

**ETHIRAJ COLLEGE FOR WOMEN
(AUTONOMOUS)**

CHENNAI

***DEPARTMENT OF CLINICAL NUTRITION
AND DIETETICS
(SELF SUPPORTING)***

PG

SYLLABUS FOR

MSC FOOD AND NUTRITION

2018-2021

ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS), CHENNAI
DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS
M. SC FOOD AND NUTRITION
SYLLABUS FROM JUNE 2018 ONWARDS

Department of Clinical Nutrition and Dietetics – M. Sc Food and Nutrition is revising syllabi with effect from the academic year 2018-2019, 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 and Dietetics/Home science/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 Courses and Elective
- Interdisciplinary Elective papers offered to other major Department students
- Research
- 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) 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 FIRST and SECOND class respectively. Candidates who pass all the examinations prescribed for the course in the FIRST APPEARANCE ITSELF ALONE are eligible for ranking.

COURSE PROFILE

SEMESTER I

Sem ester	Paper code	Title of the paper	Hours/ Week	Credits	CA	End Semester	Total
I	13SP18/1C/NUB	Paper 1- (Core 1) Nutritional Biochemistry	6	4	40	60	100
I	13SP18/1C/MT1	Paper 2- (Core 2) Medical Nutrition Therapy I	6	4	40	60	100
I	13SP18/1E/NUT	Paper 3- (Elective 1) Nutraceuticals	5	3	40	60	100
I	13SP18/1E/PHY	Paper 4- (Elective 2) Applied Physiology	5	3	40	60	100
I	13SP18/1C/PR1*	Practical 1- (Core 3) Analytical Techniques in Nutrition	6	-	40	60	100
I		Soft skill 1 Personality Enrichment for Women	2	2	-	50	50
	TOTAL		28+2	C+E+S 8+6+2			
*Practical examination (13SP18/1C/PR1) - Practical will be conducted in the second semester.							

SEMESTER II

Semester	Paper code	Title of the paper	Hours/Week	Credits	CA	End Semester	Total
II	13SP18/2C/AFS	Paper 1- (Core 4) Advanced Food Science	5	4	40	60	100
II	13SP18/2C/SRM	Paper 2- (Core 5) Applied Statistics and Research Methodology	5	4	40	60	100
II	13SP18/2C/MT2	Paper 3- (Core 6) Medical Nutrition Therapy II	4	4	40	60	100
II	13SP18/2E/NSN	Paper 4- (Elective 3) Nutrition in Special Needs	4	3	40	60	100
II	13SP18/2E/FPN	Paper 5- (Elective 4) (Interdisciplinary) Food Preservation	4	3	40	60	100
I	13SP18/1C/PR1*	Practical 1- (Core 3) Analytical Techniques in Nutrition	-	4	40	60	100
II	13SP18/2C/PR2	Practical 2- (Core 7) Advanced Food Science Practical	6	4	40	60	100
II		Soft skill 2 The Communication skills in English/ French for Beginners/ German for Beginners	2	2	-	50	50
	TOTAL		28+2	C+E+S 20+6+2			

SEMESTER III

Semester	Paper code	Title of the paper	Hours/Week	Credits	CA	End Semester	Total
III	13SP18/3C/CAL	Paper 1- (Core 8) Advanced Studies in Carbohydrates and Lipids	5	4	40	60	100
III	13SP18/3C/MIV	Paper 2- (Core 9) Advanced Studies in Minerals and Vitamins	5	4	40	60	100
III	13SP18/3C/CLB	Paper 3- (Core 10) Clinical Biochemistry	4	4	40	60	100
III	13SP18/3E/FDI	Paper 4- (Elective 5) Food and Drug Interaction	4	3	40	60	100
III	13SP18/3E/NPF	Paper 5- (Elective 6) (Interdisciplinary) Nutrition and Physical Fitness	4	3	40	60	100
III	13SP18/3C/PR3*	Practical 3- (Core 11) Innovative Food Product Development	6	-	40	60	100
III	13SP18/3S/CSS	Soft skill 3 Computing skills	2	2	-	50	50
	TOTAL		28+2	C+E+S 12+6+2			
*Practical examination (13SP18/3C/PR3) - Practical will be conducted in the fourth semester.							

SEMESTER IV

Semester	Paper code	Title of the paper	Hours/Week	Credits	CA	End Semester	Total
IV	13SP18/4C/EPR	Paper 1- (Core 12) Advanced Studies in Energy and Protein	6	4	40	60	100
IV	13SP18/4C/PHN	Paper 2- (Core 13) Public Health Nutrition	6	4	40	60	100
IV	13SP18/4C/PRO	Paper 3- (Core 14) Project	6	4	40	60	100
IV	13SP18/4E/ FMI	Paper 4- (Elective 7) Food Microbiology	4	3	40	60	100
III	13SP18/3C/PR3*	Practical 3- (Core 11) Innovative Food Product Development	-	4	40	60	100
IV	13SP18/4C/PR4	Practical 4- (Core 15) Public Health Nutrition Practical	6	4	40	60	100
IV	13SP18/4S/SWS	Soft skill 4 Scientific Writing and Presentation Skills	2	2	-	50	50
IV		Internship (1 month)	-	2	-	-	-
		TOTAL	28+2	C+E+S+I 20+3+2+2			

CREDIT ALLOTMENT FOR THE CORE AND ELECTIVE PAPERS

S.NO	SEMESTER	CORE CREDITS	ELECTIVE CREDITS	SOFT SKILL	INTERNSHIP CREDIT	TOTAL
1	I	12	6	2	-	20
2	II	16	6	2	-	24
3	III	16	6	2	-	24
4	IV	16	3	2	2	21+2
	TOTAL	60	21	8	2	89+2

EVALUATION PATTERN - THEORY

Seme ster	Paper Code	Title of the Paper	Continuous Assessment				Total
			Test I	Test II	Quiz/ Assignment Seminar/ Field Visit	Participatory Learning	
I	13SP18/1C/NUB	Nutritional Biochemistry	10	10	10	10	40
I	13SP18/1C/MT1	Medical Nutrition Therapy I	10	10	10	10	40
I	13SP18/1E/NUT	Nutraceuticals	10	10	10	10	40
I	13SP18/1E/PHY	Applied Physiology	10	10	10	10	40
II	13SP18/2C/AFS	Advanced Food Science	10	10	10	10	40
II	13SP18/2C/SRM	Applied Statistics and Research Methodology	10	10	10	10	40
II	13SP18/2C/MT2	Medical Nutrition Therapy II	10	10	10	10	40
II	13SP18/2E/NSN	Nutrition in Special Needs	10	10	10	10	40
II	13SP18/2E/FPN	Food Preservation	10	10	10	10	40
III	13SP18/3C/CAL	Advanced Studies in Carbohydrates and Lipids	10	10	10	10	40
III	13SP18/3C/MIV	Advanced Studies in Minerals and Vitamins	10	10	10	10	40
III	13SP18/3C/CLB	Clinical Biochemistry	10	10	10	10	40
III	13SP18/3E/FDI	Food and Drug Interaction	10	10	10	10	40
III	13SP18/3E/NPF	Nutrition and Physical Fitness	10	10	10	10	40
IV	13SP18/4C/EPR	Advanced Studies in Energy and Protein	10	10	10	10	40
IV	13SP18/4C/PHN	Public Health Nutrition	10	10	10	10	40
IV	13SP18/4E/FMI	Food Microbiology	10	10	10	10	40

EVALUATION PATTERN- PRACTICAL & PROJECT

Semester	Paper Code	Title of the Paper	Continuous Assessment			
			Model	Participation	Record	Total
I	13SP18/1C/PR1	Analytical Techniques in Nutrition	20	10	10	40
II	13SP18/2C/PR2	Advanced Food Science Practical	20	10	10	40
III	13SP18/3C/PR3	Innovative Food Product Development	20	10	10	40
IV	13SP18/4C/PR4	Public Health Nutrition Practical	20	10	10	40

EVALUATION PATTERN- PROJECT

Semester	Paper Code	Title of the Paper	Research Design	Originality	Literature Survey	Submission of Periodic Reports	Total
IV	13SP18/4C/PRO	Project	10	10	10	10	40

PATTERN FOR CONTINUOUS ASSESSMENT

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

RUBRICS FOR CONTINUOUS ASSESSMENT EVALUATION

Assignment	Appearance/ Content/ Originality/ Presentation/ Schematic Representation and Diagram/ Bibliography
Seminar	Organization/ Subject Knowledge/ Visual aids/ Confidence level/ Presentation
Field trip	Participation / Preparation/ Respect/ Attitude/ Leadership
Project	Preliminary work/ Design/ Content/ Presentation
Participatory learning	Answering Questions/ Clearing Doubts/ Participation in Discussion/ Attendance/ Communication and language

QUESTION PAPER PATTERN

Unless and otherwise specified in the syllabus for each paper, the pattern of question paper shall be as follows:

Components	Nature of the Question	Maximum Marks
Part A	Definition	20 Marks
Part B	Understanding Description / Problems	40 Marks
Part C	Application/ Analysis/ Synthesis/ Evaluation	40 Marks

- 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.**

INDEX FOR COURSE PROFILE

Semester	Paper Code	Title of the Paper	Page No.
I	13SP18/1C/NUB	Nutritional Biochemistry	
I	13SP18/1C/MT1	Medical Nutrition Therapy I	
I	13SP18/1E/NUT	Nutraceuticals	
I	13SP18/1E/PHY	Applied Physiology	
I	13SP18/1C/PR1	Analytical Techniques in Nutrition	
II	13SP18/2C/AFS	Advanced Food Science	
II	13SP18/2C/SRM	Applied Statistics and Research Methodology	
II	13SP18/2C/MT2	Medical Nutrition Therapy II	
II	13SP18/2E/NSN	Nutrition in Special Needs	
II	13SP18/2E/FPN	Food Preservation	
II	13SP18/2C/PR2	Advanced Food Science Practical	
III	13SP18/3C/CAL	Advanced Studies in Carbohydrates and Lipids	
III	13SP18/3C/MIV	Advanced Studies in Minerals and Vitamins	
III	13SP18/3C/CLB	Clinical Biochemistry	
III	13SP18/3E/FDI	Food and Drug Interaction	
III	13SP18/3E/NPF	Nutrition and Physical Fitness	
III	13SP18/3C/PR3	Innovative Food Product Development	
III	13SP18/3S/CSS	Computing skills	
IV	13SP18/4C/EPR	Advanced Studies in Energy and Protein	
IV	13SP18/4C/PHN	Public Health Nutrition	
IV	13SP18/4C/ PRO	Project	
IV	13SP18/4E/ FMI	Food Microbiology	
IV	13SP18/4C/PR4	Public Health Nutrition Practical	
IV	13SP18/4S/SWS	Scientific writing and presentation skills	

SEMESTER I

NUTRITIONAL BIOCHEMISTRY

CORE - 1

Teaching Hours: 90 hours

Paper Code: 13SP18/1C/NUB

Credits: 4 LTP: 4 2 0

OBJECTIVES:

To introduce the students to

- Principles of biochemistry as a basis for nutritional sciences
- Make students aware of metabolism of proximate principles and others
- The skills in quantitative and qualitative tests of nutrients.

COURSE OUTLINE:

UNIT I: Metabolism of Carbohydrates- Glycolysis, Glycogenesis, Glycogenolysis, Gluconeogenesis, Citric acid cycle, Hexose- Mono phosphate Shunt.

(20 HOURS)

UNIT II: Metabolism of Protein and Amino acids – Definition and nutritional classification of amino acids – essential, non-essential and conditionally essential amino acids. Functions of individual amino acids in the body – aromatic amino acids, sulphur containing amino acids, branched chain amino acids.

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- Biosynthesis and oxidation of saturated and unsaturated fatty acids, essential fatty acids; Biosynthesis and oxidation of triglycerides, phospholipids, cholesterol, ketone bodies; Biosynthesis of hemoglobin

(20 HOURS)

UNIT IV: Biological oxidation- Basic classification of enzymes and Nutritional importance of coenzymes and cofactors. Enzymes and Coenzymes involved in oxidation and reduction, respiratory chain, Role of ATP in energy capture, Oxidative phosphorylation

(15 HOURS)

UNIT V: Metabolism of Nucleic acids- 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

(15 HOURS)

REFERENCE BOOKS:

1. Harper- H. A, Review of physiological chemistry, Large Medical Publication, 21st edition, Los Angles,
2. West, Todd and Van Bruggan, Text book of Biochemistry. The Macmillan Co, New York,
3. Albert L.Lehninger. The molecular basis of cell structure and function ,Kalyani Publishers, New Delhi,
4. White Handler and Smith Principles of Biochemistry, Mac Graw Hill, New York,
5. Talwar .G.P. SriVatsava L.N and Moudgil .K.D -Textbook of biochemistry and Human Biology-3rd edition, Prentice Hall of India (P) Ltd. New Delhi-1,
6. Conn E.E and Stump P.K.-Outlines of Biochemistry-Wiley Eastern (P) Ltd, New Delhi,
7. RamaKrishnan .Textbook of Clinical Biochemistry, T.R.Publications, Chennai.
8. Plummer. D.T Introduction to Practical biochemistry, New Delhi,Tata McGraw Hill Publishing Company,

WEBSITES and e- LEARNING SOURCES:

- <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.

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

(For candidates admitted from the academic year 2018)

MSC FOOD AND NUTRITION

I YEAR- I SEMESTER

Title of the Paper: Nutritional Biochemistry
Paper Code: 13SP18/1C/NUB

Max. Marks: 100
Time: 3 Hours

SECTION A

Definition (Answer all)

Two questions from each unit

(10x2=20 marks)

SECTION B

Answer any FIVE questions.

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

(5x8= 40 marks)

SECTION C

Answer any TWO questions.

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

(2X20=40 marks)

SEMESTER I
MEDICAL NUTRITION THERAPY - I

CORE - 2
Teaching Hours: 90 hours

Course Code: 13SP18/1C/MT1
Credits: 4 LTP: 4 2 0

OBJECTIVES:

To enable the students to

- Understand the role of nutrition in maintaining good health and nutritional status
- Understand the dietary modifications at different stages of family life cycle and therapeutic conditions.

COURSE OUTLINE:

UNIT I: Food service in hospitals: Layout and design of dietary kitchen and service. Centralized & decentralized service and Tray service
Routine diets in hospitals
Use of RDA and Guidelines for planning balanced diets
Nutritional support for critically ill patients: Enteral and Parenteral feeds- types, indication and contraindications and calculation of requirements for different therapeutic conditions, Commercial and home formulas

(15 HOURS)

UNIT II: Pediatric Nutrition- Assessment of infant development through anthropometry. Problems of infants-VLBW, LBW, SGA babies, premature babies, stunting, and wasting;
Weaning, Commercial baby foods- Types and available infant formulas in market (Assignment)
Nutrition in eating disorders – etiology, types, diagnostic criteria, nutritional assessment, psychological management, nutritional care and nutrition education

(15 HOURS)

UNIT III: Nutrition and infection:
Fever – Etiology, patho-physiology Classification, nutritional implication metabolism, dietary considerations in influenza, typhoid, tuberculosis, Fever caused by parasites, leptospirosis and swine flu.
Diet in HIV & AIDS – Etiology, classification, manifestation and stages of HIV infection, opportunistic infections, medical management, medical nutrition therapy, complications and nutritional implications
Diet in Food intolerance and Allergy –definition, immunological aspects, classification, manifestation, common food allergies, diagnosis and dietetic treatment
Diet in Respiratory diseases: Etiology, Patho-physiology, nutritional implication and dietary considerations in Pneumonia, COPD and Chronic Bronchitis.

(25 HOURS)

UNIT IV: Nutrition in Gastro intestinal disorders

Diet in diseases of the esophagus, stomach and duodenum: Etiology, diagnostic tests, symptoms, clinical findings, treatment and dietary modification in esophagitis, GERD, gastritis and peptic ulcer.

Diet in diseases of the small intestine and colon: Etiology, types, symptoms, clinical findings, dietary considerations and nutritional consequences of drug therapy in adults and children in diarrhea, constipation, Crohn's disease, diverticulosis, ulcerative colitis and malabsorption syndrome-lactose intolerance, gluten enteropathy, tropical sprue.

Diet in diseases of the Liver, Gall Bladder and Pancreas: Etiology, pathophysiology, types, symptoms, clinical findings, nutritional implications and dietary considerations in Hepatitis, Alcoholic liver disease, Cirrhosis, Hepatic encephalopathy, Cholecystitis – acute and chronic, Cholelithiasis and Pancreatitis- acute and chronic. (25 HOURS)

UNIT V Nutrition Care Process (NCP):

NCP: Assessment, Planning, intervention and evaluation; Role of dietitian in health care; Diet Counseling- Importance and steps in diet counseling; Need for Nutrition Education. (10 HOURS)

REFERENCE BOOKS:

1. Wardlaw Gordon M. and Margaret Kessel, Perspectives in Nutrition, 5th edition, McGraw Hill publishers ,Boston, London, Sydney
2. Antia, F.P. and Philip Abraham ,Clinical Dietetics and Nutrition, 4th edition, Oxford University Press, Delhi and Chennai
3. Maurice, E. Shils, James A. Olson, Moshe Shike, (2000),Modern Nutrition in Health and Disease Eighth edition, Vol I and II , Lea and Febiger Philadelphia ,A Waverly Company
4. Mahan L.K. and Stump, S.E ,Krause's Food Nutrition and Diet therapy, 10th Edition, W. B. Saunders Company. Philadelphia, Sydney
5. Toteja, G.S and Singh P Micronutrient Profile of Indian Population, ICMR Publication, New Delhi,
6. M.Swaminathan,Principles of Nutrition and Dietetics, BAPPCO 88,Mysore Road Bangalore-560018

WEBSITES and e-LEARNING SOURCES:

- www.nutrition.gov- Service of National agricultural library, USDA
- www.nal.usda.gov/fnic-food nutrition information centre
- www.fantaproject.org -Fanta technical assistance for nutrition
- <http://dietary-supplements.info.nih.gov>- office of dietary supplements National Institute Of Health

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

(For candidates admitted from the academic year 2018)

MSC FOOD AND NUTRITION

I YEAR- I SEMESTER

Title of the paper: Medical Nutrition Therapy I
Paper Code: 13SP18/1C/MT1

Max. Marks: 100
Time: 3 hours

SECTION A

Definition (Answer all)

Two questions from each unit

(10x2=20 marks)

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

Teaching Hours: 75 hours

Paper Code: 13SP18/1E/NUT

Credits: 3 LTP: 3 2 0

OBJECTIVES:

To enable students to

- Understand the health benefits of various foods on the physiological functions of the body
- Learn the nutritive and pharmaceutical benefits of food.
- Learn the various aspects of food as preventive drug or supplement.

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, bioactive compounds as biomarkers to indicate efficacy of functional ingredients (15 HOURS)

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

UNIT IV: Significance of Nutraceuticals and Functional foods in diseases- anticancer agent, anti-inflammatory, antioxidant, anti-diabetic, hypo-cholesterolemic, and osteogenetic (15 HOURS)

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

REFERENCE BOOKS:

1. Robert Easy Wildman, Handbook of Nutraceuticals and Functional foods, Culinary and Hospitality industry publication services.
2. Wildman, R.E.C, Handbook of Nutraceuticals and Functional Foods, Second Edition, CRC Press.
3. Gibson GR & William CM, Functional foods : Designer Foods, Pharma Foods, 2004
4. Brigelius –Flohe, J & Joost HG, Nutritional Genemics : Impact on Health and Disease, Wiley VCH
5. Cupp & Tracy TS, Dietary Supplements: Toxicology and Clinical Pharmacology, Humana Press

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CHENNAI-600008

(For candidates admitted from the academic year 2018)

MSC FOOD AND NUTRITION

I YEAR- I SEMESTER

Title of the paper: Nutraceuticals

Max. Marks: 100

Paper Code: 13SP18/1E/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
APPLIED PHYSIOLOGY

ELECTIVE - 2

Teaching Hours: 75 hours

Paper code: 13SP18/1E/PHY

Credits: 3 LTP: 3 2 0

OBJECTIVES:

To enable the students to

- learn the pathological condition related to nutritional disorders
- Understand recent advances in applied physiology.

COURSE OUTLINE:

- UNIT I: General and Cellular Basis for Physiology:**
Review of Cell as structural & functional unit; Intercellular communication; Homeostasis; Aging
Circulatory and Cardiovascular Physiology:
Circulating body fluids; Review of Blood & Lymph; Heart – structure, origin and conduction of heart beat, cardiac cycle; 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.
Overview of Brain; Structure & functions – spinal cord; spinal nerves – reflex Action; Control of posture & balance; ANS; Electroencephalogram. (15 HOURS)
- UNIT III: Respiratory Physiology:**
Review of respiratory organs – Pulmonary function – Gaseous transport in lungs and tissues – regulation – respiratory adjustment in health and diseases.
Gastro-intestinal System:
Review of the digestive system, Digestion & absorption of carbohydrates, proteins and fat. Regulation & GI function. 15hrs
- UNIT IV: Renal Physiology and Fluid balance:**
Review of structure and functions. Urine formation -Regulation of extracellular sodium and osmolarity; Micturition, Body fluid compartments, Electrolyte, pH and Water balance: regulation of fluid balance.
Integumentary system: Review; Body temperature and its regulation
(15 HOURS)
- UNIT V: Endocrine system:**
Pituitary, Thyroid, Pancreas, Adrenal Glands – structure & functions
Reproductive Physiology:
Review of the structure and functions of male and female reproductive organs. Menstrual cycle, pregnancy, parturition, lactation; menopause-role of hormones; Contraceptive methods
(15 HOURS)

REFERENCES BOOKS:

1. Guyton, A.C. & Hall Textbook of Medical Physiology. 10th Edition Harcourt Asia P.Ltd Singapore,2001.
2. Guyton, A.C. &Hall .Functions of the Human Body. WB Saunders Co. Philadelphia, Latest Edition,2001.
3. Chakrabarti et al., Human Physiology. The New Book Stall, Calcutta,1994.
4. Joshi, V.D. Physiology - Preparation Manual for Undergraduates. Churchill Livingstone. New Delhi,
5. Ganong, W.F. Review of Medical Physiology 21st Edition McGrew Hill,2003
6. Tortora .G & Grabowski, S.R. Principles of Anatomy & Physiology. 10th Edition USA : John Wiley & Sons,2003.
7. Chaudhuri, A.R. Textbook of Practical Physiology .ParasPublishing , Hyderabad,2000.
8. Jain, A.K. Textbook of Physiology.Arichal publishing Co.Latest Edition,2003.
9. Ganong, W.F. Review of Medical Physiology. 21st Edition McGraw Hill Publishers,2003
10. Solomon, Eldra. Introduction to Human Anatomy and Physiology, 2nd edition. Saunders Publishing and Co,2003.

WEBSITE and e- LEARNING SOURCES:

- <http://members.aol.com/Bio50> - Human physiology lecture notes.
- <http://www.unomaha.edu/hpa> - Human Physiology and anatomy.

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(For candidates admitted from the academic year 2018)

MSC FOOD AND NUTRITION

I YEAR- I SEMESTER

Title of the paper: APPLIED PHYSIOLOGY

Max. Marks: 100

Paper Code: 13SP18/1E/PHY

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 I

ANALYTICAL TECHNIQUES IN NUTRITION

Practical – 1 CORE -3
Teaching Hours: 90 hours

Paper code: 13SP18/1C/PR1
Credits: 4 LTP: 0 0 6

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, Iodine value and acid value in oil/fat. (14 HOURS)
3. Mineral Estimation in foods: Estimation of calcium (titrimetric), iron (spectrophotometry), Phosphorous (colorimetry). (10 HOURS)
4. Vitamin estimation in foods: Estimation of Vitamin C (dye method), 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 (8 HOURS)
7. Estimation of protein in serum using Biuret reagent (10 HOURS)
8. Estimation of serum sodium , potassium (10 HOURS)
9. Demonstration on food analysis using HPLC (6 HOURS)

SEMESTER II

ADVANCED FOOD SCIENCE

CORE - 4

Teaching Hours: 75 hours

Course code: 13SP18/2C/AFS

Credits: 4 LTP: 3 2 0

OBJECTIVES:

To enable students to

- Understand the composition of various foods and the effects of cooking and processing on various components.
- Learn the emerging trends in food science.

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, Syneresis 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)

REFERENCE BOOKS:

1. Swaminathan .N, Food Science and Experimental Foods, Ganesh Publications, Madras, 2004
2. Meyers, L.M., Food Chemistry; Van Nostrand Reinhold Co., New York,
3. ShakuntalaManey and Shadaksaraswamy .M, Food : Facts and principles, Allied Publishers, New Delhi.,2005.
4. Potter N.N., Food Science, CBS Publishers & Distributors, New Delhi,
5. Belle, lowe., Experimental Cookery, Latest edition.,
6. Charley, Helen , Food Science, John Wiley and Sons ,Latest Edition,
7. Paul and Palmer, Food Theory and Applications, John Wiley and Sons, Latest Edition.
8. KhetarPaul, Neelam; Grewal, R and Jood, S, Bakery Science and Cereal Technology, Dia publishing house, Delhi. 2005
9. Vaclavik,V, Dimensions of Food, 5th Edition CRC press U.S.A.,2002
10. Aylward, F, Food technology Processing and laboratory control. Agrobios Publishing, Jodhpur, 2001
11. Journal : Journal of Food Science and Technology.

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

(For candidates admitted from the academic year 2018)

MSC FOOD AND NUTRITION
I YEAR- II SEMESTER

Title of the paper: Advanced Food Science
Paper Code: 13SP18/2C/AFS

Max. Marks: 100
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 II
APPLIED STATISTICS AND RESEARCH METHODOLOGY

CORE - 5
Teaching Hours: 75 hours

Paper Code: 13SP18/2C/SRM
Credits: 4 LTP: 3 2 0

OBJECTIVES:

- To enable students to apply statistical procedures to analyze numerical data and draw inferences.
- To make students aware of the principles and techniques involved in research methodology.
- To get an overview of the methodologies used in educational research.

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;
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, types symmetric 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 graphical representation 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

Correlation methods-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 samples t 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)

REFERENCE BOOKS:

1. Gupta, S.P. Statistical Methods ,Sultan Chand and sons, Educational Publishers New Delhi,2003.
2. John W.Best and James V.Kahn,,Research in Education ,7thEdition,Prentice Hall of India Pvt.Ltd.,New Delhi,2000.
3. LokeshKoul,Methodology of Educational Reasearch,3rd edition Vikas publishing House Pvt.Ltd,New Delhi
4. William Giles Campbell, Form and style in Thesis writing , Houghton Mifflin Company, Boston.
5. Elhance .D.N.Veenaand Elhance and Agarwal .B.M,Fundamental of statistics,48thEdition,kitab Mahal,Allahabad,2005.
6. Sadhu A.N andAmarjit Singh Research Methodology in Social Sciences. Himalaya Publishing House, Girguon,Mumbai-4,

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

(For candidates admitted from the academic year 2018)

MSC FOOD AND NUTRITION
I YEAR- II SEMESTER

Title of the paper: Applied Statistics and Research Methodology
Paper Code: 13SP18/2C/SRM

Max. Marks: 100
Time: 3 hours

SECTION A

Definition (Answer all)

Two questions from each unit

(10x2=20 marks)

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 II
MEDICAL NUTRITION THERAPY - II**

CORE - 6
Teaching Hours: 60 hours

Paper Code: 13SP18/2C/MT2
Credits: 3 LTP: 3 1 0

OBJECTIVES:

To enable students

- To understand the principles of diet and nutrition in the cause and treatment of disease.
- Understand the modifications of dietary requirements for therapeutic conditions.
- To learn recent concepts in dietary management of different diseases.

COURSE OUTLINE:

UNIT I: Nutrition for weight management: Etiology, Regulation of body weight, factors regulating energy intake and body weight, assessment, and health risks, management of obesity in adults and children- lifestyle modification, dietary modification, pharmaceutical management, Role of Leptin, Ghrelin and Glycemic load, surgical procedures.
Nutrition for Leanness –Etiology, assessment, management, high energy diets for weight gain. (10HOURS)

UNIT II: Diet in Cardiovascular diseases: Etiology, symptoms, role of specific nutrients in cardiac efficiency, clinical findings related to nutritional care and medical nutrition therapy of Atherosclerosis, Hyperlipidemia, hypertension, myocardial infarction and congestive heart failure. (10 HOURS)

UNIT III: Diet in Diabetes Mellitus: Incidence and predisposing factors, types, symptoms and tests for detection, metabolism and treatment – oral hypoglycemic drugs, insulin, & exercise, dietary guidelines and rationale for dietary modifications. Acute and chronic complications, age related issues – children and adolescents, pregnancy.
Hypoglycemia: types, diagnostic criteria and management.
Diet in Cancer: Etiology, types, metabolic effects, nutritional implications in different types of cancers and alternative nutritional therapies (15 HOURS)

UNIT IV: Diet in Renal disorders: Basic renal function, Etiology, symptoms, metabolic and nutritional implications and dietary treatment of Acute and chronic glomerulonephritis, Nephrotic syndrome, Acute kidney disease and End stage renal disease in adults and children. Nephrolithiasis: Risk factors, composition of renal stones, diagnosis, medical nutrition therapy.

(10 HOURS)

UNIT V: Diet in Burns: Types, Metabolic alterations, Rule of nine and Medical nutritional therapy.
Diet in Surgery: Pre-operative nutritional assessment.
Pre and post nutritional care in gastro intestinal surgery and Bariatric Surgery
Pre and post nutritional care in Liver transplantation, Cardiac transplantation and Kidney transplantation (15 HOURS)

REFERENCE BOOKS:

1. Antia F.P Clinical Nutrition and Dietetics, Oxford University Press
2. Mahan K.L and Stump S.E (1996) Krause's Food, Nutrition and Diet Therapy, M.B. Saundar Co., USA
3. Davidson S.R and Passmore J.F Human Nutrition and Dietetics
4. Corrine R.H Manual of Nutritional Therapeutics, 2nd edition, Little Brown Publications Washington
5. Davidson S.R and Passmore J.F Human Nutrition and Dietetics
6. Carroll A. Lutz & Karen Rutherford Nutrition and Diet Therapy 2nd edition, F.A. Davis Company, Philadelphia
7. Ruth A. Roth,Carolynn E. Townsend, Nutrition and Diet Therapy 8th edition, Thomson Delmar Learning

WEBSITES and e-LEARNING SOURCES:

- [www. diabetes.org](http://www.diabetes.org)
- [www. americanheart.org](http://www.americanheart.org)
- [www. altmedicine.com/](http://www.altmedicine.com/)

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

(For candidates admitted from the academic year 2018)

MSC FOOD AND NUTRITION
I YEAR- II SEMESTER

Title of the paper: Medical Nutrition Therapy II
Paper Code: 13SP18/2C/MT2

Max. Marks: 100
Time: 3 hours

SECTION A

Definition (Answer all)

Two questions from each unit

(10x2=20 marks)

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 DURING SPECIAL NEEDS

Elective - 3
Teaching Hours: 60 hours

Paper Code: 13SP18/2E/NSN
Credits: 3 LTP: 3 1 0

OBJECTIVES:

To enable students to

- Understand the importance of nutrients in special conditions and emergencies
- Learn the dietary modification in special needs

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, Prader Willi (PW) Syndrome, Spina Bifida , Cystic Fibrosis, Rett Syndrome (15 HOURS)
- UNIT II:** Space 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)

REFERENCE BOOKS:

1. Space Food and Nutrition – An Educators guide with activities in Science and Mathematics, NASA, <http://spacelink.nasa.gov/products>
2. Robert Easy Wildman, 2001, Handbook of Nutraceuticals and Functional foods, Culinary and Hospitality industry publication services.
3. Lane, Helen W., and Smith, Scott M. "Nutrition in Space." In Modern Nutrition in Health and Disease, 9th edition, eds. M. E. Shils, J. A. Olson, M. Shike, and A. C. Ross. Baltimore: Williams & Wilkins
4. Public Health Guide for Emergencies, www.jshsh.edu
5. A Toolkit for Addressing Nutrition in Emergency Situations , June 2008, www.motherchild.org

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

(For candidates admitted from academic year 2018)

MSC FOOD AND NUTRITION
I YEAR- II SEMESTER

Title of the paper: Nutrition during Special Needs
Paper Code: 13SP18/2E/NSN

Max. Marks: 100
Time: 3 hours

SECTION A

Definition (Answer all)

Two questions from each unit

(10x2=20 marks)

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
Teaching Hours: 60 hours

Paper code: 13SP15/2E/FPN
Credits: 3 LTP: 4 0 0

OBJECTIVES:

To enable students to:

- Understand the need for food preservation.
- Obtain knowledge of various types of preservation techniques.
- Obtain knowledge on packaging and food standards.

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)

REFERENCE BOOKS:

1. Lal.G.Siddappa G.B and Tandon. G.L: Preservation of foods and vegetables. Indian Council of NCE: Agricultural Research, New Delhi
2. Eaber and Lond: Food Hygiene and food hazards for all who handle foods
3. National symposium on agricultural Research and development since independence, Indian Council of Agricultural Research, New Delhi
4. Interaction of agriculture with Food Science. Proceeding of an interdisciplinary symposium, Singapore Ed. Reginald Machntyre
5. Indian Food Packer: Journal of the All India Preservers Association, Bangalore.
6. Sivasankar, B. Food processing and preservation, prentice Hall of India Pvt. Limited, New Delhi, 2002.
7. Jood, s. and Khetarpaul.N. Food preservation, Agrotech publishing, Udaipur, 2002.
8. NIIR Board, Modern Technology on Food preservation, Asia Pacific business press Inc, Delhi.

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

(For candidates admitted from the academic year 2018)

MSC FOOD AND NUTRITION
I YEAR- II SEMESTER

Title of the paper: Food Preservation

Max. Marks: 100

Paper Code: 13SP18/2E/FPN

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
Practical Hours: 90hrs

Paper Code: 13SP18/2C/PR2
Credits: 4 LTP: 0 0 6

COURSE OUTLINE:

1. Evaluation of Food quality:
 - a) Sensory methods: Threshold, Aroma recognition and difference tests. (5 HOURS)
 - b) Objective Methods: Ink print, line spread, specific gravity, seed displacement and percent sag (5 HOURS)
2. Convenience & Traditional Foods and Fermented Foods: (20 HOURS)
3. Gelatin, Pectin and Browning: (15 HOURS)
 - 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 panacotte
4. Fats, Oils, Emulsions and Foams: (15 HOURS)
 - 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.
5. Sugar cookery: (10 HOURS)
 - a) Crystallization of sugar
 - b) Factors affecting crystallization of sugar
 - c) Recipes
6. Bakery Products: (10 HOURS)
 - a) Estimation of gluten content
 - b) Recipes: Breads, Buns, Biscuits and Cakes
7. Adulteration: (10 HOURS)
 - a) Easy methods of detection of adulterants

SEMESTER III
ADVANCED STUDIES IN CARBOHYDRATES AND LIPIDS

CORE - 8
Teaching Hours: 75 hours

Paper Code: 13SP18/3C/CAL
Credits: 4 LTP: 4 1 0

OBJECTIVES:

To enable students

- To obtain knowledge on role of carbohydrates and lipids in human health.
- To gain knowledge on the classification, digestion, absorption and utilization of carbohydrates and lipids in humans.

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, xylose, lactose, maltose and sugar alcohols like xylitol and galactitol in human nutrition, and their toxic effects.
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 lipotropic factors;
Role of ascorbic acid in transforming cholesterol to bile acids; Fat substitutes
(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)

REFERENCE BOOKS:

1. Maurice, E. Shills, James.A. Obson, Moshe Shike, Modern Nutrition in Health and Disease. 8th edition, vol I and II Lea and Febiger Philadelphia,A. Waverly Company, 2000.
2. Mahan L.K and stump S.E Krauses Food Nutrition and Diet Therapy 10th edition, W.B.Saunders Company, Philadelphia, 2002.
3. Horase L. Sipple, Kristen W. Mcnutt Sugars in Nutrition, Academic Press London
4. Davidson and Passmore R and Brock J.B. Human nutrition and Dietetics. The English Languages book society and Churchill Livingstone.
5. Garrow et al., Human Nutrition and Dietetics 10th edition Churchill Livingstone, 2000.
6. Davidson and Passmore R and Brock J.B. Human nutrition and Dietetics. The English Languages book society and Churchill Livingstone
7. James L Groff, Sareen. S. Gropper Advanced Nutrition and Human Metabolism, 3rd edition, Wadsworth Thomson learning

WEBSITES and e- LEARNING SOURCES

- www.fda.gov/search.html
- www.nutrition.about.com
- www.lifelines.com/nthink.html
- www.blonz.com

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

(For candidates admitted from the academic year 2018)

MSC FOOD AND NUTRITION
I YEAR- II SEMESTER

Title of the paper: Advanced Studies in Carbohydrates and Lipids Max. Marks: 100
Paper Code: 13SP18/3C/CAL 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
Teaching Hours: 75 hours

Paper Code: 13SP18/3C/MIV
Credits: 4 LTP: 4 1 0

OBJECTIVES:

To enable students:

- To gain knowledge in the area of Nutrition Science with the latest advancements in vitamins and minerals
- To understand the interrelationship of vitamins and minerals to other nutrients for the maintenance of proper health and prevention of diseases

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.
Incidence of Goitre and fluorosis in India (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)

REFERENCE BOOKS:

1. Whitney, E.N. and Rolfes, S.R. Understanding Nutrition, 8th Edition, Wordsworth Thomson Learning, Australia, 2002.
2. Gibney, J.M., Margetts, B.M., Kearney, J.M and Arab, L. Public Health Nutrition, U.K., Blackwell Publishers, 2005.
3. Antia, F.P. and Abraham, P. Clinical Dietetics and Nutrition, 4th edition, Oxford University Press, New Delhi,2001.
4. Garrow, J.S., James, W.P.T. and Ralph, A. Human Nutrition and Dietetics, 10th Edition, Churchill Livingstone, London, 2000.
5. Shills, M.E., Olson, J.A. and Shike, M. Modern Nutrition in Health and Diseases, 8th edition, Lea and Febiger Company, Philadelphia, 2002.
6. Mahan, L.K. and Stump, S.E. Krause's Food Nutrition and Diet Therapy, 10th Edition, W.B.Saunders Company, Philadelphia, 2002.
7. Srilakshmi, B. Nutrition Science, New Age International (P) Ltd, New Delhi,2002.
8. Joshi, S. Nutrition and Dietetics, 2nd Edition, Tata McGraw Hill Publishing Company, New Delhi,2002.

WEBSITES and e- Learning sources:

- www.thriveonline.com/eats/vitamins/guide.index.html
- www.ncbi.nlm.nih.gov/pubmed.
- www.ifcinfo.health.org.
- www.bookman.com.au/vitamins

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

(for candidates admitted from the academic year 2018)

MSC FOOD AND NUTRITION
II YEAR- III SEMESTER

Title of the paper: Advanced Studies in Minerals and Vitamins **Max. Marks: 100**
Paper Code: 13SP18/3C/MIV **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
(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

CLINICAL BIOCHEMISTRY

CORE - 10
Teaching Hours: 60 hours

Paper Code: 13SP18/3C/CLB
Credits: 4 LTP: 3 1 0

OBJECTIVES:

To introduce the students to

- Principles of clinical biochemistry as a basis for nutritional sciences
- Make students aware of the techniques of analytical biochemistry.
- The skills in quantitative and qualitative tests of nutrients.

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. (15 HOURS)

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)

REFERENCE BOOKS:

1. Harper- H.A. Review of physiological chemistry, Large Medical Publication, 21st edition, Los Angeles
2. West, Todd and Van Bruggan, Text book of Biochemistry. The Macmillan Co, New York
3. Albert L. Lehninger. The molecular basis of cell structure and function ,Kalyani Publishers, New Delhi
4. White Handler and Smith Principles of Biochemistry, Mac Graw Hill, New York
5. Talwar .G.P. SriVatsava L.N and Moudgil .K.D Textbook of biochemistry and Human Biology-3rd edition, Prentice Hall of India (P) Ltd. New Delhi-1
6. Conn E.E and Stump P.K. Outlines of Biochemistry-Wiley Eastern (P) Ltd, New Delhi
7. RamaKrishnan. Textbook of Clinical Biochemistry, T.R.Publications, Chennai
8. Plummer. D.T. An introduction to Practical biochemistry, New Delhi, Tata McGraw Hill Publishing Company

WEBSITES AND e-LEARNING SOURCES:

- [http://www.gwu.edu/~mpb-metabolic pathways of biochemistry](http://www.gwu.edu/~mpb-metabolic%20pathways%20of%20biochemistry)
- <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.

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

(For candidates admitted from the academic year 2018)

MSC FOOD AND NUTRITION
II YEAR- III SEMESTER

Title of the paper: Clinical Biochemistry
Paper Code: 13SP18/3C/CLB

Max. Marks: 100
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

Teaching Hours: 60 hours

Paper Code: 13SP18/3E/FDI

Credits: 3 LTP: 3 1 0

OBJECTIVES:

To introduce the students to

- To enable students to gain an insight on basic concepts in pharmacology, food and drug interactions
- To help students apply the knowledge gained to prevent adverse reactions between food and drugs.

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, Inhibition of drug metabolism and 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), stimulation and inhibition of drug action. 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 drugs
- b) Drugs in Renal diseases: Diuretics and Anti diuretics: Examples, adverse effects, Precautions taken by dietitian

- c) Cardiovascular drugs: Drugs used in Congestive cardiac failure, Angina pectoris, Myocardial infarction, Lipid lowering drugs, and hypertension. Dietary modifications during ingestion of drugs
- d) 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), plant source, 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, Allergies and infections: Drugs used in bronchial asthma, NSAIDs- mechanism of action, adverse effects, Dietary modifications
- 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 and tranquillizers. Dietary modifications. (15 HOURS)

UNIT V:

Food and drug interactions:

- 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)

REFERENCE BOOKS:

1. Dr. N. Muruges, (2011), A concise text book of pharmacology, Sathya publishers, Madurai, sixth edition reprinted.
2. PadmajaUdaykumar(2010), Pharmocology for nurses, Jaypee Brothers Medical Publishers, New delhisecond edition (reprinted).
3. Raje VN (2011), Pharmacology and toxicology, CBS publishers, New delhi, first edition reprint

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

(for candidates admitted from the academic year 2018)

MSC FOOD AND NUTRITION
II YEAR- III SEMESTER

Title of the paper: Food and Drug Interaction

Paper Code: 13SP18/3E/FDI

Max. Marks: 100

Time: 3 hours

SECTION A

Definition (Answer all)

Two questions from each unit

(10x2=20 marks)

SECTION B

Answer any FIVE questions.

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

(5x8= 40 marks)

SECTION C

Answer any TWO questions.

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

(2X20=40 marks)

SEMESTER III

NUTRITION AND PHYSICAL FITNESS (INTERDISCIPLINARY)

ELECTIVE – 6

Teaching Hours: 60 hours

Paper Code: 13SP18/3E/NPF

Credits: 3 LTP: 4 0 0

OBJECTIVES:

To enable the students

- ❖ To learn the basics of nutrition, nutrients and menu planning.

COURSE OUTLINE:

UNIT I:

Introduction to nutrition - Definition of terms - Food, Nutrient and Health.

Food and our body -RDA - Factors affecting RDA, reference man, reference woman, RDA for adolescents and adults; Basic 5 food group system (ICMR), factors involved in food selection; Definition of menu planning; principles of menu planning; Planning balanced diet for adults and adolescents. (15 HOURS)

UNIT II:

Basic nutrients - Proximate principles - CHO, fats and proteins. Carbohydrates - Classification, Functions, Sources, Deficiency; Proteins - Classification, Functions, Sources and Deficiency; Fats - Classification, Functions and Sources; Energy - Definition of energy, Kilo Calories, energy from CHO, proteins and fats, Physiological fuel value, gross fuel value, BMR - factors affecting BMR (15 HOURS)

UNIT III:

Vitamins: Fat soluble vitamins (A, D, E, K) - sources, functions, deficiency. Water soluble vitamins (Thiamine, Riboflavin, Pyridoxine, Niacin, Vitamin B12) - sources, functions, deficiency. Minerals (Calcium, Iron, Phosphorus, Sodium, Potassium, Iodine, Zinc) - sources, functions, deficiency. Water - functions, sources, requirements, water balance, dehydration, water intoxication (10 HOURS)

UNIT IV:

Fitness -Definition of fitness, benefits of fitness. Components of fitness, aerobic and anaerobic activities (10 HOURS)

UNIT V:

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

REFERENCE BOOKS:

1. Whitney, E.N. and Rolfes, S.R., Understanding Nutrition, 8th Edition, Wordsworth Thomson Learning, Australia, 2002.
2. Mudambi, S.R. and Rajagopal, M.V., Fundamentals of food and nutrition, Wiley Eastern Limited, 2003.
3. Antia, F.P. and Abraham, P., Clinical Dietetics and Nutrition, 4th edition, Oxford University Press, New Delhi., 2001
4. Swaminathan, M., Principles of Nutrition and Dietetics, BAPPCO, Bangalore. 2002
5. PremalathaMullick, Textbook of Home Science, Kalyani Publishers, India.
6. Shils, M.E., Olson, J.A. and Shike, M., Modern Nutrition in Health and Diseases, 8th edition, Lea and Febiger Company, Philadelphia. 2000
7. Mahan, L.K. and Stump, S.E., Krause's Food Nutrition and Diet Therapy, 10th Edition, W.B.Saunders Company, Philadelphia. 2002
8. Srilakshmi, B. Nutrition Science, New Age International (P) Ltd, New Delhi. 2002.
9. Joshi, S., Nutrition and Dietetics, 2nd Edition, Tata McGraw Hill Publishing Company, New Delhi. 2002

WEBSITES and e- LEARNING SOURCES:

- 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

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

(For candidates admitted from the academic year 2018)

**MSC FOOD AND NUTRITION
II YEAR- III SEMESTER**

Title of the paper: Nutrition and physical fitness

Max. Marks: 100

Paper Code: 13SP18/3E/NPF

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
Teaching Hours: 90 hours

Paper Code: 13SP18/3C/PR3
Credits: 4 LTP: 0 0 6

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)

SEMESTER III

COMPUTING SKILLS

Soft skill - 3

Teaching Hours: 30 hours

Paper Code: 13SP18/3S/CSS

Credits: 2 LTP: 2 0 0

OBJECTIVES:

To enable the students

- ❖ To learn the basic computing skills of nutrition

COURSE OUTLINE:

UNIT I:

Nutritional Care process

Nutritional assessment: use of SOAP (Subjective data, Objective data, Assessment and Plan), MNA (Mini Nutritional Assessment), SGA (Subjective Global Assessment) and MUST (Malnutrition Universal Screening Tool) – assessment, diagnosis and intervention

UNIT II:

Energy requirement:

Estimation of energy content is using bomb calorimeter, energy requirement of an individual on a working and non-working day using Sathyanarayana and factorial method.

Software available in the market for calculating the energy requirement and expenditure

UNIT III:

Development of energy and protein rich recipes by calculating the chemical score and Net Dietary Protein calorie Percentage

REFERENCE BOOKS:

1. Maurice, E. Shils, James A. Olson, Moshe Shike, (2000), Modern Nutrition in Health and Disease Eighth edition, Vol I and II , Lea and Febiger Philadelphia ,A Waverly Company,2000.
2. Mahan L.K. and Stump, S.E ,Krause's Food Nutrition and Diet therapy, 10th Edition, W. B. Saunders Company. Philadelphia, Sydney,2002.

QUESTION PAPER TEMPLATE
ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008
(For candidates admitted from the academic year 2018)

MSC FOOD AND NUTRITION

II YEAR- III SEMESTER

Title of the paper: Computing skills

Max. Marks: 50

Paper Code: 13SP18/3S/CSS

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 IV

ADVANCED STUDIES IN ENERGY AND PROTEIN

CORE - 12

Teaching Hours: 90 hours

Paper Code: 13SP18/4C/EPR

Credits: 4 LTP: 4 2 0

OBJECTIVES:

To introduce the students to

- Principles of energy metabolism
- Make students aware of the techniques involved in measuring energy expenditure.
- Evaluate protein quality and in depth study of amino acids.

COURSE OUTLINE:

- UNIT I:** Energy - energy content of foods, energy from carbohydrates, fats and proteins, direct and indirect calorimetry, non-calorimetric methods. (20 HOURS)
- UNIT II:** Energy requirement –basal and factors affecting, energy expenditure for various activities.
Energy balance and maintenance of body weight (20 HOURS)
- UNIT III:** Protein- protein and amino acid requirement, Aminoacid pool, protein turnover
Amino acid patterns in proteins of animal and vegetable origin.
Novel protein, protein for special needs – Immune proteins, protein for muscle building (20 HOURS)
- UNIT IV:** Evaluation of protein quality - critical study of methods of assessment. (15 HOURS)
- UNIT V:** Essential amino acids, protein and amino acid deficiencies and toxicity, amino acid balance, imbalance, mutual supplementation of proteins in foods. (15 HOURS)

REFERENCE BOOKS:

1. Mahan L.K. and Stump, S.E ,Krause's Food Nutrition and Diet therapy10th Edition, W. B. Saunders Company. Philadelphia, Sydney,2002.
2. Maurice, E. Shils, James A. Olson, Moshe Shike, (2000),Modern Nutrition in Health and Disease . Eighth edition, Vol I and II, Lea and Febiger Philadelphia ,A Waverly Company.

WEBSITES and e-LEARNING SOURCES:

- www.nutrition.gov- Service of National agricultural library, USDA
- www.nal.usda.gov/fnic-food nutrition information centre.
- [www.american journal of nutrition .org](http://www.americanjournalofnutrition.org)
- [www.british journal nutrition .org](http://www.britishjournalofnutrition.org)

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

(For candidates admitted from the academic year 2018)

MSC FOOD AND NUTRITION
II YEAR- IV SEMESTER

Title of the paper: Advanced studies in Energy and Protein
Paper Code: 13SP18/4C/EPR

Max. Marks: 100
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

Teaching Hours: 90 hours

Paper Code: 13SP18/4C/PHN

Credits: 4 LTP: 4 2 0

OBJECTIVES:

To enable students

- To understand the role of nutrition in national development
- To overcome nutritional problems facing community.
- Plan and conduct nutrition education programmes.

COURSE OUTLINE:

UNIT I:

Nutritional Epidemiology:

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.

(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.

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. Integration of breastfeeding and complementary feeding practices into National programme. (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 in India, 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)

REFERENCE BOOKS:

1. Jelliffe. D.B., The assessment of Nutritional status on the community, -WHO monograph cd's- no 53. Geneva,
2. Jelliffe. D.B. The assessment of Nutritional status on the community -WHO Geneva,
3. Jelliffe. D.B. Nutrition in the subtropics and tropics,
4. Shanthi Gosh, The feeding and care of infants and young children, Voluntary Health association of India- New Delhi,
5. Bamji. M Textbook of Human Nutrition, 2000
6. Nutrition foundation of India series, scientific reports .
7. Hindu survey of Indian agriculture, latest edition
8. McLarea, D.S. (Ed.). , Nutrition in the community, John Wiley and sons.
9. Shukla .P.K, Nutritional Problems of India- Prentice Hall of India Pvt., Ltd., New Delhi
10. Waterlow. J.C. Protein energy malnutrition, London, Edward Arnold publishers
11. Workshop on Clinical Epidemiology, Clinical epidemiology Unit, Madras Medical College, Chennai
12. Robert H. Fletcher, Suzanne W. Fletcher and Edward H. Wagner, Clinical Epidemiology – the essentials, Williams & Wilkins, Baltimore, Second Edition
13. Sheila ChanderVir, Public Health Nutrition in Developing Countries Part 1, Woodhead Publishing India in Food science, Technology and Nutrition, New Delhi, 2011
14. Sheila ChanderVir, Public Health Nutrition in Developing Countries Part 2, Woodhead Publishing India in Food science, Technology and Nutrition, New Delhi, 2011

WEBSITE and e-LEARNING SOURCES:

- <http://www.hsc.wvu.edu/library/U-links/community-nutrition.htm>
- www.asns.rg/njun04a.pdf
- www.fns.usda.gov/fsec/FILES/safetyNet.pdf
- www.ext.vt.edu/action_for_healthykids/assistance/lesson5background.pdf

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

(For candidates admitted from the academic year 2018)

MSC FOOD AND NUTRITION
II YEAR- IV SEMESTER

Title of the paper: Public Health Nutrition
Paper Code: 13SP18/4C/PHN

Max. Marks: 100
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

PROJECT

CORE - 14
Teaching Hours: 90 hours

Paper Code: 13SP18/4C/PRO
Credits: 4 LTP: 0 6 0

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.
 - I. Introduction: statement of the problem, significance, need for the study, objectives, and operational definitions.
 - II. Review of literature
 - III. Methodology – Sampling and tools for data collection, procedures, hypothesis
 - IV. Results and Discussion–Tables and figures, statistical presentations, hypothesis testing.
 - V. Summary and Conclusion
 - VI. References.
 - VII. Appendices

EVALUATION PATTERN FOR THE EXAMINERS

Title of the paper: Project

Paper Code: 13SP18/4C/PRO

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

Teaching Hours: 60 hours

Paper Code: 13SP18/4E/FMI

Credits: 3 LTP: 3 1 0

OBJECTIVES:

To enable the students to

- To acquire knowledge on the application of microbes in food industry
- To be familiar with micro-organisms causing food spoilage and the recent trends in food preservation
- To gain knowledge on the microbial quality control procedures used 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 - Types, Mycotoxins - Source, Chemistry, 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)

REFERENCE BOOKS:

1. Adams, M.R and Moss, M.O,Food Microbiology, New Age International (P) Ltd, New Delhi,
2. Frazier C and Denis, W.C,Food Microbiology, 4th ed, Tata Mc Graw Hill publishing Company. New Delhi, 2002.
3. James. M.Jay,Modern Food Microbiology,4th ed, Chapman & Halls. New York, 2003.
4. Dubey, R.C. Textbook of Biotechnology, 4th ed, S.Chand & Company Ltd. New delhi, 2002.
5. John .E.SmithBiotechnology, 3rd ed, Cambridge University Press. London,1996.
6. Purohit, S.S.,Microbiology - fundamentals & applications, 6th ed, Agro bices. Indiana, 2002.
7. Stanier, R.X., The Microbial World, 5th ed, Prentice Hall of India. New Delhi,1986.
8. Anandakrishnan, C.P,Singh,R.B and Padmanabhan,P.N, DairyMicrobiology, Srilakshmi publications. Chennai
9. Patel, A.H. Industrial Microbiology, Macmillan India Limited. New Delhi
10. Casida, L.E. Industrial Microbiology, New Age International Pvt Ltd. New Delhi

WEBSITES AND e- LEARNING SOURCES:

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

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

(For candidates admitted from the academic year 2018)

MSC FOOD AND NUTRITION

II YEAR- IV SEMESTER

Title of the paper: Food Microbiology

Paper Code: 13SP18/4E/FMI

Max. Marks: 100

Time: 3 hours

SECTION A

Definition (Answer all)

Two questions from each unit

(10x2=20 marks)

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 IV

PUBLIC HEALTH NUTRITION PRACTICAL

Practical -4 (CORE – 15)
Teaching Hours: 90 hours

Paper Code: 13SP18/4C/PR4
Credits: 4 LTP: 0 0 6

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)

SEMESTER IV

SCIENTIFIC WRITING AND PRESENTATION SKILLS

Soft skill - 4

Teaching Hours: 30 hours

Paper Code: 13SP18/4S/SWS

Credits: 2 LTP: 2 0 0

OBJECTIVES:

To enable the students

- ❖ To learn the basics of scientific writing, copy editing and poster and oral presentation
- ❖ To learn the use of computer in research

COURSE OUTLINE:

- UNIT I:** Scientific writing - abstract, full paper, clinical update, manuscripts. Process of copy editing journals
- UNIT II:** Presentation skills – Thematic, poster, oral, principles to be followed for presentation
- 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

REFERENCE BOOKS:

1. John W. Best and James V. Kahn, Research in Education, 7th Edition, Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
2. Lokesh Koul, Methodology of Educational Research, 3rd edition Vikas publishing House Pvt. Ltd., New Delhi
3. William Giles Campbell, Form and style in Thesis writing, Houghton Mifflin Company, Boston.
4. Elhance .D.N. Veena and Elhance and Agarwal .B.M, Fundamental of statistics, 48th Edition, kitab Mahal, Allahabad, 2005.
5. Sadhu A.N and Amarjit Singh Research Methodology in Social Sciences. Himalaya Publishing House, Girguon, Mumbai-4

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

(For candidates admitted from the academic year 2018)

M.SC FOOD AND NUTRITION
II YEAR- IV SEMESTER

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

Paper Code: 13SP18/4S/SWS

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