

ETHIRAJ COLLEGE FOR WOMEN

AUTONOMOUS

SELF SUPPORTING

CHENNAI-8

DEPARTMENT OF

CLINICAL NUTRITION & DIETETICS

SYLLABUS FOR

M.Sc. FOODS & NUTRITION

2015 – 2018 batch

ETHIRAJ COLLEGE FOR WOMEN
Department of Clinical Nutrition and Dietetics
M.Sc Foods and Nutrition
Syllabus from June 2015 onwards

Department of Clinical Nutrition and Dietetics – M.Sc Food and Nutrition is revising syllabi with effect from the academic year 2015-2016, 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 Foods and Nutrition course shall be required to have passed the B.Sc Nutrition and Dietetics/ general 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:

Core courses and elective

Interdisciplinary elective papers offered to other major department students

Research

Soft skills

Personality Development – Soft skill course in the first semester of the first year.

The communication skills in English / French for Beginners / German for Beginners/ Computing skills are offered as Soft skill course papers in the second semester of the first year and the students have the privilege to choose any one of the above compulsorily.

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. All other successful candidates shall be declared to have passed the examination in the THIRD class. Candidates who pass all the examinations prescribed for the course in the FIRST APPEARANCE ITSELF ALONE are eligible for ranking.

COURSE PROFILE

SEMESTER I

semester	Course code	Course title	Hours/ Week	Credits	CA	End Semester	Total
I	13SP15/1C/NUB	Paper 1 Nutritional Biochemistry (Core 1)	6	4	40	60	100
I	13SP15/1C/MT1	Paper 2 Medical Nutrition Therapy I (Core 2)	6	4	40	60	100
I	13SP15/1E/NFF	Paper 3 Nutraceutical and Functional foods Elective1	5	3	40	60	100
I	13SP15/1E/PHY	Paper 4 Applied Physiology Elective2	5	3	40	60	100
I	13SP15/1C/PR1*	Practical 1 Analytical Techniques in Nutrition (Core 3)	6	-	40	60	100
I	PG15/1S/PEW	Soft skill Personality Enrichment for Women	2	2	-	50	50
	TOTAL		28+2	14+2			
*practical examination (13SP15/1C/PR1) - Practical will be conducted in the second semester.							

SEMESTER II

	Paper code	Paper	Hours/ week	Credits	CA	End Semester	Total
II	13SP15/2C/AFS	Paper 1 Advanced Food Science (Core 4)	5	4	40	60	100
II	13SP15/2C/SRM	Paper 2 Applied Statistics and Research Methodology (Core 5)	5	4	40	60	100
II	13SP15/2C/MT2	Paper 3 Medical Nutrition Therapy II (Core 6)	4	4	40	60	100
II	13SP15/2E/NSN	Paper 4 Nutrition in Special needs Elective3	4	3	40	60	100
II	13SP15/2E/FPN	Paper 5 (Interdisciplinary) Food Preservation Elective4	4	3	40	60	100
I	13SP15/1C/PR1*	Practical 1 Analytical Techniques in Nutrition (Core 3)	-	4	40	60	100
II	13SP15/2C/PR2	Practical 2 Advanced Food Science Practical (Core 7)	6	4	40	60	100
II	Soft skill 2	“The Communication skills in English”/”French for Beginners”/”German for Beginners”/”Computing skills” (Interdisciplinary)	2	2	-	50	50
	TOTAL		28+2	23+3+2			

SEMESTER III

Paper code	Paper	Hours /week	Credits	CA	End Semester	Total
13SP15/3C/CAL	Paper 1 Advanced Studies in Carbohydrates and Lipids (Core 8)	5	4	40	60	100
13SP15/3C/MIV	Paper 2 Advanced Studies in Minerals and Vitamins (Core 9)	5	4	40	60	100
13SP15/3C/CLB	Paper 3 Clinical Biochemistry (Core 10)	4	4	40	60	100
13SP15/3E/FDI	Paper 4 (Elective 5) Food and Drug Interactions	4	3	40	60	100
13SP15/3E/NPF	Paper 5 (Elective 6) Interdisciplinary Nutrition and physical fitness	4	3	40	60	100
13SP15/3C/PR3	Practical 3 Innovative Food Products Development (Core 11)	6	4	40	60	100
13SP15/3S/CSS	Soft skill 3 Computing skills	2	2	-	50	50
TOTAL		24+4+2	19+3+2			

SEMESTER IV

Paper code	Paper	Hours/ Week	Credits	CA	End Semest er	Total
13SP15/4C/EPR	Paper 1 Advanced Studies in Energy and proteins (Core 12)	6	4	40	60	100
13SP15/4C/PHN	Paper 2 Public Health Nutrition (Core 13)	6	4	40	60	100
13SP15/4C/ PRO	Paper 3 Project -Dissertation (Core 14)	6	4	40	60	100
13SP15/4E/ FMI	Paper 4 (Elective 7) Food Microbiology	4	3	40	60	100
13SP15/4C/PR4	Practical 4 Public Health Nutrition Practical (Core 15)	6	4	40	60	100
13SP15/4S/SWS	Soft skill 4 Scientific writing and presentation skills	2	2	-	50	50

EVALUATION PATTERN

Semester	Course Code	Course Title	Continuous Assessment				
			Test I	Test II	Quiz/Assignment Seminar/ Field Visit	Participatory Learning	Total
I	13SP15/1C/NUB	Nutritional Biochemistry	10	10	10	10	40
I	13SP15/1C/MT1	Medical Nutrition Therapy I	10	10	10	10	40
I	13SP15/1E/NFF	Nutraceutical and Functional foods	10	10	10	10	40
I	13SP15/1E/PHY	Applied Physiology	10	10	10	10	40
II	13SP15/2C/AFS	Advanced Food Science	10	10	10	10	40
II	13SP15/2C/SRM	Applied Statistics and Research Methodology	10	10	10	10	40
II	13SP15/2C/MT2	Medical Nutrition Therapy II	10	10	10	10	40
II	13SP15/2E/NSN	Nutrition in Special needs	10	10	10	10	40
II	13SP15/2E/FPN	Food Preservation	10	10	10	10	40

EVALUATION PATTERN

Semester	Course Code	Course Title	Continuous Assessment				
			Test I	Test II	Quiz/Assignment Seminar/ Field Visit	Participatory Learning	Total
III	13SP15/3C/CAL	Paper 1 Advanced Studies in Carbohydrates and Lipids	10	10	10	10	40
III	13SP15/3C/MIV	Paper 2 Advanced Studies in Minerals and Vitamins	10	10	10	10	40
III	13SP15/3C/CLB	Paper 3 Clinical Biochemistry	10	10	10	10	40
III	13SP15/3E/FDI	Paper 4 Food and Drug Interactions	10	10	10	10	40
III	13SP15/3E/NPF	Paper 5 Interdisciplinary Nutrition and physical fitness	10	10	10	10	40
III	13SP15/3C/PR3	Practical 3 Innovative Food Products Development	10	10	10	10	40
III	13SP15/3S/CSS	Soft skill 3 Computing skills	-	-	-	-	-

Semester	Course Code	Course Title	Continuous Assessment				
			Test I	Test II	Quiz/Assignment Seminar/ Field Visit	Participatory Learning	Total
IV	13SP15/4C/EPR	Paper 1 Advanced Studies in Energy and proteins (Core 12)	10	10	10	10	40
IV	13SP15/4C/PHN	Paper 2 Public Health Nutrition (Core 13)	10	10	10	10	40
IV	13SP15/4C/ PRO	Paper 3 Project - Dissertation (Core 14)	10	10	10	10	40
IV	13SP15/4E/ FMI	Paper 4 (Elective 7) Food Microbiology	10	10	10	10	40
IV	13SP15/4C/PR4	Practical 4 Public health Nutrition Practical (Core 15)	10	10	10	10	40
IV	13SP15/4S/SWS	Soft skill 4 Scientific writing and presentation skills	-	-	-	-	-

CREDIT ALLOTMENT FOR THE CORE AND ELECTIVE PAPERS

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

***2 credits for Internship**

EVALUATION PATTERN- PRACTICALS

Semester	Course Code	Course Title	Continuous Assessment		
			Even semester (II,IV)		Total
			Model	Participation	40
I	13SP15/1C/PR1	Analytical Techniques in Nutrition	20	20	40
II	13SP15/2C/PR2	Advanced Food Science Practical	20	20	40
III	13SP15/3C/PR3	Innovative Food Products	20	20	40
IV	13SP15/4C/PR4	Public Health Nutrition Practical	20	20	40

PATTERN FOR CONTINUOUS ASSESSMENT

Component	Time	Total marks	CA
Test I	2 hrs	50 marks	10 marks
Test II	2 hrs	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/ contents/ 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:

COMPONENT	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 from mentioned units.

Part C: Two out of four questions to be answered carrying 20 marks each.

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

Semester	Code	Course title	Page No.
I	13SP15/1C/NUB	Paper 1 Nutritional Biochemistry (Core 1)	15
I	13SP15/1C/MT1	Paper 2 Medical Nutrition Therapy I (Core 2)	18
I	13SP15/1E/NFF	Paper 3 Nutraceutical and Functional foods Elective1	22
I	13SP15/1E/PHY	Paper 4 Applied Physiology Elective2	24
I	13SP15/1C/PR1	Practical 1 Analytical Techniques in Nutrition	27
II	13SP15/2C/AFS	Paper 1 Advanced Food Science (Core 3)	28
II	13SP15/2C/SRM	Paper 2 Applied Statistics and Research Methodology (Core 4)	32
II	13SP15/2C/MT2	Paper 3 Medical Nutrition Therapy II (Core 5)	36
II	13SP15/2E/NSN	Paper 4 Nutrition in Special needs Elective3	40
II	13SP15/2E/FPN	Paper 5 (Interdisciplinary) Food Preservation Elective4	43
II	13SP15/2C/PR2	Practical 2 Advanced Food Science Practical (Core 7)	46

Semester	Code	Course title	Page No.
III	13SP15/3C/CAL	Paper 1 Advanced Studies in Carbohydrates and Lipids	47
III	13SP15/3C/MIV	Paper 2 Advanced Studies in Minerals and Vitamins	50
III	13SP15/3C/CLB	Paper 3 Clinical Biochemistry	53
III	13SP15/3E/FDI	Paper 4 Food and Drug Interactions	56
III	13SP15/3E/NPF	Paper 5 Interdisciplinary Nutrition and physical fitness	59
III	13SP15/3C/PR3	Practical 3 Innovative Food Products Development	62
III	13SP15/3S/CSS	Soft skill 3 Computing skills	63
IV	13SP15/4C/EPR	Paper 1 Advanced Studies in Energy and protein (Core 12)	65
IV	13SP15/4C/PHN	Paper 2 Public Health Nutrition (Core 13)	68
IV	13SP15/4C/ PRO	Paper 3 Project -Dissertation (Core 14)	72
IV	13SP15/4E/ FMI	Paper 4 (Elective 7) Food Microbiology	73
IV	13SP15/4C/PR4	Practical 4 Public Health Nutrition Practical (Core 15)	76
IV	13SP15/4S/SWS	Soft skill 4 Scientific writing and presentation skills	77

SEMESTER I

NUTRITIONAL BIOCHEMISTRY

CORE - 1
Teaching Hours: 90 hrs

Course Code: 13SP15/1C/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. 20Hrs
- 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 nonessential amino acids (no Structures), catabolism of amino acid nitrogen and biosynthesis of urea 20 Hrs
- 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
20Hrs
- 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 Hrs
- 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 Hrs

REFERENCEBOOKS:

1. Harper- H.A, Review of physiological chemistry, Large Medical Publication, 21st edition, Los Angeles, 1997.
2. West, Todd and Van Bruggan, ,Text book of Biochemistry. The Macmillan Co, New York, 1986.
3. Albert L. Lehninger. The molecular basis of cell structure and function , Kalyani Publishers, New Delhi, 1992.
4. White Handler and Smith Principles of Biochemistry, Mac Graw Hill, New York, 1968
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, 2003
6. Conn E.E and Stump P.K.-Outlines of Biochemistry-Wiley Eastern (P) Ltd, New Delhi, 1981.
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, 1997.

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 during the academic year 2015-2017)

**M.Sc DEGREE EXAMINATION
I YEAR- I SEMESTER**

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

**Title of the paper: Nutritional Biochemistry
Paper Code: 13SP15/1C/NUB**

**Max. Marks: 100
Time: 3 hrs**

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. Sub divisions may be given. Each question carries twenty marks (Application/ Analysis/Synthesis/ Evaluation)

(2X20=40 marks)

SEMESTER I
MEDICAL NUTRITION THERAPY - I

CORE - 2
Teaching Hours: 90 hrs

Course Code: 13SP15/1C/MT1
Credits: 4 LTP: 4 2 0

OBJECTIVES:

To enable the students to

- Understand the role of nutrition in maintaining good health
- Understand the dietary modifications at different stages of family life cycle.

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, Malaria, Chikungunya, dengue, 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 Asthma, 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, hiatus hernia, 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, 2002.
2. Antia, F.P. and Philip Abraham ,Clinical Dietetics and Nutrition, 4th edition, Oxford University Press, Delhi and Chennai, 2001.
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, 2000.
4. Mahan L.K. and Stump, S.E ,Krause's Food Nutrition and Diet therapy, 10th Edition, W. B. Saunders Company. Philadelphia, Sydney, 2002.
5. Toteja, G.S and Singh P Micronutrient Profile of Indian Population, ICMR Publication, New Delhi, 2004.
6. M.Swaminathan, Principles of Nutrition and Dietetics, BAPPCO 88, Mysore Road Bangalore-560018, 2002.

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

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**ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
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(For candidates admitted during the academic year 2015-2017)

**M.Sc DEGREE EXAMINATION
I YEAR- I SEMESTER**

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

**Title of the paper: Medical Nutrition Therapy I
Paper Code: 13SP15/1C/MT1**

**Max. Marks: 100
Time: 3 hrs**

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. Sub divisions may be given. Each question carries twenty marks (Application/ Analysis/Synthesis/ Evaluation)

(2X20=40 marks)

SEMESTER I

NUTRACEUTICALS AND FUNCTIONAL FOODS

ELECTIVE - 1

Teaching Hours: 75hrs

Course code: 13SP15/1E/NFF

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, definitions, concepts, classification and General mechanism of action. (15hrs)
- UNIT II** Functional foods – definition, development of functional foods, bioactive compounds, biomarkers to indicate efficacy of functional ingredients (15hrs)
- UNIT III** Nutraceuticals with potential health benefits from plant phytochemicals, animal products, Novel sources & dietary fiber. (15hrs)
Role of Prebiotics & Probiotics as nutraceuticals and commercial availability.
- UNIT IV** Significance of nutraceuticals and functional foods in diseases - anticancer agent, anti-inflammatory, antioxidant, antidiabetic, hypocholesterolemic, and osteogenetic (15 hrs)
- UNIT V** Nutrigenomics – relationship between nutritional supplementation, gene expression and disease prevention. Application of technologies in functional food industry. (15hrs)

REFERENCE BOOKS:

1. Robert Easy Wildman, 2001, Handbook of Nutraceuticals and Functional foods, Culinary and Hospitality industry publication services.
2. Wildman, R.E.C. (2007), 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 Genomics : Impact on Health and Disease, Wiley VCH, 2006
5. Cupp & Tracy TS, Dietary Supplements: Toxicology and Clinical Pharmacology, Humana Press, 2003.

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**ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
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(for candidates admitted during the academic year 2015-2017)

**M.Sc DEGREE EXAMINATION
I YEAR- I SEMESTER**

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

Title of the paper: Nutraceutical and Functional Foods

Max. Marks: 100

Paper Code: 13SP15/1E/NFF

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. Sub divisions may be given. Each question carries twenty marks (Application/ Analysis/Synthesis/ Evaluation)

SEMESTER I
APPLIED PHYSIOLOGY

ELECTIVE - 2

Teaching Hours : 75hrs

Course code : 13SP15/1E/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: **The General & 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. 15hrs
- 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. 15hrs
- 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. Review of the integumentary system.
- Environmental Physiology**- Body temperature and its regulation. 15hrs
- 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. 15hrs

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,1995.
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.

QUESTION PAPER TEMPLATE

**ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
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(for candidates admitted during the academic year 2015-2017)

**M.Sc DEGREE EXAMINATION
I YEAR- I SEMESTER**

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

Title of the paper: APPLIED PHYSIOLOGY

Max. Marks: 100

Paper Code: 13SP15/1E/PHY

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 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. Sub divisions may be given. Each question carries twenty marks (Application/ Analysis/Synthesis/ Evaluation)

SEMESTER I

ANALYTICAL TECHNIQUES IN NUTRITION

Practical – 1 CORE -6
Teaching Hours : 90 hrs

Course code : 13SP15/1C/PR1
Credits : 4 LTP: 0 0 6

PRACTICALS:

1. Estimation of proteins using macrokjeldhal method 10 hrs
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 hrs
3. Mineral Estimation in foods : Estimation of calcium (titrimetric) , iron (spectrophotometry), Phosphorous(colorimetry). 10 hrs
4. Vitamin estimation in foods: Estimation of Vitamin C (dye method) , beta carotene (Column Chromatography). 10 hrs
5. Estimation of urinary calcium, estimation of urinary creatinine (12 hrs)
6. Estimation of hemoglobin in blood , estimation of blood glucose using colorimetry and glucometer (8 hrs)
7. Estimation of protein in serum using Biuret reagent (10 hrs)
8. Estimation of serum sodium , potassium (10 hrs)
9. Demo on food analysis using HPLC (6hrs)

SEMESTER II
ADVANCED FOOD SCIENCE

CORE - 3
Teaching Hours: 75hrs

Course code: 13SP15/2C/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: Gelatinisation, 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, 1969.
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, 1996.
5. Belle, lowe., Experimental Cookery, Latest edition.,1955.
6. Charley, Helen , Food Science, John Wiley and Sons ,Latest Edition, 1970
7. Paul and Palmer, Food Theory and Applications, John Wiley and Sons ,Latest Edition.,1972
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 during the academic year 2015-2017)

**M.Sc DEGREE EXAMINATION
I YEAR- II SEMESTER**

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

Title of the paper: Advanced Food Science

Max. Marks: 100

Paper Code: 13SP15/2C/AFS

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. Sub divisions may be given. Each question carries twenty marks (Application/ Analysis/Synthesis/ Evaluation)

b) Classification and tabulation of Data-Meaning and objectives of classification, objects of classification, Types of classification , formation of frequency distribution, typesymmetric 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.

c)**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 hrs.

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

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

b)**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.

c)**Correlation methods**-meaning, product moment, coefficient of correlation, rank correlation, scatter diagram and regression lines and their uses. Concepts of partial and multiple correlations.

d)**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 hrs

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

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-4,1992

QUESTION PAPER TEMPLATE

**ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008**

(for candidates admitted during the academic year 2015-2017)

**M.Sc DEGREE EXAMINATION
I YEAR- II SEMESTER**

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

**Title of the paper: Applied Statistics and Research Methodology
Paper Code: 13SP15/2C/SRM**

**Max. Marks: 100
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. Sub divisions may be given. Each question carries twenty marks (Application/ Analysis/Synthesis/ Evaluation)

SEMESTER II
MEDICAL NUTRITION THERAPY - II

CORE - 5
Teaching Hours: 60 hours

Course code: 13SP15/2C/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 short bowel syndrome and short resection, jejunal resection, ileal resection and rectal surgery and liver resection; Pre and post nutritional therapy in Liver transplantation, cardiac transplantation and Kidney transplantation. (15 HOURS)

REFERENCE BOOKS:

1. Antia F.P (1989) Clinical Nutrition and Dietetics, Oxford University Press,1989.
2. Mahan K.L and Stump S.E (1996) Krause's Food, Nutrition and Diet Therapy,M.B. Saundar Co., USA,1996.
3. Davidson S.R and PassmoreJ.F Human Nutrition and Dietetics,1989.
4. Corrine R.H Manual of Nutritional Therepeutics, 2nd edition, Little Brown Publications Washington,1982.
5. Davidson S.R and PassmoreJ.F Human Nutrition and Dietetics,1989.
6. Corrine R.H, Manual of Nutritional Therepeutics, 2nd edition, Little Brown Publications Washington,1982.
7. Carroll A. Lutz & Karen Rutherford Nutrition and Diet Therapy 2nd edition, F.A. Davis Company, Philadelphia,1997.
8. Ruth A. Roth,Carolynn E. Townsend, Nutrition and Diet Therapy 8th edition,Thomson Delmar Learning,2003.

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 during the academic year 2015-2017)

**M.Sc DEGREE EXAMINATION
I YEAR- II SEMESTER**

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

**Title of the paper: Medical Nutrition Therapy II
Paper Code: 13SP15/2C/MT2**

**Max. Marks: 100
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 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. Sub divisions may be given. Each question carries twenty marks (Application/ Analysis/Synthesis/ Evaluation)

SEMESTER II

NUTRITION DURING SPECIAL NEEDS

Elective - 3
Teaching Hours: 60hrs

Course code: 13SP15/2E/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. (1998). "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 during the academic year 2015-2017)

**M.Sc DEGREE EXAMINATION
I YEAR- II SEMESTER**

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

Title of the paper: Nutrition during Special Needs

Max. Marks: 100

Paper Code: 13SP15/2E/NSN

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 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. Sub divisions may be given. Each question carries twenty marks (Application/ Analysis/Synthesis/ Evaluation)

SEMESTER II
FOOD PRESERVATION
(INTERDISCIPLINARY)

ELECTIVE - 1
Teaching Hours : 60 HRS

Course 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** - 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 products. 15 hrs
- UNIT II: Methods of food preservation-** Traditional methods- salting, pickling and drying. Preservation as sugar concentrates - Jams, Jelly, Marmalades and Preserves. Fruit Juice Beverages – Preparation and preservation. Chemical preservation - limits, advantages and disadvantages. 15 hrs
- UNIT III: Role of Temperature in Food Preservation** : Use of High temperatures – Drying, sterilizations, canning, pasteurization, Blanching. Use of low temperatures – Refrigeration & freezing, Irradiation. 15 hrs
- UNIT IV: Packaging:** Functions of Packaging, packing materials and forms, special packaging – military & space foods, safety & package tests. 15 hrs
- UNIT V: Food additives and food standards:** Food Additives and Food Standards. 15 hrs

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, 1967.
2. Eaber and Lond: Food Hygiene and food hazards for all who handle foods, 1971.
3. National symposium on agricultural Research and development since independence, Indian Council of Agricultural Research, New Delhi, 1974.
4. Interaction of agriculture with Food Science. Proceeding of an interdisciplinary symposium, Singapore Ed. Reginald Machntyre, 1974.
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 during the academic year 2015-2017)

**M.Sc DEGREE EXAMINATION
I YEAR- II SEMESTER**

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

Title of the paper: Food Preservation

Max. Marks: 100

Paper Code: 13SP15/2E/FPN

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 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. Sub divisions may be given. Each question carries twenty marks (Application/ Analysis/Synthesis/ Evaluation)

SEMESTER II
ADVANCED FOOD SCIENCE PRACTICAL

Practical -2 CORE – 7
Practical Hours : 90hrs

Course code : 13SP15/2C/PR2
Credits : 4 LTP: 0 0 6

COURSE OUTLINE:

COURSE OUTLINE:

1. Sensory methods: Threshold, Preference and difference tests. (5 HOURS)
2. Objective methods: Ink print, line spread, specific gravity and seed displacement. (5 HOURS)
3. Emulsions and foams- types of emulsions, Egg foaming and Preparation of mayonnaise using different variation. (10 HOURS)
4. Preparation and Estimation of fat content in dairy products
5. Sugar Cookery –Crystallization of sugar through preparation of fondant and fudge. Recipes: Jelebi, Gouja, Coconut burfi, Mysore pak, Gulab Jamun and Badushah (15 HOURS)
6. Fermented foods – Idli, Dosai, appam, Naan, Batura, Dhokla and Curd. (10HOURS)
7. Convenience foods and Traditional foods (10 HOURS)
8. Gelatin and Pectin: Testing pectin strength in fruit and vegetable extract. Preparation of vegetable and fruit preserves. Recipes: custard, jam, jelly, lemon chiffon pie and marshmallow. (15 HOURS)
9. Bakery products: Breads, buns, Biscuits and Cakes (10 HOURS)
- 10. Adulteration: Easy methods of detection of adulterants (10 HOURS)**

SEMESTER III
ADVANCED STUDIES IN CARBOHYDRATES AND LIPIDS

CORE - 8
Teaching Hours: 75 hrs

Course code: 13SP15/3C/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 15hrs
- 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 and diabetes mellitus, cancer, PCOD. 15hrs
- 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 hrs
- UNIT IV:** Role of lipids in health and disease – functions of EFA, PUFA , MUFA, SFA, MCT, Adverse effect of exogenous and endogenous lipids in obesity, cardiovascular diseases and diabetes mellitus, cancer, PCOD. Hypocholesterolemic agents – enzymes – role of LCAT, exogenous and endogenous lipo trophic factors, role of ascorbic acid in transforming cholesterol to bile acids, fat substitutes. 15hrs
- UNIT V:** Inter-relationship of carbohydrates and lipids with other nutrients. Metabolic syndrome - role of carbohydrates and lipids, Relationship of hormones - leptin, ghrelin, adiponectin , 15hrs

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,1974.
4. Davidson and Passmore R and Brock J.B. Human nutrition and Dietetics. The English Languages book society and Churchill Livingstone, 1976.
5. Garrow et al., Human Nutrition and Dietetics 10th edition Churchil Livingstone, 2000.
6. Davidson and Passmore R and Brock J.B. Human nutrition and Dietetics. The English Languages book society and Churchill Livingstone, 1976.
7. James L Groff, Sareen. S. Gropper Advanced Nutrition and Human Metabolism, 3rd edition, Wadsworth Thomson learning,1999

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 during the academic year 2015-2017)

**M.Sc DEGREE EXAMINATION
I YEAR- II SEMESTER**

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

Title of the paper: Advanced Studies in carbohydrates and lipids Max. Marks: 100

Paper Code: 13SP15/3C/CAL

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. Sub divisions may be given. Each question carries twenty marks (Application/ Analysis/Synthesis/ Evaluation)

SEMESTER III
ADVANCED STUDIES IN MINERALS AND VITAMINS

CORE - 9
Teaching Hours : 75 hrs

Course code : 13SP15/3C/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, 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 hrs
- 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 hrs
- 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 function. 20 hrs
- UNIT IV:** **Water soluble vitamins** - sources, requirements, metabolism, losses in processing and cooking, deficiency and excess, assessment of nutritional status. 20 hrs
- 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 hrs

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 during the academic year 2015-2017)

**M.Sc DEGREE EXAMINATION
II YEAR- III SEMESTER**

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

Title of the paper: Advanced Studies in minerals and vitamins Max. Marks: 100
Paper Code: 13SP15/3C/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. Sub divisions may be given. Each question carries twenty marks (Application/ Analysis/Synthesis/ Evaluation)

SEMESTER III
CLINICAL BIOCHEMISTRY

CORE - 10

Teaching Hours : 60 hrs

Course code : 13SP15/3C/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-radio active isotopes-Principle, detection, measurement-GM – Counter, Scintillation counter, Scanning techniques.

15Hrs

UNIT II: Enzyme assays as a diagnostic tool in acute pancreatitis, liver damages, bone disorders, myocardial infarction and muscle wasting. Inborn errors of metabolism - phenylketonuria, alcaptonuria, homocysteinuria , albinism, maple syrup urine disorder, glycogen storage disease.

10Hrs

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 Hrs

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

10Hrs

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.

15Hrs

REFERENCE BOOKS:

1. Harper- H.A.Review of physiological chemistry, Large Medical Publication, 21st edition, Los Angeles,1997.
2. West, Todd and Van Bruggan, Text book of Biochemistry. The Macmillan Co, New York,1986.
3. Albert L.Lehninger. The molecular basis of cell structure and function ,Kalyani Publishers, New Delhi,1992.
4. White Handler and Smith Principles of Biochemistry, Mac Graw Hill, New York,1968.
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-1,2003
6. Conn E.E and Stump P.K.-Outlines of Biochemistry-Wiley Eastern (P) Ltd, New Delhi,1981.
7. RamaKrishnan.Textbook of Clinical Biochemistry, T.R.Publications, Chennai,1997.
8. Plummer. D.T.An introduction to Practical biochemistry, New Delhi,Tata McGraw Hill Publishing Company,1997.

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 during the academic year 2015-2017)

**M.Sc DEGREE EXAMINATION
II YEAR- III SEMESTER**

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

Title of the paper: Clinical Biochemistry

Max. Marks: 100

Paper Code: 13SP15/3C/CLB

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. Sub divisions may be given. Each question carries twenty marks (Application/ Analysis/Synthesis/ Evaluation)

SEMESTER III
FOOD AND DRUG INTERACTIONS

ELECTIVE - 5
Teaching Hours: 60 hrs

Course code: 13SP15/3E/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, Tablet - Actirom and vitamin K interaction. (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 tranquilizers. 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)

References:

1. Dr. N. Murugesh, (2011), A concise text book of pharmacology, Sathya publishers, Madurai, sixth edition reprinted.
2. PadmajaUdaykumar(2010), Pharmacology 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 during the academic year 2015-2017)

**M.Sc DEGREE EXAMINATION
II YEAR- III SEMESTER**

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

Title of the paper: Food and Drug Interaction

Max. Marks: 100

Paper Code: 13SP15/3E/FDI

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. Sub divisions may be given. Each question carries twenty marks (Application/ Analysis/Synthesis/ Evaluation)

SEMESTER III

NUTRITION AND PHYSICAL FITNESS

INTERDISCIPLINARY

ELECTIVE – 6

Teaching Hours : 60 hrs

Course code : 13SP15/3E/NPF

Credits : 3 LTP: 4 0 0

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 hrs
- UNIT II: Basic nutrients** - Proximate principles - CHO, fats and proteins. Carbohydrates - Classification, Functions, Sources, Deficiency . Proteins - Classification, Functions, Sources and Deficiency. Fats - Classification, Functions, Sources and Deficiency. **Energy** - Definition of energy, Kilo Calories, energy from CHO, proteins and fats, physiological fuel value, gross fuel value, BMR - factors affecting BMR. 15 hrs
- 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 (Ca, Fe, P, Na, K, Iodine, Zinc) - sources, functions, deficiency. Water - functions, sources, requirements, water balance, dehydration, water intoxication 10 hrs
- UNIT IV: Fitness** -Definition of fitness, benefits of fitness. Components of fitness, aerobic and anaerobic activities. 10 hrs
- UNIT V: Diet for athletes** - Requirement for CHO, protein, fat, vitamin, mineral and fluids for an athlete. Pre event and post event meal 10 hrs

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. 1995
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 during the academic year 2015-2017)

**M.Sc DEGREE EXAMINATION
II YEAR- III SEMESTER**

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

Title of the paper: Nutrition and physical fitness

Max. Marks: 100

Paper Code: 13SP15/3E/NPF

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. Sub divisions may be given. Each question carries twenty marks (Application/ Analysis/Synthesis/ Evaluation)

SEMESTER III
INNOVATIVE FOOD PRODUCTS DEVELOPMENT

Practical – 3 (CORE -11)
Teaching Hours : 90 hrs

Course code : 13SP15/3C/PR3
Credits : 4 LTP: 0 0 6

COURSE OUTLINE:

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

SEMESTER III
COMPUTING SKILLS

Soft skill - 3
Teaching Hours: 30 hrs

Course code: 13SP15/3S/CSS
Credits : 2 LTP: 2 0 0

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:

7. 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.
8. 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 during the academic year 2015-2017)

**M.Sc DEGREE EXAMINATION
II YEAR- III SEMESTER**

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

Title of the paper: Computing skills

Max. Marks: 50

Paper Code: 13SP15/3S/CSS

Time: 2 hrs

SECTION A

Answer any TEN questions.

(5X10=50 marks)

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

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 during the academic year 2015-2017)

**M.Sc DEGREE EXAMINATION
II YEAR- IV SEMESTER**

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

**Title of the paper: Advanced studies in energy and protein
Paper Code: 13SP15/4C/EPR**

**Max. Marks: 100
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. Sub divisions may be given. Each question carries twenty marks (Application/ Analysis/Synthesis/ Evaluation)

**SEMESTER IV
PUBLIC HEALTH NUTRITION**

CORE - 13
Teaching Hours: 90hrs

Course code : 13SP15/4C/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:

- a) 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,1996.
2. Jelliffe. D.B. The assessment of Nutritional status on the community -WHO Geneva,1966
3. Jelliffe. D.B. Nutrition in the subtropics and tropics,1968.
4. Shanthi Gosh, The feeding and care of infants and young children,Voluntary Health association of India- New Delhi,1977.
5. Bamji. MTextbook 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, 1983.
9. Shukla .P.K, Nutritional Problems of India- Prentice Hall of India Pvt., Ltd., New Delhi,1982.
10. Waterlow. J.C. Protein energy malnutrition, London, Edward Arnold publishers, 1992.
11. Workshop on Clinical Epidemiology, Clinical epidemiology Unit, Madras Medical College, Chennai, 1993
12. Robert H. Fletcher, Suzanne W. Fletcher and Edward H. Wagner, Clinical Epidemiology – the essentials, Williams &wilkins, Baltimore, Second Edition, 1988
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/njjun04a.pdf
- www.fns.usda.gov/fsec/FILES/safetyNet.pdf
- [www.ext.vt.edu/action for healthykids/assistance/lesson5background.pdf](http://www.ext.vt.edu/action_for_healthykids/assistance/lesson5background.pdf)

QUESTION PAPER TEMPLATE

**ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008**

(for candidates admitted during the academic year 2015-2017)

**M.Sc DEGREE EXAMINATION
II YEAR- IV SEMESTER**

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

Title of the paper: Public Health Nutrition

Max. Marks: 100

Paper Code: 13SP15/4C/PHN

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. Sub divisions may be given. Each question carries twenty marks (Application/ Analysis/Synthesis/ Evaluation)

SEMESTER IV DISSERTATION

CORE - 14
Teaching Hours : 90 hrs

Course code : 13SP15/4C/PRO
Credits : 4 LTP: 0 6 0

OBJECTIVES:

To enable students

- To gain knowledge in the area of research

COURSE OUTLINE:

The dissertation should be based on individual studies and carry the following format:

Preliminary

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,definitions.
- II. Review of literature
- III. Methodology –Tools used,procedures,hypothesis
- IV. Results and Discussion –Tables and figures, statistical presentations,hypothesis testing.
- V. Summary and Conclusion
- VI. Suggestion for the future study
- VII. References.

SEMESTER IV

FOOD MICROBIOLOGY

ELECTIVE - 7

Teaching Hours : 60 Hrs

Course code : 13SP15/4E/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 hrs
- 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 hrs
- 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 hrs
- UNIT IV:** **Microbial Toxins** - Types, Mycotoxins - Source, Chemistry, Mode of Action Bacterial Toxins - Exo and Endo toxins - Source, Mode of Action 12hrs
- 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 hrs

REFERENCE BOOKS:

1. Adams, M.R and Moss, M.O,Food Microbiology, New Age International (P) Ltd, New Delhi,1996.
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,1994.
9. Patel, A.H. Industrial Microbiology, Macmillan India Limited. New Delhi,1996.
10. Casida, L.E. Industrial Microbiology, New Age International Pvt Ltd. New Delhi,1996.

WEBSITES AND e- LEARNING SOURCES:

- <http://www.betterhealth.vic.an/bhcv2/bh.articles.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 during the academic year 2015-2017)

**M.Sc DEGREE EXAMINATION
II YEAR- IV SEMESTER**

DEPARTMENT OF CLINICAL NUTRITION AND DIETETIC

**Title of the paper: Food Microbiology
Paper Code: 13SP15/4E/FMI**

**Max. Marks: 100
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. Sub divisions may be given. Each question carries twenty marks (Application/ Analysis/Synthesis/ Evaluation)

SEMESTER IV
PUBLIC HEALTH NUTRITION PRACTICAL

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

Course code : 13SP15/4C/PR4
Credits : 4 LTP: 0 0 6

PRACTICALS:

1. Visit to various organisations concerned with food and nutrition –ICMR, FNB , WVS, ICDS, FCI, PDS, DMS, MSSRF, Agricultural department, World vision, Social welfare Board.(10hours)
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, 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 : 30hrs

Course code : 13SP15/4S/SWS

Credits : 2 LTP: 2 0 0

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:

7. John W.Best and James V.Kahn, Research in Education ,7th Edition,Prentice Hall of India Pvt.Ltd.,New Delhi,2000.
8. Lokesh Koul.Methodology of Educational Reasearch,3rd edition Vikas publishing House Pvt.Ltd,New Delhi
9. William Giles Campbell, Form and style in Thesis writing , Houghton Mifflin Company, Boston.
10. Elhance .D.N.Veena and Elhance and Agarwal .B.M,Fundamental of statistics,48th Edition,kitab Mahal,Allahabad,2005.
11. Sadhu A.N and Amarjit Singh Research Methodology in Social Sciences. Himalaya Publishing House, Girguon,Mumbai-4,1992

QUESTION PAPER TEMPLATE

**ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008**

(for candidates admitted during the academic year 2015-2017)

**M.Sc DEGREE EXAMINATION
II YEAR- IV SEMESTER**

DEPARTMENT OF CLINICAL NUTRITION AND DIETETIC

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

Paper Code: 13SP15/4S/SWS

Time: 2 hrs

SECTION A

Answer any TEN questions.

(5 X 10 = 50 marks)

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