutrition Therapy (10 HOURS)

UNIT II **Nutrition in Cardiovascular diseases**

Etiology, Signs and Symptoms, Diagnostic Tests, Medical Treatment and Medical Nutrition Therapy

(i) Atherosclerosis
(ii) Myocardial infarction
(iii) Congestive heart failure.
(iv) Hyperlipidemia
(v) Hypertension (10 HOURS)

UNIT III **Nutritional Management in Diabetes Mellitus**

Incidence, Pathophysiology, Screening, Risk factors and Diagnosis, Medical Treatment, Complications, Nutritional Assessment and Intervention and Medical Nutrition Therapy

(i) Type 1 Diabetes
(ii) Type 2 Diabetes
(iii) Gestational Diabetes

Hypoglycemia: types, diagnostic criteria and management.

Nutrition in Oncology

Etiology, Types of Cancer, Cancer Staging, Medical Treatment, Nutritional Assessment and Intervention, Nutritional Management of Specific Solid tumors and Medical Nutrition Therapy of Cancer

(15 HOURS)

UNIT IV **Nutrition in Renal disorders**

a) Etiology, Signs and Symptoms, Diagnostic Tests, Medical Treatment and Medical Nutrition Therapy

(i) Acute and Chronic glomerulonephritis,
(ii) Nephrotic syndrome
(iii) Acute kidney disease
(iv) End Stage Renal Disease
(v) Nephrolithiasis

b) Dialysis – Types, Monitoring Nutritional Adequacy During Dialysis (10 HOURS)

UNIT V **Nutrition in Burns**

Types, Metabolic alterations, Rule of nine and Medical Nutrition Therapy.

Nutrition Support in Surgery

(i) Pre-operative nutritional assessment.
(ii) Pre and post nutritional care in gastro intestinal surgery and Bariatric Surgery
(iii) Pre and post nutritional care in Liver transplantation, Cardiac transplantation and Kidney transplantation (15 HOURS)

Related Experience:

- Compile case studies for any ten different conditions and submit a report on the same
- Guest Lecture or certificate course on different condition collaborating with practicing dietitians

RECOMMENDED TEXTBOOKS

1. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13th Edition, Elsevier Saunders, Missouri, 2012
2. Kane K and Prelack K, Advanced Medical Nutrition Therapy, First Edition, Jones and Barlett learning, Burlington, 2019.

REFERENCES

1. Verma P, *Food ,Nutrition & Dietetics*, 1st edition, CBS publishers & distributors PVT Ltd, New Delhi, 2015
2. Edelstein S, *Lifecycle Nutrition- An evidence based approach*, 2nd edition, Jones & Bartlett learning publications, 2015,
3. Elia M, Ljunggvist O, Stratton RJ, Lanham SA, *Clinical Nutrition (The Nutrition Society Textbook)*, 2nd edition, Wiley Blackwell Publishers, 2013
4. Stump SE, *Nutrition and diagnosis related care*, 7th edition, Lippincott Williams and Wilkins, Canada, 2012
5. Srilakshmi B, *Dietetics*, sixth edition, New age Publishing Press, New Delhi, 2011.

6. Skipper A, Advanced Medical Nutrition Therapy Practice**,** Jones and Barlett Learning, MA, 2008
7. Marian M et al., *Clinical Nutrition for surgical patients*, Jones and Bartlett Publishers, Canada, 2008
8. Joshi Y.K, *Basics of Clinical Nutrition*, 2nd edition, JP Medical Publishers Pvt Ltd, New Delhi, 2008
9. Stacy N, *William's Basic Nutrition and Diet Therapy*, 12th edition, Elseivier publications, UK, 2005
10. Gibney MJ, Elia M, Ljunggvist O, ***Clinical Nutrition (The Nutrition Society Textbook)*** Wiley Blackwell Publishers, 2005
11. Whitney EN and Rolfes SR, *Understanding Nutrition,* 9th edition, West/Wordsworth, 2002
12. Williams SR, *Nutrition & Diet Therapy*, CV. Mosby St. Louis, 2001
13. Garrow JS, James WPT, Ralph A, *Human Nutrition and Dietetics* 10th edition, Churchill Livingstone, NY, 2000
14. Shils ME, Obson JA, Shike M, *Modern Nutrition in Health and Disease*, Eighth edition, Volume I and II , Lea and Febiger Philadelphia, A Waverly Company, 2000
15. Cataldo, DeBruyne and Whitney, *Nutrition and Diet therapy– Principles and Practice* 5th edition, West/ Wadsworth, London. 1999
16. Antia, F.P. and Abraham P, *Clinical Dietetics and Nutrition*,.4th edition, Oxford University Press, Delhi,
17. Carroll AL &Rutherford K,*Nutrition and Diet Therapy* 2nd edition, F.A. Davis Company, Philadelphia
18. Ruth A., Townsend CE, *Nutrition and Diet Therapy* 8thedition,Thomson Delmar Learning

JOURNALS

1. International journal of Clinical Nutrition
2. International journal of Food and Nutrition

E-LEARNING RESOURCES

- https://www.youtube.com/watch?v=2dbCmdCccGk
- https://www.youtube.com/watch?v=1nuSSsAnRVM
- https://www.youtube.com/watch?v=ZGPa_4FN9M4
- https://www.youtube.com/watch?v=Lf5R9yqpun8
- https://www.youtube.com/watch?v=MOe1Svj3Tg8
- https://www.youtube.com/watch?v=v67BwDQcFOM
- https://www.youtube.com/watch?v=fQwar_-QdiQ
- https://www.youtube.com/watch?v=vKIRWY-LMYc
- https://www.youtube.com/watch?v=7m2WG91HZy8
- https://www.youtube.com/watch?v=1mo80kTZgW4

COURSE OUTCOME:

CO No.	CO Statement	Knowledge Level
CO 1	Recall and describe the work of dietary department with whom the dietitian collaborates in the delivery of food and nutrition services.	K1, K2
CO 2	Demonstrate the Nutrition Care Process in complex clinical conditions like trauma, renal disorders, diabetes mellitus and cancer	K2
CO 3	Explain the mechanisms by which different foods, food constituents and unhealthy life style progresses the risk of Non-Communicable diseases.	K5
CO 4	Evaluate and apply scientific knowledge into clinical practice.	K3, K4
CO 5	Plan, analyze, assess and develop disease specific dietary modification for the patient.	K3,K4, K5, K6

Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	2	2	2	2
CO2	3	3	3	3	2	3
CO3	3	3	3	2	3	2
CO4	3	3	3	3	3	2
CO5	2	2	2	3	3	2
AVERAGE	2.6	2.6	2.6	2.6	2.6	2.2

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY

1. Lecture (Chalk and Talk-OHP-LCD)
2. Flipped Learning/Blended Classroom-E Content, Videos
3. Problem Solving-Group Discussion-Role Modelling
4. Quiz-Seminar
5. Peer Learning

QUESTION PAPER TEMPLATE
ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008
(For candidates admitted from the academic year 2021)

MSC FOOD AND NUTRITION
I YEAR- II SEMESTER

Title of the paper: Advanced Medical Nutrition Therapy II **Max. Marks: 100**
Paper Code: 13SP21/2C/AM2 **Time: 3 hours**

SECTION A

Definition (Answer all) **(10x2=20 marks)**
Two questions from each unit

SECTION B

Answer any FIVE questions. **(5x8= 40 marks)**
Each answer should not exceed 300 words.
One question from each unit and the remaining three questions from Unit III, Unit IV and Unit V respectively
(Understanding/Description / Problems)
Each question carries eight marks

SECTION C

Answer any TWO questions. **(2X20=40 marks)**
Each answer should not exceed 1500 words.

Four questions covering all five units.
(Application/ Analysis/Synthesis/ Evaluation)
Sub divisions may be given.
Each question carries twenty marks

SEMESTER II

NUTRITION IN SPECIAL NEEDS

Elective - 3

TOTAL HOURS: 60 hours **COURSE CODE: 13SP21/2E/NSP**

CREDITS: 3 **L-T-P: 3-1-0**

COURSE OBJECTIVES

- ✓ To understand the importance of nutrients for special children, astronauts, soldiers, high altitude, artic and Antarctic travelers and during disaster
- ✓ To learn the dietary modification for children with special conditions
- ✓ To study the nutritional requirements for age related problems

COURSE OUTLINE

UNIT I: Nutrition in children with feeding problems – cleft lip, cleft palate, Underweight, failure to thrive, overweight and swallowing problems
Nutrition for Special children: ADHD, Autism, Cerebral Palsy, Epilepsy or Seizure Disorder, Muscular Dystrophy , Mental Retardation, Down Syndrome, PraderWilli (PW) Syndrome, Spina Bifida , Cystic Fibrosis, Rett Syndrome (15 HOURS)

UNIT II: **S**pace nutrition – Classification, Types of foods, selection of food, microgravity, planning, food preparation and serving (10 HOURS)

UNIT III: Nutrition during emergency situations like Tsunami, earthquake, draught, famine and cyclone. Role of National and international agencies in emergency feeding (10 HOURS)

UNIT IV: Nutrition in high Altitudes, Nutrition in Arctic and Antarctic regions & Military foods. (10 HOURS)

UNIT V: Nutrition in Geriatrics:
Nutritional requirements in age related problems- Alzheimer's disease, Parkinson's disease, changes in the gastrointestinal tract, age-related renal impairment, reduced immunity, weight loss, cognitive impairment and vascular risk factors and hospitalized elderly patient. (15 HOURS)

RECOMMENDED TEXTBOOKS

1. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13th Edition, Elsevier Saunders, Missouri, 2012.
2. Lane HW and Smith SM., 'Nutrition in Space", In: *Modern Nutrition in Health and Disease*, 9th edition, eds. Shils ME, Olson JA, Shike M, and A. C. Ross. Baltimore: Williams & Wilkins

REFERENCE BOOKS

1. Abraham S, *Nutrition Through Lifecycle*, 1st edition, New age international publishers, New Delhi, 2016
2. Edelstein S, *Lifecycle Nutrition- An evidence based approach*, 2nd edition, Jones & Bartlett learning publications, 2015,
3. Stump SE, *Nutrition and diagnosis related care*, 7th edition, Lippincott, 2012
4. A Report on Toolkit for Addressing Nutrition in Emergency Situations, June 2008, www.motherchild.org
5. Stacy N, *William's Basic Nutrition and Diet Therapy*, 12th edition, Elseivier publications, UK, 2005
6. Whitney EN and Rolfes SR, *Understanding Nutrition*, 9th edition, West/Wordsworth, 2002
7. Wildman RE, Handbook of Nutraceuticals and Functional foods, Culinary and Hospitality industry publication services, 2001
8. Garrow JS, James WPT, Ralph A, *Human Nutrition and Dietetics* 10th edition, Churchill Livingstone, NY, 2000
9. Cataldo, DeBruyne and Whitney, *Nutrition and Diet therapy– Principles and Practice* 5th edition, West/ Wadsworth, London, 1999
10. Swaminathan M, *Principles of Nutrition and Dietetics*, Bappeo, Bangalore,1995
11. Space Food and Nutrition – An Educators guide with activities in Science and Mathematics, NASA, http://spacelink.nasa.gov/products
12. Public Health Guide for Emergencies, www.jshsh.edu

JOURNALS

1. International journal of Clinical Nutrition and Dietetics
2. International journal of Food, Nutrition and Dietetics

COURSE OUTCOME

CO No	CO statement	Knowledge level
CO1	Identify and define the children and elderly persons with special needs and emergency situations	K1
CO2	Infer the role of nutrition for special children, elderly people, astronauts, soldiers, high altitude, artic and Antarctic travelers and during disaster	K2
CO3	Explain the importance of nutrition during special condition and emergency situations	K3
CO4	Plan, develop and prioritize the diet for children with special needs, geriatric conditions.	K4, K5,K6

Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	1	2	2	2
CO2	3	3	3	2	2	1
CO3	3	3	3	3	2	1
CO4	3	3	3	3	3	3
AVERAGE	3	3	2.5	2.5	2.25	1.75

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY

1. Lecture (Chalk and Talk-OHP-LCD)
2. Flipped Learning/Blended Classroom-E Content, Videos
3. Problem Solving-Group Discussion-Role Modelling
4. Quiz-Seminar
5. Peer Learning

QUESTION PAPER TEMPLATE
ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008
(For candidates admitted from academic year 2021)

MSC FOOD AND NUTRITION
I YEAR- II SEMESTER

Title of the paper: Nutrition in Special Needs **Max. Marks: 100**
Paper Code: 13SP21/2E/NSP **Time: 3 hours**

SECTION A

Definition (Answer all) **(10x2=20 marks)**
Two questions from each unit

SECTION B

Answer any FIVE questions. **(5x8= 40 marks)**
Each answer should not exceed 300 words.
One question from each unit and the remaining three questions from Unit I, Unit III and Unit V respectively
(Understanding/Description / Problems)
Each question carries eight marks

SECTION C

Answer any TWO questions. **(2X20=40 marks)**
Each answer should not exceed 1500 words.

Four questions covering all five units.
(Application/ Analysis/Synthesis/ Evaluation)
Sub divisions may be given.
Each question carries twenty marks

SEMESTER II

FOOD PRESERVATION
(INTERDISCIPLINARY)
ELECTIVE -4

TOTAL HOURS: 60 hours **COURSE CODE: 13SP21/2E/FPR**

CREDITS: 3 **L-T-P: 4-0-0**

COURSE OBJECTIVES

To enable students

- ✓ To understand the role of biological agents (microorganisms) in preservation of foods
- ✓ To learn science behind the various preservation/ processing technologies.
- ✓ To impart knowledge on the need, importance of food preservation.
- ✓ To obtain knowledge on current trends in food packaging.
- ✓ To familiarize with food safety management systems and food regulations.

COURSE OUTLINE

UNIT I: **Importance, Principles of preservation & Spoilage:**

Importance and principles of preservation; Preservation of various foods- cereals, pulses, fruits & vegetables, milk & milk products, flesh foods; Food spoilage – causes of spoilage, spoilage of various foods & food product. (15 HOURS)

UNIT II: **Methods of food preservation**:

Traditional methods of preservation; Preservation as sugar concentrates- Jams, Jelly, Marmalades and Preserves; Fruit Juice Beverages– Preparation and preservation; Chemical preservation - advantages and disadvantages. (15 HOURS)

UNIT III: **Role of Temperature in Food Preservation**:

Use of High temperatures – Drying, sterilizations, canning, pasteurization, Blanching, Irradiation
Use of low temperatures – Refrigeration & freezing.

(15 HOURS)

UNIT IV: **Packaging:**

Functions of Packaging, packing materials and forms, special packaging– military & space foods, safety & package tests

(15 HOURS)

UNIT V: **Food additives and food standards**:

Food Additives and Food Standards (15 HOURS)

RECOMMENDED TEXTBOOKS

1. *Khetarpaul N, Food Processing & Preservation, 2nd Edition, Daya Publishing House, 2012.*
2. Jood S and Khetarpaul N, *Food Preservation*, Agro Tech Publishing Academy, Udaipur, 2002

REFERENCE BOOKS

1. Sivasankar B, *Food Processing and Preservation*, Prentice Hall of India (P) Ltd, New Delhi, 2008
2. Manay SN, Swamy MS, *Food Facts and Principles*, 3rd edition, New Age International (P) Ltd, New Delhi, 2008
3. Khetarpaul N, *Food Processing and Preservation*, Daya Publishing House, New Delhi, 2005
4. Hausner A, *Preserved Foods and Sweetmeats*, Biotech Books, New Delhi, 2005
5. Subbulakshmi G, Udipi SA, *Food Processing and Preservation*, New Age International (P) Ltd, Publishers, New Delhi, 2001
6. NIIR BOARD, *Manual of Modern Technology on Food Preservation*, Asia Pacific Business Press Inc, New Delhi.
7. *Desroisier, Technology of Food Preservation,1st Edition, CBS Publishers, 1998*

JOURNALS

1. Food Science Research Journal
2. Current Research in Nutrition & Food Science Journal
3. Journal of Experimental food chemistry

E-LEARNING RESOURCES

- www.nchfp.uga.edu
- https://preservingfoodathome.com
- https://www.buecher.de
- https://www.barnesandnoble.com
- https://www.crcpress.com

COURSE OUTCOMES

CO Number	**CO STATEMENT**	**Knowledge scale**
CO 1	Explain the importance of microorganisms in food preservation	K5
CO 2	Identify the concept of different methods of food preservation	K4
CO 3	Elaborate on the principles of food preservation including high and low temperature	K6
CO 4	Develop knowledge on different types of food packaging materials, requirements of effective packaging	K3
CO 5	Interpret food safety management systems and food	K5

	regulations	
CO6	Classify the various types of food additives	K4

Mapping of CO with PSO

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	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

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY

1. Lecture (Chalk and Talk-OHP-LCD)
2. Flipped Learning/Blended Classroom-E Content, Videos
3. Problem Solving-Group Discussion-Role Modelling
4. Quiz-Seminar
5. Peer Learning

QUESTION PAPER TEMPLATE

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MSC FOOD AND NUTRITION
I YEAR- II SEMESTER

Title of the paper: Food Preservation **Max. Marks: 100**
Paper Code: 13SP21/2E/FPR **Time: 3 hours**

SECTION A

Definition (Answer all) **(10x2=20 marks)**
Two questions from each unit

SECTION B

Answer any FIVE questions. **(5x8= 40 marks)**
Each answer should not exceed 300 words.
One question from each unit and the remaining three questions from Unit I, Unit II and Unit III respectively
(Understanding/Description/Problems)
Each question carries eight marks

SECTION C

Answer any TWO questions. **(2X20=40 marks)**
Each answer should not exceed 1500 words.

Four questions covering all five units.
(Application/ Analysis/Synthesis/ Evaluation)
Sub divisions may be given.
Each question carries twenty marks

SEMESTER II

ADVANCED FOOD SCIENCE PRACTICAL

Practical -2

CORE – 7

TOTAL HOURS: 90 hours **COURSE CODE: 13SP21/2C/PR2**
CREDITS: 4 **L-T-P: 0-0-6**

COURSE OBJECTIVES

To enable the students to

- ✓ Acquire in depth-knowledge of food
- ✓ Equip with skills of preparation of various recipes science to analyse, discriminate and interpret the results
- ✓ Evaluate the sensory and objective quality of food products
- ✓ Assess the effect of cooking and processing on various food components
- ✓ Estimate pectin strength ,smoking temperature and discuss the factors affecting foam formation and crystallization of sugar

COURSE OUTLINE

1. Evaluation of Food quality:

a) Sensory methods: Threshold, Aroma recognition and difference tests.
b) Objective Methods: Ink print, line spread, specific gravity, seed displacement and percent sag (10 HOURS)

2. **Convenience & Traditional Foods and Fermented Foods**. (20 HOURS)

3. **Gelatin, Pectin and Browning**:

a) Factors affecting gelatin
b) Testing pectin strength in fruit and vegetable extract
c) Enzymatic Browning and its prevention in fruits and vegetables
d) Vegetable and fruit preserve preparation – Jam , Jelly and Marmalade
e) Marshmallows, Lemon chiffon pie, Coffee pannacotta. (15 HOURS)

4. Fats, Oils, Emulsions and Foams:

a) Determination of smoking temperature of fats and oils
b) Types of Emulsions: Permanent emulsions – preparation of mayonnaise using different variations; Temporary emulsions
c) Egg Foaming: Factors affecting foam formation. (15 HOURS)

5. Sugar cookery:

a) Crystallization of sugar
b) Factors affecting crystallization of sugar
c) Recipes (10 HOURS)

6. Bakery Products:

a) Estimation of gluten content

b) Recipes: Breads, Buns, Biscuits and Cakes (10 HOURS)

8. **Adulteration**

a) Easy methods of detection of adulterants in honey, flour, spices, salt – DART

b) Detection of adulteration in milk - virtual lab. (10 HOURS)

RECOMMENDED TEXTBOOKS

1. Lowe B, *Experimental cookery from chemical and physical stand point*, Forgotten books, UK, 2015
2. Swaminathan .N, *Food Science and Experimental Foods*, Ganesh Publications, Madras, 2004

REFERENCE BOOKS

1. Khetar Paul N; Grewal, R and Jood, S, *Bakery Science and Cereal Technology*, Dia publishing house, Delhi. 2005
2. McCance and Widdowson, *Composition of food*, 6th Edition, Food Standards Agency, 2004

JOURNALS

1. Food Science Research Journal
2. Current Research in Nutrition & Food Science Journal
3. Journal of Experimental food chemistry
4. International journal of Food Science & Technology
5. International journal of Food Properties
6. International Journal of Agriculture & food Science technology
7. Journal Of Food Science & Technology
8. Asian Journal of dairy and Food research
9. Rice Research
10. Research & Review; Journal of Food Science & Technology
11. Journal of applied research in Food Science & Nutrition

E resources

http://biotech01.vlabs.ac.in/bio-chemistry/Detection_of_Adulteration_in_Milk/

COURSE OUTCOME:

CO No.	CO Statement	Knowledge Level
CO1	Apply the principles of subjective and objective methods for evaluating the quality of food products	K3 & K5

CO2	Demonstrate the crystallisation of sugar and assess the factors affecting crystallisation and egg foam formation	K2 &K5
CO3	Acquire knowledge on enzymatic browning reactions and illustrate preventive methods	K2
CO4	Estimate pectin strength, gluten content, and determine the smoking temperature of fats and oils.	K4
CO5	Compare and differentiate traditional and convenience foods	K4
CO6	Apply the principles of food science ,develop skills and gain hands on practical experience on an individual basis that motivate them to undertake research in the field of food science and career in food industry	K6

Mapping of CO with PSO

CO/PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	2	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3
CO6	3	3	3	3	3	3
AVE RAGE	3	3	3	3	3	3

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY

1. Lecture (Chalk and Talk-OHP-LCD)
2. Flipped Learning/Blended Classroom-E Content, Videos
3. Problem Solving-Group Discussion-Role Modelling
4. Quiz-Seminar
5. Peer Learning

SEMESTER III

ADVANCED STUDIES IN CARBOHYDRATES AND LIPIDS

CORE - 8

TOTAL HOURS: 75 hours **COURSE CODE: 13SP21/3C/ACL**

CREDITS: 4 **L-T-P: 4-1-0**

COURSE OBJECTIVES

To enable the students

- ✓ To gain knowledge on the composition, classification, digestion, absorption, functions and utilization of carbohydrates and lipids in human health
- ✓ To obtain knowledge on role of carbohydrates and lipids in human health
- ✓ To study the characteristic and functional properties of polysaccharides and sweeteners in industrial applications
- ✓ To apply physiological significance and therapeutic use of carbohydrates and lipids in health and disease
- ✓ To integrate scientific information, research, and critical thinking into evidence-based practice.

COURSE OUTLINE

UNIT I: Review of Classification of carbohydrates, digestion and absorption, Simple carbohydrates, Complex carbohydrates – Oligosaccharides, Polysaccharides – Characteristic and functional properties of Starch, modified starches, Slowly and rapidly digesting starch, food hydrocolloids - classification.
Non starch polysaccharides – Soluble and insoluble fiber, small millets and pseudo cereal as carbohydrates, Cellulose, carboxymethylcellulose, hemicelluloses, pectin– Algal polysaccharides, seed gums, exudate gums, and microbial polysaccharides.Use of intense and artificial sweeteners.
(15 HOURS)

UNIT II: Carbohydrates of physiological significance - Therapeutic use of glucose, sucrose, galactose, fructose, Carbohydrate awareness and lifestyle diseases
Sugars and dental caries; Relationship of flatulence to carbohydrate intake; Role of fiber in gut health, obesity, cardiovascular diseases, diabetes mellitus, cancer and PCOD.
(15 HOURS)

UNIT III: Classification of lipids - simple, compound and derived lipids, EFA– SFA, PUFA & MUFA, digestion, absorption and transport lipids; Composition and function of serum lipoproteins, Storage of lipids- Adipose tissue – structure of WAT & BAT. (15 HOURS)

UNIT IV: Role of lipids in health and disease – functions of EFA, PUFA, MUFA, SFA, and MCT;
Adverse effect of exogenous and endogenous lipids in obesity, cardiovascular diseases, diabetes mellitus, cancer and PCOD;
Hypo-cholesterolemic agents – enzymes – Role of LCAT, exogenous and endogenous lipotrophic factors;
Role of ascorbic acid in transforming cholesterol to bile acids;Fat substitutes. Trans fats. (15 HOURS)

UNIT V: Inter-relationship of carbohydrates and lipids with other nutrients.
Metabolic syndrome - Role of carbohydrates and lipids, Relationship of hormones - leptin, ghrelin, adiponectin
(15 HOURS)

RECOMMENDED TEXTBOOKS

1. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13th Edition, Elsevier Saunders, Missouri, 2012
2. Whitney EN and Rolfes SR, *Understanding Nutrition*, 9th edition, West/Wordsworth, 2002

REFERENCE BOOKS

1. Sharma M, *Textbook of Nutrition*, 1st edition, CBS publishers & distributors PVT Ltd, New Delhi, 2017
2. Verma P, *Food ,Nutrition & Dietetics*, 1st edition, CBS publishers & distributors PVT Ltd, New Delhi, 2015
3. Edelstein S, *Lifecycle Nutrition- An evidence based approach*, 2nd edition, Jones & Bartlett learning publications, 2015,
4. Garrow JS, James WPT, Ralph A, *Human Nutrition and Dietetics* 10th edition, Churchill Livingstone, NY, 2000
5. Groff JL, Gropper SS, *Advanced Nutrition and Human Metabolism* 3rd edition, West/ Wadsworth, UK. 2000
6. Shills ME, Obson JA, Shike M, *Modern Nutrition in Health and Disease*, 8th edition, Vol I and II Lea an d Febiger Philadelphia, A. Waverly Company, 2000.
7. Cataldo, DeBruyne and Whitney, *Nutrition and Diet therapy– Principles and Practice* 5th edition, West/ Wadsworth, London, 1999
8. Gordon WM, *Perspectives in Nutrition*, 4th edition, McGraw Hill, 1999
9. Swaminathan M, *Principles of Nutrition and Dietetics,*Bappeo, Bangalore,1995
10. Sipple **HL**, Mcnutt **KW,***Sugars in Nutrition,* Academic Press London
11. Davidson and Passmore R and Brock J.B. Human nutrition and Dietetics, The English Languages book society and Churchill Livingstone, NY

JOURNALS

1. The Journal of Nutrition
2. British Journal of Nutrition
3. Advances in Nutrition

4. Nutrition Reviews
5. Journal of Human Nutrition & Dietetics

E-LEARNING RESOURCES

1. https://www.youtube.com/watch?v=JxK5rZxbyQY
2. https://www.youtube.com/watch?v=7nP76QKiORw
3. https://www.youtube.com/channel/UC-WHWhLDdRAiiT53kqDe3PA
4. https://www.youtube.com/watch?v=lCnPfsTivrk
5. https://www.youtube.com/watch?v=STwOEu4Uv5o
6. https://www.youtube.com/watch?v=wxzc_2c6GMg
7. https://www.youtube.com/watch?v=YO244P1e9QM

COURSE OUTCOME

S.No.	CO Statement	Knowledge level
CO1	State and acquire knowledge on digestion, absorption, transport and utilisation of nutrients in body	K1
CO2	Explain and classify nutrients with examples	K2, K3
CO3	Determine the composition, characteristic and functional properties of polysaccharides	K4
CO4	Associate the role of nutrients in health and disease	K4
CO5	Compare and gain knowledge on physiological significance, therapeutic use and toxic effects of various sugars	K5
CO6	Integrate the recent research findings, scientific information and critical thinking into evidence-based practice in health and disease	K6

Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	3	2	2	2	2	2
CO3	3	3	3	3	3	2
CO4	2	2	2	2	2	3
CO5	3	3	3	3	3	3
CO6	3	3	3	3	3	3
	2.8	2.7	2.7	2.7	2.7	2.7

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY

1. Lecture (Chalk and Talk-OHP-LCD)
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MSC FOOD AND NUTRITION
II YEAR- IIISEMESTER

Title of the paper: Advanced Studies in Carbohydrates and Lipids Max. Marks: 100
Paper Code: 13SP21/3C/ACL Time: 3 hours

SECTION A

Definition (Answer all) **(10x2=20 marks)**
Two questions from each unit

SECTION B

Answer any FIVE questions. **(5x8= 40 marks)**
Each answer should not exceed 300 words.
One question from each unit and the remaining three questions from Unit II, Unit III and Unit IV respectively
(Understanding/Description / Problems)
Each question carries eight marks

SECTION C

Answer any TWO questions. **(2X20=40 marks)**
Each answer should not exceed 1500 words.

Four questions covering all five units.
(Application/ Analysis/Synthesis/ Evaluation)
Sub divisions may be given.
Each question carries twenty marks

SEMESTER III

ADVANCED STUDIES IN MINERALS AND VITAMINS

CORE - 9

TOTAL HOURS: 75 hours **COURSE CODE: 13SP21/3C/AMV**

CREDITS: 4 **L-T-P: 4-1-0**

COURSE OBJECTIVES

- ✓ To recall facts on the importance of vitamins and minerals in human nutrition
- ✓ To equip students to understand and interpret the recent research advancements on the role of antioxidants and phytochemicals in human nutrition
- ✓ To apply their acquired knowledge to identify the best sources of vitamins and minerals in various foods.
- ✓ To analyse and discover the functions and daily requirements and deficiency of vitamins and minerals in the human body
- ✓ To assess the interrelationship of vitamins and minerals with other nutrients in health and disease and determine the biomarkers to assess their levels in the body.
- ✓ To elaborate and discuss the appropriate processing and preservation techniques to conserve the vitamin and mineral content in foods

COURSE OUTLINE:

UNIT I: Calcium- sources, requirements, distribution in body tissues and fluids, metabolism, factors affecting calcium absorption, homeostasis, and assessment of nutritional status, deficiency and excess.
Iron- sources, requirements, distribution in body tissues and fluids, metabolism, factors affecting iron absorption, assessment of nutritional status, deficiency and excess.
(10 HOURS)

UNIT II: Importance of Zinc, copper, fluorine, Iodine, selenium, sodium, potassium, magnesium and chromium - sources, requirements, distribution, metabolism, deficiency and excess, assessment of nutritional status. (20 HOURS)

UNIT III: Interrelationship of minerals with other nutrients.
Toxic metals - lead, arsenic and mercury poisoning in humans; Antioxidants and phytochemicals - natural and synthetic, mechanism of action and functions
(20 HOURS)

UNIT IV: Water soluble vitamins - sources, requirements, metabolism, losses in processing and cooking, deficiency and excess, assessment of nutritional status. (20 HOURS)

UNIT V: Fat soluble vitamins-sources, requirements, metabolism, deficiency and excess, assessment of nutritional status.
Effect of nutrient on gene expression- Retinoic acid and vitamin A; Interrelationship of vitamins with other nutrients (20 HOURS)

RECOMMENDED TEXTBOOKS

1. Shills, M.E., Olson, J.A. and Shike, M, *Modern Nutrition in Health and Diseases*, 8th edition, Lea and Febiger Company, Philadelphia, 2002
2. Groff JL, Gropper SS, *Advanced Nutrition and Human Metabolism* 3rd edition, West / Wadsworth, UK. 2000

REFERENCE BOOKS

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3. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13th Edition, Elsevier Saunders, Missouri, 2012
4. Stump SE, *Nutrition and diagnosis related care*, 7th edition, Lippincott, 2012
5. Gibney J.M., Margetts, B.M., Kearney, J.M and Arab L (Eds) *Public Health Nutrition*, Wiley Blackwell Publishers, UK, 2005
6. Whitney EN and Rolfes SR, *Understanding Nutrition*, 9th edition, West/Wordsworth, 2002
7. Srilakshmi, B. Nutrition Science, New Age International (P) Ltd, New Delhi,2002.
8. Garrow JS, James WPT, Ralph A, *Human Nutrition and Dietetics* 10th edition, Churchill Livingstone, NY, 2000
9. Cataldo, DeBruyne and Whitney, *Nutrition and Diet therapy– Principles and Practice* 5th edition, West/ Wadsworth, London, 1999
10. Gordon WM, *Perspectives in Nutrition*, 4th edition, McGraw Hill, 1999
11. Swaminathan M, *Principles of Nutrition and Dietetics*,Bappeo, Bangalore,1995

JOURNALS

1. The Journal of Nutrition
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E-LEARNING RESOURCES

- www.thrive online.com/eats/vitamins/guide.index.html
- www.ncbi.n/m.nih.gov/pubmed.
- www.ifcinfo.health.org.

www.bookman.com.au/vitamins

COURSE OUTCOME

CO.NO	CO Statement	Knowledge
CO1	Recalling the importance of nutrients and gain indepth knowledge in the latest research. advancements related to vitamins and minerals	K1
CO2	Demonstrate understanding of the sources & functions and analyse the metabolism of vitamins and minerals.	K2 &K4
CO3	Apply techniques to identify the biomarkers in the blood to assess the nutrient levels and the associated deficiency symptoms.	K3 &K5
C O4	Examine the correct method of processing of foods to prevent losses and discover the best method to preserve the nutrients in them	K4
CO5	Determination and assessment of interrelationship of minerals and vitamins with other nutrients and the role of antioxidants and phytochemicals .	K5
CO6	Estimate nutrient requirements. and recommend the daily allowance of vitamins and minerals for the improvement of the overall wellbeing	K6

Mapping of CO with PSO

O/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	3	3	2
CO2	3	3	3	2	2
CO3	2	3	3	2	2
CO4	3	3	2	2	2
CO5	2	3	3	2	3
CO6	3	3	3	2	2
	16	18	17	13	13
AVERAGE	2.6	3	2.8	2.1	2.1

KEY : STRONGLY CORRELATED- 3, MODERATELY CORRELATED 2, WEAKLY CORRELATED -1, NO CORRELATION -0

TEACHING METHODOLOGY

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(for candidates admitted from the academic year 2021)

MSC FOOD AND NUTRITION
II YEAR- III SEMESTER

Title of the paper: Advanced Studies in Minerals and Vitamins **Max. Marks: 100**
Paper Code: 13SP21/3C/AMV **Time: 3 hrs**

SECTION A

Definition (Answer all) **(10x2=20 marks)**
Two questions from each unit

SECTION B

Answer any FIVE questions. **(5x8= 40 marks)**
Each answer should not exceed 300 words.
One question from each unit and the remaining three questions from Unit II, Unit III and Unit IV respectively
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SECTION C

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(Application/ Analysis/Synthesis/ Evaluation)
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SEMESTER III

CLINICAL BIOCHEMISTRY

CORE - 10

TOTAL HOURS: 60 hours **COURSE CODE: 13SP21/3C/CBC**

CREDITS: 4 **L-T-P: 3-1-0**

COURSE OBJECTIVES

At the end of the course, the students will be able to:

- ✓ Acquire knowledge and understand the theories and principles of clinical biochemistry and its relationship with nutritional science
- ✓ Demonstrate their understanding of the analytical techniques and usage of various equipments in the separation of compounds.
- ✓ Apply the principles of clinical biochemistry in identifying the metabolic abnormalities as a basis for the diagnosis of diseases.
- ✓ Analyze the clinical parameters associated with various diseases and draw evidences on the nature and complexity of disease conditions
- ✓ Evaluate the biochemical parameters in assessing the functioning of various organs in different clinical conditions and also the severity of the diseases.

COURSE OUTLINE

UNIT I: Analytical techniques and Instrumentation:

a) Chromatography- paper, adsorption, gel, HPLC.
b) Electrophoresis-paper, gel
c) Photometry and Colorimetry,
d) Spectrometer and fluorimetry,
e) Polarimetry and electron microscopy,

Immunoassay- Radioactive isotopes-Principle, detection, measurement-GM–Counter, Scintillation counter, Scanning techniques. (15HOURS)

UNIT II: Enzyme assays as a diagnostic tool in acute pancreatitis, liver damage, bone disorders, myocardial infarction and muscle wasting.

Inborn errors of metabolism - phenylketonuria, alcaptonuria, homocysteinuria, albinism, maple syrup urine disorder, glycogen storage disease. (10 HOURS)

UNIT III: Disorders of metabolism- Blood glucose homeostasis

Disorders of protein metabolism-plasma proteins, alpha beta globulin, immunodeficiency syndrome, Nitrogen, urea;

Disorders of metabolism of lipids;

Disorders of purine and pyrimidine metabolism –Gout and xanthonuria, (15 HOURS)

UNIT IV Liver function tests –LFT test based on (i) Secretory function (ii) Excretory function (iii) Metabolic function (iv) Protective function of the liver.

Kidney function tests- (i) Glomerular filtration test, urea clearance, endogenous creatinine clearance, Inulin clearance, Cr51 EDTA clearance(ii) Test for renal blood flow, filtration fraction.(iii) Test based on tubular function, Fishberg concentration test, water dilution test, Concentration test with posterior pituitary extract, phenol sulfthalein (PSP) excretion test (iv)Miscellaneous test – Renogram, radioactive scanning, intravenous pyelography, renal ability to excrete acids

(10 HOURS)

UNIT V: Lab test for calcium, phosphorus and Iron–

Calcium and phosphorous lab tests for hyper-parathyroidism, rickets and bone disorders in elderly patients;

Iron deficiency and tests for anemia-prothrombin time hematocrit, ESR, Total and differential count of leucocytes, hemophilia, fetal and sickle cell anemia. (15 HOURS)

RECOMMENDED TEXTBOOKS

1. Ramasamyiyer S, *Handbook of Clinical Biochemistry*, 2nd Edition, World Scientific, 2011
2. Marshall WJ, Bangert SK, *Clinical Biochemistry: Metabolic and Clinical Aspects*, 1st edition, Churchill Livingstone, 1995

REFERENCE BOOKS

1. Chawla R, *Practical Clinical Biochemistry Methods and Interpretations*, 1st edition, Jaypee brothers, 2014
2. Crook MA, *Clinical Biochemistry and Metabolic Medicine,* Eighth Edition, CRC Press, 2012
3. Ahmed N, *Clinical Biochemistry*, 1st edition, OUP Oxford, 2011
4. Deb. A.C, *Concepts of Biochemistry theory+ Practical*, Books and Allied Pvt ltd, 2007
5. Talwar G.P, Srivatsa L.N and Moudgil D, *Textbook of biochemistry and human biology*, 3rdedition, Prentice hall of India Pvt Ltd, New Delhi, 2003
6. Deb. A.C, *Fundamentals of Biochemistry*, 7th edition, New central book agency, Kolkata, 2001
7. Marshall WJ, Bangert SK, *Clinical Biochemistry: Metabolic and Clinical Aspects*, 1st edition, Churchill Livingstone, 1995
8. RamaKrishnan, *Textbook of Clinical Biochemistry*, T.R.Publications, Chennai
9. Plummer. D.T.*An introduction to Practical biochemistry*, Tata McGraw Hill Publishing Company, New Delhi

JOURNALS:

1. Indian Journal of medical Biochemistry
2. International journal of Clinical Nutrition

E-LEARNING RESOURCES:

- http//www.gwu.edu/~mpb-metabolic pathways of biochemistry
- http//www.indstate.edu/thcme/mwking/inborn.html-Inborn errors of metabolism
- http//www.worhtington-biochem.com/introBiochem/introEnzymes.html-enzymes
- http//en.wikipedia.org/wiki/Biochemistry-biochemistry encyclopedia

COURSE OUTCOME

CO No.	**CO Statement**	**Know ledge Level**
CO1	Define and relate the principles of clinical biochemistry and its importance in the diagnosis of diseases	K1
CO2	Understand the concepts of biochemical techniques and demonstrate skills in analysing and separating various biochemical compounds	K1 &K2
CO3	Apply the techniques of clinical biochemistry to identify disease conditions and the associated clinical and metabolic abnormalities	K3
CO4	Analyze and compare clinical parameters with the reference standards and draw conclusions on the functioning of various organs to identify comorbid conditions.	K4
CO5	To deduce and evaluate the clinical conditions based on the biochemical values and assess the prognosis of the disease for future management.	K5
CO6	To compile the clinical parameters and predict the effective treatment necessary in management of the disease	K6

Mapping of CO with PSO

CO/PO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	2	3	2
CO2	3	3	3	3	2	3
CO3	3	3	3	2	2	2
CO4	2	3	3	2	2	2
CO5	2	2	3	3	2	3
CO6	2	2	3	3	3	3
AVERAGE	2.5	2.6	3	2.5	2.3	2.3

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY:

1. Lecture (Chalk and Talk-OHP-LCD)
2. Flipped Learning/Blended Classroom-E Content, Videos
3. Problem Solving-Group Discussion-Role Modelling
4. Quiz-Seminar
5. Peer Learning

QUESTION PAPER TEMPLATE
ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008
(For candidates admitted from the academic year 2021)

MSC FOOD AND NUTRITION
II YEAR- III SEMESTER

Title of the paper: Clinical Biochemistry **Max. Marks: 100**
Paper Code: 13SP21/3C/CBC **Time: 3 hours**

SECTION A

Definition (Answer all) **(10x2=20 marks)**
Two questions from each unit

SECTION B

Answer any FIVE questions. **(5x8= 40 marks)**
Each answer should not exceed 300 words.
One question from each unit and the remaining three questions from Unit II, Unit III and Unit IV respectively
(Understanding/Description / Problems)
Each question carries eight marks

SECTION C

Answer any TWO questions. **(2X20=40 marks)**
Each answer should not exceed 1500 words.

Four questions covering all five units.
(Application/ Analysis/Synthesis/ Evaluation)
Sub divisions may be given.
Each question carries twenty marks

SEMESTER III

FOOD AND DRUG INTERACTION
ELECTIVE - 5

TOTAL HOURS: 60 hours **COURSE CODE: 13SP21/3E/FAD**

CREDITS: 3 **L-T-P: 3-1-0**

COURSE OBJECTIVES

- ✓ To enable students to gain an insight on basic concepts in pharmacology.
- ✓ Learn the mechanism of pharmacokinetics and pharmacodynamics.
- ✓ To help students understand the drug therapy.
- ✓ To assess the dietary modification during drug therapy for various disease condition
- ✓ To analyse the effect of drug on nutrient intake
- ✓ To assess the impact of food on drug absorption

COURSE OUTLINE

UNIT I: General Pharmacology

a) Drug – Definition, Sources of drugs, Routes of drug administration- Enteral (Oral ingestion), Parenteral (Injections, Inhalation, Transdermal, Transmucosal) and special drug delivery system.

b) Pharmacokinetics and drug dosage – Definition, drug passage through the biological membranes: Passive & Active transfer, Absorption of drug, Factors influencing absorption, Bioavailability, Distribution, Metabolism of drugs, Excretion of drugs – routes of excretion.

c) Drug Dosage: Definition of Minimum dose, Maximum dose, Toxic dose, Lethal dose, Fixed dose, individualizing dose and Loading dose (10 HOURS)

UNIT II: Pharmacodynamics

a) Definition, Principles and mechanism of drug action (physical, chemical, through enzymes). Receptors- Definition and functions of receptors.

b) Antagonism (physical, chemical, physiological and receptor mediated), Factors modifying drug action – body size, age, sex, route of administration, diet &environment, psychological factors, pathological state, genetic factors and dose (10 HOURS)

UNIT III: Drug therapy& Dietary modifications

a)Drugs acting on Gastro intestinal system: Drugs used in peptic ulcer, Drugs used for Constipation and Drugs used for the treatment of Diarrhea. Dietary modifications during

ingestion of drug. Drugs in Renal diseases: Diuretics and Anti diuretics: Examples, adverse effects, Precautions taken by dietitian

a) Cardiovascular drugs: Drugs used in Congestive cardiac failure, Angina pectoris, Myocardial infarction, Lipid lowering drugs, and hypertension. Dietary modifications during ingestion of drugs
b) Coagulants & Anti-coagulants: definition, classification – Coumarin derivatives, warfarin and heparin, Dietary modifications during ingestion of drugs .(15 HOURS)

UNIT IV: Drug Therapy& Dietary modifications

a) Hypoglycemic drugs: definition, classification – insulin, oral hypoglycemic drugs (Sulphonyl urea derivative and Biguanides), mechanism of action. Dietary modification during ingestion of drugs**.**
b) Chemotherapy in Cancer: General principles in the treatment of cancer. Common adverse effects to anticancer drugs, Dietary modifications during ingestion of drugs
c) Drugs in Asthma and allergy: Drugs used in bronchial asthma, NSAIDs- mechanism of action, adverse effects.
d) Drugs in Gout and Rheumatism: Anti gout drugs and Anti rheumatics, Dietary modifications.
e) Drugs in Seizures, Mood disorders and Sleep disorders: definition of hypnotics, sedatives, Anticonvulsants, Antipsychotics, antianxiety drugs, antidepressants. Dietary modifications. (15 HOURS)

UNIT V: Effect of Food and Drug Interaction on Health

a) Effect of drugs on food and nutrition- nutrient absorption, nutrient metabolism, and nutrient excretion
b) Effect of food on drug therapy- drug absorption, drug distribution, drug Metabolism, drug excretion.
c) Modification of drug action
d) Effects of drugs on nutritional status – alterations in oral taste and smell perceptions, gastro intestinal system, appetite, glucose levels, organ system toxicity**.**

(10 HOURS)

RECOMMENDED TEXTBOOKS

1. *Ashutoshkar, SC, Mehta, Essentials of Pharmacology, 1st Edition, New Age International Publications, New Delhi, 2013*
2. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13th Edition, Elsevier Saunders, Missouri, 2012

REFERENCE BOOKS

1.Murugesh N, *A Concise Text Book of Pharmacology*, 6th edition, Sathya publishers, Madurai, 2011

2.Udaykumar P, *Pharmacology for Nurses*,2nd edition reprint,Jaypee Brothers Medical Publishers, New Delhi, 2010

3.Raje VN, *Pharmacology and toxicology*, 1st edition reprint, CBS publishers, New Delhi, 2011.

4. Grover JK, Malik M, Drug Interaction, 1st Edition, Pee Pee Publication, 2005

5.Katzung B, Masters S, Trevor A, *Basic and Clinical Pharmacology*, 13th edition, Mcgraw hill education, 2015

JOURNALS

1. The Journal of Nutrition
2. British Journal of Nutrition
3. Advances in Nutrition
4. Nutrition Reviews
5. Journal of Human Nutrition & Dietetics

E-LEARNING RESOURCES

- http://evolve.elsevier.com
- www.foodmedinteractions.com
- www.nih.gov/ccc/patient_education
- https://www.fda.gov
- https://www.food.actapol.net

COURSE OUTCOME

CO No.	CO Statement	Knowledge Level
CO1	List the sources of drugs, routes of drug administration	K1
CO2	Explain the drug pharmacokinetics and pharmacodynamics mechanism	K2
CO3	Classify the drug therapy for various diseases condition	K3
CO4	To determine the dietary modification during drug therapy	K4
CO5	Assess the effect of drug on nutrient intake	K5
CO6	To compile the impact of food on drug absorption	K6

Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	2	2
CO2	3	3	2	3	2	2
CO3	3	3	3	2	2	2
CO4	2	3	2	3	2	3
CO5	2	3	3	3	2	2
CO6	3	3	2	3	2	2
AVERAGE	2.6	3	2.5	2.8	2	2.2

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY

1. Lecture (Chalk and Talk-OHP-LCD)
2. Flipped Learning/Blended Classroom-E Content, Videos
3. Problem Solving-Group Discussion-Role Modelling
4. Quiz-Seminar
5. Peer Learning

QUESTION PAPER TEMPLATE
ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008
(For candidates admitted from the academic year 2021)

MSC FOOD AND NUTRITION
II YEAR- III SEMESTER

Title of the paper: Food and Drug Interaction **Max. Marks: 100**
Paper Code: 13SP21/3E/FAD **Time: 3 hours**

SECTION A

Definition (Answer all) **(10x2=20 marks)**
Two questions from each unit

SECTION B

Answer any FIVE questions. **(5x8= 40 marks)**
Each answer should not exceed 300 words.
One question from each unit and the remaining three questions from Unit II, Unit III and Unit IV respectively
(Understanding/Description / Problems)
Each question carries eight marks

SECTION C

Answer any TWO questions. **(2X20=40 marks)**
Each answer should not exceed 1500 words.

Four questions covering all five units.
(Application/ Analysis/Synthesis/ Evaluation)
Sub divisions may be given.
Each question carries twenty marks

SEMESTER III

NUTRITION AND PHYSICAL FITNESS

(INTERDISCIPLINARY)

ELECTIVE – 6

TOTAL HOURS: 60 hours **COURSE CODE: 13SP21/3E/NAP**

CREDITS: 3 **L-T-P: 4-0-0**

- ✓ To impart knowledge on the balanced diet, menu planning and classification of food.
- ✓ To understand the need of consuming nutritionally balanced diet
- ✓ To introduce the sources, functions and deficiencies of macronutrients and micronutrients
- ✓ To learn the importance of fitness in daily life
- ✓ To study the nutritional requirements for athletes

COURSE OUTLINE

UNIT I **Introduction to nutrition:**

a) **Basic nutrition**: Definition of Health, nutrients optimal nutrition, malnutrition, -under nutrition, over nutrition. Nutritional status, nutritional index, nutritional screening and nutritional surveillance

b) **Recommended dietary allowances** – Definition, General principles of deriving RDA, Factors affecting RDA, uses of RDA. Recommended dietary allowances for different age groups. Proximate principles of nutrients- CHO, fats and proteins.

c) **Energy** - Definition of energy, Kilo Calories, energy from CHO, proteins and fats, Physiological fuel value, gross fuel value, BMR - factors affecting BMR. (10 HOURS)

UNIT-II **Nutrients and their functions**

a) **Classification of nutrients** –macronutrients and micronutrients

Macronutrients: Carbohydrates-classification, functions, sources, deficiency.

Proteins - classification, functions, sources and deficiency;

Fats - classification, functions and sources

b)**Water as a nutrient** - functions, sources, requirements, water balance, dehydration, water intoxication. (15 HOURS)

UNIT III: Micronutrients: Vitamin And Minerals

a) **Vitamins:** Fat soluble vitamins (A,D,E,K) - sources, functions, deficiency. Water soluble vitamins (Thiamine, Riboflavin, Pyridoxine, Niacin, Vitamin B12 - sources, functions, deficiency.

b**) Minerals**: Macro minerals (Calcium, Phosphorus, Sodium, Potassium, magnesium) - sources, functions, deficiency. Micro minerals: (Iron, zinc, Copper, Iodine) sources, functions, deficiency. (15 HOURS)

UNIT IV Basic concepts on food and Menu planning:

a) **Food as a source of nutrients**: Definition, classification and functions of food, factors involved in selection of foods. Basic 5 food group system (ICMR),Nutritive value of food groups, Food guide pyramid.

b) **Menu planning:** Concept of menu planning; principles of menu planning, Food exchange list, balanced diet, planning balanced diet for different age groups. (10 HOURS)

UNIT V: Physical Fitness and diet for athletes

a) **Concept of physical fitness**: Meaning, Components and benefits of fitness, types of physical activities-aerobic and anaerobic activities, Role of physical activity in the prevention of life style diseases

b) **Women and fitness**: Health benefits of physical activity for women, barriers to physical activity for women, importance of physical activity during puberty, pregnancy, post-partum period and menopause

c) **Diet for athletes** -Requirement for CHO, protein, fat, vitamin, mineral and fluids for an athlete. Pre event and post event meal (10 HOURS)

RECOMMENDED TEXTBOOKS

1. Srilakshmi B, *Nutritional Science*, 3rd edition, New age Publishing Press, New Delhi, 2002
2. Mudambi, S.R. and Rajagopal, M.V., Fundamentals of food and nutrition, Wiley Eastern Limited, 2003

REFERENCE BOOKS

1. Sharma M, *Textbook of Nutrition*, 1st edition, CBS publishers & distributors PVT Ltd, New Delhi, 2017
2. Abraham S, *Nutrition Through Lifecycle*, 1st edition, New age international publishers, New Delhi, 2016
3. Verma P, *Food ,Nutrition & Dietetics*, 1st edition, CBS publishers & distributors PVT Ltd, New Delhi, 2015
4. Edelstein S, *Lifecycle Nutrition- An evidence based approach*, 2nd edition, Jones & Bartlett learning publications, 2015,
5. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13th Edition, Elsevier Saunders, Missouri, 2012
6. Stump SE, *Nutrition and diagnosis related care*, 7th edition, Lippincott, 2012
7. Mullick P, *Textbook of Home Science*, Kalyani Publishers, India, 2006
8. Joshi S., *Nutrition and Dietetics*, 2nd Edition, Tata McGraw Hill Publishing Company, New Delhi. 2002
9. Stacy N, *William's Basic Nutrition and Diet Therapy*, 12th edition, Elseivier publications, UK, 2005
10. Whitney EN and Rolfes SR, *Understanding Nutrition*, 9th edition, West/Wordsworth, 2002
11. Bean A,, The Complete guide to sports Nutrition, 3rd Edition, A&C Black Publishers Ltd, 2000
12. Garrow JS, James WPT, Ralph A, *Human Nutrition and Dietetics* 10th edition, Churchill Livingstone, NY, 2000
13. Cataldo, DeBruyne and Whitney, *Nutrition and Diet therapy– Principles and Practice* 5th edition, West/ Wadsworth, London, 1999
14. Gordon WM, *Perspectives in Nutrition*, 4th edition, McGraw Hill, 1999
15. Swaminathan M, *Principles of Nutrition and Dietetics,*Bappeo, Bangalore,1995

JOURNALS

1. International Journal of Sports Nutrition
2. Journal of nutrition science research

E-LEARNING RESOURCES

- www.nal.usda.gov/fnic/food comp
- www.niddk.nih.gov/health/nutrit/nutrit.htm
- www.sportsci.org
- www.nal.usda.gov/fnic/fpyr/pyramid.html
- http://evolve.elsevier.com
- http://www.choosemyplate.gov
- http://www.healthypeople.gov
- https://gradireland.com/institution/ulster-university
- https://weblink.lakehealth.org/WLP2/#!/classes/info/C10002GC

COURSE OUTCOMES

CO No.	CO Statement	Knowledge Level
CO 1	Identify the classification of food by ICMR and Food guide pyramid	K1
CO 2	Identify and describe the role of amino acids, lipids, carbohydrates, and vitamins in our body	K1,K2
CO 3	Explain the functions, food sources, and consequences of deficiencies and toxicities for each of the essential macro and micro nutrients	K3, K4
CO 4	Apply the current understanding of nutrition to aspects of physical fitness	K3
CO 5	Analyze and understand the principles in menu planning and alter food intake to reach the daily recommendation of an individual or an athlete.	K4
CO 6	Discuss and develop nutrition plan for athletes	K5,K6

Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	2	2	2
CO2	3	2	2	2	2	2
CO3	3	3	3	3	3	2
CO4	3	3	3	3	3	2
CO5	3	3	3	3	3	3
CO6	3	3	3	3	3	3
AVERAGE	3	2.7	2.7	2.7	2.7	2.3

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY

1. Lecture (Chalk and Talk-OHP-LCD)
2. Flipped Learning/Blended Classroom-E Content, Videos
3. Problem Solving-Group Discussion-Role Modelling
4. Quiz-Seminar
5. Peer Learning

QUESTION PAPER TEMPLATE
ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008

(For candidates admitted from the academic year 2021)

MSC FOOD AND NUTRITION
II YEAR- III SEMESTER

Title of the paper: Nutrition and physical fitness **Max. Marks: 100**

Paper Code: 13SP21/3E/NAP **Time: 3 hours**

SECTION A

Definition (Answer all) **(10x2=20 marks)**
Two questions from each unit

SECTION B

Answer any FIVE questions. **(5x8= 40 marks)**
Each answer should not exceed 300 words.
One question from each unit and the remaining three questions from Unit II, Unit III and Unit IV respectively
(Understanding/Description / Problems)
Each question carries eight marks

SECTION C

Answer any TWO questions. **(2X20=40 marks)**
Each answer should not exceed 1500 words.

Four questions covering all five units.
(Application/ Analysis/Synthesis/ Evaluation)
Sub divisions may be given.
Each question carries twenty marks

SEMESTER III

INNOVATIVE FOOD PRODUCT DEVELOPMENT
Practical – 3- CORE -11

TOTAL HOURS: 90 hours **COURSE CODE: 13SP21/3C/PR3**

CREDITS: 4 **L-T-P: 0-0-6**

COURSE OBJECTIVES

- ✓ Learn to develop an innovative product
- ✓ To enhance their entrepreneurship skills
- ✓ To understand the importance of getting patent for the product
- ✓ To gain knowledge on product life cycle and standardization.
- ✓ To advertise and market the products

COURSE OUTLINE

1. Market survey on innovative ingredients and products available(5 HOURS)
2. Consumer oriented product development (5 HOURS)
3. Product life cycle – optimization, Scale up, production (10 HOURS)
4. Theme/ concept based product formulation (6 HOURS)
5. Ingredient combinations (6 HOURS)
6. Processing technique (6 HOURS)
7. Standardization of the product (6 HOURS)
8. Subjective and objective evaluation of the standardized product (6 HOURS)
9. Nutrient analysis (8 HOURS)
10. Packaging and labeling (6 HOURS)
11. Shelf life analysis (6 HOURS)
12. Cost benefit analysis (4 HOURS)
13. Advertising and sale of the developed innovative product (4 HOURS)
14. Documentation (6 HOURS)
15. Report submission (6 HOURS)

RECOMMENDED TEXTBOOKS

1. Earle M, Earle R and Anderson A. Food and product development; maximising success, Woodhead publishing ltd, food series, No.64, 2001.
2. Paine FA, Paine HY(Eds) . A handbook of food packaging. Second ed, Blackie Academic and professional. 1992.

JOURNALS

1. International journal of Food Engineering
2. Food Marketing and Technology
3. Journal of Agriculture and Food Economics

COURSE OUTCOME

CO No.	CO Statement	Knowledge Level
CO1	Identify and understand the food products and process innovations in the market	K3
CO2	Design and execute product innovation trials to efficiently optimise the product formulation and process	K6
CO3	Learn methods of generating, evaluating and testing product ideas	K5
CO4	Develop good communication and team work skills	K3
CO5	Identify relevant components and plan a product launch	K3
CO6	Learn methods of evaluating and monitoring the success of a launch	K5

Mapping of CO with PSO

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO6
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
CO6	3	3	3	3	3	3
AVERAGE	3	3	3	3	3	3

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY

1. Lecture (Chalk and Talk-OHP-LCD)
2. Flipped Learning/Blended Classroom-E Content, Videos
3. Problem Solving-Group Discussion-Role Modelling
4. Quiz-Seminar
5. Peer Learning
6. Field Visits

SEMESTER III

SOFT SKILL-3

COMPUTING SKILLS

TOTAL HOURS: 30 hours **COURSE CODE: 13SP21/3S/COS**

CREDITS: 2 **L-T-P: 2-0-0**

COURSE OBJECTIVES

- ✓ To understand the use of Nutrition Care Process Model.
- ✓ To introduce the current nutrition assessment and screening techniques
- ✓ To study the protein quality of different food items
- ✓ To calculate energy expenditure and physical activity level for an individual using different methods

COURSE OUTLINE

UNIT I: Nutritional Screening tools and assessment

(i) Use of Screening tools
(ii) Anthropometry: Calculation of IBW, ABW, weight using demi span, knee height, Weight loss percentage, BMI for normal individual and amputee, MAMC and TSF.

Nutrition Diagnosis: Writing of PES statement.

(10 HOURS)

UNIT II: Nutrition Intervention

(i) Calculation of energy, protein and fat requirement for oral, enteral and parenteral plan. Developing an enteral and parenteral plan.
(ii) Use of Exchange list in dietary assessment and menu planning.
(iii) Use of Software in dietary calculation,
(iv) Advanced Carbohydrate Counting for Diabetics

(10 HOURS)

UNIT III: Energy Balance

(i) Calculation of Energy Expenditure of an individual on a working and non-working day using Satyanarayana - factorial method.
(ii) Calculation of Energy requirement using BMR, proposed equations by ICMR

Development of energy and protein rich recipes by calculating the chemical score and Net Dietary Protein Calorie Percentage. (10 HOURS)

RECOMMENDED TEXTBOOKS

1. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13th Edition, Elsevier Saunders, Missouri, 2012
2. Garrow JS, James WPT, Ralph A, *Human Nutrition and Dietetics* 10th edition, Churchill Livingstone, NY, 2000

REFERENCE BOOKS

1. Gordon WM, *Perspectives in Nutrition*, 4th edition, McGraw Hill, 1999
2. Swaminathan M, *Principles of Nutrition and Dietetics*,Bappeo, Bangalore,1995

JOURNALS

1. International Journal of community nutrition
2. Journal of nutrition science research

COURSE OUTCOMES

CO No.	CO Statement	Knowledge Level
CO 1	Recall and describe the use of nutrition care process model	K1
CO 2	Use the Nutrition Care Process to make decisions and identify nutrition-related problems of different clinical cases	K3
CO 3	Apply principles of nutrition assessment and screening to determine and evaluate nutrition interventions for clinical conditions	K3, K4
CO 4	Gather, analyze, and interpret the amino acid composition of foods	K3,K4, K5
CO 5	Use of different methods to evaluate the energy expenditure and physical activity of an individual	K4, K5

Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	2	3	3
CO2	3	3	3	2	3	3
CO3	3	3	3	2	3	3
CO4	3	3	2	2	3	2
CO5	3	3	2	2	3	2
AVERAGE	3	3	2.6	2	3	2.6

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY

1. Lecture (Chalk and Talk-OHP-LCD)
2. Flipped Learning/Blended Classroom-E Content, Videos
3. Problem Solving-Group Discussion-Role Modelling
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QUESTION PAPER TEMPLATE
ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008
(For candidates admitted from the academic year 2021)

SOFT SKILLS

II YEAR- III SEMESTER

Title of the paper: Computing skills **Max. Marks: 50**

Paper Code: 13SP21/3S/COS **Time: 2 hours**

SECTION A

Answer any TEN questions. **(5X10=50 marks)**

Twelve questions covering all three units.
Sub divisions may be given.
Each question carries five marks

SEMESTER V

ADVANCED PAPER FOR REGISTERED DIETITIAN CREDENTIAL AND COMPETITIVE EXAMINATIONS
(Self-Study Paper)

Credits: 2 **Course Code: 13SP21/3SS/ARD**

COURSE OBJECTIVES:

- ✓ To train future oriented nutrition professional
- ✓ To encourage the students to pursue for nationally recognized professional credential
- ✓ To motivate students with a positive approach and boost confidence to take up state and central level competitive examinations in the field of nutrition and dietetics such as UGC NET, SET, TNPSC, FSSAI, Railway Recruitment Board, M.Phil and Ph.D Entrance examinations.

COURSE OUTLINE

Unit I **Food Science, Nutrition and Supporting Sciences**

Composition, nutritive value of plant and animal foods; Physical andchemical properties of all foods; scientific basis for food preparation- function of ingredients, cooking methods, effect on sensory quality and nutrient loss; methods of food preservation ; food packaging methods; role of additives.

Principles of normal nutrition- Classification, Sources and Function of nutrients – Macronutrients and Micronutrients; RDA, Nutrient requirements throughout the life span- physiological changes, growth and development from conception to adolescence, nutritional needs and dietary guidelines for adequate nutrition through life cycle, nutrition concerns.

Principles of normal human anatomy and physiology in Gastrointestinal, Renal, Pulmonary, Cardiovascular, Neurological, Musculoskeletal and Reproductive systems

Metabolism of lipids, protein, carbohydrates; Enzymes – classification, factors affecting enzyme activity, enzymes in clinical diagnosis; Nucleic acids – classification, properties of DNA and RNA; Hormones – mode of action, regulation of metabolism; endocrinological abnormalities and clinical diagnosis.

Unit II **Communication, Counseling, Education and Research**

Components of the educational plan- Targeted setting; Goals and objectives; principles and barriers- Individual and Group; Content (community resources, learning activities/methodology, references, handouts, and instructional materials); Implementation - Communication- Interpersonal, Group process (e.g., interprofessional), Teaching methods, Interviewing - techniques of questioning: open-ended, closed-ended, leading, Counseling - techniques: motivational, behavioral, other, Methods of communication- Verbal/non-verbal,

Written, Media; Evaluation of educational outcomes - Measurement of learning, Evaluation of effectiveness of educational plan

Consumer-definition, role, rights and responsibilities, consumer behavior, consumer problems, education and empowerment; Consumer protection

Research-Types; Research process (e.g., hypothesis testing, study design, statistical analysis, results, and discussion); Sampling methods, Data collection, analysis and interpretation; Application of statistical analysis; Presentation of research data and outcomes, report writing; Use of evidence analysis as the basis for practice decisions

Unit III **Nutrition care process for individuals and groups**

Nutritional Screening and Assessment of individuals and groups; Relationship between nutrition diagnoses and medical diagnoses – pathophysiology, Identifying medical diagnoses affecting nutrition care; Diagnosing nutrition problems for individuals and groups; Etiology (cause/contributing risk factors), signs and symptoms, nutrition care for disease prevention and health promotion;Medical Nutrition Therapy- Identify desired outcomes and actions, Relationship of pathophysiology to treatment of nutrition-related disorders - Critical care and hypermetabolic states, Eating disorders, Food allergies and intolerance, Immune system disorders, infections, and fevers, Malnutrition (e.g., protein, calorie, vitamin and mineral), Metabolic, endocrine, and inborn errors of metabolism, Oncologic and hematologic conditions, Organ system dysfunction, Orthopedic/wounds and Obesity; Determine energy/nutrient needs specific to condition, Determine specific feeding needs, oral, enteral and parenteral feeding.

State and community resources and nutrition related programs – community interventions, Implementation and promotion of Dietary Guidance or policies in India.

Unit IV **Food Service Management, Sanitation and Safety**

Principles, Functions, tools of Management, Human Resources – employment process; Financial Management, Marketing analysis**,** Pricing**,** Marketing mix principles**;** Quality Management – regulatory guidelines; Catering – types, Menu Development- types, Procurement- Purchasing methods**,** receiving**,** and inventory management, layout planning; arranging work spaces; work simplification techniques; Production- Principles **of** quantity food preparation and processing - Cooking methods, Equipment;Food production control procedures- Standardized recipes, Ingredient control, Portion control and yield analysis, Forecasting production, Production scheduling, Food waste management; Production systems – Conventional, Commissary, Ready prepared, Assembly serve, Cook – chill, Display cooking; Distribution and **Service-** Type of service systems

Sanitation practices and infection control- Personal hygiene, Food and equipment, Waste disposal; Food handling techniques – Food laws and regulations;

Food safety- Contamination and spoilage of plant and animal foods, Microbiological control, food borne illness - Signs and symptoms, mode of transmission and treatment of food borne illness; Food safety- quality analysis, application of HACCP in food safety. Role of national and international agencies in food safety

Unit V **Human Development, Family Dynamics, Textiles and Interior Design**

Pre natal development, characteristics of physical, motor, social, cognitive, language and emotional development from infancy to old age; Childhood ailments,characteristics and problems of adolescents, adulthood and the aged

Family- Types, Characteristics and functions of the family; Stages and adjustments in family life cycle- Individual roles, rights and responsibilities; Critical family situation; Marriage- motives, factors influencing marital adjustments.

Classification of fibres, yarns and weaves, properties and identification of fibres; textiles finishes; dyeing and printing; Fashion- fashion cycle, fashion theories, factors affecting fashion; Pattern making; Apparel manufacturing and Quality testing; Care and maintenance of clothing.

Design fundamentals – elements, principles of design; Colour – dimensions, psychological effects of colour, colour schemes, factors affecting use of colour; Space planning and design- principles of planning spaces; Ergonomics – significance, scope, factors affecting physiological cost of work, functional design of work place, time and motion study, energy studies; Furniture and furnishing – wall finishes, window and window treatments.

REFRENCES

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- Lowe B, *Experimental cookery from chemical and physical stand point*, Forgotten books, UK, 2015
- Srilakshmi B,*Food Science*, Sixth Edition, New Age International Ltd Publishers,New Delhi, 2015
- Roday S, *Food science and Nutrition*, Oxford university press, New Delhi, 2007
- Chatterjee CC, *Human Physiology*, Volume I, 11th Edition, CBS Publishers, New Delhi, 2016
- Chatterjee CC, *Human Physiology*, Volume II, 11th Edition, CBS Publishers, New Delhi, 2016
- Waugh A&Grant A, *Ross & Wilson Anatomy and Physiology in Health and Illness*,12thEdition,Churchill Livingstone Elsevier evolve, 2014
- Sembulingam K, *Essentials of Medical Physiology*, 6th edition, Jaypee Medical Publishers, New Delhi, 2013

- Longvah T, Ananthan R, Bhaskar K, Venkaiah K, *Indian Food Composition Tables*, National Institute of Nutrition, 2017
- Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13th Edition, Elsevier Saunders, Missouri, 2012
- Robinson CH, *Normal and Therapeutic nutrition*, Oxford and IBH publishing company, Bombay, 2010
- Whitney EN and Rolfes SR, *Understanding Nutrition*, 10th edition, Thomson/Wordsworth, 2005
- Parija SC, Textbook of Microbiology & Immunology, 2nd Edition, Elsevier India, 2012
- AnandanarayananR and Panicker CK, *Textbook of Microbiology*, Seventh edition, University Press, Hyderabad, 2009
- Ramesh VK, *Food Microbiology*, MJP Publishers, 2007
- Edelstein S, *Lifecycle Nutrition- An evidence based approach*, 2nd edition, Jones & Bartlett learning publications, 2015,
- Stump SE, *Nutrition and diagnosis related care*, 7th edition, Lippincott, 2012
- Srilakshmi B, *Dietetics*, sixth edition, New age Publishing Press, New Delhi, 2011
- Stacy N, *William's Basic Nutrition and Diet Therapy*, 12th edition, Elseivier publications, UK, 2005
- Ramadevi K, Ed: *AmbikaShanmugam's Fundamentals of biochemistry for medical students*, 8th edition, Wolters Kluwer Health, India, 2016
- Rodwell V, Bender D, Botham KM, Kennelly PJ, Weil PA, *Harper's Illustrated Biochemistry*, 30th Edition, McGraw hill Education, 2015
- Sulochana H, *Principles of Biochemistry*, PBS enterprises, Chennai, 2010
- Cox MM and Nelson DL, *Lehninger Principles of biochemistry*, 5th edition, EH Freman&Company, New york, 2008
- Vasudevan DM, Sreekumari S, *Textbook of Biochemistry*, 5th edition, Jaypee Publishers, New Delhi, 2007
- Sethi M and MalhanS,*Catering Management An integrated approach*, 3rd edition, New age international publishers, New Delhi, 2015
- SethiM,*Institutional Food Management*, 3rd edition, New age international publishers, New Delhi, 2015
- Walsh BA, Weiser DA, DeFlorio L, and Burnham MM, 1st edition, *Introduction to Human Development and Family Studies*, Psychology Press, 2017
- Beckett C, Taylor H, *Human Growth and Development*, 3rdedition, SAGE, 2016
- Peterson GW, Bush KR, *Handbook of Marriage and the Family*, 3rd edition, Springer US, 2016
- Sigelman CK and Rider EA, *Life-span Human development*, 8thedition, Cengage Learning, USA, 2015
- *Seetharaman P, Pannu P, Interior Design and Decoration, 1st Edition, CBS Publishers and DistributorsPvt Ltd, New Delhi, 2015*
- Hollen N, Saddler J et al, Textiles, Macmillan Sixth Edition, 1988
- Dantyagi S, fundamentals of Textiles, Orient Black Swan, Fifth Edition, 1996

COURSE OUTCOME

CO1	Perform self-assessment	K2
CO2	Develop goals for self-improvement	K3
CO3	Demonstrateprofessional attributes in all areas of practice	K3
CO4	Evaluate, Compile and Apply the scientific knowledge in the field of food and nutrition into professional skill development	K3,K4,K5,K6

Mapping of CO with 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
AVERAGE	3	3	3	3	3	3

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

SEMESTER IV

ADVANCED STUDIES IN ENERGY AND PROTEIN
CORE - 12

TOTAL HOURS: 90 hours **COURSE CODE: 13SP21/4C/AEP**

CREDITS: 4 **L-T-P: 4-2-0**

COURSE OBJECTIVES

- ✓ To impart knowledge on the energy content of carbohydrates, proteins and fat
- ✓ To study the energy and protein requirement, energy balance and quality assessment of proteins
- ✓ To obtain in depth knowledge on immune proteins, novel protein and essential amino acids

COURSE OUTLINE

UNIT I: Energy – Sources of food energy- Determination of fat, carbohydrate and protein content in foods using heat of combustion. Digestibility and available energy from fat, carbohydrate and protein.Computation of fuel values of foods from plant and animal origin. Energy measurement methods- direct and indirect calorimetry, non-calorimetric methods. (20 HOURS)

UNIT II: Components of energy requirement and energy expenditure –Factors affecting energy requirement, BMR and RMR Estimation & factors affecting BMR. Specific dynamic action of food and Physical activity. Calculation of Total energy expenditure. Concept of Energy balance and role of various factors in the maintenance of body weight . (20 HOURS)

UNIT III: Amino acid patterns in proteins of animal and vegetable origin. Novel proteins types, sources, extraction procedures and their role in nutrition , Specific protein requirements for muscle building, Immune proteins-sources, types and requirement during different physiological states. (20 HOURS)

UNIT IV: Concept of Amino acid pool & protein turnover in the body Evaluation of protein quality - Critical study of methods of assessment. Estimation of protein and amino

acid requirement during different stages of life cycle. (15 HOURS)

UNIT V: Essential amino acids and their deficiencies. Effect of protein and amino acid imbalance and mutual supplementation of proteins. Toxic proteins in foods of vegetable and animal origin and processing and cooking methods for detoxification. 15 HOURS)

RECOMMENDED TEXTBOOKS

1. Groff JL, Gropper SS, *Advanced Nutrition and Human Metabolism* 3rd edition, West / Wadsworth, UK. 2000
2. Shills, M.E, Oslon, J.A, Shike, M and Ross, A.C., *Modern Nutrition in Health and Diseases*, 9th Edition, 1999

REFERENCE BOOKS

1. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13th Edition, Elsevier Saunders, Missouri, 2012
2. Waterlow J ,*Protein Turnover*, Biddles Ltd, Lynn, UK, 2006
3. Carpenter KJ, *Protein and energy: A study of changing trends in Nutrition*, Cambridge University Press, 1994

JOURNALS

1. Food and nutrition bulletin
2. American journal of clinical nutrition

E-LEARNING RESOURCES

- www.nutrition.gov- Service of National agricultural library, USDA
- www.nal.usda.gov/fnic-food nutrition information centre.
- www.american journal of nutrition .org
- www.british journal nutrition .org

Course Outcome

CO No	CO statement	Knowledge level
CO1	Relate and demonstrate the role of energy and protein in human Nutrition.	K1, K2
CO2	Interpret the role of energy for physical activities.	K2
CO3	Distinguish between energy balance and maintenance of body weight.	K3

CO4	Compare and analyze the requirement of protein, need for different types of protein such as novel protein, animal protein, vegetable protein and immune proteins in health.	K4
CO5	Justify and evaluate the protein quality through various methods of assessment.	K5
CO6	Compile the various deficiencies caused by amino acids and protein and overcoming them through mutual supplementation.	K6

Mapping of CO with PSO

CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**
CO1	3	3	2	2	2	2
CO2	3	2	3	2	2	3
CO3	2	3	2	3	2	3
CO4	3	2	3	3	1	2
CO5	3	3	2	2	1	2
CO6	3	2	3	2	2	2
AVERAGE	2.83	2.5	2.5	2.33	1.67	2.33

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY

1. Lecture (Chalk and Talk-OHP-LCD)
2. Flipped Learning/Blended Classroom-E Content, Videos
3. Problem Solving-Group Discussion-Role Modelling
4. Quiz-Seminar
5. Peer Learning

QUESTION PAPER TEMPLATE
ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008
(For candidates admitted from the academic year 2021)

MSC FOOD AND NUTRITION
II YEAR- IV SEMESTER

Title of the paper: Advanced studies in Energy and Protein **Max. Marks: 100**

Paper Code: 13SP21/4C/AEP **Time: 3 hours**

SECTION A

Definition (Answer all) **(10x2=20 marks)**
Two questions from each unit

SECTION B

Answer any FIVE questions. **(5x8= 40 marks)**
Each answer should not exceed 300 words.
One question from each unit and the remaining three questions from Unit II, Unit III and Unit V respectively
(Understanding/Description / Problems)
Each question carries eight marks

SECTION C

Answer any TWO questions. **(2X20=40 marks)**
Each answer should not exceed 1500 words.

Four questions covering all five units.
(Application/ Analysis/Synthesis/ Evaluation)
Sub divisions may be given.
Each question carries twenty marks

SEMESTER IV

PUBLIC HEALTH NUTRITION
CORE - 13

TOTAL HOURS: 90 hours **COURSE CODE: 13SP21/4C/PUH**

CREDITS: 4 **L-T-P: 4-2-0**

COURSE OBJECTIVES

To enable students

- ✓ To understand the role of nutritional epidemiology in public health.
- ✓ To outline the issues related to maternal and child nutrition.
- ✓ To recognise the solutions to overcome the problems of malnutrition.
- ✓ To create awareness on the interventional strategies for preventing micronutrient deficiencies in India.
- ✓ To understand the concept of food and nutrition security and management of nutrition in emergency situations.

COURSE OUTLINE

UNIT I: Nutritional Epidemiology- Definition, components.
Application of Epidemiological study in Nutrition- cross sectional studies, ecological studies, cohort studies, case control studies, randomized controlled trials: prophylactic, therapeutic and community trials; Sampling and Sample size; From research to programs- Applying knowledge to improve nutrition outcomes related to NCD's. (20 HOURS)

UNIT II: Maternal and Child Nutrition:
Nutrition burden in women: Maternal Nutritional status; Factors associated with deterioration of maternal nutritional status; Interventions to improve nutritional status in women. Health Care services- Public health sector, Private sectors, Voluntary Health Agencies.
Under nutrition in children: Stunting, underweight and wasting- an overview of the global situation; determinants of under nutrition, Prevention of under nutrition in children-a lifecycle approach;
Over nutrition in children: The epidemic of obesity in children, consequences and prevention of overweight and Obesity. Policies and programmes for reducing malnutrition in the Indian context. Recent schemes and programmes related to maternal and child nutrition.
(20 HOURS)

UNIT III: Vitamin A Deficiency (VAD): Consequences of Vitamin A deficiency; Epidemiology of vitamin A deficiency; Vitamin A deficiency status in India; Intervention

strategies for preventing VAD; Policies and programmes in the Indian context.

Iodine**:** Importance of iodine for human population; Requirements, Controlling of IDD- a three prong strategy; Elimination of IDD- international focus; Fortification – Universal Salt Iodization; Policies and programmes in the Indian context. (15 HOURS)

UNIT IV:

Iron deficiency anemia &Nutritional anemia**:** Prevalence, causes, Approaches for the prevention and control of anemia; Policies and programmes in the Indian context.

Zinc**:** Zinc epidemiology, Requirements, Evidence from Zinc supplementation studies on child health and Zinc intervention strategies. (15 HOURS)

UNIT V:

Food and Nutrition Security:

a) Food and Nutrition Security – Basic concepts; Food insecurity and vulnerability; Factors underlying the current state of Food and Nutrition security- food pricing, climate, agriculture, biofuels, agricultural commodities, impact of green revolution, food supply inIndia, land fragmentation, poverty, hidden hunger and purchasing power; Food and Nutrition Situation in India; Sustainable diets and Sustainable development goals
b) Food and Nutrition in Natural and Manmade Disasters: Food insecurity and malnutrition-identification and measurement, Nutritional Requirements & intervention, Disaster management in India. (20 HOURS)

RECOMMENDED TEXTBOOKS

1. ChanderVir S, *Public Health Nutrition In Developing Countries*, Part I, 1st edition, Woodhead Publishing, New Delhi, 2011
2. ChanderVir S, *Public Health Nutrition In Developing Countries*, Part II, 1st edition, Woodhead Publishing, New Delhi, 2011
3. Park K, Park's Textbook of preventive medicine, 2005

REFERENCE BOOKS

1. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., *Nutritive value of Indian foods*, NIN, Hyderabad, 2010
2. Bamji M,*Textbook of Human Nutrition*, Oxford publishers, New Delhi, 2010
3. Bhatt VB, *Protein Energy Malnutrition*, PeePee Publishers, New Delhi, 2008
4. Sharma N, *Child Nutrition*, 1st edition, Murarilal& sons, New Delhi, 2006
5. Gupte S, *Textbook of Pediatric Nutrition*, Pawaninder P Vij Publishers, New Delhi, 2006

6. Gibney MJ, Margetts BM, Kearney JM, Arab L (Ed), *Public Health Nutrition (The Nutrition Society Textbook)*, 1st edition, Wiley black well, 2004
7. WHO, *The Management of Nutrition in Major Emergencies*, AITBS Publishers, New Delhi, 2000
8. Sachdev HPS, Choudhary P, *Nutrition In Children – Developing Country Concerns*, BI publications, New Delhi, 1994
9. Swaminathan M, *Principles of Nutrition and Dietetics*, Bappeo, Bangalore, 1993
10. Young H, *Nutrition in Emergencies* (Practical Health Guides), 1st edition, Oxfam, 1991
11. Robert H. Fletcher, Suzanne W. Fletcher and Edward H. Wagner, *Clinical Epidemiology- the essentials*, 2nd edition, Williams & Wilkins, Baltimore
12. Nutrition foundation of India series, scientific reports
13. Hindu survey of Indian agriculture, latest edition

JOURNALS

1. International journal of Community Nutrition
2. Indian journal of community health

E-LEARNING RESOURCES

1. http://www.hsc.wvu.edu/library/U-links/community- nutrition.htm
2. www.asns.rg/nnjun04a.pdf
3. www.fns.usda.gov/fsec/FILES/safetyNet.pdf
4. www.ext.vt.edu/action for healthykids/assistance/lesson5background.pdf
5. *https://www.aaas.org/sites/default/files/migrate/uploads/EnvironmentalHealth.pdf*
6. https://www.rand.org/content/dam/rand/pubs/research_reports/.../RAND_RR1084.pdf
7. *https://www.nih.gov/health-information*

COURSE OUTCOME

CO No.	CO Statement	Knowledge Level
CO 1	Identify and explain the various types of study designs commonly used in nutritional epidemiologic research.	K3 & K2
CO 2	Assess the factors associated with maternal and child nutrition	K5
CO 3	Classify the causes of malnutrition in India and perceive the knowledge of various nutrition intervention schemes provided.	K2 & K5
CO 4	Discuss on the various intervention programmes and policies concerned with micronutrient deficiency.	K6
CO 5	Analyse the basic concepts of food and nutrition security and summarize the food and nutrition security situation in India.	K4 & K2
CO6	Categorise and formulate the various nutritional assessment techniques for the community	K4 & K6

Mapping of CO with PSO

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	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
CO6	3	3	3	2	2	3
AVERAGE	3	3	3	2.8	2.8	3

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY:

1. Lecture (Chalk and Talk-OHP-LCD)
2. Flipped Learning/Blended Classroom-E Content, Videos
3. Problem Solving-Group Discussion-Role Modelling
4. Quiz-Seminar
5. Peer Learning

QUESTION PAPER TEMPLATE
ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008
(For candidates admitted from the academic year 2021)

MSC FOOD AND NUTRITION
II YEAR- IV SEMESTER

Title of the paper: Public Health Nutrition **Max. Marks: 100**

Paper Code: 13SP21/4C/PUH **Time: 3 hours**

SECTION A

Definition (Answer all) **(10x2=20 marks)**
Two questions from each unit

SECTION B

Answer any FIVE questions. **(5x8= 40 marks)**
Each answer should not exceed 300 words.
One question from each unit and the remaining three questions from Unit II, Unit III and Unit V respectively
7(Understanding/Description / Problems)
Each question carries eight marks

SECTION C

Answer any TWO questions. **(2X20=40 marks)**
Each answer should not exceed 1500 words.

Four questions covering all five units.
(Application/ Analysis/Synthesis/ Evaluation)
Sub divisions may be given.
Each question carries twenty marks

SEMESTER IV

PROJECT
CORE - 14

TOTAL HOURS: 90 hours **COURSE CODE: 13SP21/4C/PRT**

CREDITS: 4 **L-T-P: 0-6-0**

COURSE OBJECTIVES

To enable students
- ✓ To gain knowledge in the area of research
- ✓ To contribute to the community or to the existing research base

COURSE OUTLINE

The project should be based on individual study and carry the following format:

1. Title page – Title, author's name
2. Certificate of originality by the guide
3. Declaration by the author
4. Table of contents
5. List of tables
6. List of figures
7. Acknowledgement
8. Abstract.
9. Introduction: statement of the problem, significance, need for the study, objectives, and operational definitions.
10. Review of literature
11. Methodology – Sampling and tools for data collection, procedures, hypothesis
12. Results and Discussion–Tables and figures, statistical presentations, hypothesis testing.
13. Summary and Conclusion
14. References.
15. Appendices

RECOMMENDED TEXTBOOKS

1. Singh, Y.K, *Fundamental of Research Methodology and Statistic*. New Age International (P) Ltd., Publishers. New Delhi, 2015
2. Kothari, C. and Garg, G, *Research methodology Methods and Techniques* 3rd edition, New Delhi: New Age International (P) Ltd, 2014
3. Gupta. S.P, *Statistical Methods*, S Chand & Sons,, New Delhi, 2008
4. Saravanavel, P, *Research Methodology*, KitabMahal Agencies, New Delhi, 2005
5. Elhance .D.N, Veenaand and Agarwal .B.M, *Fundamental of statistics*,48thEdition, KitabMahal, Allahabad, 2005
6. Best JW and Kahn JV, *Research in Education*, Prentice Hall of India Pvt. Ltd., New Delhi, 1996

7. Koul L, *Methodology of Educational Research*, 3rd edition Vikas publishing House Pvt. Ltd ,New Delhi
8. William Giles Campbell, *Form and style in Thesis writing*, Houghton Mifflin Company, Boston.
9. Sadhu A.N and Singh A, *Research Methodology in Social Sciences*, Himalaya Publishing House, Mumbai,

JOURNALS

1. International journal of Nutrition and Dietetics
2. International journal of Clinical Nutrition and Dietetics
3. International journal of Food Microbiology
4. International journal of Food Engineering
5. International journal of Food Properties
6. Food and Nutrition Bulletin
7. Annual review of Nutrition
8. Food Science Research Journal
9. Journal of Agriculture and Food Economics
10. Current Research in Nutrition & Food Science Journal

EVALUATION PATTERN FOR THE EXAMINERS

Title of the paper: Project **Paper Code: 13SP21/4C/PRT**

The project is evaluated based on the following criteria

- Data Collection and Methodology (20 marks)
- Data Interpretation (25 marks)
- Report Writing (40 marks)
- Significant Conclusions/
  Contribution to community or existing research base (15 marks)

SEMESTER IV

FOOD MICROBIOLOGY
ELECTIVE - 7

TOTAL HOURS: 60 hours **COURSE CODE: 13SP21/4E/FOM**

CREDITS: 3 **L-T-P: 3-1-0**

COURSE OBJECTIVES

- ✓ Understand the taxonomy of bacteria.
- ✓ To acquire knowledge on the application of microbes in food industry.
- ✓ To learn the microbial toxins
- ✓ To be familiar with micro-organisms causing food spoilage.
- ✓ Learn the recent trends in food preservation.
- ✓ To gain knowledge on the microbial quality control procedures adopted in food industry.

. .COURSE OUTLINE

UNIT I: Recent Trends in classification of Bacteria
DNA Finger printing; Chemotaxonomy and numerical taxonomy (12 HOURS)

UNIT II: Importance of Microbes in food fermentation - Study of fermented foods; Probiotics and their importance Fermented dairy products of Lactic Acid Bacteria Importance of Yeast in food fermentation
Mycoprotein - Production and uses.
Genetically Modified Foods – recent trends
(12 HOURS)

UNIT III: Microbial Spoilage of Food - Study of the Spoilage causing Organism, Nature of the Spoilage, Detection and Control of Spoilage-Recent Trends.
Preservation of food - Recent methods - Importance and Limitations
Industrial Uses of Microbes Production of Vitamin B12, SCP - Production and importance (12 HOURS)

UNIT IV: Microbial Toxins - Mycotoxins – Types, Source, Mode of Action
Bacterial Toxins - Exo and Endo toxins - Source, Mode of Action (12 HOURS)

UNIT V: Microbiological evaluation of foods and importance-Sampling Scheme, Quality Control Code of good manufacturing practice

Hazard Analysis at Critical Point (HACCP); Quality Systems - ISO 9000 Series (12 HOURS)

RECOMMENDED TEXTBOOKS

1. Dubey RC, Maheswar DK, *A Textbook of Microbiology*, 1st edition, S. Chand & Co Ltd Publications, 2005
2. Jay JM, Loessner MJ, Golden DA, *Modern Food Microbiology*, 7th Edition, Springer, New york, 2005

REFERENCE BOOKS

1. Arorn DR, *Textbook of Microbiology*, 4th edition, CBS Publishers and distribution Pvt Ltd, New Delhi, 2012
2. Parija SC, *Textbook of Microbiology & Immunology*, 2nd Edition, Elsevier India, 2012
3. Anandanarayanan R and Panicker CK, *Textbook of Microbiology*, Seventh edition, University Press, Hyderabad, 2009
4. Ramesh VK, *Food Microbiology*, 2nd edition, MJP Publishers, 2007
5. Frazier C and Denis, W.C, *Food Microbiology*, 4th edition, Tata McGraw Hill publishing Company. New Delhi, 2006
6. Dubey RC, Maheswar DK, *A Textbook of Microbiology*, 1st edition, S. Chand & Co Ltd Publications, 2005
7. Adam MR, Moses MO, *Food Microbiology*, 2nd edition, Panima publishing corporation, 2003
8. Purohit, S.S *Microbiology – Fundamentals & applications*, 6th Edition, Agro bices Indiana, 2002
9. Heritage J, Evans EGV, Killington RA, *Introductory Microbiology*, Cambridge University press, 2002
10. Pelczar, J. *Microbiology*, 7th edition, Tata McGraw Hill publishing, 1998
11. Garbutt J, *Essentials of Food microbiology*, 2nd edition, Arnold publication, New York,1997
12. Patel A.H, *Industrial Microbiology*, Macmillan India Limited. New Delhi, 1996
13. Smith JE, *Biotechnology*, 3rdedition, Cambridge University Press. London,1996.

JOURNALS

1. International journal of Food Microbiology
2. Journal of microbiology

E-LEARNING RESOURCES

1. http//www.betterhealth.vic.an/bhcv2/bh.carticles.nsf - genetically modified foods.
2. www.cfsan.fda.gov - Centre for food safety and applied nutrition
3. http://www.microbiol.org - Microbiology network
4. http://mic.sgnjournals.org - Microbiology journal

5. http://microbial.org
6. http://mic.sgnjournals.org
7. www.cfsan.fda.gov
8. https://www.sciencedirect.com
9. https://foodmicrobiology.conferenceseries.com

COURSE OUTCOME

CO No.	CO Statement	Knowledge Level
CO1	State the taxanomy of bacteria.	K1
CO2	Explain the importance of microbes in food fermentation.	K2
CO3	To classify microbial food spoilage and the preservation methods.	K3
CO4	To determine the industrial use of microbes	K4
CO5	To assess the microbial toxins	K5
CO6	To develop the microbiological evaluation of foods and quality systems	K6

Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	3	2	2	3
CO2	3	3	3	2	2	2
CO3	3	3	2	3	2	2
CO4	3	3	3	2	3	2
CO5	3	3	3	2	2	2
CO6	3	3	3	3	2	3
AVERAGE	3	2.6	2.6	2.3	2.2	2.3

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY

1. Lecture (Chalk and Talk-OHP-LCD)
2. Flipped Learning/Blended Classroom-E Content, Videos
3. Problem Solving-Group Discussion-Role Modelling
4. Quiz-Seminar
5. Peer Learning

QUESTION PAPER TEMPLATE

ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008

(For candidates admitted from the academic year 2021)

MSC FOOD AND NUTRITION

II YEAR- IV SEMESTER

Title of the paper: Food Microbiology **Max. Marks: 100**

Paper Code: 13SP21/4E/FOM **Time: 3 hours**

SECTION A

Definition (Answer all) **(10x2=20 marks)**
Two questions from each unit

SECTION B

Answer any FIVE questions. **(5x8= 40 marks)**
Each answer should not exceed 300 words.
One question from each unit and the remaining three questions from Unit II, Unit III and Unit IV respectively
(Understanding/Description / Problems)
Each question carrieseight marks

SECTION C

Answer any TWO questions. **(2X20=40 marks)**
Each answer should not exceed 1500 words.

Four questions covering all five units.
(Application/ Analysis/Synthesis/ Evaluation)
Sub divisions may be given.
Each question carries twenty marks

SEMESTER IV

PUBLIC HEALTH NUTRITION PRACTICAL
Practical -4 (CORE – 15)

TOTAL HOURS: 90 hours **COURSE CODE: 13SP21/4C/PR4**

CREDITS: 4 **L-T-P: 0-0-6**

COURSE OBJECTIVES

- ✓ To create awareness of various national agencies involved in health and nutrition
- ✓ To learn various health indices and assessment techniques for the community.
- ✓ To plan and conduct nutrition and health education programme for the community balancing the socio-cultural environment.
- ✓ To formulate and prepare low cost recipes for the vulnerable group.
- ✓ To overcome the nutrition and health problems faced by the community.

COURSE OUTLINE

1. Visit to various organizations concerned with food and nutrition –ICMR, FNB, WVS, ICDS, FCI, PDS, DMS, MSSRF, Agricultural department, Social welfare Board. (10 HOURS)
2. Identification of Vulnerable group and Assessment of nutritional Status of vulnerable group (20 HOURS)
3. Formulation, and preparation of low cost recipes – weaning, pregnancy, lactation, Vitamin A, Iron and Iodine (20 HOURS)
4. Planning and implementation of Nutrition–Health Education (NHE) for a vulnerable group (20 HOURS)
5. Preparation of teaching aids for Nutrition- Health Education. (20 HOURS)

REFERENCE BOOKS

1. ChanderVir S, *Public Health Nutrition In Developing Countries*, Part I, 1st edition, Woodhead Publishing, New Delhi, 2011
2. ChanderVir S, *Public Health Nutrition In Developing Countries*, Part II, 1st edition, Woodhead Publishing, New Delhi, 2011
3. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., *Nutritive value of Indian foods*, NIN, Hyderabad, 2010
4. Bamji M,*Textbook of Human Nutrition*, Oxford publishers, New Delhi, 2010
5. Bhatt VB, *Protein Energy Malnutrition*, PeePee Publishers, New Delhi, 2008
6. Sharma N, *Child Nutrition*, 1st edition, Murarilal& sons, New Delhi, 2006
7. Gupte S, *Textbook of Pediatric Nutrition*, Pawaninder P Vij Publishers, New Delhi, 2006
8. Park K, Park's Textbook of preventive medicine, 2005

JOURNALS

1. International journal of Community Nutrition
2. Journal of community health nursing

E-LEARNING RESOURCES

• http://www2.mfa.gr/infofiles/radC4CD6Health-Nutrition%20Orgs%20(2008).pdf
• http://www.jmedscindmc.com/article.asp?issn=1011-4564;year=2014;volume=34;issue=5;spage=211;epage=213;aulast=Shrivastava
• https://www.indiastudychannel.com/resources/120148-Teaching-Aids-Their-Needs-Types-and-Importance-Of-Teaching-Aids-In-Teaching-Learning-Process.aspx
• http://www.yourarticlelibrary.com/nutrition/nutrition-education-of-community-importance-methods-and-other-details/64428
• http://vikaspedia.in/health/nutrition/nutritive-value-of-foods/low-cost-nutritious-supplements

COURSE OUTCOME

CO No.	CO Statement	Knowledge Level
CO 1	Identify and explain the broad determinants of dietary and food aspects of health and wellbeing.	K1 & K2
CO 2	Analyse the principles of, and approaches to nutritional assessment.	K4
CO 3	Assess and deliver effective nutritional information to the vulnerable group.	K5
CO 4	Develop nutrition and health information to a wide range of audiences through diverse teaching aids.	K6
CO 5	Formulate and prepare low cost recipes for the nutritionally disadvantaged to combat the nutritional deficiencies.	K5

Mapping of CO with PSO

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO6
CO1	3	3	3	3	3	3
CO2	2	3	3	2	2	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	2	3	3	3	2	3
AVERAGE	2.6	3	3	2.8	2.6	3

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY

1. Lecture (Chalk and Talk-OHP-LCD)
2. Flipped Learning/Blended Classroom-E Content, Videos
3. Problem Solving-Group Discussion-Role Modelling
4. Quiz-Seminar
5. Peer Learning
6. Field Visits

SEMESTER IV

SOFT SKILL-4

SCIENTIFIC WRITING AND PRESENTATION SKILLS

TOTAL HOURS: 30 hours **COURSE CODE: 13SP21/4S/SPS**

CREDITS: 2 **L-T-P: 2-0-0**

COURSE OBJECTIVES

- ✓ To gain knowledge in scientific writing and presentation skill.
- ✓ To understand the principles for oral presentations.
- ✓ To gain in depth knowledge on research paper publication

COURSE OUTLINE

UNIT I:	Scientific writing - abstract, full paper, clinical update, manuscripts. Process of copy editing journals (10 HOURS)
UNIT II:	Presentation skills – Thematic, poster, oral, principles to be followed for presentation. (10 HOURS)
UNIT III:	Computer application for research Use of Internet in Research – Websites, search Engines, E-journal and E-Library – INFLIBNET, SHODHGANGA Plagiarism – Citation and acknowledgement – reproducibility and accountability, Soft wares available in the market for plagiarism. (10 HOURS)

RECOMMENDED TEXTBOOKS

1. Best JW and Kahn JV,*Research in Education*,7th Edition,Prentice Hall of India Pvt.Ltd.,New Delhi,2000.
2. Campbell WG, *Form and style in Thesis writing*, Houghton Mifflin Company, Boston.

REFERENCE BOOKS

1. Koul L, Methodology of Educational Research,3rd edition, Vikas Publishing House Pvt.Ltd,New Delhi
2. John W. Best and James V.Kahn, Research in Education, 7th Eed, Prentice Hall of India Pvt. Ltd, New Delhi, 2000.
3. Elhance. D. N Veena and Elhance and Agarwal . B.M, Fundamentals of Statistics, 48th ed, Kitab mahal, Allahabad, 2005.
4. Sadhu AN, Amarjit Singh, Research methodology in Social Sciences. Himalaya Publishing House, gurgoan, Mumbai, 1992.

JOURNALS

1. Journal of academic writing

E-LEARNING RESOURCES

Course Outcome

CO No	CO statement	Knowledge level
CO1	Develop a frame work for scientific writing.	K1
CO2	Describe, Compare and Interpret various means for poster, oral presentation and copy editing.	K2, K4, K5
CO3	Evaluate the use of websites, search engine, E-journals and E-library for research	K5
CO4	Propose the authenticity of the research article using plagiarism checking soft ware.	K6

Mapping of CO with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	1	3	1
CO2	3	3	3	3	1	2
CO3	3	3	3	3	1	1
CO4	3	3	3	3	1	1
AVERAGE	3	3	3	2.5	1.5	1.25

KEY:**S**TRONGLY CORELATED-3 **M**ODERATELY CORELATED-2**W**EAKLY CORELATED-1 **N**O CORELATION-0

TEACHING METHODOLOGY

1. Lecture (Chalk and Talk-OHP-LCD)
2. Flipped Learning/Blended Classroom-E Content, Videos
3. Problem Solving-Group Discussion-Role Modelling
4. Quiz-Seminar
5. Peer Learning

QUESTION PAPER TEMPLATE
ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008
(For candidates admitted from the academic year 2021)

SOFT SKILLS
II YEAR- IV SEMESTER

Title of the paper: Scientific Writing and Presentation Skills **Max. Marks: 50**

Paper Code: 13SP21/4S/SPS **Time: 2 hours**

SECTION A

Answer any TEN questions. **(5X10=50 marks)**

Twelve questions covering all three units.
Sub divisions may be given.
Each question carries five marks

INTERNSHIP

Credits: 2 **Course Code: 13SP21/4I/INT**

Internship in a multispecialty hospital for a period of ONE month under the supervision of a Registered Dietitian and completed before third semester.
Evaluation will be done by the dietetic department of the hospital and the course in-charge.

Hospital – 25 marks
Report submitted to the college- 25 marks

Occasionally, circumstances arise such as the current COVID-19 pandemic, where a traditional on-site quality internship cannot be completed due to no fault of the student, the college or the internship hospital. An Alternative internship guideline is framed for such situations.

The following guidelines have been proposed to support the students in the completion of the internship and awarding of academic credits that meet M.Sc Food and Nutrition Programme requirements.

- When an emergency circumstance prevents a traditional on-site internship from taking place, the in-person internship will be converted to a virtual format.
- Student will be assigned projects, case study or subjects. Student will do in depth analysis on those assigned work and will be mentored through videoconferencing.
- Student will perform all the steps in nutrition care process – screening the subject for malnutrition, assessing using anthropometric measurements, clinical symptoms and dietary habits, diagnosing the nutritional deficiencies and planning diet for the given case history or subject
- Student will provide diet consultation for the given case history or subject through video conferencing.
- Student should present her project to the coordinator and submit a detailed report for the given project. This will be used for evaluation.

An Alternative Internship may be considered for students who face any serious illness, personal emergency, any natural disaster situations or public health emergency which is beyond the student's control that causes absence or the inability to work in a hospital.

Evaluation Pattern (50 Marks)

A. Assessment and screening- 15 marks
B. Presentation of case- 15 marks
C. Report - 20 marks