ETHIRAJ COLLEGE FOR WOMEN, (AUTONOMOUS)

CHENNAI-600008

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

(Self- Supporting)

UG SYLLABUS

B.Sc CLINICAL NUTRITION AND DIETETICS

CHOICE BASED CREDIT SYSTEM

OUTCOME BASED EDUCATION

(OFFERED FROM THE ACADEMIC YEAR 2021-22)

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SYLLABUS- INDEX

ETHIRAJ COLLEGE FOR WOMEN
DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS
Revised Syllabus from June 2021

Department of Clinical Nutrition and Dietetics is revising syllabi with effect from the academic year 2021-2022, by revising CBCS and Part IV and Part V components as specified by the Government of Tamil Nadu. Part IV and Part V components will seek to build the capacity of the students and provide inputs for his/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 Clinical Nutrition and Dietetics course shall be required to have passed the Higher Secondary Examinations conducted by the Government of Tamil Nadu or an Examination accepted as equivalent thereto by the syndicate of the University of Madras with chemistry as one of the mandatory subjects.

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 three academic years, passed the examinations of all the six semesters prescribed.

3. COURSE OF STUDY:

The main subject of study for Bachelor Degree shall consist of the following:

PART-I : Foundation Course exclusive for Languages.
PART-II : Foundation Course - English
PART III : Core Courses, Elective Courses and Allied Courses
PART-IV : Non Major Electives / Soft skills / EVS/ Value Education
PART-V : Extension Activities/ Sports/ NCC

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 40% of the marks prescribed for the examination.

5. CLASSIFICATION OF SUCCESSFUL CANDIDATES:

Part I, II, III & IV

Successful candidates passing the examination and securing the marks (i) 75 percent and above (ii) 60 percent and above and (ii) 50 percent and above, but below 60 percent, in the aggregate shall be declared to have passed the examination in the DISTINCTION, FIRST and SECOND class respectively. All other successful candidates (above 40 and below 50 percent) shall be declared to have passed the examination in the THIRD class. Candidates who pass all the examinations (Part I, II, III & IV) prescribed for the course in the FIRST APEARANCE ITSELF ALONE is eligible for ranking.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

On obtaining an undergraduate degree the students will be able to:

PEO1: Apply and advance the knowledge and skills acquired, to become a creative professional in their chosen field.

PEO2: Engage in self-directed continuous learning, aimed at global competency, which will promote professional and personal growth

PEO3: Develop management skills and entrepreneurial skills, by harnessing core competencies tempered by values and ethics

PEO4: Work towards achieving economic and social equity for women through application of relevant knowledge

PEO5: Contribute to promoting environmental sustainability and social inclusivity

PROGRAMME OUTCOMES (POs)

PO1: To promote and apply scientific knowledge for finding sustainable solution to solve the issues pertaining to the society/ industry.

PO2: Identify, analyze and formulate novel ideas to yield substantial results in the fields of research utilizing the principles of physical and biological sciences.

PO3: Relate key concepts and scientific principles to various scientific phenomenon and their applications in day-to-day life.

PO4: Cultivate unparalled comprehension of fundamental concepts relevant to basic sciences leading to an individual progress and career advancement at the National and Global levels.

PO5: To communicate effectively their views and ideas orally/ written in English and in other related languages.

PO6: Design solutions for complex problems and design system components or processes that meet the specific needs with appropriate consideration for public health and safety, cultural, societal and environmental conditions.

B.Sc CLINICAL NUTRITION AND DIETETICS

PROGRAMME SPECIFIC OUTCOME (PSOs)

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

PSO1: Gain in depth knowledge on concepts, theories, principles of food science, food service management, food preservation, interior decoration, child development, physiology, biochemistry, microbiology, basic nutrition, clinical nutrition, life span nutrition, medical nutrition therapy and public health nutrition relate it to the holistic development and wellness of the individual, family and community at large.

PSO2: Develop effective communication and foster positive health enhancing practices extending to the community to support sustainable living.

PSO3: Develop interpersonal communication, aesthetics, academic, analytical and managerial skills for individual growth and well being.

PSO4: Analyze the knowledge and skills gained through the academic pursuit for enhancing the quality of life of people and undertake intervention programme to solve the nutrition problem confronting our nation.

PSO5: Engage in lifelong learning process and prioritize the acquired professional skills for empowerment of society.

PSO6: Equip professional competency to become successful entrepreneurs, nutritionists and to pursue higher education.

PROGRAMME PROFILE -B.Sc. CLINICAL NUTRITION AND DIETETICS

Sem	Part	Course code	Title of the paper	Credits	Hours /week	Total hours	CA	SE	Total
I	I		Foundation Course Language	3	5	75	40	60	100
I	II		Foundation English	3	5	75	40	60	100
I	III	**CN21/1C/FSC**	Food Science	5	7	105	40	60	100
I	III	**BC21/1A/AC1**	Allied Basic Chemistry I	4	4	60	40	60	100
I	IV	**UG21/1S/EVS**	Environmental Studies	2	2	30	-	50	50
I	IV		Soft skill 1	3	2	30	-	50	50
II	I		Foundation Course Language	3	5	75	40	60	100
II	II		Foundation English	3	5	75	40	60	100
II	III	**CN21/2C/PHY**	Physiology	5	7	105	40	60	100
I &II	III	**CN21/2C/PR1***	Food Science & Physiology Practical	3	3+3	45+45	40	60	100
II	III	**BC21/2A/AC2**	Allied Basic Chemistry II	4	4	60	40	60	100
I &II	III	**BC21/2A/AEP**	Allied Chemistry Practical	2	2+2	30+30	40	60	100
II	IV	**UG21/2S/VED**	Value Education	2	2	30	-	50	50
II	IV		Soft skill 2	3	2	30	-	50	50
III	I		Foundation Course Language	3	5	75	40	60	100
III	II		Foundation English	3	5	75	40	60	100
III	III	**CN21/3C/HNU**	Human Nutrition	5	7	105	40	60	100
III	III	**CN21/3A/MIB**	Microbiology	4	4	60	40	60	100
III	IV	**CN21/3N/ART**	Art of Interior Decoration	2	2	30	-	50	50
III	IV		Soft Skill 3	3	2	30	-	50	50
IV	I		Foundation Language	3	5	75	40	60	100
IV	II		Foundation English	3	5	75	40	60	100
IV	III	**CN21/4C/NTL**	Nutrition Through Lifecycle	5	7	105	40	60	100

III &IV	III	**CN21/4C/PR2***	Human Nutrition & Nutrition Through Lifecycle practical	3	3+3	45+45	40	60	100
IV	III	**CN21/4A/NBC**	Nutritional Biochemistry	4	4	60	40	60	100
III &IV	III	**CN21/4A/PR1***	Microbiology & Nutritional Biochemistry Practical	2	2+2	30+30	40	60	100
IV	IV	**CN21/4N/BFP**	Basics of Food Preservation	2	2	30	-	50	50
IV	IV		Soft Skill 4	3	2	30	-	50	50
V	III	**CN21/5C/FS1**	Food Service Management I	4	4	60	40	60	100
V	III	**CN21/5C/HDF**	Human development and Family Studies	4	5	75	40	60	100
V	III	**CN21/5C/BCN**	Biomarkers in Clinical Nutrition	4	5	75	40	60	50
V	III	**CN21/5C/MT1**	Medical Nutrition Therapy I	4	5	75	40	60	50
V	III	**CN21/5E1/IDC** **(or)** **CN21/5E1/GPH**	Interior Designing in Clinical Setting **(or)** Gender Perspectives in Health Care	5	5	75	40	60	100
V	III	**CN18/5SS/HEP**	Self- study course- Health Psychology	2 **(Extra credits)**					
VI	III	**CN21/6C/FS2**	Food Service Management II	4	4	60	40	60	100
VI	III	**CN21/6C/MT2**	Medical Nutrition Therapy II	4	5	75	40	60	100
VI	III	**CN21/6C/PUB**	Public Health Nutrition	4	5	75	40	60	100

VI	III	**CN21/6E2/ESN** **(or)** **CN21/6E2/NPG**	Exercise and Sports Nutrition (or) Nutritional management of metabolic, neurological and degenerative diseases in pediatrics and geriatrics	5	5	75	40	60	100
VI	III	**CN21/6E3/FPP** **(or)** **CN21/6E3/TFQ**	Food Product Development and Packaging Technology (or) Technology of Food Processing and Quality Control	5	5	75	40	60	100
V&VI		**CN21/6C/PR3***	Food Service Management Practical	3	3+3	45+45	40	60*	100
V&VI		**CN21/6C/PR4***	Medical Nutrition Therapy Practical	3	3+3	45+45	40	60*	100
VI			Dietetic Internship	1 **(Extra credit)**	-	-	50	-	50
			Extension Activity	1					
			TOTAL	**140**					

*Practical examination is conducted internally in the even semester (II, IV, and VI).

CREDIT ALLOTMENT FOR CORE, ALLIED AND PART IV SUBJECTS

Semester	Part I	Part II	Part – III		Elective	Part - IV				Part V
			Core credits (Theory+ practical)	Allied Credits (Theory+ practical)		NME	Soft skill	Skill based EVS	Skill based VE	Extension activities/ NCC/ Sports
I	3	3	5	4	-	-	3	2	-	-
II	3	3	5+3	4+2	-	-	3	-	2	-
III	3	3	5	4	-	2	3	-	-	-
IV	3	3	5+3	4+2	-	2	3	-	-	-
V	-	-	16	-	5	-	-	-	-	-
VI	-	-	12+6	-	10	-	-	-	-	1
Total	**12**	**12**	**60**	**20**	**15**	**4**	**12**	**2**	**2**	**1**

Total Credits: 139+1 (Extension activities)= 140 credits

EVS- Environmental Studies
VE- Value Education
NME- Non- Major Elective

Mandatory extension activities:

- NSS/CSS/Sports/RRC/Rotract/NCC

EXTRA CREDITS

- Self- study/Internship*****/Women studies/E-Cell/SIFE/Consumer club/Certificate course

***Internship- 15 day's internship in a teaching hospital will be awarded one extra credit. Credits will be given in the sixth semester.**

EVALUATION PATTERN FOR CONTINIOUS ASSESSMENT-UG

INTERNAL VALUATION BY COURSE TEACHER/S

PART I, II AND III-THEORY PAPERS

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

EVALUATION PATTERN- THEORY

SEM	Paper Code	Title of the paper	Continuous Assessment				
			Test I	Test II	Quiz/ Assignment Seminar/ Field Visit	Participatory Learning	Total
I	**CN21/1C/FSC**	Food Science	10	10	10	10	40
II	**CN21/2C/PHY**	Physiology	10	10	10	10	40
III	**CN21/3C/HNU**	Human Nutrition	10	10	10	10	40
III	**CN21/3A/MIB**	Microbiology	10	10	10	10	40
IV	**CN21/4C/NTL**	Nutrition Through Lifecycle	10	10	10	10	40
IV	**CN21/4A/NBC**	Nutritional Biochemistry	10	10	10	10	40
V	**CN21/5C/FS1**	Food Service Management I	10	10	10	10	40
V	**CN21/5C/HDF**	Human Development and Family Studies	10	10	10	10	40
V	**CN21/5C/BCN**	Biomarkers in Clinical Nutrition	10	10	10	10	40
V	**CN21/5C/MT1**	Medical Nutrition Therapy I	10	10	10	10	40
V	**CN21/5E1/IDC** **(or)** **CN21/5E1/GPH**	Interior Designing in Clinical Setting **(or)** Gender Perspectives in Health Care	10	10	10	10	40
VI	**CN21/6C/FS2**	Food Service Management II	10	10	10	10	40
VI	**CN21/6C/MT2**	Medical Nutrition Therapy II	10	10	10	10	40
VI	**CN21/6C/PUB**	Public Health Nutrition	10	10	10	10	40
VI	**CN21/6E2/ESN** **(or)** **CN21/6E2/NPG**	Exercise and Sports Nutrition **(or)** Nutritional management of metabolic, neurological and degenerative diseases in pediatrics and geriatrics	10	10	10	10	40
VI	**CN21/6E3/FPP** **(or)** **CN21/6E3/TFQ**	Food Product Development and Packaging Technology (or) Technology of Food Processing and Quality Control	10	10	10	10	40

PART III- PRACTICAL PAPERS

Sem	Paper Code	Title of the paper	Continuous Assessment				
			Odd semester (I/III/V)		Even semester (II/IV/VI)		Total 40
			Model	Record & Participation	Model	Record & Participation	
II	**CN21/2C/PR1**	Food Science and Physiology Practical	10	10	10	10	40
IV	**CN21/4C/PR2**	Human Nutrition& Nutrition Through Lifecycle Practical	10	10	10	10	40
IV	**CN21/4A/PR1**	Microbiology & Nutritional Biochemistry Practical	10	10	10	10	40
VI	**CN21/6C/PR3**	Food Service Management Practical	10	10	10	10	40
VI	**CN21/6C/PR4**	Medical Nutrition Therapy Practical	10	10	10	10	40

PART IV-NME/SOFT SKILLS

Knowledge Level	Semester	Paper Code	Title of the Paper	Section	Word Limit	Maximum Marks
K 1, K2	I	UG21/1S/EVS	Environmental Studies	**A-5X10**	350	50
K 1, K2	II	UG21/2S/VED	Value Education	**A-5X10**	350	50
K 1, K2	III	CN21/3N/ART	Art of Interior Decoration	**A-5X10**	350	50
K 1, K2	IV	CN21/4N/BFP	Basics of Food Preservation	**A-5X10**	350	50

CA QUESTION PAPER PATTERN-UG

Knowledge Level	Section	Word Limit	Marks	Total
K 1	**A-7X2 marks**	**50**	**14**	**50**
K1. K 2	**B-2/4x8marks**	**Not exceeding 300**	**16**	
K2, K 3	**C-1/2x20 marks**	**Not exceeding 1500**	**20**	

CA QUESTION PAPER PATTERN FOR PART IV

Knowledge Level	Section	Word Limit	Marks	Total
K 1, K2	**A-5X10**	**350**	**50**	**50**

RUBRICS FOR CONTINIOUS ASSESSMENT

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

END SEMESTER EVALUATION PATTERN-UG

THEORY PAPERS

PART I/II/III
SEMSTER I/II/III/IV/V/VI

DOUBLE VALUATION BY COURSE TEACHER AND EXTERNAL EXAMINER
Maximum marks: 100 TO BE CONVERTED TO 60
Passing mark: 40/100; 24/60

PART IV: NME/SOFT SKILLS
Single valuation
Written exam- Maximum marks: 50 For all Courses- Passing mark: 20
For B.Com (Hons)- Passing mark- 25

PRACTICAL PAPERS

PART III

SEMSTER I/II/III/IV/V/VI
DOUBLE VALUATION BY TWO INTERNAL EXAMINERS; **NO EXTERNAL EXAMINERS**
Maximum marks: 60
Passing marks: 24

END SEMESTER 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 (10x2)	20 Marks
Part B	Understanding/ Description / Problems (5x8)	40 Marks
Part C	Application/ Analysis/ Synthesis/ Evaluation (2x20)	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.

COURSE PROFILE- B.Sc CLINICAL NUTRITION AND DIETETICS

SEMESTER I

Course Code	Title of the Paper	Credits	Hours / Week	Total Hours	L-T-P	CA	SE	Total
	Part - I Foundation Course Language	3	5			40	60	100
	Part – II Foundation Course English	3	5			40	60	100
CN21/1C/FSC	**Part – III (Core -1)** Food Science	5	7	105	4 3 0	40	60	100
CN21/2C/PR1*	**Practical 1 (Core -3)** Food Science and Physiology Practical	-	3	45	0 0 3	-	-	-
BC21/1A/AC1	**Part III (Allied-1)** Allied Basic Chemistry I	4	4	60		40	60	100
BC21/2A/AEP	**Allied Practical 1**** Allied Chemistry Practical	-	2	30		-	-	-
UG21/1S/EVS	**Part –IV (Skill Based)** Environmental studies	2	2	30		-	50	50
	Soft skill 1	3	2			-	50	50
Total		**20**						

***Practical examination (CN21/2C/PR1) – Food Science and Physiology Practical will be conducted in the second semester.**

****Allied Practical 1 will be conducted in the second semester**

SEMESTER II

Course Code	Title of the Paper	Credits	Hours/ Week	Total hours	L-T-P	CA	SE	Total
	Part – I Foundation Course Language	3	5			40	60	100
	Part – II English	3	5			40	60	100
CN21/2C/PHY	**Part –III (Core – 2)** Physiology	5	7	105	4 3 0	40	60	100
CN21/2C/PR1*	**Practical 1 (Core -3)** Food Science and Physiology Practical	3	3	45	0 0 3	40	60	100
BC21/2A/AC2	**Part –III (Allied -2)** Allied Basic Chemistry II	4	4	60		40	60	100
BC21/2A/AEP	**Allied Practical 1**** Allied Chemistry Practical	2	2	30		40	60	100
UG21/2S/VED	**Part –IV (Skill Based)** Value Education	2	2	30		-	50	50
	Soft skill 2	3	2				50	50
Total		**25**	**30**					

* **Practical examination (CN21/2C/PR1) – Food Science and Physiology practical will be conducted in the second semester**

****Allied Practical 1 will be conducted in the second semester**

SEMESTER III

Course Code	Title of the Paper	Credits	Hours/ Week	Total hours	L-T-P	CA	SE	Total
	Part – I Foundation Course Language	3	5			40	60	100
	Part – II Foundation Course English	3	5			40	60	100
CN21/3C/HNU	**Part – III (Core -4)** Human Nutrition	5	7	105	4 3 0	40	60	100
CN21/4C/PR2*	**Practical 2 (Core-6)** Human Nutrition and Nutrition Through Life Cycle Practical*	-	3	45	0 0 3	-	-	-
CN21/3A/MIB	**Part –III (Allied-3)** Microbiology	4	4	60	3 1 0	40	60	100
CN21/4A/PR1**	**Allied Practical**** Microbiology and Nutritional Biochemistry Practical	-	2	30	0 0 2	-	-	-
CN21/3N/ART	**Part –IV (Non Major Elective) 1a/b/c:** Basic Tamil/Advanced Tamil/Art of Interior Decoration	2	2	30		-	50	50
	Soft skill 3	3	2			-	50	50
Total		**20**	**30**					

***Practical examination (CN21/4C/PR2) – Human Nutrition and Nutrition through Lifecycle Practical will be conducted in the fourth semester.**

****Practical examination (CN21/4A/PR1) – Microbiology and Nutritional Biochemistry Practical will be conducted in the fourth semester.**

SEMESTER IV

Course Code	Title of the Paper	Credits	Hours/ Week	Total hours	L-T-P	CA	SE	Total
	Part – I Foundation Course Language	3	5	75		40	60	100
	Part – II Foundation Course English	3	5	75		40	60	100
CN21/4C/NTL	**Part – III (Core 5)** Nutrition Through Lifecycle	5	7	105	4 3 0	40	60	100
CN21/4C/PR2*	**Practical 2 (Core-6)*** Human Nutrition and Nutrition Through Life Cycle Practical	3	3	45	0 0 3	40	60	100
CN21/4A/NBC	**Part- III (Allied -4)** Nutritional Biochemistry	4	4	60	3 1 0	40	60	100
CN21/4A/PR1**	**Allied Practical**** Microbiology and Nutritional Biochemistry Practical	2	2	30	0 0 2	40	60	100
CN21/4N/BFP	**Part –IV (Non Major Elective)1a/b/c:** Basic Tamil/Advanced Tamil/Basics of Food Preservation	2	2	30	1 1 0	-	50	50
	Soft skill 4	3	2			-	50	50
Total		**25**	**30**					

***Practical examination (CN21/4C/PR2) – Human Nutrition and Nutrition through Lifecycle Practical will be conducted in the fourth semester.**

****Practical examination (CN21/4A/PR1) – Microbiology and Nutritional Biochemistry Practical will be conducted in the fourth semester.**

SEMESTER V

Course Code	Title of the Paper	Credits	Hours/ Week	Total hours	L-T-P	CA	SE	Total
CN21/5C/FS1	**Core -7** Food Service Management I	4	4	60	3 1 0	40	60	100
CN21/5C/HDF	**Core- 8** Human Development and Family Studies	4	5	75	4 1 0	40	60	100
CN21/5C/BCN	**Core -9** Biomarkers in Clinical Nutrition	4	5	75	4 1 0	40	60	100
CN21/5C/MT1	**Core- 10** Medical Nutrition Therapy 1	4	5	75	3 2 0	40	60	100
CN21/5E1/IDC **(or)** **CN21/5E1/GPH**	Interior Designing in Clinical Setting **(or)** Gender Perspectives in Health Care	5	5	75	4 1 0	40	60	100
CN21/6C/PR3*	**Practical 3 (Core - 14)*** Food Service Management Practical	-	3	45	0 0 3	-	-	-
CN21/6C/PR4**	**Practical 4 (Core - 15)**** Medical Nutrition Therapy Practical	-	3	45	0 0 3	-	-	-
Total		**21**	**30**					
	Self study paper- Health Psychology	2	-	-	-	-	100	100

***Practical examination (CN21/6C/PR3) – Food Service Management Practical will be conducted in the sixth semester.**

****Practical examination (CN21/6C/PR4) – Medical Nutrition Therapy Practical will be conducted in the sixth semester.**

SEMESTER VI

Course code	Title of the paper	Credits	Hours / week	Total hours	L-T-P	CA	SE	Total
CN21/6C/FS2	**Core -11** Food Service Management II	4	4	60	3 1 0	40	60	100
CN21/6C/MT2	**Core -12** Medical Nutrition Therapy II	4	5	75	3 2 0	40	60	100
CN21/6C/PUB	**Core-13** Public Health Nutrition	4	5	75	3 2 0	40	60	100
CN21/6E2/ESN (or) CN21/6E2/NPG	Exercise and Sports Nutrition (or) Nutritional management of metabolic, neurological and degenerative diseases in pediatrics and geriatrics	5	5	75	4 1 0	40	60	100
CN21/6E3/FPP (or) CN21/6E3/TFQ	Food Product Development and Packaging Technology (or) Technology of Food Processing and Quality Control	5	5	75	4 1 0	40	60	100
CN21/6C/PR3*	**Practical 3 (Core -14)** Food Service Management Practical	3	3	45	0 0 3	40	60	100
CN21/6C/PR4**	**Practical 4 (Core - 15)**Medical Nutrition Therapy Practical	3	3	45	0 0 3	40	60	100
Total		**28**	**30**	**30**				
***Practical examination (CN21/6C/PR3) – Food Service Management Practical will be conducted in the sixth semester.**								
****Practical examination (CN21/6C/PR4) – Medical Nutrition Therapy Practical will be conducted in the sixth semester.**								
Credits at the end of VI semesters					**139**			
Part V (Extension activities)					**1**			
Total credits					**140**			

**** Dietetic internship (15 days) in a teaching hospital- one extra credit will be offered.**

SEMESTER- I

FOOD SCIENCE

TOTAL HOURS: 105 Hours **COURSE CODE: ND21/1C/FSC//CN21/1C/FSC**
CREDITS: 5 **L-T-P: 4-3-0**

COURSE OBJECTIVES

- ✓ To impart knowledge on the classification of food groups, composition and nutritive value of different food ingredients.
- ✓ To understand the role of each food group in cookery.
- ✓ To introduce different preliminary preparation and cooking methods to enhance conservation of nutrients.
- ✓ To learn the importance of sensory and objective evaluation of foods.
- ✓ To study the effect of cooking on food and nutrients.

COURSE OUTLINE

UNIT I: **Basics of Food and Cooking Methods:** Food Group-Basic four; Food guide pyramid (ICMR) and Food plate. Classification of food based on functions.
Introduction to Food science: Preliminary preparation of food prior to cooking with special reference to conservation of nutrients and palatability.
Study of cooking methods: Dry heat method - broiling, grilling, frying and baking- its advantages and disadvantages; Moist method- boiling steaming, poaching, pressure cooking and stewing; Microwave cooking and solar cooking- merits and demerits.
Evaluation of food quality: Sensory characteristics of food, Food evaluation - Subjective method, Objective methods: chemical physical, physicochemical, and microscopic examination (25 HOURS)

UNIT II: **Cereal and Grains**: Rice and wheat- structure, composition, nutritive value and processing; locally available millets- Ragi, Bajra, Foxtail, Kodo, Barnyard- composition and nutritive value.
Fermented products, dough and batter; Cooking of starch – moist heat method (gelatinization) dry heat method (dextrinisation);Maillard's reaction.
Pulses and legumes: Composition and nutritive value, processing– decortication, germination, parching & puffing, soya products, TVP. Toxic constituents in pulses; lathyrism and favism
Role of cereals and pulses in cookery
Nuts and oilseeds: Composition and nutritive value of some common nuts and oilseeds. (20 HOURS)

UNIT III: **Vegetables and Fruits**: Vegetables- Classification, composition, nutritive value, and storage of some common vegetables.
Pigments: Classification, effect of cooking on pigments, factors affecting pigments.
Role of vegetables in cookery
Fruits: Classification, composition and nutritive value. Browning of fruits
Milk: Composition, nutritive value and types. Milk products-Types and processing of fermented and non-fermented.

Milk cookery: Effect of heat, acid, enzymes, phenolic compounds, and salts; Role in cookery.

Beverages: Classification and uses in cookery. (20 HOURS)

UNIT IV: **Flesh Foods & Egg:**

Meat - composition, nutritive value, postmortem changes in meat, ageing, tenderization of meat. Changes during cooking of meat

Fish- Classification, composition, nutritive value, selection, changes during cooking and spoilage.

Egg- structure, composition, nutritive value, storage, deterioration during storage-Physical and Chemical changes; Egg cookery- effect of heat, sugar, salt, acid, and starch on egg protein; Evaluation of egg quality; Role of egg in cookery. (20 HOURS)

UNIT V: **Fats and Sugars**:

Fat and oils: Sources, shortening, emulsification, flavour component, hydrogenation, rancidity, smoking point and factors affecting absorption of fat. Role of fat in cookery

Sugar and Jaggery: Types, stages of sugar cookery and crystallization of sugar

Common condiments and spices: Composition and uses in cookery

(20 HOURS)

RECOMMENDED TEXT BOOKS

- Srilakshmi B, *Food Science*, Sixth Edition, New Age International Ltd Publishers, New Delhi, 2015
- Manay S and Swamy S, *Food Facts and Principles*, New Age International (P) Ltd Publishers, New Delhi, 2001

REFERENCE BOOKS

- Reddy SM, *Basic Food science and Technology*, New Age Publishers, New Delhi, 2015
- Lowe B, *Experimental cookery from chemical and physical stand point*, Forgotten books, UK, 2015
- Potter NM andHotchkiss JH, *Food Science*, C.B.S. Publishers, New Delhi, reprint 2008
- Roday S, *Food science and Nutrition*, Oxford university press, New Delhi, 2007
- McCance and Widdowson, *Composition of food*, 6th Edition, Food Standards Agency, 2004
- Subramani A, *Concise Food Science*, Soundarya Publications, 1998

JOURNALS

1. Indian Food Science Journal
2. International journal of Food Technology

E-LEARNING RESOURCES

- https://www.youtube.com/watch?v=qBU7Bu79cVo&t=1022s
- https://www.youtube.com/watch?v=lWq_4XBnwNM
- https://www.youtube.com/watch?v=8mGeJFpCptw
- https://www.youtube.com/watch?v=3sOccQyYQxo
- https://www.youtube.com/watch?v=Y7YYa1yhzro
- https://www.youtube.com/watch?v=gk_rPkglyao

- https://www.youtube.com/watch?v=ZwU8xY5VnQk
- https://www.youtube.com/watch?v=EJLHeJTdZZU
- https://www.youtube.com/watch?v=AjWkd0VIsa8
- https://www.youtube.com/watch?v=zDEcvSc2UKA
- https://www.youtube.com/watch?v=oiGUyvMHqM4
- https://www.youtube.com/watch?v=XrQP34zYUE4
- https://www.youtube.com/watch?v=cal3MAjzo2w
- https://www.youtube.com/watch?v=hxZGaoNDgt8
- https://www.youtube.com/watch?v=HDTRAvqxizA
- https://www.youtube.com/watch?v=mfbJUsVoG70
- https://www.youtube.com/watch?v=r_J8FOyzjxw

COURSE OUTCOMES

CO No.	CO Statement	Knowledge Level
CO 1	Identify, Define and classify different food groups, nutrients, and different pre-preparation and cooking methods adopting best practices of health and safety.	K1
CO 2	Describe the composition and nutritive value of different food groups and their role in cookery from current literature.	K2
CO 3	Define and explain the physical and chemical changes occurring in the nutritive and non-nutritive constituents of different foods during various cooking processes.	K3, K4
CO 4	Apply the current understanding of food science to describe the various sustainable food practices like energy and nutrient conservation methods	K3
CO 5	Analyze and understand the principles in cooking and its effect on sensory attributes and nutrients.	K4

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	2	2
CO2	3	3	3	3	2	3
CO3	3	3	2	3	3	3
CO4	3	3	2	3	3	2
CO5	3	3	3	3	2	2
AVERAGE	3	3	2.6	3	2.4	2.4

TEACHING METHODOLOGY

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

QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1	A-10X2 marks	50	20	100
K1. K 2	B-5/8x8 marks	Not exceeding 300	40	
K2, K 3	C-2/3x20 marks	Not exceeding 1500	40	

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

(For candidates admitted from the academic year 2021)
B.Sc DEGREE EXAMINATION
I YEAR- II SEMESTER

Title of the paper: FOOD SCIENCE **Max. Marks: 100**
Paper Code: ND21/1C/FSC //CN21/1C/FSC **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
PHYSIOLOGY

TOTAL HOURS: 105 Hours **COURSE CODE:ND21/2C/PHY// CN21/2C/PHY**
CREDITS: 5 **L-T-P: 4-3-0**

COURSE OBJECTIVES

To enable the students

- ✓ To impart knowledge on structure and functions of different organs
- ✓ To understand the physiological functioning of various system of the body
- ✓ To introduce the interrelationship between nutritional science and physiological functions

COURSE OUTLINE

UNIT I: **Cell**: Structure and functions (Review).
Tissues: Classification, structure and functions of – epithelial, connective, muscular and nervous tissue (Review)
Blood: Composition, RBC, WBC, Platelets; structure and function; Erythropoiesis, Blood Groups, Blood coagulation. (20 HOURS)

UNIT II: **Nervous system**
Neuron- Structure and function**,** Conduction of nerve impulses along nerve and muscle fibres.
Central and Peripheral Nervous System
General Anatomy – Functions of cerebrum, cerebellum, medulla oblongata, pons, Spinal cord.
Autonomic nervous system
Sympathetic, parasympathetic – functions
Sense organs
Vision, hearing, Olfaction and Gustation
Physiology of Vision and Gustation. (20 HOURS)

UNIT III: **Heart and Circulation**

Anatomy of Heart, Properties of cardiac muscle, Origin and conduction of heart beat – cardiac cycle, cardiac output and heart sounds; Blood pressure, Factors affecting blood pressure, ECG.

Respiratory System
Anatomy of respiratory organs.Gaseous exchange in lungs and tissues – External and Internal respiration, Pulmonary Ventilation, Muscles of inspiration and expiration. Transport of oxygen and carbon dioxide
(25 HOURS)

UNIT IV: **Digestive System**

Anatomy of Gastrointestinal Tract, digestion and absorption of Carbohydrates, fats and proteins.

Excretory System

Structure of Kidney and Nephron, Urine Formation.

Acid – base balance.

Skin

Structure and function. Body temperature regulation. (20 HOURS)

UNIT V: **Endocrine System**

Pituitary, Thyroid, Parathyroid, Adrenal Gland and Pancreas – List of Hormones with its functions.Hyper and Hypo secretion.

Reproductive System

Anatomy of Reproductive organs (Review) Structure of Sperm and Ovum; Spermatogenesis and Oogenesis: menstrual cycle and ovarian cycle. Influence of hormones on fertilization, conception and lactation.

(20 HOURS)

RECOMMENDED TEXTBOOKS

1. Waugh A&Grant A, *Ross & Wilson Anatomy and Physiology in Health and Illness*,12th Edition,Churchill Livingstone Elsevier evolve, 2014
2. Sembulingam K, *Essentials of Medical Physiology*, 6th edition, Jaypee Medical Publishers, New Delhi, 2013

REFERENCES

1. Chatterjee CC, *Human Physiology*, Volume I, 11th Edition, CBS Publishers, New Delhi, 2016
2. Chatterjee CC, *Human Physiology*, Volume II, 11th Edition, CBS Publishers, New Delhi, 2016
3. Sathya P and Devanand V, *Textbook of Physiology*, First edition, CBS Publishers and Distributers Pvt Ltd, New Delhi, 2013
4. Boron WF and Boulpaep EL, *Medical Physiology*, IIedition,SaundersElseivier, 2009
5. MariebEN,*Human Anatomy and Physiology*, VI edition, Pearson edition, 2004
6. Tortora. G&Grabowski, S.R. *Principles of Anatomy & Physiology*,10th Edition, John Wiley & Sons, USA,2003
7. Ganong, WF, *Review of Medical Physiology*,21st Edition, McGraw Hill Publishers, 2003
8. Guyton AC & Hall JE,*Textbook of Medical Physiology*,10th Edition, Harcourt Asia P.Ltd Singapore, 2001
9. Joshi, VD, *Physiology – Preparation Manual for Undergraduates*, Churchill Livingstone. New Delhi, 1995
10. Chakrabarti et al., *Human Physiology*, The New Book Stall, Calcutta, 1994

WEBSITES AND e-LEARNING SOURCES

1. http://ib.bioninja.com.au/standard-level/topic-6-human-physiology/
2. https://www.drnajeeblectures.com/cardiac-cycle/
3. www.cvphysiology.com/Heart%20Disease/HD002
4. https://study.com/academy/lesson/what-is-respiration-definition-process-equation.html
5. https://www.bbc.com/education/guides/zq349j6/revision

6. https://books.google.co.in/books/about/Guyton_and_Hall_Textbook_of_Medical_Phys.html?id=Po0zyO0BFzwC
7. http://jpkc.hactcm.edu.cn/2012yxslx/file/Textbook%20of%20Medical%20Physiology.pdf
8. https://books.google.co.in/books?isbn=070205321X
9. https://www.us.elsevierhealth.com/medicine/physiology
10. www.ebooks-for-all.com/bookmarks/detail/Human-Physiology/onecat/0.html
11. https://www.youtube.com/watch?v=FczvTGluHKM
12. https://www.youtube.com/watch?v=qWti317qb_w

COURSE OUTCOME

CO No	CO statement	Knowledge level
CO1	Identify the major levels of organization, major components of each organ and define the relationship between anatomy and physiology	K1
CO2	Explain the concept of homeostasis, negative and positive feedback mechanisms and usage of anatomical terms to describe the body	K2
CO3	Illustrate the functions of important physiological systems including digestive, cardio respiratory, renal, reproductive, endocrine and nervous.	K2
CO4	Distinguish the interaction between separate systems to yield the integrated physiological responses in the body	K3
CO5	Develop competency to analyze relationship between health, disease and physiology	K4

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	3
CO2	3	3	3	2	2	3
CO3	3	3	2	3	2	3
CO4	3	3	2	3	2	3
CO5	3	3	3	3	3	3
AVERAGE	3	3	2.4	2.6	2.2	3

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

TEACHING METHODOLOGY:

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

QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1	A-10X2 marks	50	20	**100**
K1. K 2	B-5/8x8 marks	Not exceeding 300	40	
K2, K 3	C-2/3x20 marks	Not exceeding 1500	40	

QUESTION PAPER TEMPLATE

ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008
(For candidates admitted from the academic year 2021)
B.Sc DEGREE EXAMINATION
I YEAR- II SEMESTER

Title of the paper: PHYSIOLOGY **Max. Marks: 100**
Paper Code: ND21/2C/PHY // CN21/2C/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 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 & II

FOOD SCIENCE AND PHYSIOLOGY PRACTICAL

TOTAL HOURS: 45 Hours **COURSE CODE: ND21/2C/PR1 // CN21/2C/PR1**
CREDITS: 3 **L-T-P: 0-0-3**

COURSE OBJECTIVES:

FOOD SCIENCE

- ✓ To impart knowledge on sensory analysis of food.
- ✓ To introduce the skills of different cooking techniques and use of cooking equipment for food preparation.
- ✓ To study the physical and chemical changes that happens during cooking.

PHYSIOLOGY

- ✓ To identify the different vital organs, glands and tissues under a microscope.
- ✓ To study the factors affecting the pulse and respiration rate of an individual
- ✓ To estimate the blood parameters like bleeding time, clotting time, Serum hemoglobin, RBC and WBC

COURSE OUTLINE:

FOOD SCIENCE PRACTICAL

1. Techniques in measurements of food stuffs, uses of standard measuring cups and spoons. Experimental foods and cookery practical.
2. Cereals :
    a. Microscopic study of different starches.
    b. Method of combining starch and boiling water
    c. Study of effect of dry heat and moist heat on starch
    d. Preparation of white sauce
    e. Gluten formation

    Different methods of cooking rice - straining, absorption, pressure cooking.
    Preparation of phulka, lime rice, vegetable fried rice, ragiadai, uppuma, string hoppers, puttu, idli and dosai,.
3. Pulses: Effect of hard, soft water, alkali, papaya, on the texture and the cooking time of grams and dhals.
    Preparation: sambhar, sundal, cereal and pulse combination - adai, dhokla, poli, sprouted gram salad.
4. Eggs: Coagulation of egg protein - egg white foam, effect of beating, addition of sugar, acid and effect of temperature on egg foam.
    Preparation – poached egg, omelette, scrambled egg, custard, steamed vanilla pudding.
5. Vegetables: Effect of shredding, dicing, addition of acid, alkali, covering, steaming and pressure cooking on different pigments and acceptability on vegetables.
    Preparation- Carrot cuchumber, cauliflower manchurian, avial, vegetable kofta, stuffed capsicum, baked vegetables.
6. Fruits: Browning of fruits and its prevention. Preparation of banana fritters, fruit jelly, date pudding, fruit salad, pine apple payasam.
7. Milk: Coagulation of milk proteins, preparation of paneer, curd.
    Preparation- paneer masala, firni, rice payasam, sweet lassi, shrikand,.

8. Beverages:Preparation of stimulating and nourishing beverages - coffee, tea, cocoa, milk shake, lassi, fruit punch, panagam.
9. Fats and oils: Comparison of smoking temperature of some fats and oils.
   Preparation- shallow fry- vegetable cutlet and deep fry; banana chips, vadai, diamond cuts
10. Sugar cookery: Different stages of crystallisation of sugar Preparation of recipes at different stages of sugar crystallisation - gulabjamun, , chocolate fudge, badhushah, coconut burfi, peanuts chikkis, caramel custard.

PHYSIOLOGY PRACTICAL

1. Microscopic study of different tissues – epithelial, Connective, Muscular and Nervous.
2. Anatomy of Sheep's Brain.
3. Hemoglobin Estimation, WBC Count, RBC Count, Coagulation time, bleeding time, blood grouping., Anatomy of Sheep's Heart, Estimation of Blood Pressure, effect of exercise on respiratory rate, arterial blood pressure and pulse rate.
4. Microscopic structure of lung and trachea.
5. Microscopic structure of pancreas, stomach, small intestine, liver.
6. Microscopic structure of nephron.
7. Microscopic structure of thyroid, pituitary, adrenal, ovary, uterus, mammary gland and testis.

RECOMMENDED TEXTBOOKS

1. Lowe B, *Experimental cookery from chemical and physical stand point*, Forgotten books, UK, 2015
2. Gunasegaran JP, *Textbook of Histology and A Practical guide*, 3rd edition, Elsevier, 2016

REFERENCES

1. Srilakshmi B, *Food Science*, Sixth Edition, New Age International Ltd Publishers, New Delhi, 2015
2. KoteN,*Practical Manual of Histology for Medical Students,* Jaypee brothers, 2014
3. Chaudhuri, A.R,*Textbook of Practical Physiology*,Paras Publishing, Hyderabad,2000

FOOD SCIENCE

- https://www.youtube.com/watch?v=qBU7Bu79cVo&t=1022s
- https://www.youtube.com/watch?v=lWq_4XBnwNM
- https://www.youtube.com/watch?v=8mGeJFpCptw
- https://www.youtube.com/watch?v=3sOccQyYQxo
- https://www.youtube.com/watch?v=Y7YYa1yhzro
- https://www.youtube.com/watch?v=gk_rPkglyao
- https://www.youtube.com/watch?v=ZwU8xY5VnQk
- https://www.youtube.com/watch?v=EJLHeJTdZZU
- https://www.youtube.com/watch?v=AjWkd0VIsa8
- https://www.youtube.com/watch?v=zDEcvSc2UKA
- https://www.youtube.com/watch?v=oiGUyvMHqM4

- https://www.youtube.com/watch?v=XrQP34zYUE4
- https://www.youtube.com/watch?v=cal3MAjzo2w
- https://www.youtube.com/watch?v=hxZGaoNDgt8
- https://www.youtube.com/watch?v=HDTRAvqxizA
- https://www.youtube.com/watch?v=mfbJUsVoG70
- https://www.youtube.com/watch?v=r_J8FOyzjxw

PHYSIOLOGY

- https://www.youtube.com/watch?v=O0ZvbPak4ck
- https://www.youtube.com/watch?v=oAjnlDZH9H8
- https://www.youtube.com/watch?v=Xr-Bucc2J38
- https://www.youtube.com/watch?v=Gmic13mvsgo
- https://www.khanacademy.org/science/health-and-medicine/circulatory-system/blood-pressure-ddp/v/what-is-blood-pressure-1
- https://www.khanacademy.org/science/health-and-medicine/circulatory-system/blood-pressure-ddp/v/learn-how-a-stethoscope-can-help-determine-blood-pressure
- https://www.youtube.com/watch?v=q6rfJQVSals
- https://www.youtube.com/watch?v=JzGW9PovzGg
- https://www.youtube.com/watch?v=V9bQW7yn1cI
- https://www.youtube.com/watch?v=tOa2TB96KRM

COURSE OUTCOMES

CO No.	CO Statement	Knowledge Level
	FOOD SCIENCE	
CO 1	Identify the different food ingredients and incorporate traditional and sustainable cooking techniques	K1
CO 2	Describe and conduct appropriate sensory analysis of recipes	K2
CO 3	Demonstrate skills while using cooking utensils and equipment during food preparation	K2
	PHYSIOLOGY	
CO4	Recognize and identify the principle tissue structures	K1
CO5	Perform, analyze and interpret the experiments of blood parameters.	K2 & K3

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

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

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

SEMESTER III

HUMAN NUTRITION

TOTAL HOURS: 105 Hours **COURSE CODE: ND21/3C/HNU// CN21/3C/HNU**
CREDITS: 5 **L-T-P: 4-3-0**

COURSE OBJECTIVES

- ✓ To provide an integrated overview of dietary sources, physiological role, requirements of macro and micro nutrients and water
- ✓ To gain information and knowledge regarding metabolism of major nutrients
- ✓ To comprehend principle of nutrition

COURSE OUTLINE

UNIT I: Importance of nutrition, History of nutrition. Energy: Definition - Calories, Joule, Calorimetry, direct and indirect calorimetry, respiratory quotient, Energy value of foods, physiological fuel values.
Energy needs of the body – BMR, RMR, definition, factors influencing BMR, the energy cost of physical activities and method of determination, calculation of total caloric requirements, factorial method for determining total energy needs.
Carbohydrates: definition, classification, functions, utilization and storage, Unavailable carbohydrate or dietary fibre, food sources, requirements. Role of fibre in human nutrition;Glycemic index and Glycemic load.
(25 HOURS)

UNIT II: **Protein** : Definition, Classification, Functions, Essential and Non-essential amino acids, requirements, evaluation of protein quality- PER, BV, NPU, chemical score& PDCAAS; supplementary value; nitrogen balance; food sources & requirement. Protein energy mal nutrition
Lipids: Definition, Classification, Functions, Essential fatty acids - sources and effects of deficiency; saturated fatty acids, cholesterol and its relation to CHD. Food sources & requirements. (20 HOURS)

UNIT III: **Minerals :** (I) **Macro-minerals** – calcium and phosphorus : (a) Distribution in the body, functions, absorption and storage, excretion, blood level, role of parathyroid hormone, vitamin D and calcium (b) Ca : P ratio (c) food sources, RDA, effects of deficiency.
(II) **Micro minerals**- Iron - distribution in the body, functions, absorption, transport, storage, excretion, food sources, nutritionalanaemia, nutritional siderosis. Zinc, Copper, Iodine: distribution, function, RDA, food sources, deficiency and toxicity. Selenium-Vitamin E relationship, Chromium and glucose tolerance factor. (20 HOURS)

.

UNIT IV: **Vitamins:Fat Soluble Vitamins**: Vitamin A & D–Measurements, function, absorption and transport, storage, RDA, food source, effects of deficiency, treatment of Vitamin A deficiency and prevention, hypervitaminosis, Vitamin E & K- functions, sources, effects of deficiency. (20 HOURS)

UNIT V: **Water:** Water balance, dehydration, water intoxication. Potassium, Sodium and Chloride: effects of imbalance (Deficiency and excess), distribution in the body, function, food sources, requirements.

Water soluble vitamins: Vitamin C, B1, B2, niacin, vitamin B6, B12, Folic acid, Biotin and pantothenic acid - function, RDA, food sources, loss during processing and preparation of food, effects of deficiency.

(20 HOURS)

RECOMMENDED TEXT BOOKS

1. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13th Edition, Elsevier Saunders, Missouri, 2012.
2. Robinson CH, *Normal and Therapeutic nutrition*, Oxford and IBH publishing company, Bombay, 2010.

REFERENCE BOOKS

1. Longvah T, Ananthan R, Bhaskar K, Venkaiah K, *Indian Food Composition Tables*, National Institute of Nutrition, 2017
2. Mann and Truswell, *Essential of Human Nutrition*, 3rd edition, Oxford University Press, 2007
3. Whitney EN and Rolfes SR, *Understanding Nutrition*, 10th edition, Thomson/Wordsworth, 2005
4. Insel P, Turner E & Ross D, *Nutrition*, ADA, Jones & Bartlett, Canada, 2nd edition, 2004
5. Sumathi R. Mudambi and Rajagopal MV, *Foods and Nutrition*, 4th edition, New Age International Ltd. Publishers, New Delhi, 2001
6. Groff JL, Gropper SS, *Advanced Nutrition and Human Metabolism*,3rd edition, West/ Wadsworth, UK, 2000
7. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., *Nutritive value of Indian Foods*, NIN, Hyderabad, 2001
8. Cataldo, DeBruyne and Whitney EN, *Nutrition and Diet therapy, Principle and Practice*, 5th edition, West Wordsworth, London, , 1999
9. Gordon WM, 4th edition, *Perspectives in Nutrition*, McGraw Hill, 1999
10. Brown JE, *Nutrition now*, West Publishing Company, 1995
11. Swaminathan .M, *Principles of Nutrition and Dietetics*, Bappeo, Bangalore, 1993

JOURNALS

1. Journal of human nutrition and dietetics
2. Food and nutrition journals

E-LEARNING RESOURCES

1. http://ninindia.org/DietaryGuidelinesforNINwebsite.pdf
2. http://www.indiaenvironmentportal.org.in/files/file/IFCT%202017%20Book.pdf

COURSE OUTCOMES

CO No.	CO Statement	Knowledge Level
CO 1	List or define key terms related to macro nutrients, micronutrients, water, electrolyte as in sources, losses during processing, deficiency and RDA	K1
CO 2	Classify micronutrients and examine/ discuss their functions, metabolism and deficiencies.	K2 & K4
CO 3	Define and explain the relationship between nutrients and nutrient metabolism	K2 & K3
CO4	Identify and analyse the distribution, functions, metabolism, deficiency of micronutrients	K2 & K4
CO5	Explain and analyse the role of water and electrolytes in human health	K2 & K4

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	2	2	2	2
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3
AVERAGE	3	3	2.7	2.8	2.8	2.8

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

TEACHING METHODOLOGY

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

QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1	A-10X2 marks	50	20	**100**
K1. K 2	B-5/8x8 marks	Not exceeding 300	40	
K2, K 3	C-2/3x20 marks	Not exceeding 1500	40	

QUESTION PAPER TEMPLATE

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

B.Sc DEGREE EXAMINATION
II YEAR- III SEMESTER

Title of the paper: HUMAN NUTRITION **Max. Marks: 100**
Paper Code: ND21/3C/HNU //CN21/3C/HNU **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

MICROBIOLOGY

ALLIED- 3
TOTAL HOURS: 60 Hours **PAPER CODE –ND21/3A/MIB// CN21/3A/MIB**
CREDITS: 4 **L-T-P: 3- 1- 0**

COURSE OBJECTIVES

To enable the students to

- ✓ Gain knowledge of general characteristics of micro-organisms.
- ✓ Understand the role of microorganisms in food spoilage and food borne diseases.
- ✓ Recognize the diseases caused by microorganisms in the environment.
- ✓ Gain familiarity with the methods of sterilization and disinfection.

COURSE OUTLINE:

UNIT I:

(a) History of microbiology, scope and relevance of microbiology in food industry.

(b) Classification of microorganisms.

(c) Bacteria- structure, classification based on morphology, anatomical features, motility, nutrition, pathogenicity, staining and environmental factors. Growth characteristics of bacteria, reproduction.

Yeast and mould- structure, types, reproduction and economic importance.

Virus- structure, types, life cycle. SARS-Cov-2- an insight.

(20 HOURS)

UNIT II:

Spoilage and contamination of common foods:

a) Factors affecting growth of microorganisms- intrinsic and extrinsic.

b) Sources of contamination and spoilage of common foods -Cereal and cereal products, fruits and vegetables, egg, Meat and fish, milk and milk products (two each) (10 HOURS)

UNIT III:

Microorganisms in infection and immunity:

a) Infection-types, sources, modes of spread of Infection; Body Defense- external and internal - cellular, chemical, antigen- antibody reactions.

b)Immunity: types- Active and Passive, Artificial and natural; Importance of vaccines, vaccination- recent advances, basic concepts of combination, local and herd immunity.

(10 HOURS)

UNITIV: **Food poisoning and Food borne diseases**:

a)Food poisoning/ intoxication and food infection- definition. Bacterial food poisoning- Staphylococcus aureus, Clostridium botulinum, Clostridium perfringes, Bacillus cereus

b) Food Infection- Salmonellosis, Shigellosis, Cholera, Gastroenteritis; Measures to prevent food poisoning and food borne infections. (10 HOURS)

UNIT V: **Environmental Microbiology:**

a) Microorganisms found in water, soil, air and sewage- List of microorganisms and diseases caused; Test for sanitary quality of water: Total Bacterial count, Test for E-coli- MPN and Faecal Streptococci; Purification of water

b) Destruction of Microorganism: Methods of sterilization and Disinfection. (10 HOURS)

RECOMMENDED TEXT BOOKS

1**.** Purohit, S.S *Microbiology – Fundamentals & applications,* 6th Edition, Agro bices Indiana, 2002

2. Frazier C and Denis, W.C, *Food Microbiology*, 4th edition, Tata McGraw Hill publishing Company. New Delhi, 2006

REFERENCE BOOKS

1. Parija SC, Textbook of Microbiology & Immunology, 2nd Edition, Elsevier India, 2012
2. AnandanarayananR and Panicker CK, *Textbook of Microbiology*, Seventh edition, University Press, Hyderabad, 2009
3. Ramesh VK, *Food Microbiology*, MJP Publishers, 2007
4. Dubey RC, Maheswar DK, *A Textbook of Microbiology*, 1st edition, S. Chand & Co Ltd Publications, 2005
5. Jay JM, Loessner MJ, Golden DA, *Modern Food Microbiology*, 7th Edition, Springer, New york, 2005
6. Adam MR, Moses MO, *Food Microbiology*, 2nd edition, Panima publishing corporation, 2003
7. Heritage J, Evans EGV, Killington RA, *Introductory Microbiology*, Cambridge University press, 2002
8. Pelczar, J.*Microbiology*, 7th edition, Tata McGraw Hill publishing, 1998
9. Garbutt J, *Essentials of Food microbiology*, 2nd edition, Arnold publication, New York,1997
10. Patel A.H, *Industrial Microbiology*, Macmillan India Limited. New Delhi, 1996

JOURNALS

1. Journal of food and industrial microbiology

2. International journal of food microbiology

E-LEARNING RESOURCES

- http://people.uleth.ca/~selibl/Biol3200/CourseNotes/MicroTaxonomyCh10.pdf
- https://www.open.edu/openlearncreate/mod/oucontent/view.php?id=194&printable=1
- https://www.cdc.gov/vaccines/hcp/conversations/downloads/vacsafe-understand-color-office.pdf

- https://vaccine-safety-training.org/how-the-immune-system-works.html
- https://www.chop.edu/centers-programs/vaccine-education-center/vaccine-safety/immune-system-and-health
- https://www.who.int/news-room/fact-sheets/detail/food-safety
- https://epi.dph.ncdhhs.gov/cd/diseases/food.html
- http://vikaspedia.in/health/nutrition/food-borne-diseases-or-food-poisoning
- http://vikaspedia.in/health/nutrition/food-borne-diseases-or-food-poisoning
- https://www.microrao.com/micronotes/sterilization.pdf
- https://ehs.colorado.edu/resources/disinfectants-and-sterilization-methods/

COURSE OUTCOMES

CO Number	CO STATEMENT	KNOWLEDGE LEVEL
CO 1	Outline the fundamental knowledge on the microorganisms and classify them	K1 & K2
CO 2	Explain the sources of contamination and spoilage of foods	K2
CO 3	Classify the different types of immunity and describe the vaccines	K3
CO 4	Categorize the microorganisms in soil, water, air and sewage and assess the quality of water	K4
CO 5	Explain the causes and prevention of food poisoning and food borne infections.	K2
CO6	Distinguish between sterilization and disinfection and outline the appropriate methods to be used in different settings.	K1 & K4

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO6
CO1	3	3	3	3	3	3
CO2	3	3	2	3	3	3
CO3	3	3	2	3	3	3
CO4	3	3	1	3	3	3
CO5	3	3	1	3	3	3
CO6	3	3	1	3	3	3
AVERAGE	3	3	1.6	3	3	3

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

TEACHING METHODOLOGY

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

QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1	A-10X2 marks	50	20	**100**
K1. K 2	B-5/8x8 marks	Not exceeding 300	40	
K2, K 3	C-2/3x20 marks	Not exceeding 1500	40	

QUESTION PAPER TEMPLATE

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

B.Sc DEGREE EXAMINATION
II YEAR- III SEMESTER

Title of the paper: MICROBIOLOGY **Max. Marks: 100**
Paper Code: ND21/3A/MIB// CN21/3A/MIB **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

NON MAJOR ELECTIVE

ART OF INTERIOR DECORATION

TOTAL HOURS: 30 Hours **COURSE CODE: CN21/3N/ART**
CREDITS: 2 **L-T-P: 1-1-0**

COURSE OBJECTIVES

- ✓ To help students understand principles of design, elements of decoration, and to learn to create beautiful surroundings and interiors.
- ✓ To gain skills in using basic principles of art in home and to select the right materials for decoration.

COURSE OUTLINE

UNIT I: Introduction to Interior Decoration- Good taste in art, elements of design, types of design, characteristics of good design. Principles of design- harmony, balance, proportion, rhythm and emphasis (10 HOURS)

UNIT II: Colour: qualities of colour, Prang colour chart, colour harmony, applying principles of design in colour and to create different effects and moods. (10 HOURS)

UNIT III: Furniture- Selection and arrangement**.** Window treatment- types of curtains and draperies. Accessories-Types; Flower arrangement-Types; Floor decorations-Types (10 HOURS)

RECOMMENDED TEXT BOOKS

1. Seethraman P and Pannu P, *Interior design and decoration,* CBS publishers & distributors, New Delhi, 2014.
2. Khanna G, *Art of interior design,*Indica Publishers, New Delhi, 2004

JOURNALS

1. Journal of interior design
2. International journal of interior design

E-LEARNING RESOURCES:

https://www.thespruce.com/basic-interior-design-principles-1391370
http://launchpadacademy.in/elements-of-interior-design-2/amp/#aoh=15745888091844&referrer=https%3A%2F%2Fwww.google.com&_tf=From%20%251%24s

COURSE OUTCOMES

CO Number	CO STATEMENT	KNOWLEDGE LEVEL
CO 1	Define the various principles of design	K1
CO 2	Apply the principles of designs in interiors	K2
CO 3	Identify and select the right type of furniture and furnishings for interior design	K3

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO6
CO1	3	1	3	3	3	3
CO2	3	1	3	3	3	3
CO3	3	1	3	3	3	3
AVERAGE	3	1	3	3	3	3

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

TEACHING METHODOLOGY

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

QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1, K2	A-10 X 5 marks	50	50	50

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

NON MAJOR ELECTIVE
II YEAR- III SEMESTER

Title of the paper: Art of Interior Decoration **Max. Marks: 50**

Paper Code: CN21/3N/ART **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

NUTRITION THROUGH LIFE CYCLE

TOTAL HOURS: 105 Hours **COURSE CODE: ND21/4C/NTL// CN21/4C/NTL**
CREDITS: 5 **L-T-P: 4-3-0**

COURSE OBJECTIVES

- ✓ To understand the role of nutrition in the growth and development through the lifestyle.
- ✓ To gain insight into the principles of effective meal planning.
- ✓ To understand the nutritional needs of individuals at every stage of lifecycle.
- ✓ To plan diets for various age groups across the lifecycle.

COURSE OUTLINE

UNIT I: Introduction to meal planning**:** Balanced diet, RDA - Food Guide Pyramid (ICMR); Food plate; Principles of meal planning – steps involved in planning a diet.
Adult:- nutritional requirements, planning balanced diets for adult men and women, promoting healthy lifestyle through holistic approach - Diet, physical activity, stress management, yoga & mediation.
(25 HOURS)

UNIT II: Pregnancy: Effect of nutrition on outcome of pregnancy, physiological demands of gestation, weight gain, nutrition needs, dietary plans and dietary problems, complication of pregnancy. Lactation: Physiology of lactation, nutritional requirements during lactation, concerns of breast feeding mother. Lactogogues. (20 HOURS)

UNIT III: Infancy: Breast feeding, complementary feeding, advantages and disadvantages, low cost complementary foods**-** Artificial feeding- Infant milk Substitutes. Low birth weight infants
Preschool: Normal growth and development, nutrient allowances, feeding behaviours, factors influencing food preferences, common nutrition related problems (PEM & VAD) and their dietary interventions, other health concerns- allergy, choking, food poisoning, Pica. (20 HOURS)

UNIT IV: School Children**:** Physical development, factors affecting food needs, RDA, packed lunch. Childhood obesity;
Adolescence: Growth and development, Food Habits, nutritional requirements, Eating disorders, Nutritional Anaemia. (20 HOURS)

UNIT V: Old Age: Biologic & Physiologic aspects of aging, nutritional disorders in the aged, factors affecting food selection, nutritional requirements.
(20 HOURS)

RECOMMENDED TEXT BOOKS

1. Srilakshmi B, *Dietetics*, sixth edition, New age Publishing Press, New Delhi, 2011
2. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., Nutritive value of Indian foods, NIN, Hyderabad, 2001

REFERENCE BOOKS

1. Sharma M, *Textbook of Nutrition*, 1st edition, CBS publishers & distributors PVT Ltd, New Delhi, 2017
2. Longvah T, Ananthan R, Bhaskar K, Venkaiah K, *Indian Food Composition Tables*, National Institute of Nutrition, 2017
3. Abraham S, *Nutrition Through Lifecycle*, 1st edition, New age international publishers, New Delhi, 2016
4. Verma P, *Food ,Nutrition & Dietetics*, 1st edition, CBS publishers & distributors PVT Ltd, NewDelhi, 2015
5. Edelstein S, *Lifecycle Nutrition- An evidence based approach*, 2nd edition, Jones & Bartlett learning publications, 2015,
6. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13th Edition, Elsevier Saunders, Missouri, 2012
7. Stump SE, *Nutrition and diagnosis related care*, 7th edition, Lippincott, 2012
8. Stacy N, *William's Basic Nutrition and Diet Therapy*, 12th edition, Elseivier publications, UK, 2005
9. Whitney EN and Rolfes SR, *Understanding Nutrition*, 9th edition, West/Wordsworth, 2002
10. Garrow JS, James WPT, Ralph A, *Human Nutrition and Dietetics* 10th edition, Churchill Livingstone, NY, 2000
11. Groff JL, Gropper SS, *Advanced Nutrition and Human Metabolism* 3rd edition, West / Wadsworth, UK. 2000
12. Cataldo, DeBruyne and Whitney, *Nutrition and Diet therapy– Principles and Practice* 5th edition, West/ Wadsworth, London. 1999
13. Gordon WM, *Perspectives in Nutrition*, 4th edition, McGraw Hill, 1999
14. Swaminathan M, *Principles of Nutrition and Dietetics*, Bappeo, Bangalore,1995

JOURNALS

1. International journal of food, nutrition and public health

2. Indian journal of nutrition and dietetics

E-LEARNING RESOURCES

- http://vikaspedia.in/health/nutrition/dietary-guidelines-1/dietary-guideline-1
- https://www.nhp.gov.in/healthlyliving/healthy-diet
- https://motherchildnutrition.org/india/complementary-feeding-guidelines.html
- http://vikaspedia.in/health/nutrition/dietary-guidelines-1/diet-for-children-and-adolescents
- https://motherchildnutrition.org/india/complementary-feeding-guidelines.html
- https://sol.du.ac.in/mod/book/view.php?id=1422&chapterid=1288
- https://www.indi.ie/fact-sheets/fact-sheets-on-nutrition-for-older-people/509-good-nutrition-for-the-older-person.html

COURSE OUTCOMES

CO Number	CO STATEMENT	Knowledge level
CO 1	Explain the physiological basis for nutritional needs through the human lifecycle	K1 & K2
CO 2	Identify nutrition related concerns and deficiency disorders at every stage of lifecycle	K3
CO 3	Discuss appropriate dietary guidelines for various age groups	K2
CO 4	Construct and interpret diets to meet the nutritional needs across the lifecycle	K2 & K3
CO 5	Relate healthy eating behaviours to general well being	K2

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3
AVERAGE	3	3	3	3	3	3

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

TEACHING METHODOLOGY

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

QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1	A-10X2 marks	50	20	**100**
K1. K 2	B-5/8x8 marks	Not exceeding 300	40	
K2, K 3	C-2/3x20 marks	Not exceeding 1500	40	

QUESTION PAPER TEMPLATE

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

B.Sc DEGREE EXAMINATION
II YEAR- IV SEMESTER

Title of the paper: NUTRITION THROUGH LIFECYCLE **Max. Marks: 100**
Paper Code: ND21/4C/NTL// CN21/4C/NTL **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 –IV

NUTRITIONAL BIOCHEMISTRY

TOTAL HOURS: 60 Hours **COURSE CODE: ND21/4A/NBC //CN21/4A/NBC**
CREDITS: 4 **L-T-P: 3-1-0**

COURSE OBJECTIVES

To introduce the students to

- ✓ The principles and viewpoints of biochemistry.
- ✓ A basic understanding of the functions of biological systems in relation to nutritional biochemistry. To understand the chemical nature of biological macromolecules.
- ✓ To relate the role of nutrients and enzymes in biochemical processes and pathways.
- ✓ To understand principles of bioenergetics and inborn errors of metabolism.

COURSE OUTLINE

UNIT I: Introduction to biochemistry and its relation to nutrition:
Carbohydrates: Classification, glucose oxidation via glycolysis-aerobic, anaerobic (with structure), TCA (with structure), HMP(No Structure) Gluconeogenesis, glycogenolysis& biosynthesis of glycogen, blood glucose homeostasis, Cori Cycle. (15 HOURS)

UNIT II: **Proteins and Amino acids**:
Amino acids: Classification, chemical properties, chromatography separation techniques. Peptides: Structure& nomenclature.
Protein: Classification, structure-primary, secondary, tertiary and quaternary, transamination, deamination-oxidative and non-oxidative, decarboxylation, urea cycle, fate of ammonia, glutamine synthesis.
(10 HOURS)

UNIT III: **Lipid:** Classification**,** Chemical composition and properties of fat, beta-oxidation of fatty acids of oleic, linoleic and palmitic acid, desaturation of fatty acids, ketone bodies, ketogenesis.
Dietary cholesterol- cholesterol bio-synthesis (No Structure), regulation of cholesterol synthesis
Lipoproteins – Classification, their role and normal values.
Interrelationship between carbohydrates, fat and protein metabolism –hormonal regulation (15 HOURS)

UNIT IV: **Enzymes** – Classification, factors affecting enzyme activity, role of B-vitamins as coenzymes - TPP, FAD, FMN, NAD, NADP, Tetrahydrofolic acid, Biotin, Coenzyme A, B12, Pyridoxine. Enzymes of clinical importance- LDH, AST, ALT, Creatine kinase Biological Oxidation- electron transport chain. (10 HOURS)

UNIT V: **Inborn errors of metabolism**

Carbohydrate**:** fructose intolerance, galactosemia, glycogen-Type I Von Gierke's Disease.

Disorders of aromatic amino acids: Phenyl ketonuria, alkaptonuria, tyrosinosis.

Disorders of sulphur-containing amino acids:Homocystinuria

Nucleic acids- Nucleoside, Nucleotide, DNA and RNA – Structure and Functions. (10 HOURS)

RECOMMENDED TEXT BOOKS

1. Ramadevi K, Ed: *AmbikaShanmugam's Fundamentals of biochemistry for medical students*, 8th edition, Wolters Kluwer Health, India, 2016 .
2. Rodwell V, Bender D, Botham KM, Kennelly PJ, Weil PA, *Harper's Illustrated Biochemistry,* 30th Edition, McGraw hill Education, 2015

REFERENCE BOOKS

1. Sulochana H, *Principles of Biochemistry*, PBS enterprises, Chennai, 2010
2. Cox MM and Nelson DL, *Lehninger Principles of biochemistry*, 5th edition, EH Freman&Company, New york, 2008
3. Vasudevan DM, Sreekumari S, *Textbook of Biochemistry*, 5th edition, Jaypee Publishers, New Delhi, 2007
4. Veerakumari L, *Biochemistry*, 1st edition, MJP Publishers, 2005
5. Murray RK, Granner DK, Mayes PA, Rodwell VW, Harper's Illustrated*Biochemistry*,26th edition, Mcgraw hill publishing house,., 2003
6. Montgomery R, Conway TW, Spector AA, *Biochemistry-A care oriented Approach*. Mosby Company, 1990

JOURNALS

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

E-LEARNING RESOURCES

1. https://ia801208.us.archive.org/0/items/HARPERSILLUSTRATEDBIOCHEMISTRY30th/HARPER%27S%20ILLUSTRATED%20BIOCHEMISTRY%2030th.pdf
2. https://www.journals.elsevier.com/clinical-biochemistry
3. https://www.journals.elsevier.com/the-international-journal-of-biochemistry-and-cell-biology
4. http://www.ijmb.in
5. http://jpkc.gmu.cn/swhx/book/Biochemistry.pdf
6. http://www.jaypeedigital.com/Book/BookDetail?isbn=9788180615382&AspxAutoDetectCookieSupport=1
7. https://www.saddleback.edu/faculty/jzoval/mypptlectures/ch15_metabolism/lecture_notes_ch15_metabolism_current-v2.0.pdf
8. http://www.inf.ed.ac.uk/teaching/courses/csb/CSB_lecture_metabolic_pathways.pdf
9. http//www.gwu.edu/~mpb-metabolic pathways of biochemistry

COURSE OUTCOME

CO No.	CO statement	Knowledge level
CO1	Define various inborn errors of metabolism	K1
CO2	Outline the structure and classification of major biological macromolecules, specific micro molecules and enzymes	K2
CO3	Illustrate the major metabolic pathways and its interrelationship	K2
CO4	Outline the process of biological oxidation and metabolic release of energy	K2
CO5	Apply and relate the knowledge of biochemistry to nutrition, health and diseases	K3

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	3	3	2	3	2	3
CO3	3	3	3	2	2	2
CO4	2	2	2	2	2	2
CO5	3	3	3	3	3	3
AVERAGE	14	14	13	13	12	13

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

TEACHING METHODOLOGY

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

QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1	A-10X2 marks	50	20	**100**
K1. K 2	B-5/8x8 marks	Not exceeding 300	40	
K2, K 3	C-2/3x20 marks	Not exceeding 1500	40	

QUESTION PAPER TEMPLATE

ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008

(For candidates admitted from the academic year 2021)

B.Sc DEGREE EXAMINATION
II YEAR- IV SEMESTER

Title of the paper: NUTRITIONAL BIOCHEMISTRY **Max. Marks: 100**
Paper Code: ND21/4A/NBC// CN21/4A/NBC **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 –IV

NON MAJOR ELECTIVE

BASICS OF FOOD PRESERVATION

TOTAL HOURS: 30 Hours **COURSE CODE: CN21/4N/BFP**
CREDITS: 2 **L-T-P: 1-1-0**

COURSE OBJECTIVES

- ✓ To enable the students to learn the basic principles of food preservation.
- ✓ To help the students to perceive the simple methods of preparing fruit and vegetable based preserves.

COURSE OUTLINE

UNIT I: **Importance and principles of food preservation**, Methods of food preservation- traditional methods- salting, pickling, drying, jugging and potting. (10 HOURS)

UNIT II: **Preservation as sugar concentrate-** basic principles, pectin test and setting tests. Jam, Jelly and Marmalade- ingredients, equipment, preparation (any2) and storage.
Fruit Juice beverage – fruit juice, syrups, squashes and cordials- ingredients, equipment, preparation (any 2) and storage (10 HOURS)

UNIT-III: **Vegetable preserves**- pickles, chutneys, sauces and ketchup- preparation (any 2) and storage.
Packaging materials- types and functions (10 HOURS)

RECOMMENDED TEXT BOOKS

1. Jood S and Khetarpaul N, *Food preservation*, Agrotech Publishing, Udaipur, 2002

REFERENCE BOOKS

1. Manay S andSwamyM S, *Foods: Facts and Principles*, New Age International (P) Limited, Chennai, 2005
2. Puri R, *Jam Jelly Marmalade*, Sahni Publications, New Delhi, 2004

JOURNALS

1. Journal of food processing and preservation
2. The technology of food preservation

E-LEARNING RESOURCES:

http://ecoursesonline.iasri.res.in/mod/page/view.php?id=4037
https://www.britannica.com/topic/food-preservation
https://www.toppr.com/guides/evs/mangoes-round-the-year/food-spoilage/

https://en.m.wikipedia.org/wiki/Food_additive
https://en.m.wikipedia.org/wiki/Food_Safety_and_Standards_Authority_of_India

COURSE OUTCOMES

CO Number	CO STATEMENT	KNOWLEDGE LEVEL
CO 1	Define the various methods of food preservation.	K1
CO 2	Identify the different types of packaging materials	K3
CO 3	Explain the simple methods of preparing fruit and vegetable based preserves	K2

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO6	AVE
CO1	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3
AVERAGE	3	3	3	3	3	3	3

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

TEACHING METHODOLOGY

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

QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1, K2	A-10 X 5 marks	50	50	50

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

NON MAJOR ELECTIVE
II YEAR- IV SEMESTER

Title of the paper: Basics of Food Preservation **Max. Marks: 50**

Paper Code: CN21/4N/BFP **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 III &IV

HUMAN NUTRITION AND NUTRITION THROUGH LIFE CYCLE PRACTICAL

TOTAL HOURS: 45 Hours **COURSE CODE: ND21/4C/PR2 //CN21/4C/PR2**
CREDITS: 3 **L-T-P: 0-0-3**

COURSE OBJECTIVES

- ✓ To enable students to describe selected and relevant biochemical techniques related to nutrition
- ✓ To demonstrate practical skills necessary to conduct laboratory based tests
- ✓ To gain knowledge in planning diets for individuals-based on physical activity levels and income group- across the life cycle.
- ✓ To enable students to plan diets for specific deficiency states.

COURSE OUTLINE

HUMAN NUTRITION PRACTICAL

1. Quantitative Estimation of Reducing Sugar
2. Quantitative estimation of Calcium.
3. Quantitative estimation of Vitamin C.
4. Quantitative estimation of Phosphorous.
5. Quantitative estimation of Iron.
6. Assessment of BMR and Calorie requirement by factorial approach
7. Determination of Chemical Score for protein rich recipes

NUTRITION THROUGH LIFE CYCLE PRACTICAL

1. Preparation of Complementary feed.
2. Planning and preparation of diets for different activity levels and income group.
    a. Pre-school child
    b. School going children
    c. Adolescents
    d. Adult
    e. Expectant mother
    f. Nursing mother
    g. Old age
3. Planning and preparation of diets (low and medium cost) for deficiency diseases-

a. PEM
b. Vitamin A deficiency
c. Nutritional anemia

REFERENCES

1. Nielson S, *Food Analysis Laboratory Manual*, 3rd edition, Springer International Publishing, 2017
2. Longvah T, Ananthan R, Bhaskar K, Venkaiah K, *Indian Food Composition Tables*, National Institute of Nutrition, 2017
3. Abraham S, *Nutrition Through Lifecycle*, 1st edition, New age international publishers, New Delhi, 2016
4. Cheung PCK and Mehta BM (Eds), Handbook of Food chemistry, 1st edition, Springer-Verlag Berlin Heidelberg, 2015
5. James CS, *Analytical chemistry of Foods*, 1st edition Springer US, 1995

JOURNALS

1. Journal of Nutrition, health and food sciences.
2. American Journal of clinical nutrition

COURSE OUTCOME

CO No	CO Statement
	Human Nutrition
CO1	Estimate the amount of specific biological macro and micro molecules
CO2	Assess the energy requirements and evaluate the quality of protein rich recipes by chemical scoring method
	Nutrition Through Life cycle
CO3	Planning and Preparing diets for individuals across the life span
CO4	Developing indigenous, value added and low cost complementary feeds
CO5	Planning and Preparing suitable and sustainable diets for deficiency diseases.

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

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

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

SEMESTER –III & IV

MICROBIOLOGY & NUTRITIONAL BIOCHEMISTRY PRACTICAL

TOTAL HOURS: 30 Hours **COURSE CODE: ND21/4A/PR1// CN21/4A/PR1**
CREDITS: 2 **L-T-P: 0-0-2**

COURSE OBJECTIVES

Microbiology:

- ✓ To examine the microorganisms under the microscope.
- ✓ To perform simple tests to identify the microorganisms.
- ✓ Identify appropriate techniques for sterilization and infection.

Nutritional Biochemistry:

- ✓ To enable students to describe selected and relevant biochemical techniques
- ✓ To demonstrate practical skills necessary to conduct laboratory based tests

COURSE OUTLINE

MICROBIOLOGY PRACTICAL

1. Study of different equipment's in a microbiology lab
2. Safety practices in microbiology laboratory.
3. Microscope and its operations.
4. Observation of permanent slides to study the structural characteristics of algae, yeast, mould and bacteria.
5. Examination of organisms using simple staining technique.
6. Examination of organisms using gram staining technique.
7. Examination of motility of bacteria using hanging drop technique.
8. Demonstration of sterilization of glassware using hot air oven, autoclave (principles and operation).
9. Dye reduction test to assess the microbiological quality of milk.

NUTRITIONAL BIOCHEMISTRY PRACTICAL

1. Qualitative test for carbohydrates - glucose, fructose, lactose, maltose
2. Qualitative test for proteins - albumin, casein and gelatin
3. Qualitative test for individual amino acids-Tyrosine, Cysteine, Methionine,Tryptophan.
4. Qualitative test for minerals

REFERENCES

1. Nielson S, *Food Analysis Laboratory Manual*, 3rd edition, Springer International Publishing, 2017
2. Cheung PCK and Mehta BM (Eds), Handbook of Food chemistry, 1st edition, Springer-Verlag Berlin Heidelberg, 2015
3. Cappuccino J, Sherman, N, *Microbiology: A Laboratory Manual*, 10th edition, Pearson, 2013
4. Garg N and Garg KL, *Laboratory Manual of Food Microbiology*, 1st edition, KG Mukerji Publishers, 2010
5. James CS, *Analytical chemistry of Foods*, 1st edition Springer US, 1995

JOURNALS

1. Journal of clinical nutrition
2. Journal of microbiology

COURSE OUTCOME

CO No.	CO Statement	Knowledge Level
	Microbiology practical	
CO1	Learn techniques to identify and differentiate microorganisms	K1
CO2	Demonstrate and identify the best practices relating to sterilization and disinfection appropriate to various settings to promote healthy, safe and eco-friendly environment.	K2
	Nutritional biochemistry Practical	
CO3	Recall relevant principles and practical procedure for various analytical techniques	K4
CO4	Demonstrate analytical techniques	K1
CO5	Identify macro and micro nutrients based on qualitative analysis	K4

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

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

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

SEMESTER V
FOOD SERVICE MANAGEMENT I

TOTAL HOURS: 60 HOURS **COURSE CODE: ND21/5C/FS1 //CN21/5C/FS1**

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

COURSE OBJECTIVES

- ✓ To acquire knowledge on the various sectors of food service industry and food service systems
- ✓ To become skilled in planning and organizing the spaces for food service units.
- ✓ To familiarize with the classification and selection of equipment used in food service outlets
- ✓ To understand the concept of menu planning, standardization and portion control
- ✓ To develop skills in quantity food purchase and maintenance of store records.
- ✓ To get acquainted with the various styles of food service and etiquettes of food service personnel

COURSE OUTLINE

UNITI: **Food Service Industry**:

(a) Sectors of Food Service Industry:

Commercial sectors-hotels: classification, restaurants-classification, popular catering, fast food, take away, transport catering and outdoor catering. Non-commercial sectors-industrial catering, hospital catering, institutional catering and welfare catering-orphanages, prisons, old age homes and religious institutions

(b) Food service systems: conventional, commissary, cook chill/cook freeze and assembly serve.

(c) Trends in food service :production trends –ghost kitchen ,open kitchen, home kitchen , service and delivery trends-single service packaged meal, online food service , technology trends-touch less transactions, touch less equipment, QR code menus.

(20 HOURS)

UNITII: **Layout and Physical facilities:**

a)Planning and organizing of spaces: kitchen area, storage area and service area, concepts of work flow and work simplification technique

b) **Equipment:** definition, classification and factors considered in the selection of equipment. (10 HOURS)

UNITIII: **Menu Planning and Standardization:**

a) **Menu planning:** definition, functions of menu, types of menu, French classic menu, factors considered in menu planning, writing menu, menu display and effective use of leftovers.

b) **Standardization of recipes**: components, advantages and disadvantages of standardized recipes, methods of standardization, portion control. (10 HOURS)

UNITIV: **Food Purchase and Storage:**

a) **Food Purchase:** buying and receiving methods

b) **Food Storage**: types of storage and store records- requisition slips, order form, stock book, invoice, goods received book, inventories (10 HOURS)

UNITV: **Food and Beverage Service:**

a) Styles of Service: table service/ waiter service**,** assisted service, self-service, specialized service and single point service, rules for laying a table, waiting at table.

b) **Food service personnel:** basic technical skills, inter-personal skills, attributes of food and beverage personnel.

c) Computer application in foodservice. (10 HOURS)

RECOMMENDED TEXT BOOKS

1. Sethi M and Malhan S, *Catering Management An integrated approach*, 3rd edition, New age international publishers, New Delhi, 2015.
2. Sethi M, *Institutional Food Management*, 3rd edition, New age international publishers, New Delhi, 2015.
3. Singaravelavan R, *Food and Beverage Service,* 2nd edition, Oxford university press, 2018.

REFERENCEBOOKS

1. Cousins J, LillicrapDandWeekes.S,*Food and beverage service*, 9th edition, Hodder education,2014.
2. Rai.S.K,*Food and Beverage Service ,1st edition ,SBW publishers,2014*
3. Foskett D and Paskins P, *The theory of Hospitality and Catering*, 12th edition ,Hodder Education, UK, 2011
4. Jaiswal P, *Food Quality and safety*, CBS Publishers and Distributers Pvt Ltd, New Delhi, 2011
5. Bali PS, *Quantity food Production operations & Indian Cuisine,* Oxford University Press, New Delhi,2011
6. George B and Chatterjee S, *Food and beverage Service and Management*, JAICO,2010
7. Andrews .S, Food &Beverage Service,2nd Edition,Tata Mc Graw hill Education Private Ltd,2009
8. Kalsigsis C and Thomas C, *Design and equipment for food service -A management view*, John Wiley and sons limited,1999

9. Jones, P, *Introduction to hospitality operations (An Indispensable guide to the industry),*Cassell publications, London,1996
10. West B, and Wood, *Food service in institutions*, New York,1995
11. Nathaniel BS, *Catering management for hotels, restaurants, Institutions,*Sujeet publications, New Delhi,1991
12. JonesP, *Food service operations*, Cassell publications, London,1990

JOURNALS

1. Journal of food service management andresearch
2. Educationalresearch
3. Journal of foodservice

E-LEARNING RESOURCES

1. http//www.ccohs.ca/oshanswers/hsprograms/house.html
2. https://en.wikipedia.org/wiki/Foodservice
3. http://www.nfsmi.org/documentlibraryfiles/PDF/20080228031334.pdf
4. https://www.webstaurantstore.com/blog/2214/top-foodservice-trends.html

COURSE OUTCOME

CO No.	CO Statement	Knowledge level
CO1	Identify and differentiate the types of food service sectors.	K2 , K3
CO2	Sketch sample lay out of the food service units	K2,K3
CO3	Recognize the use and operation of equipment and acquire skills in the selection of equipment	K2,K3
CO4	Develop skills to formulate and standardize recipes from various cuisines.	K3,K6
CO5	Demonstrate the skills relating to food purchase, and store maintenance	K2
CO6	Distinguish various styles of service and identify the basic technical skills, and interpersonal skills required for food service	K4

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

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

CO5	3	1	3	3	3	3
C06	3	1	3	1	3	3
AVERAGE	3	1.2	3	2.3	3	3

Key: Strongly Correlated-3 Moderately Correlated-2 Weakly Correlated-1 No Correlation-0

Teaching Methodology

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

QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1	A-10X2 marks	50	20	**100**
K1. K 2	B-5/8x8 marks	Not exceeding 300	40	
K2, K 3	C-2/3x20 marks	Not exceeding 1500	40	

QUESTION PAPER TEMPLATE

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

B.Sc DEGREE EXAMINATION
IIIYEAR- V SEMESTER

Title of the paper: FOOD SERVICE MANAGEMENT I **Max. Marks: 100**
Paper Code: ND21/5C/FS1//CN21/5C/FS1 **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 V

HUMAN DEVELOPMENT AND FAMILY STUDIES

TOTAL HOURS: 75 Hours **COURSE CODE: ND21/5C/HDF // CN21/5C/HDF**
CREDITS: 4 **L-T-P: 4-1-0**

COURSE OBJECTIVES

To enable students to

- ✓ Understand the major concepts in human development
- ✓ Know about the birth process and lactation
- ✓ Gain insight into the problems of oldage.
- ✓ Develop a scientific attitude towards behavior pattern in individual, family and community life.

COURSE OUTLINE

UNIT I: **Prenatal development**- Conception- test tube baby, signs of pregnancy, stages of prenatal development - Prenatal care, management of normal pregnancy, hygiene, diet and medical supervision, multiple pregnancy Labor-signs and stages of labor, types of birth, post-natal care of mother, adjustments of new born to temperature, breathing, feeding and elimination. (15 HOURS)

UNIT II: **Infancy[birth to 2years]**: Development- physical, motor, social, emotional, cognitive and language, Effects of stimulation- care of infants - feeding, bathing, clothing, sleeping, toilet training and immunization. Maternal deprivation

Early childhood [2-6 years]: Development- physical, motor, social, emotional, cognitive and language.Importance of play and play activities, behaviour problems- causes and treatment. Paternal deprivation (15 HOURS)

UNIT III: **Late childhood [6-12 years]**: Development- physical, motor, social, emotional, cognitive,moral and language, styles of parenting.

Adolescence [12-18 years]: Development - physical, motor, social, emotional, moral and cognitive; adjustment problems; sex education (15 HOURS)

UNIT IV: **Adulthood [18-60 years]**- characteristics and developmental tasks, marriage and family as basic institution, functions of marriage, adjustments in marriage –-sex, finance, career, society and in-laws. family lifecycle-adjustment in different stages, critical family situations and its effect on children. (15 HOURS)

UNIT V: **Old age [60 years and above**]: physical and psychological changes, problems of the aged, family attitude towards the aged, place of the aged in Indian society. (15 HOURS)

Related experience

- Visit to a nursery school.
- A survey on adjustment problems between husband and wife
- Survey on in-law relationships
- Survey on problems of old age

RECOMMENDED TEXT BOOKS

1. Hurrlock EB, *Child development*, 6th edition, Tat Mcgraw hill education, New york, 1997
2. Devadas RP, Jaya N, *A Textbook on Child Development*, MacMillan India Ltd, New Delhi, 2003

REFERENCE BOOKS

1. Walsh BA, Weiser DA, DeFlorio L, and Burnham MM, 1st edition, *Introduction to Human Development and Family Studies*, Psychology Press, 2017
2. Beckett C, Taylor H, *Human Growth and Development*, 3rdedition, SAGE, 2016
3. Peterson GW, Bush KR, *Handbook of Marriage and the Family*, 3rd edition, Springer US, 2016
4. Sigelman CK and Rider EA, *Life-span Human development*, 8th edition, Cengage Learning, USA, 2015
5. McCarthy JR, Edwards R, *Key Concepts in family studies*, 1st edition reprint, SAGE publications, 2010
6. Santrock WJ, *Adolescence*, 11th edition, Tata Mcgraw hill education, New Delhi, 2007
7. Berk LE,*Child Development*, 6thEdition, Prentice Hall of India Pvt Ltd, New Delhi, 2003
8. Berk LE, *Child Development*, 3rd Edition, Prentice Hall of India Pvt Ltd, New Delhi, 2001
9. Menon KMK, Palaniappan, *Mudaliar and Menon's Clinical Obstetrics*, 9thEdition, Orient Longman, Chennai, 2000
10. Park K,*Textbook of Preventive and Social Medicine*, 14thEdition, Banarasidas Bharat Publishers, Jabalpur, 1995
11. Boss P, Doherty WJ, LaRossa R, Schumm WR, Steinmet SK, *Source book of Family Theories and Methods: A Contextual Approach*, Springer Science & Business Media, 1993

JOURNALS

1. Indian journal of human development
2. Indian Journal of social development

E-LEARNING RESOURCES

- https://www.alleydog.com/glossary/definition.php?term=Family+Studies
- https://www.parents.com/toddlers-preschoolers/development/behavioral/preschoolers-101-understanding-preschooler-development/
- https://my.clevelandclinic.org/health/articles/7060-adolescent-development
- https://en.m.wikipedia.org/wiki/Prenatal_development
- https://www.britannica.com/science/adulthood

COURSE OUTCOME

CO No.	CO Statement	Knowledge Level
CO1	Identify the major developmental milestones of individual across the lifespan in the areas of physical, social, emotional, cognitive and language development	K1&K3
CO2	Interpret inputs and insights regarding family – adjustments, critical situations	K2
CO3	Explain the psychosocial, economic and health issues of the aged in the current scenario.	K2&K5
CO4	Examine the prenatal and postnatal care of mother and child.	K4
CO5	Develop the skills in handling real life situations in order to face challenges and opportunities in life	K6

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO6	AVE
CO1	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3
CO5	1	3	3	3	3	3	2.6
AVERAGE	2.6	3	3	3	3	3	2.9

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

TEACHING METHODOLOGY

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

QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1	A-10X2 marks	50	20	**100**
K1. K 2	B-5/8x8 marks	Not exceeding 300	40	
K2, K 3	C-2/3x20 marks	Not exceeding 1500	40	

QUESTION PAPER TEMPLATE

ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008
(For candidates admitted from the academic year 2021)
B.Sc DEGREE EXAMINATION
III YEAR- V SEMESTER

Title of the paper: Human Development and Family Studies **Max. Marks: 100**
Paper Code: ND21/5C/HDF//CN21/5C/HDF **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 -V

BIOMARKERS IN CLINICAL NUTRITION

TOTAL HOURS: 75 Hours **COURSE CODE: CN21/5C/BCN**
CREDITS: 4 **L-T-P: 4-1-0**

COURSE OBJECTIVES

To enable the students

- ✓ To understand the basic metabolic processes in the body
- ✓ To learn the normal and abnormalities metabolic conditions in body
- ✓ To relate normal functioning with diseases conditions
- ✓ To diagnose diseases and to learn the diagnostic procedure for the same
- ✓ To learn about basic instrumentation used in analysis

COURSE OUTLINE

UNIT I: Basic concepts of instrumentation in nutrient separation and analysis, chromatography, electrophoresis and photo instrumentation-colorimeter, spectrophotometer and flame photometer. (15 HOURS)

UNIT II: Enzyme assays as a diagnostic tool in acute pancreatitis, liver damages, bone disorder, myocardial infarction and muscle wasting. Inborn Errors of metabolism–Phenylketonuria, Albinism, Galactosemia and Alcaptonuria (15 HOURS)

UNIT III: Liver function tests- basic concepts, LFT test based on bile pigment levels in blood and urine, plasma protein changes in liver diseases, differential diagnosis for jaundice. (15 HOURS)

UNIT IV: Basic description of kidney function tests- sugar, urea, creatinine and electrolytes in serum- creatinine clearance tests, phenol red test, serum uric acid, serum total protein, serum albumin, serum globulin, and AG ratio. (15 HOURS)

UNIT V: Test for Diabetes Mellitus:Fasting glucose, Postprandial glucose, IGT, OGTT,Initial glucose challenge test, HBA1C, Insulin sensitivity test, Fructosamine test (15 HOURS)

RECOMMENDED TEXT BOOKS

1. Ramasamyiyer S, *Handbook of Clinical Biochemistry*, 2nd Edition, World Scientific, 2011
2. Deb. A.C, *Fundamentals of Biochemistry*, 7th edition, New central book agency, Kolkata, 2001

REFERENCE BOOKS

1. Chawla R, *Practical Clinical Biochemistry Methods and Interpretations*, 1st edition, Jaypee brothers, 2014
2. Crook MA, *Clinical Biochemistry and Metabolic Medicine*, Eighth Edition, CRC Press, 2012
3. Ahmed N, *Clinical Biochemistry*, 1st edition, OUP Oxford, 2011
4. Deb. A.C, *Concepts of Biochemistry theory+ Practical*, Books and Allied Pvt ltd, 2007
5. Talwar G.P, Srivatsa L.N and Moudgil D, *Textbook of biochemistry and human biology*, 3rdedition, Prentice hall of India Pvt Ltd, New Delhi, 2003
6. Marshall WJ, Bangert SK, *Clinical Biochemistry: Metabolic and Clinical Aspects*, 1st edition, Churchill Livingstone, 1995

JOURNALS

1. American journal of clinical nutrition
2. Journal of clinical nutrition and metabolism

E-LEARNING RESOURCES:

1. https://www.youtube.com/watch?v=QVoicTVf4DA
2. https://www.youtube.com/watch?v=5nnY0aP0Xqg
3. https://www.youtube.com/watch?v=GncU_PxVX40
4. https://www.youtube.com/watch?v=5zj8JYdtep4
5. https://www.youtube.com/watch?v=tXVDY1HvrVU&t=32s

COURSE OUTCOME

S.No.	CO Statement	Knowledge level
CO1	Outline on the basic principles of various instruments used in analysis	K1
CO2	Discuss enzyme assays as diagnostic tools in diseased conditions	K2
CO3	Describe inborn errors of metabolism	K2
CO4	Apply basic concepts of liver and kidney function test in diagnosis and interpretation	K3
CO5	Examine and assess various diagnostic test in diabetes mellitus	K4 & K5
CO6	Compose recent biomarkers used as diagnostic tool in nutrition	K6

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	2	2
CO2	3	3	3	3	3	3
CO3	2	2	2	2	2	2
CO4	3	3	3	3	3	3
CO5	3	2	2	3	2	2
CO6	3	3	3	3	3	3
AVERAGE	17	16	16	17	15	15

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

TEACHING METHODOLOGY

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

QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1	A-10X2 marks	50	20	**100**
K1. K 2	B-5/8x8 marks	Not exceeding 300	40	
K2, K 3	C-2/3x20 marks	Not exceeding 1500	40	

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

B.Sc DEGREE EXAMINATION
IIIYEAR- V SEMESTER

Title of the paper: Biomarkers in Clinical Nutrition **Max. Marks: 100**
Paper Code: CN21/5C/BCN **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 V

MEDICAL NUTRITION THERAPY I

TOTAL HOURS: 75 Hours **COURSE CODE: CN21/5C/MT1**
CREDITS: 4 **L-T-P: 3-2-0**

COURSE OBJECTIVES

- ✓ To define the etiology, symptoms and metabolic changes of diseases
- ✓ To demonstrate their understanding of the facts and ideas in identifying the nutritional implications of various diseases .
- ✓ To apply their knowledge and identify the techniques of planning, preparation and execution of therapeutic diets
- ✓ To analyse and examine the severity of malnourishment associated with the specific comorbid conditions based on their observation
- ✓ To assess the nutritional status and decide and choose the appropriate dietary modification
- ✓ To formulate and administer appropriate dietary modifications and counseling for the patients.

COURSE OUTLINE

UNIT I: **Basic Concepts:** Definition of terms – Health, Recommended Dietary Allowances (RDA) and Balanced Diet (Review)
Therapeutic Diet: Routine Hospital Diets: Clear fluid, Full fluid, Semisolids, Soft diet and Regular diet. Different methods of feeding: Oral Feeding, Tube feeding and parenteral feeding
Nutrition Care Process (NCP): Nutritional Assessment of Patients, Psychology in feeding patient, Steps in diet counseling, Patient education and Follow up;NCP team, Classification of Dietitian and responsibility of Dietitian. (15 HOURS)

UNIT II: **Diet in Fevers and Infection:**Fever – Definition, Classification of fevers, Causes and Dietary management in Influenza, Typhoid, Malaria, Tuberculosis and Dengue
Diet in Food Allergy: Food Allergy- Definition, Classification, Common food allergies, tests and dietary treatment- Elimination Diets (15 HOURS)

UNIT III: a) **Nutrition in Weight management:** Etiology, symptoms, dietary management and complications in Obesity and Underweight.
b) Gout- Nature and occurrence of uric acid, causes, symptoms and dietary management (10 HOURS)

UNIT IV: **Diseases of the Gastrointestinal tract**- Etiology, Symptoms and dietary management in diarrhea, constipation, gastritis, peptic ulcers, colitis, mal absorption syndrome – tropical sprue, celiac disease and lactose intolerance. (20 HOURS)

UNIT V: **Diseases of the liver, gall bladder, and Pancreas**- Etiology, symptoms, nutritional implication and dietary management of Hepatitis, Cirrhosis, Hepatic Coma, Cholecystitis, Cholelithiasis and Pancreatitis. (15 HOURS)

RECOMMENDED TEXT BOOKS

1. Srilakshmi B, *Dietetics*, sixth edition, New age Publishing Press, New Delhi, 2011
2. Whitney EN and Rolfes SR, *Understanding Nutrition*, 9th edition, West/Wordsworth, 2002

REFERENCE BOOKS

1. Elia M, Ljunggvist O, Stratton RJ, Lanham SA, Clinical Nutrition (The Nutrition Society Textbook), 2nd edition, Wiley Blackwell Publishers, 2013
2. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13th Edition, Elsevier Saunders, Missouri, 2012
3. Stump SE, *Nutrition and diagnosis related care*, 7th edition, Lippincott Williams and Wilkins, Canada, 2012
4. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., Nutritive value of Indian foods, NIN, Hyderabad, 2010
5. Srilakshmi B, *Dietetics*, sixth edition, New age Publishing Press, New Delhi, 2011.
6. Marian M et al., Clinical Nutrition for surgical patients, Jones and Bartlett Publishers, Canada, 2008
7. Joshi Y.K, Basics of Clinical Nutrition, 2nd edition, JP Medical Publishers Pvt Ltd, New Delhi, 2008
8. Stacy N, *William's Basic Nutrition and Diet Therapy*, 12th edition, Elseivier publications, UK, 2005
9. Gibney MJ, Elia M, Ljunggvist O, Clinical Nutrition (The Nutrition Society Textbook) Wiley Blackwell Publishers, 2005
10. Whitney EN and Rolfes SR, *Understanding Nutrition*, 9th edition, West/Wordsworth, 2002
11. Guthrie H, Introductory Nutrition, CV Mosby Co.St. Louis, 2002
12. Williams SR, Nutrition & Diet Therapy, CV. Mosby St. Louis, 2001
13. Garrow et al, Human Nutrition & Dietetics, 10th Edition, Churchill Livingston, 2001

JOURNALS

1. Indian journal of nutrition and dietetics
2. JAMA

E-LEARNING RESOURCES

1. www.nal.usda.gov – Food & Nutrition Information Centre.
2. www.eatright.org – American Dietetic Organisation.
3. www.nin.org- National Institute of Nutrition, Hyderabad, India
4. www.icmr.org – Indian Council for medical Research

COURSE OUTCOME

CO.NO	CO Statement	Knowledge
CO1	Recall and list the predisposing factors, symptoms of diseases and the metabolic derangements during various clinical conditions for their effective management	K1
CO2	Interpret and describe the role of specific nutrients and analyse systematically the effect of deficiency in management of diseases	K2 &K3
CO3	Implementation of skills in planning and formulate dietary recommendations appropriate to the clinical condition	K3 &K4
CO4	Analyze the biochemical parameter ,decide appropriate nutritional requirement and recommend dietary treatment	K4 & K5
CO5	Assess the nutritional status and determine effective dietary management to combat malnutriton	K5
CO6	Compile the subjective and objective assessment and administer diets to prevent and control the progression of diseases.	K6

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	3	2	2
CO2	3	3	3	2	2
CO3	2	3	3	2	2
CO4	3	3	2	2	2
CO5	3	3	3	2	3
AVERAGE	2.8	3	2.8	2.0	2.2

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

TEACHING METHODOLOGY:

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

QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1	A-10X2 marks	50	20	**100**
K1. K 2	B-5/8x8 marks	Not exceeding 300	40	
K2, K 3	C-2/3x20 marks	Not exceeding 1500	40	

QUESTION PAPER TEMPLATE
ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008
(for candidates admitted during the academic year 2021-2022)
B.Sc DEGREE EXAMINATION
III YEAR- V SEMESTER

Title of the paper: MEDICAL NUTRITION THERAPY I **Max. Marks: 100**
Paper Code: CN21/5C/MT1 **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 V

INTERIOR DESIGNING IN CLINICAL SETTING

ELECTIVE 1

TOTAL HOURS: 75 Hours **PAPER CODE: CN21/5E1/ IDC**
CREDITS: 5 **L-T-P: 4-1-0**

COURSE OBJECTIVES

✓ To gain understanding of the basic art principles and to develop aesthetic sense for better patient health outcome

✓ To learn to make good colour combinations in the interiors of outpatient and inpatient setup

✓ To understand the need to implement better interior hospital outlook and improvise patient health care facilities

COURSE OUTLINE

UNIT I **Art of interior design in clinical setup:**

a) Objectives of Interior design; Basic concepts of Interior Design – Types and characteristics of design, Elements and Principles of design
b) Application of elements and principles of interior design in clinical set up- Planning and Designing the interiors for different areas. (15 HOURS)

UNIT II **Colour Schemes and Lighting in improving hospital ambience**

a) Introduction to qualities of colour, prang colour chart, colour harmony; Lighting: principles, types of lighting and choice of appropriate lighting in rooms
b) Application of colour schemes and lighting in designing different rooms and hospital service areas. Developing the colour scheme and a suitable lighting for the interiors. (15 HOURS)

UNIT III **Selection of Furniture, Furnishings and Accessories**

(a) Furniture: types and factors considered in selection of furniture; Furnishing materials: types; factors considered in selection of furnishings; Floor coverings: types; Window treatment: types; Accessories: types, use and care
(b) Arrangement of furniture in different rooms and areas and Use of furnishings and accessories in clinical set up – Practical Application. (15 HOURS)

UNIT IV **Patient Care in Clinic and Hospitals**

a) Introduction to patient care – Meaning and Importance; Patient Care Process involved in hospitals- Inpatient and outpatient protocol**,** need based patient approach and follow up; Health care delivery system in the hospital-Support and utility services.
b) Role of Medical tourism- - Advantages of health care system in India in terms of -Patient care, diagnosis, medical expertise, treatment and cost effectiveness. (15 HOURS)

UNIT V **Nutrition Support Services for Patient**

Role of Nutrition Support Services in Patient Care; Organization, coordination with food and beverage department and management of nutrition support services – Planning and delivery of menus. (15 HOURS)

RECOMMENDED TEXT BOOKS

1. Seetharaman P, Pannu P, *Interior Design and Decoration*, 1st Edition, CBS Publishers and DistributorsPvt Ltd, New Delhi, 2015.
2. B.M.Sakhar kar , Principles of Hospital Administration and planning,Japyee Brothers, New Delhi
3. S.L. Goel, Health care System & Management, Deep and Deep Publisher, New Delhi

REFERENCE BOOKS

1. Wildhide E, *The Interior Design Directory*, 1st Edition, Quardrille Publishing Ltd, 2009
2. Khanna G, *Art of Interior Design*, 1st Edition, Indica Publishers, 2005
3. Murphy B, Flawless Interior Decorating,1st Edition, McGraw Hill Publications NY, 2005
4 Norman Metzger, Handbook of Health care human resource Management, 2nd edition, Aspen publicationInc. Rockville,Maryland, USA,2015 .

JOURNALS

1. Journal of interior design
2. Interior -Designs, architecture and culture
3. Journal of health care management

E-LEARNING RESOURCES

https://www.thespruce.com/basic-interior-design-principles-1391370
http://launchpadacademy.in/elements-of-interior-design-2/amp/#aoh=15745888091844&referrer=https%3A%2F%2Fwww.google.com&_tf=From%20%251%24s http://59.90.94.166/1Yr/home/402Fashion/paper3/unit2.pdf
https://www.cityflowers.co.in/blog/9-types-popular-classic-flower-arrangement-styles/
https://hmhub.me/housekeeping-in-other-institutions/
https://existek.com.blog
https:// light-it.net

COURSE OUTCOMES

CO No.	CO Statement	Knowledge Level
CO1	Outline the universality of principles and elements of design	K1
CO2	Explain the basic concepts in the selection and types of furniture, furnishings, floor coverings and accessories	K2
CO3	Apply the colour and lighting principles in designing interiors	K3
CO4	Analyse the scope of various styles of flower arrangement	K4
CO5	Examine the quality and safety aspects of hospital	K2
CO6	Explore various information management systems and relative supportive services.	K6

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	1	3	3
CO4	3	1	3	3	3	3
CO5	3	3	3	1	3	3
CO6	3	3	3	1	3	3
AVERAGE	3	2.7	3	2	3	3

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

TEACHING METHODOLOGY

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

QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1	A-10X2 marks	50	20	100
K1.K2	B-5/8x8 marks	Not exceeding 300	40	
K2,K3	C-2/3x20 marks	Not exceeding 1500	40	

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

B.Sc DEGREE EXAMINATION
III YEAR- V SEMESTER

Title of the paper: Interior Designing in Clinical Setting **Max. Marks: 100**
Paper Code: CN21/5E1/IDC **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 V

GENDER PERSPECTIVES IN HEALTH CARE

ELECTIVE 1

TOTAL HOURS:75 hours **PAPER CODE : CN21/5E1/GPH**
CREDITS: 5 **L-T-P:4-1-0**

COURSE OBJECTIVES

- ✓ To introduce the gender related perspectives of health
- ✓ To impart knowledge on gender discrimination associated under nutrition problems of children and adult women
- ✓ To enable the students to gain an insight and understand the need for gender sensitive health care services.

COURSE OUTLINE

UNIT 1: **Gender and Development** - and empowerment.
Understanding the significance. Concept of gender, comprehensive definition and dimensions of health. Changing trends in health sector - gender inequality, gender analysis and framework to shift from gender welfare to development of gender in National development through women's health movement and initiatives by State, National and International organisations. (10 HOURS)

UNIT II: **Survey Analysis on Gender related health issues in India** . Retrospective survey analysis of gender, nutrition and health-based data from the fact sheets of National Family Health Surveys (NFHS), National Sample Surveys (NSS) and Indian Human Development surveys of India, National Nutrition Monitoring Bureau (NNMB).
(20 HOURS)

UNIT III: **Gender and Nutrition related poverty**-Gender Discrimination and under nutrition at the household level. Poverty induced nutritional insufficiency affecting men and women, social exclusion of women causing denial and limited health care access. Health indicators of Women and Child Health – Maternal and Antenatal care, perinatal care determining mortality, morbidity, reproductive -infertility, menstrual problems and mental health issues-post-partum depression in women.
(15 HOURS)

UNIT IV: **Social Determinants of Health (**SDH) **in the Indian context-** Social gradient of income, health and illness. Importance of health seeking behaviour- social stigma, individual health perception, socio-cultural, socio-economic determinants and role of family in influencing the gender health status and its outcome. (15 HOURS)

UNIT V: **Policy Making in the upgradation of Gender based Health Care -** Identification of gender gap areas, Equity in resource allocation, Government policies and programmes pertaining to women's health & development in India and Tamil Nadu in particular. Setting Millennium development goals (MDG) and Sustainable Development Goals (SDG). Participation of civil society in capacity building, evidence building, monitoring of gender- based policies and their evaluation. (15 HOURS)

RECOMMENDED TEXT BOOKS

1. Sagar, Rajiv (2012)Women Health and Social Issues, Cybertech Publishers , New Delhi.
2. Himanshu and Prashant (2016) HEALTH Economics in India , New century Publishers New Delhi,

REFERENCE TEXT BOOKS

1)Agarwal, Suresh. 2015. *Social Problems in India.* New Delhi: Rajat Publications.
2)Deshpande, Ashwini. 2011. *The Grammar of Caste: Economic Discrimination in Contemporary India.* New Delhi: Oxford University Press.
3) Rhode, Deborah L. 2014. *What Women Want: An Agenda for the Women's Movement.* Ne York: Oxford University Press.
4) Evans, Mary& Carolyn H. Williams (ed). 2015. *Gender: The Key Concepts.* New York:

JOURNAL

- Journal of gender and health Journal of women's health

E- LEARNING RESOURCES

- www.who.int/gender/en www.tandofonline.com journals,sagepub.com
- International Institutes for Population Sciences (IIPS) National Family Health Survey (NFHS-3), India, 2005-06.
- (NFHS-4) 2015-2016 Mumbai: IIPS.

COURSE OUTCOME

CO Number	CO STATEMENT	KNOWLEDGE LEVEL
CO 1	Understand the importance and the role of Gender in availing the health care services	K1
CO 2	Illustrate the different survey data sets available to assess the health related information in tables and graphs .	K2
CO 3	Describe the importance of gender in poverty related undernutrition leading to health issues	K3
CO 4	Assess and analyse the factorial determinants of gender based health seeking behaviour	K4 & K5
CO 5	Integrate the aspects of health gender and nutrition in policy making to understand gender based health care	K5&K2
CO6	Compile the secondary data to depict the health issues	K4 & K5

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

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

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

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

B.Sc DEGREE EXAMINATION
III YEAR- V SEMESTER

Title of the paper: Gender Perspectives in Health Care **Max. Marks: 100**
Paper Code: CN21/5E1/GPH **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 V

SELF STUDY COURSE/ADVANCED LEARNER COURSE

HEALTH PSYCHOLOGY *

Paper code: **CN18/5SS/HEP** **Credits: 2**

Course objectives

- ✓ To understand the basic concepts of human behavior and health psychology
- ✓ To gain insight into the psychological and psycho-social factors that affect health
- ✓ To understand the psychological approaches to illness
- ✓ Overview of health interventions relating to diseases

Course Outline

UNIT I: Foundation of Health psychology – Definition – Health and Health Psychology, Mind Body Relationships, Need for Health Psychology, Bio psycho social model in health psychology.

UNIT II: Health behavior- Health Enhancing Behaviors- Exercise, Healthy Eating Practices, Sleep, Weight Management and Health Screening. Health Compromising Behaviors – Alcoholism, Eating Disorders, Smoking.

UNIT III: Stress - Physiology of stress, sources of stress, coping with stress, factors affecting stress and Stress Management.

UNIT IV: Management of chronic illness- Quality of Life, Emotional responses to chronic illness- CVD, Diabetes mellitus and Cancer, coping with chronic illness, patient education, social support interventions and family support.

UNIT V: Intervention strategies- Rational Emotive Behavioral therapy, Cognitive Behavioral Therapy –Trans theoretical Model of behavior change.

RECOMMENDED TEXTBOOK

1. Taylor ES. Health Psychology (2006) 6th Edition, Tata Mc Graw Hill Publishers New Delhi.

REFERENCES

1. Capuzzi D, Gross DR. Counseling and Psychotherapy – Theories and Interventions (2007) 4th Edition, Pearson Prentics Hall Publishers.
2. Brannon L, Feist J. Introduction to Health Psychology (2007) Akash Press, New Delhi.

3. Richard.O. Straub. Health Psychology: a biophysical Approach (2016) 5th edition,Worth Publishers.

JOURNAL

1. Journal of Indian Health Psychology
2. Journal of Health Psychology
3. International Journal of Clinical and Health Psychology

***Criteria for Advanced Learner** –

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

COURSE OUTCOMES

1. Identify the importance of health psychology in enhancing well being.
2. Learn strategies to foster positivity and wellness.
3. Outline the relevance of various intervention strategies in the current health scenario.

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	1	3	3
CO4	3	1	3	3	3	3
CO5	3	3	3	1	3	3
CO6	3	3	3	1	3	3
AVERAGE	3	2.7	3	2	3	3

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

QUESTION PAPER PATTERN

Knowledge level	Section	Word limit	Marks	Total
K1	A – 10x2 marks	50	20	100
K1, K2	B – 5/8x8 marks	200	40	
K2, K3	C – 2/4 x20 marks	Not exceeding 1500	40	

SEMESTER VI

FOOD SERVICE MANAGEMENT II

TOTAL HOURS: 60 Hours **COURSE CODE:ND21/6C/FS2//CN21/6C/FS2**
CREDITS: 4 **L-T-P:3-1-0**

COURSE OBJECTIVES

- ✓ To understand the principle, functions and tools of organization management
- ✓ To gain knowledge on basic concepts of human resource management
- ✓ To study the basics of financial management
- ✓ To foster entrepreneurship skills and trading.
- ✓ To gain an insight into the basic principles of hygiene and safety in the food service

COURSE OUTLINE

UNIT I: **Organization management**

(a)Types of organization-line, line and staff, functional
(b)Principles and functions of management
(c)Tools of management-Tangible tools-organization chart, job description ,job specification, job analysis, work schedule, Intangible tools-budget, leadership styles, decision making, communication skills.

(10HOURS)

UNIT II: **Human Resource Management**:

(a)Recruitment, selection, induction, training, supervision, performance appraisal, promotion, demotion, transfer, retirement, termination and dismissal of employees.
(b) Labor laws pertaining to the food service establishment

(10HOURS)

UNIT III: **Financial Management:**

(a)Elements of cost- food cost, labor cost and overhead cost.
(b)Book of Accounts – journal, ledger, difference between journal and ledger, subsidiary books
(c)Basic concept of book keeping: meaning, objectives, types- single entry and double entry system of book keeping, advantages and disadvantages, trial balance and balance sheet break- even analysis- definition, components, advantages and disadvantages
Food cost pricing: methods of pricing and factors affecting pricing.

(15HOURS)

UNIT IV: **Entrepreneurship in catering**:

a. Entrepreneurship–concept and significance
b. Entrepreneur-definition, characteristics and classification
c. Food start up –Start -up process -steps, opportunities and challenges ,problems faced by women entrepreneurs

(15 HOURS)

UNIT V: **Sanitation, hygiene and safety:**

a) Hygiene and sanitation: personal hygiene, food hygiene-food safety practices though the production cycle, HACCP- principles, application, advantages

b) Environmental hygiene-pest control-types of pests and pest control methods; garbage disposal method.

c) Accidents –causes and prevention. (10HOURS)

RECOMMENDED TEXT BOOKS

1. Sethi M and MalhanS,*Catering Management An integrated approach*, 3rd edition, New age international publishers, New Delhi,2015
2. SethiM,*Institutional Food Management*, 3rd edition, New age international publishers, New Delhi,2015
3. Singaravelavan R, *Food and Beverage Service,* 2nd edition, Oxford university press,2018
4. Sudhamatmi and Premnath, *Entrepreneurship*, 2nd edition,Shanlax Publications, 2019

REFERENCEBOOKS

1. Cousins J, Lillicrap D and Weekes.S,*Food and beverage service*, 9th edition, Hodder education,2014.
2. Desai.V and Kulveer.K,*Entrepreneurship development and management*, Himalaya Publishing house, 2013
3. Rai.S.K,*Food and Beverage Service ,1st edition ,SBW publishers,2014*
4. Foskett D and Paskins P, *The theory of Hospitality and Catering*, 12th edition ,Hodder Education, UK, 2011
5. Jaiswal P, *Food Quality and safety*, CBS Publishers and Distributers Pvt Ltd, New Delhi, 2011
6. Bali PS, *Quantity food Production operations & Indian Cuisine*, Oxford University Press, New Delhi,2011
7. George B and Chatterjee S, *Food and beverage Service and Management*, JAICO,2010
8. Andrews .S, Food &Beverage Service,2nd Edition,Tata Mc Graw hill Education Private Ltd,2009
9. Kalsigsis C and Thomas C, *Design and equipment for food service -A management view*, John Wiley and sons limited,1999
10. Jones, P, *Introduction to hospitality operations (AnIndispensable guide to the industry),*Cassell publications, London,1996
11. West B, and Wood, *Food service in institutions*, New York,1995

12. Nathaniel BS, *Catering management for hotels, restaurants, Institutions,*Sujeet publications, New Delhi,1991
13. JonesP, *Food service operations*, Cassell publications, London,1990

JOURNALS

1. Journal of food service business research
2. Educational research
3. Journal of foodservice

E-LEARNING RESOURCES

1. http//www.ccohs.ca/oshanswers/hsprograms/house.html
2. https://en.wikipedia.org/wiki/Foodservice
3. http://www.nfsmi.org/documentlibraryfiles/PDF/20080228031334.pdf

COURSE OUTCOME

CO No.	CO Statement	Knowledge Level
CO1	Apply the principles , tools of managementto ensure for effective functioning of organization	K3
CO2	Develop the managerial skills to select , train, appraise human resources	K3
CO3	Use the basic concept of book keeping and elements of cost to assess the financial viability of the organization	K3
CO4	Identify the entrepreneurial ventures in food production and service.	K3,K5
CO5	Evaluate and implement food safety and environmental sanitation in the work space	K3,K5

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

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

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

TEACHING METHODOLOGY

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

QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1	A-10x 2 marks	50	20	**100**
K1. K 2	B-5/8x8 marks	Not exceeding 300	40	
K2, K 3	C-2/3x20 marks	Not exceeding 1500	40	

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

B.Sc DEGREE EXAMINATION
III YEAR- VI SEMESTER

Title of the paper: FOOD SERVICE MANAGEMENT II **Max. Marks: 100**

Paper Code: ND21/6C/FS2//CN21/6C/FS2 **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 VI

MEDICAL NUTRITION THERAPY II

TOTAL HOURS: 75 Hours **COURSE CODE: CN21/6C/MT2**
CREDITS: 4 **L-T-P: 3-2-0**

COURSE OBJECTIVES

- ✓ To gain knowledge on the various physiological ,metabolic and nutritional changes that occur in various communicable and non-communicable diseases conditions
- ✓ To understand the etiology , classification symptoms and prevention of acute and chronic diseases
- ✓ To assess the nutritional status to know the disease prognosis and the ways to combat the abnormality
- ✓ To apply nutritional guidelines and principles in administering appropriate dietary recommendations to the subjects and improve their nutritional status
- ✓ To demonstrate their professional skill obtained to alleviate the symptoms and nutritional deficiencies arising thereof by appropriate execution of diet.
- ✓ To impart diet counseling to alleviate and cure communicable and non communicable diseases.

COURSE OUTLINE

UNIT I: **Diet in Diabetes Mellitus:**
Diabetes Mellitus- Incidence and predisposing factors, symptoms, types and tests for detection, insulin and its types, Hypoglycemic agent, Dietary management of Pre-diabetes, Type I DM and Type II DM and Complications of diabetes- Acute and Long term. Glycemic Index& Glycemic Load- Definition, Low Glycemic Foods in the treatment of Diabetes. (15HOURS)

UNIT II: **Diet in Cardiovascular Disorders:** Incidence, etiology, symptoms, role of specific nutrients, dietary management in hypertension and atherosclerosis.
Hyperlipidemia: Definition, Classification of lipoprotein, Types of hyperlipidemia and dietary management. (15 HOURS)

UNIT III: **Diet in Renal diseases:** Basic renal function - etiology, symptoms, nutritional implications and dietary treatment of Nephritis, Nephrosis and End stage Renal Disease. Dialysis: Types of dialysis, Dietary treatment for dialysis patient. Kidney transplantation: Screening of patient and donor, dietary treatment for kidney transplanted patient. Urolithiasis and Nephrolithiasis: types of stones and dietary management. (20 HOURS)

UNIT IV: **Nutrition in Critical Conditions:**
Diet in Burns – Definition, Classification of Burns, Metabolic alterations, Rule of nines and Dietary management in Burns

Diet in Surgery – Pre operative and Post-operative diets.

(10 HOURS)

UNIT V: **Nutrition and Cancer**: Etiology, Pathophysiology, Stages in carcinogenesis, Nutrients for Cancer Prevention, Medical Nutrition therapy and Nutritional impact of Cancer Treatment

Food & drug interaction: Effect of drugs on food and nutrition-nutrient absorption, nutrient metabolism and nutrient excretion, Modification of drug action by food and nutrients. (15 HOURS)

RECOMMENDED TEXT BOOKS

1. Srilakshmi B, *Dietetics*, sixth edition, New age Publishing Press, New Delhi, 2011
2. Stacy N, *William's Basic Nutrition and Diet Therapy*, 12th edition, Elseivier publications, UK, 2005.

REFERENCE BOOKS

1. Elia M, Ljunggvist O, Stratton RJ, Lanham SA, Clinical Nutrition (The Nutrition Society Textbook), 2nd edition, Wiley Blackwell Publishers, 2013
2. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13th Edition, Elsevier Saunders, Missouri, 2012
3. Stump SE, *Nutrition and diagnosis related care*, 7th edition, Lippincott Williams and Wilkins, Canada, 2012
4. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., Nutritive value of Indian foods, NIN, Hyderabad, 2010
5. Srilakshmi B, *Dietetics*, sixth edition, New age Publishing Press, New Delhi, 2011.
6. Marian M et al., Clinical Nutrition for surgical patients, Jones and Bartlett Publishers, Canada, 2008
7. Joshi Y.K, Basics of Clinical Nutrition, 2nd edition, JP Medical Publishers Pvt Ltd, New Delhi, 2008
8. Stacy N, *William's Basic Nutrition and Diet Therapy*, 12th edition, Elseivier publications, UK, 2005
9. Gibney MJ, Elia M, Ljunggvist O, Clinical Nutrition (The Nutrition Society Textbook) Wiley Blackwell Publishers, 2005
10. Whitney EN and Rolfes SR, *Understanding Nutrition,* 9th edition, West/Wordsworth, 2002
11. Guthrie H, Introductory Nutrition, CV Mosby Co.St. Louis, 2002
12. Williams SR, Nutrition & Diet Therapy, CV. Mosby St. Louis, 2001
13. Garrow et al, Human Nutrition & Dietetics, 10th Edition, Churchill Livingston, 2001

JOURNALS

1. Journal of clinical nutrition and dietetics

2. Nutrition in clinical practice.

E-LEARNING RESOURCES

1. www.nal.usda.gov – Food & Nutrition Information Centre.
2. www.eatright.org – American Dietetic Organisation.

3. www.nin.org- National Institute of Nutrition, Hyderabad, India
4. www.icmr.org – Indian Council for medical Research.

COURSE OUTCOME

CO.NO	CO Statement	Knowledge
CO1	Aquaint and analyse systematically the various metabolic changes in the diseased organs and understand the nutritional implications of the diseases	K1 &K2
CO2	Critically analyse the symptoms and complications of chronic disease conditions and determine the dietary intervention to be employed .	K2
CO3	Apply the knowledge base and professionally demonstrate the skill acquired in assessing the nutritional status of the individuals and evaluate the extent of deficiencies.	K3
C O4	Analyze the symptoms and biochemical parameters to understand the severity of the disease for effective administration of diet therapy	K4 & K5
CO5	Decision to execute and evaluate appropriate dietary modification in the management of the disease and its impact on the nutritional status	K5

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	2	2	2
CO2	2	3	3	3	2
CO3	2	3	3	3	2
CO4	3	3	3	2	3
CO5	2	3	3	2	3
AVERAGE	2.4	3	2.8	2.4	2.4

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

TEACHING METHODOLOGY:

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

QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1	A-10X2 marks	50	20	**100**
K1. K 2	B-5/8x8 marks	Not exceeding 300	40	
K2, K 3	C-2/3x20 marks	Not exceeding 1500	40	

QUESTION PAPER TEMPLATE

ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI-600008
(for candidates admitted during the academic year 2021)
B.Sc DEGREE EXAMINATION
III YEAR- VI SEMESTER

Title of the paper: MEDICAL NUTRITION THERAPY II **Max. Marks: 100**
Paper Code: CN21/6C/MT2 **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 VI

PUBLIC HEALTH NUTRITION

TOTAL HOURS: 75 Hours **COURSE CODE: ND21/6C/PUB// CN21/6C/PUB**
CREDITS: 4 **L-T-P: 4-1-0**

COURSE OBJECTIVES

- ✓ To sensitize students to public health inequities of the country in terms of nutrition and its role in national development, focusing on maternal and child nutrition in keeping with sustainable development goals.
- ✓ To create awareness of various national and international agencies involved in health and nutrition and nutritional intervention programs concerned with public health in India.
- ✓ To integrate the biological and social factors affecting health and develop intervention programmes aimed at a positive impact on the nutritional status of the community, balancing the socio-cultural milieu.

COURSE OUTLINE

UNIT I: Nutrition and Health in National Development; Nutritional problems confronting our country; Malnutrition - Causes and Ecological factors, Food and Nutrition Security - PDS, Food production, Balance between food and population growth, Sustainable Development Goals, Sustainable diets. (15 HOURS)

UNIT II: A) Health Indicators - Mortality, Morbidity, Disability, Nutritional status, Environmental and Socio-Economic indicators. Nutritional Assessment Methods- Anthropometry, Biochemical estimations, Clinical and Dietary assessment.

B) Infectious disease Epidemiology - Modes of disease transmission, prevention and control. Types of immunity and immunizing agents (Review) Immunization and its importance- National immunization policy, Role of Nutrition and Infection. (10 HOURS)

UNIT III: A) National Nutrition Programmes to combat malnutrition: Prophylactic programs – Vitamin A, Iron & Folic acid, Iodine, Pulse Polio, Revised National Tuberculosis Control Programme- DOTS, National AIDS control Programme, ICDS, School feeding Programmes. (15 HOURS)
B) National and International agencies in Community Nutrition: FAO, WHO, UNICEF, ICMR, ICAR, NIN, CFTRI, MSSRF, Food & Nutrition Board, Social Welfare Boards – Central & State. (15 HOURS)

UNIT IV: A) Maternal and Child Health – RMNCAH program- Life cycle approach, 1000 days window period, growth monitoring.

B) Importance of Breast feeding: Promotion of successful breastfeeding, Government policies, Exclusive Breastfeeding, Wet nursing, Breast milk banks, IMS Act; Weaning foods: Planning, Formulating and preparation; Importance of correct and timely weaning, Low cost complementary foods. (10 HOURS)

UNIT V: A) Nutrition Education Program: Objectives, Planning, Implementation and Evaluation; Communication Strategies – Role of Audio visual aids

B) Recent advances in Community Nutrition; Food Fortification and Enrichment; Nutrition Intervention during Emergencies. (10 HOURS)

Related Experiences: A) Assessment of Nutritional status of vulnerable groups
B) Nutrition Education Programme for vulnerable groups

RECOMMENDED TEXT BOOKS

1. ChanderVir S, Public Health Nutrition in developing countries, Part I, 1st edition, Woodhead Publishing, New Delhi, 2011.
2. Park K, Park's Textbook of preventive medicine, 2005.
3. Bamji, M. Textbook of Human Nutrition, Oxford publishers, New Delhi, 2010

REFERENCE BOOKS

1. ChanderVir S, Public Health Nutrition in developing countries, Part II, 1st edition, Woodhead Publishing, New Delhi, 2011
2. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., Nutritive value of Indian foods, NIN, Hyderabad, 2010
3. Bhatt VB, *Protein Energy Malnutrition*, PeePee Publishers, New Delhi, 2008
4. Sharma N, *Child Nutrition*, 1st edition, Murarilal& sons, New Delhi, 2006
5. Gupte S, Textbook of Pediatric Nutrition, Pawaninder P Vij Publishers, New Delhi, 2006
6. Gibney MJ, Margetts BM, Kearney JM, Arab L (Ed), *Public Health Nutrition (The Nutrition Society Textbook)*, 1st edition, Wiley black well, 2004
7. WHO, The Management of Nutrition in Major Emergencies, AITBS Publishers, New Delhi, 2000
8. Sachdev HPS, Choudhary P, *Nutrition In Children – Developing Country Concerns*, BI publications, New Delhi, 1994
9. Swaminathan M, Principles of Nutrition and Dietetics, Bappeo, Bangalore, 1993
10. Young H, Nutrition in Emergencies (Practical Health Guides), 1st edition, Oxfam**,** 1991

JOURNALS

1. Journal of community nutrition and health
2. Journal of health, population and nutrition
3. Journal of community nutrition and health.

E-LEARNING RESOURCES

1. https://motherchildnutrition.org/india/food-nutrition-board.htm
    1. www.nin.org- National Institute of Nutrition, Hyderabad, India
    2. www.icmr.org – Indian Council for medical Research.
    3. https://motherchildnutrition.org/resources/pdf/mcn-iasc-toolkit-nutrition-in-emergency-situations.pdf
    4. http://fscluster.org/sites/default/files/documents/chapter_9_food_and_nutrition.pdf
    5. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3148629/

COURSE OUTCOME

CO Number	CO STATEMENT	KNOWLEDGE LEVEL
CO 1	Define and summarize the nutritional problems facing the country.	K1, K2
CO 2	Classify the causes of malnutrition in India and demonstrate knowledge of various nutrition intervention schemes and assessment techniques for the community.	K2
CO 3	Justify the role of nutrition in national development through various key health indicators and government policies	K5
CO 4	Explain breastfeeding policies of the country and to formulate low cost weaning foods using emerging trends and technologies.	K2, K6
CO 5	Plan nutrition health education programs for vulnerable sections of the community promoting sustainability, gender equity and safe health practices.	K3, K6

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

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

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

TEACHING METHODOLOGY

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

7. Self-Study Papers

QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1	A-10X2 marks	50	20	**100**
K1. K 2	B-5/8x8 marks	Not exceeding 300	40	
K2, K 3	C-2/3x20 marks	Not exceeding 1500	40	

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

B.Sc DEGREE EXAMINATION
III YEAR- VI SEMESTER

Title of the paper: PUBLIC HEALTH NUTRITION **Max. Marks: 100**
Paper Code: ND21/6C/PUB//CN21/6C/PUB **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 VI

EXERCISE AND SPORTS NUTRITION

ELECTIVE 2

TOTAL HOURS: 75 hours **COURSE CODE: CN21/6E2/ ESN**
CREDITS: 5 **L-T-P: 4-1-0**

COURSE OBJECTIVES

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

COURSE OUTLINE

UNIT 1:

Introduction: Fitness- definition, benefits, components, conditioning by training . Exercise - aerobic & anaerobic exercise. Energy systems, Storage of carbohydrate, protein and fat in the body, important fuels for exercise. Fatigue during aerobic and anaerobic activities and prevention. (15 HOURS)

UNIT II:

a) **Role of Carbohydrates in sports and exercise** – Relationship between muscle glycogen and performance, Importance of glycemic index in athletes, high GI and low GI foods, pre and post exercise carbohydrate meals, glycogen replenishment, carbohydrate loading.

b) **Role of protein in sports and exercise** : Determining protein requirements for endurance and strength training. Protein recommendation for vegetarians, effect of excess protein intake on health.

c) **Role of fat , vitamin mineral and antioxidants in sports and exercise** : Desirable body fat percentage for general fitness and sports person. Role of dietary fat in sports and exercise performance. vitamins, minerals and antioxidant recommendation for fitness and sports activity.(15 HOURS)

UNIT III: **Fluid requirements & Ergogenic aids for exercise and sports performance**:

Fluid requirements for exercise and sports performance, dangers of dehydration and over hydration, hyponatremia, sports drinks –types.

(b) Sports anemia - causes, symptoms, latent iron deficiency.

Ergogenic aids: Classification, commonly used ergogenic aids- protein supplements, vitamin and mineral supplements.

(15 HOURS)

UNIT IV: **Nutritional issues in female Sports Person**:

(a)Female Athletic Triad: Eating disorders- anorexia nervosa, amenorrhea, and bone loss – risk factors, causes, symptoms and prevention. Special recommendations for pregnancy, body fat level and fertility, weight gain during pregnancy. Athletes - young, elderly, diabetic and travelling athletes.

UNIT V : **Sports person with specific Health issues:**

(a)Gastro intestinal disturbance before, during and after exercise, training and competition in - excessive flatulence, abdominal distension, Intermittent diarrhea, constipation.

(b)Food Related Adverse Reaction (FRAR): Food allergy, food intolerance, diagnosis, Nutrition intervention for sports person with FRAR. (15 HOURS)

RECOMMENDED TEXT BOOKS

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

REFERENCE BOOKS

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

Journals

1. Journal of international society of sports nutrition
2. International journal of sports nutrition and exercise metabolism

E-LEARNING RESOURCES

- **https://fssai.gov.in/upload/uploadfiles/files/Guidance_Document_Sportsperson_10_0 7_2019.pdf**
- **https://www.opensciencepublications.com/wp- content/uploads/IJN-2395-2326-3-147.pdf**
- **https://irjponline.com/admin/php/uploads/2345_pdf.pdf**
- **https://indianathletics.in/wp-content/uploads/2019/07/IAAF- Practical-Guide-to-Nutrition-May-2013.pdf**

COURSE OUTCOME

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

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

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

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

TEACHING METHODOLOGY

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

QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1	A-10X2 marks	50	20	**100**
K1. K 2	B-5/8x8 marks	Not exceeding 300	40	
K2, K 3	C-2/3x20 marks	Not exceeding 1500	40	

QUESTION PAPER TEMPLATE

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

B.Sc DEGREE EXAMINATION
III YEAR- VI SEMESTER

Title of the paper: EXERCISE AND SPORTS NUTRITION **Max. Marks: 100**
Paper Code: CN21/6E2/ESN **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 VI

NUTRITIONAL MANAGEMENT OF METABOLIC, NEUROLOGICAL AND DEGENERATIVE DISEASES IN PAEDIATRICS AND GERIATRICS

ELECTIVE 2

TOTAL HOURS: 75 Hours **COURSE CODE: CN21/6E2/NPG**
CREDITS: 5 **L-T-P: 4-1-0**

COURSE OBJECTIVES

- ✓ Learn about the concepts of diet therapy specific metabolic diseases in pediatrics.
- ✓ Gain knowledge about the assessment role of nutrition in children with inborn errors of metabolic diseases.
- ✓ Develop skills and techniques in the planning and preparation of therapeutic diets for certain pediatric neurological disease conditions
- ✓ Understand the nutritional management of geriatric patient's chronic degenerative diseases.

COURSE OUTLINE

UNIT I: Nutritional assessment and dietary management of certain specific metabolic diseases in pediatric age group- Obesity, Respiratory and Metabolic Acidosis and Alkalosis, growth faltering. Thyroid disorders. (15 HOURS)

UNIT 2: Nutritional Assessment and management of children with Inborn errors of metabolism- Phenylketonuria, Galactosemia, Glycogen storage diseases, Lysosomal storage disorders, Maple syrup urine disease, combined oxidative phosphorylation defects. (15 HOURS)

UNIT 3: Etiology, Pathophysiology, Assessment and Nutritional management in Neurological diseases in Pediatrics- ADHD, Mental retardation, Down syndrome, Autism, Epilepsy, Cerebral palsy. (15 HOURS)

UNIT 4: Nutritional assessment and management of diseases in the elderly -Factors influencing Food intake, Lifestyle pattern and Medication intake in elderly with Stroke, Insomnia, Eye diseases (glaucoma, cataract), Lung infections- Pneumonia, COPD; Foot infections- gangrene, cellulitis, amputation. (15 HOURS)

UNIT 5: Nutritional management of Chronic degenerative diseases in elderly- Parkinson's disease, Alzheimers, Dementia, Osteoarthritis, Management of bedridden elderly patients with pressure ulcers and bedsores.

(15 HOURS)

RECOMMENDED TEXT BOOKS

1. Srilakshmi B, *Dietetics*, sixth edition, New age Publishing Press, New Delhi, 2011
2. Whitney EN and Rolfes SR, *Understanding Nutrition*, 9th edition, West/Wordsworth, 2002

REFERENCE BOOKS

1. Elia M, Ljunggvist O, Stratton RJ, Lanham SA, Clinical Nutrition (The Nutrition Society Textbook), 2nd edition, Wiley Blackwell Publishers, 2013
2. Mahan LK, Stump SE and Raymond JL, *Krause's Food and Nutrition Care Process*, 13th Edition, Elsevier Saunders, Missouri, 2012
3. Stump SE, *Nutrition and diagnosis related care*, 7th edition, Lippincott Williams and Wilkins, Canada, 2012
4. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., Nutritive value of Indian foods, NIN, Hyderabad, 2010
5. Srilakshmi B, *Dietetics*, sixth edition, New age Publishing Press, New Delhi, 2011.
6. Marian M et al., Clinical Nutrition for surgical patients, Jones and Bartlett Publishers, Canada, 2008
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11. Guthrie H, Introductory Nutrition, CV Mosby Co.St. Louis, 2002
12. Williams SR, Nutrition & Diet Therapy, CV. Mosby St. Louis, 2001
13. Garrow et al, Human Nutrition & Dietetics, 10th Edition, Churchill Livingston, 2001

JOURNALS

1. Indian journal of nutrition and dietetics
2. JAMA

E-LEARNING RESOURCES

1. www.nal.usda.gov – Food & Nutrition Information Centre.
2. www.eatright.org – American Dietetic Organisation.

3. www.nin.org- National Institute of Nutrition, Hyderabad, India
4. www.icmr.org – Indian Council for medical Research

COURSE OUTCOME

CO.NO	CO Statement	Knowledge
CO1	Recall and list the predisposing factors, symptoms of diseases and the metabolic derangements during various clinical Conditions in pediatric subjects for their effective management	K1
CO2	Interpret and describe the role of specific nutrients and analyse the inborn errors of metabolism in management of diseases in pediatrics	K2 &K3
CO3	Implementation of skills in planning and formulate dietary recommendations appropriate to the clinical condition in pediatrics and geriatrics	K3 &K4
CO4	Analyze the biochemical parameters assess and decide appropriate nutritional requirement and recommend dietary plan	K4 & K5
CO5	Assess the nutritional status and determine effective dietary management of degenerative and neurological diseases	K5
CO6	Compile the subjective and objective assessment and administer diets to prevent and control the progression of diseases.	K6

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	3	2	2
CO2	3	3	3	2	2
CO3	2	3	3	2	2
CO4	3	3	2	2	2
CO5	3	3	3	2	3
AVERAGE	2.8	3	2.8	2.0	2.2

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

TEACHING METHODOLOGY:

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

QUESTION PAPER PATTERN

Knowledge Level	Section	Word Limit	Marks	Total
K 1	A-10X2 marks	50	20	**100**
K1. K 2	B-5/8x8 marks	Not exceeding 300	40	
K2, K 3	C-2/3x20 marks	Not exceeding 1500	40	

QUESTION PAPER TEMPLATE

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

B.Sc DEGREE EXAMINATION
III YEAR- VI SEMESTER

Title of the paper: NUTRITIONAL MANAGEMENT OF METABOLIC, NEUROLOGICAL AND DEGENERATIVE DISEASES IN PAEDIATRICS AND GERIATRICS

Paper Code: CN21/6E2/NPG
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 VI

FOOD PRODUCT DEVELOPMENT AND PACKAGING TECHNOLOGY

ELECTIVE 3

TOTAL HOURS: 75 hours **COURSE CODE : CN21/6E3/ FPP**
CREDITS: 5 **L-T-P:4-1-0**

COURSE OBJECTIVES

✓Identify the necessity for new marketable, nutritionally and economically acceptable food products
- ✓ To help the students to develop entrepreneurship skills in establishing small scale industries
- ✓ To gain knowledge on the packaging methods of different food products

COURSE OUTLINE

UNIT I: Introduction to technology of Product Development, Principles and Purpose of New Product Development. Global trends and demands in Economical, Psychological and Sociological dimensions of food consumption patterns necessitating newer Product Development. Product Designing- stages involved in product development. Specifications and criteria assigned to innovative products. (15 HOURS)

UNIT II: Development of Traditional Foods Convenience Foods-RTE, RTS, Extruded foods, IMF Foods, Speciality Products, Nutritional Supplements, Functional Foods, and Designer Foods, Foods for Defence Services, Space foods. (15 HOURS)

UNIT III: Standardization, Analysis of shelf life and nutritional quality of developed product. Packaging Materials- Basic types, Functions, Advantages and disadvantages. Packaging Films – Types. (15 HOURS)

UNIT IV: Packaging Methods and Systems- Types of Packaging Equipment- Traditional, Retortable, Lined Cartons, Aseptic Bag in Box, Modified Atmosphere MAP, Vacuum, Intelligent. active, military, Gas, Eco-friendly and Safe Packaging for Exports, Oven able Packages and Packages for Transport. (15HOURS)

UNIT V: Testing and Evaluation of Suitable Packaging Materials for Different Foods, SWOT Analysis-Basic concept. Handling and Distribution of Packages. Nutritional Labelling as per FSSAI specifications. Packaging Laws and Regulations – National and International Specifications. Marketing Specifications and strategies of developed food product. (15 HOURS)

TEXT BOOKS

1. Sudhir Gupta (2017) Handbook of Packaging Technology, Engineers India Research Institute, New Delhi

2. Khanaka, S.S., Entrepreneurial Development, S. Chand and Company Ltd, New Delhi, 2016.

REFERENCE BOOKS

1. Suja, R. Nair(2014) Consumer Behaviour and Marketing Research, 1st Edition, Himalaya Publishers.

2. Hmacfie,(2017) Consumer led Food Product Development, Weedhead Publishing Ltd., UK

3. Fuller, Gordon, W(2015) New Food Product Development, 2nd Edition, CRC Press, Boca Raton, Florida,

4. Schaffner .D,J, Schroder , W.R.(2010)Food Marketing and International Perspectives, Web/McGraw Hill Publication

JOURNALS

- Trends in food science and Technology Journal of Marketing
- Innovative food Science and Emerging technologies Journal of Packaging Technology and Research

E-Learning Resources

- www.sciencedirect.co
- http://academicaccelerator.com
- www.effost.org

COURSE OUTCOME

CO No.	CO Statement	Knowledge Level
CO1	Understand the the trends and transition in food consumption pattern	K1
CO2	Explain types of food processing techniques	K2
CO3	Apply principles in product development and design	K3
CO4	Analyse the different steps involved in development of food products, testing and	K4
CO5	Examine the different packaging materials for different foods	K2
CO6	Develop entrepreneurship skills with marketing strategies.	K6

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

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

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

QUESTION PAPER TEMPLATE

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

B.Sc DEGREE EXAMINATION
III YEAR- VI SEMESTER

Title of the paper FOOD PRODUCT DEVELOPMENT AND PACKAGING TECHNOLOGY
Paper Code: CN21/6E3/FPP
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 VI

TECHNOLOGY OF FOOD PROCESSING AND QUALITY CONTROL

ELECTIVE 3

TOTAL HOURS:75 hours **COURSE CODE : CN21/6E3/ TFQ**
CREDITS: 5 **L-T-P:4-1-0**

COURSE OBJECTIVES

- ✓ To enable the students to understand the methods of food processing and food preservation
- ✓ To Gain knowledge on the processing and preservation of perishable food products
- ✓ To Learn the importance of food quality and food laws

UNIT I: Introduction to the technology and principles of food processing and Preservation. Recent technology in the processing of cereals and millets and their products. Processing of legumes and oil seeds - technology of removal of anti-nutritional factors, production of edible oil and flour. (15 HOURS)

UNIT II: Technology of processing and preservation of egg, meat, poultry, fish and its products, milk and milk products using low temperature- refrigeration and freezing and high temperature. – Sterilization, pasteurization, dehydration, canning, smoking, drying. (20 HOURS)

UNIT III: Processing and Preservation of fruits and vegetables using sugar, salts and chemicals and fermentation - Jam, Jelly, Marmalades, squash, preserves. Salt Preservation- RTS sauces, soups, Pickling, and curing. Fermentation-Wine, cheese making. Chemical Preservation – Food additives – definition, types, uses of additives. (15HOURS)

UNIT IV: Introduction to Food Quality- Definition, Objectives and Evaluation of Food Quality control in various stages of food processing. Food adulteration – types of adulterants, methods to detect adulterants. Recent Concerns in Food Safety, basic concepts of Food safety audit. (15HOURS)

UNIT V: Food Laws and Quality Management. -International and National food laws-Food Safety and Standards -FSSAI JAIVIK BHARAT, Codex Alimentarius, ISO 9000 series, Organic certification-NPOP, Agricultural and processed food products Export Development Authority APEDA,USDA Organic, INDOCERT. (10 HOURS)

TEXT BOOKS

1. Srilakshmi, B.(2018) Food Science, New Age International (P) Ltd., New Delhi,
2 Sivasankar B, (2014) Food Preservation and Processing, 1st Edition, Prentice – Hall of India Private Ltd., New Delhi, 2012.
3. *Bawa AS, Raju PS, Chauhan OP, (2013) Food Science*, New India Publishing Agency, New Delhi, 2013.

REFERENCE BOOKS

1. *Fellow, P., Food Processing Technology (2016)*– Principles and Practices, 3rd Edition, CRC Press Woodland Publishers, England.
2. *Adams, M.R. and Moss, M.O., Food Microbiology*, (2015) New Age International (P) Ltd., New Delhi.
3. *Sommers, C.H. and Xveteng Fan, (2016) Food Irradiation Research and Technology, 2nd Edition,* Blackwell Publishing, New Delhi.
4. Swaminathan,M. Food Science (2013), Chemistry and Experimental Foods, Bappco Publishers

JOURNALS

1. Journal of food processing and preservation
2. Journal of food processing and technology
3. International Journal of food science and technology

E-LEARNING RESOURCES

www.longdom,com www.journals.elsvier.com fppn.biomedcentral.com

COURSE OUTCOMES

CO No.	CO Statement	Knowledge Level
CO1	Understand the principles of the various food processing methods	K1
CO2	Explain the processing methods of different foods	K2
CO3	Apply, distinguish between the byproducts of processing of different Foods	K3
CO4	Analyze the need for quality control and its implications in food industry	K4
CO5	Examine the food quality control standards in different food products	K2
CO6	Integrate the food processing techniques in ensuring food quality.	K6

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	3	2	3	3	2	3
CO3	2	3	2	2	3	2
CO4	3	2	3	3	3	3
CO5	3	3	3	3	3	3
CO6	3	3	3	3	2	3
AVERAGE	2,8	2.6	2.8	2.8	2.6	2,8

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

QUESTION PAPER TEMPLATE

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

B.Sc DEGREE EXAMINATION
III YEAR- VI SEMESTER

Title of the paper TECHNOLOGY OF FOOD PROCESSING AND QUALITY CONTROL
Paper Code: CN21/6E3/TFQ
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 V & VI
FOOD SERVICE MANAGEMENT PRACTICAL

TOTAL HOURS: 45 Hours **COURSE CODE: ND21/6C/PR3// CN21/6C/PR3**
CREDITS: 3 **L-T-P: 0-0-3**

COURSE OBJECTIVE

- ✓ To help the students to understand the various sectors of food service units.
- ✓ To understand the lay out, organization structure and the effective functioning of foodservice industry.
- ✓ To develop skills in quantity food purchase production, preparation and service.

COURSE OUTLINE

FOOD SERVICE MANAGEMENT I

1. Visit to sectors of food industry – any 2 commercial and non-commercial sectors.
2. Standardization of two portions of North Indian, South Indian and Chinese Cuisine.

FOOD SERVICE MANAGEMENT II

1. Quantity production of standardized North Indian, South Indian and Chinese Cuisine.
2. Food product sales

REFERENCES

1. Sethi M and MalhanS, Catering Management An Integrated Approach, 3rd edition,New age international publishers, New Delhi, 2015
2. Andrews S,*Food and Beverage Service*, 2nd edition, Tata McGraw hill publishingcompany limited, 2009
3. George B, *Food and Beverage Service*, 1stedition, JAICO Publishing House, 2005
4. Singaravelavan R, Food and Beverage Service, 1st edition, Oxford University press, 2011

COURSE OUTCOME

CO No.	CO Statement
CO1	Identify and classify various sectors of catering industry
CO2	Differentiate equipment, menu, styles of service, lay out, organization structure and the food production cycle
CO3	Build the skills of interpretation and report writing on industrial visits.
CO4	Assess food handling and sanitary practices in the food service establishments.
CO5	Formulate ,Standardization and selling off different cuisines

MAPPING-COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOME

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	2	2	3	3	3	3
CO4	3	2	3	3	3	3
CO5	3	2	3	3	3	3
AVERAGE	**2.8**	**2.4**	**3**	**3**	**3**	**3**

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

TEACHING METHODOLOGY

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

SEMESTER V& VI
MEDICAL NUTRITION THERAPY PRACTICAL

TOTAL HOURS: 45 Hours **COURSE CODE: CN21/6C/PR4**
CREDITS: 3 **L-T-P: 0-0-3**

COURSE OBJECTIVES

- ✓ To assess the nutritional status and decide and choose the appropriate dietary modification
- ✓ To demonstrate their understanding of the facts and ideas in identifying the nutritional implications of various diseases .
- ✓ To apply their knowledge and identify the techniques of planning, preparation and execution of therapeutic diets
- ✓ To formulate and administer appropriate dietary modifications and counseling for the patients.

MEDICAL NUTRITION THERAPY I

Menu planning using ICMR food composition tables and/or ICMR food exchange lists

1. Planning and preparing clear fluid full fluid and soft diet.
2. Planning and preparing diet for fever patient- typhoid and tuberculosis.
3. Planning and preparing diet for obesity and underweight.
4. Planning and preparing diet for diarrhea, constipation and ulcer
5. Planning and preparing diet for hepatitis and cirrhosis of liver.
6. Report on the visit to the dietary department of hospital.

MEDICAL NUTRITION THERAPY II

Menu planning using ICMR food composition tables and/or ICMR food exchange lists

1. Planning and preparing diet for Hypertension and Atherosclerosis.
2. Planning and preparing diet for Diabetes mellitus with insulin and without insulin
3. Planning and preparing diet for Gout
4. Planning and preparing diet for Nephritis, Nephrosis and ESRD with dialysis
5. Planning and preparing diet for Cancer
6. Planning and preparing diet in Burns
7. Presentation of two case study done in hospital internship (15 days Internship to be done before the completion of II year in a teaching hospital)

REFERENCES

1. Stump SE, *Nutrition And Diagnosis Related Care*, 7th edition, Lippincott Williams and Wilkins, Canada, 2012
2. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., Nutritive value of Indian foods, NIN, Hyderabad, 2010

3. Srilakshmi B, *Dietetics*, sixth edition, New age Publishing Press, New Delhi, 2011.
4. Marian M et al., Clinical Nutrition for surgical patients, Jones and Bartlett Publishers, Canada, 2008
5. Joshi Y.K, Basics of Clinical Nutrition, 2nd edition, JP Medical Publishers Pvt Ltd, New Delhi, 2008

COURSE OUTCOME

CO.NO	CO Statement	Knowledge
CO1	Understand the nutritional implications of the diseases	K1 &K2
CO2	Determine the dietary intervention to be employed	K2
CO3	Apply the knowledge base and professionally demonstrate the skill to evaluate the extent of deficiencies.	K3
C O4	Analyze the symptoms and biochemical parameters for effective administration of diet therapy	K4 & K5
CO5	Decision to execute appropriate dietary modification	K5

MAPPING COURSE OUTCOME WITH PROGRAMME SPECIFIC OUTCOMES

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	2	3	2
CO2	3	3	3	2	3
CO3	2	2	3	3	2
CO4	2	2	3	2	3
CO5	2	3	3	2	3
AVERAGE	2.4	2.6	2.8	2.4	2.6

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

TEACHING METHODOLOGY

1. Lecture (Chalk and Talk-OHP-LCD)
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DIETETIC INTERNSHIP

CREDITS: 1 **COURSE CODE:**

Dietetics internship in a teaching hospital for 15 days to be conducted and completed before the sixth semester.
Evaluation will be done by the dietetic department of the hospital.

Alternative protocol for Dietetics Internship during disaster / emergency.

1. A disease condition within the framework of the syllabus will be given to each student in the form of a case history.
2. A report has to be submitted.
3. Presentation of information must be in the following manner.

A. A brief introduction about the disease and the role of dietary modification in its prognosis
B. Nutrition care process must entail the following details.
    a. Nutrition assessment- ABCD methods, screening tools ratifying its appropriateness.
    b. Nutritional Diagnosis
    c. Intervention must be based on current guidelines and recommendation mentioning the source.
    d. Monitoring and evaluation
C. Plan a sample menu for a day and justify the food choice. Calculate the nutrient content keeping in mind the proximate principles, nutrients that are relevant to the disease (apart from energy and macronutrients.
D. The report must contain information regarding references- Bibliography and appendices.

Evaluation Pattern (50 Marks)

A. Introduction- 5 marks
B. NCP- 20 marks
C. Diet plan and nutrient calculation- 20 marks
D. Bibliography and appendices- 5 marks