FATIMA COLLEGE (AUTONOMOUS)

Re-Accredited with "A++" Grade by NAAC (Cycle - IV)
Maryland, Madurai- 625 018, Tamil Nadu, India

NAME OF THE DEPARTMENT: RESEARCH CENTRE OF HOME SCIENCE

NAME OF THE PROGRAMME : HUMAN NUTRITION & NUTRACEUTICALS

PROGRAMME CODE : PSNN

ACADEMIC YEAR : 2021-2022

VISION OF THE DEPARTMENT

To empower the potential home makers and home scientists with life management skills to face the multidimensional challenges and contribute towards the progress of home and nation.

MISSION OF THE DEPARTMENT

- To empower today's women with entrepreneurial skills to face the challenges of life effectively.
- To make them self-reliant.
- To explore ways and means to strengthen the industry-institution tie-up in order to prepare the students to meet the industrial expectations through internship in hospitals and industries.
- To kindle the scientific approach of the students towards research.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PEO 1	Our graduates will be academic, digital and information literates; creative, inquisitive, innovative and committed researchers who would be desirous for the "more" in all aspects
PEO 2	They will be efficient individual and team performers who would deliver excellent professional service exhibiting progress, flexibility, transparency, accountability and in taking up initiatives in their professional work

PEO 3	The graduates will be effective managers of all sorts of real – life and professional circumstances, making ethical decisions, pursuing excellence within the time framework and demonstrating atleadership skills
PEO 4	They will engage locally and globally evincing social and environmental stewardship demonstrating civic responsibilities and employing right skills at the right moment.

GRADUATE ATTRIBUTES (GA)

Fatima College empowers her women graduates holistically. A Fatimite achieves all-round empowerment by acquiring Social, Professional and Ethical competencies. A graduate would sustain and nurture the following attributes:

I. SOCIAL COMPETENCE	
GA 1	Deep disciplinary expertise with a wide range of academic and digital literacy
GA 2	Hone creativity, passion for innovation and aspire excellence
GA 3	Enthusiasm towards emancipation and empowerment of humanity
GA 4	Potentials of being independent
GA 5	Intellectual competence and inquisitiveness with problem solving abilities befitting the field of research

GA 6	Effectiveness in different forms of communications to be employed in personal and professional environments through varied platforms
GA 7	Communicative competence with civic, professional and cyber dignity and decorum
GA 8	Integrity respecting the diversity and pluralism in societies, cultures and religions
GA 9	All – inclusive skill sets to interpret, analyse and solve social and environmental issues in diverse environments
GA 10	Self awareness that would enable them to recognise their uniqueness through continuous self-assessment in order to face and make changes building on their strengths and improving their weaknesses
GA 11	Finesse to co-operate exhibiting team-spirit while working in groups to achieve goals
GA 12	Dexterity in self-management to control their selves in attaining the kind of life that they dream for
GA 13	Resilience to rise up instantly from their intimidating setbacks
GA 14	Virtuosity to use their personal and intellectual autonomy in being life-long learners
GA 15	Digital learning and research attributes
GA 16	Cyber security competence reflecting compassion, care and concern towards the marginalised
GA 17	Rectitude to use digital technology reflecting civic and social responsibilities in local, national and global scenario

PROFESSIONAL COMPETENCE	
GA 18	Optimism, flexibility and diligence that would make them professionally competent
GA 19	Prowess to be successful entrepreuners and become employees of trans-national societies
GA 20	Excellence in Local and Global Job Markets
GA 21	Effectiveness in Time Management
GA 22	Efficiency in taking up Initiatives
GA 23	Eagerness to deliver excellent service
GA 24	Managerial Skills to Identify, Commend and tap Potentials
II. ETHICAL COMPETENCE	
GA 25	Integrity and be disciplined in bringing stability leading a systematic life promoting good human behaviour to build better society
GA 26	Honesty in words and deeds
GA 27	Transparency revealing one's own character as well as self-esteem to lead a genuine and authentic life
GA 28	Social and Environmental Stewardship
GA 29	Readiness to make ethical decisions consistently from the galore of conflicting choices paying heed to their conscience
GA 30	Right life skills at the right moment

PROGRAMME OUTCOMES (PO)

On completion of M. Sc Programme, the graduates would be able to

PO 1	Apply acquired scientific knowledge to solve major complex issues in the society/industry.
PO 2	Attain research skills to solve complex cultural, societal and environmental issues.
PO 3	Employ latest and updated tools and technologies to solve complex issues.
PO 4	Demonstrate Professional Ethics that foster Community, Nation and Environment Building Initiatives.

PROGRAMME SPECIFIC OUTCOMES (PSO)

On completion of M.Sc. Human Nutrition and Nutraceuticals programme, the graduates would be able to

PSO 1	Attain enhanced scientific knowledge about the physiology of the human body.
PSO 2	Gain advanced scientific knowledge in foods, functional foods, nutrition and nutraceuticals
PSO 3	Obtain professional competence in planning diet for normal & therapeutic conditions and diet counseling.
PSO 4	Acquire advanced knowledge and understanding on the preventive and therapeutic role of functional foods.
PSO 5	Develop understanding on the perspectives of research and formulate research designs.
PSO 6	Integrate the basic principles of community nutrition processes to address the major health related concerns of the population.
PSO 7	Imbibe scientific knowledge on the principles, instrumentation techniques and applications of different hi-tech analytical instruments.

PSO 8	Acquire skills in analyzing food components and blood constituents
PSO 9	Demonstrate the knowledge of the scientific basis available to develop innovative value added food products
PSO 10	Achieve professional competence in implementing nutrition care during critical illness and disasters.
PSO 11	Acquire knowledge and understanding the concepts of microbiology in the diverse areas such as food, environment and health.
PSO 12	Attain enhanced knowledge and understanding of the bio molecules and its vital processes in human body.
PSO 13	Advanced scientific knowledge and skill in the maintenance and monitoring of food safety and quality assurance.
PSO 14	Demonstrate the knowledge and skill gained in the management of food service institutions.
PSO 15	Acquire in-depth knowledge on production of processed food products.

FATIMA COLLEGE (AUTONOMOUS), MADURAI-18

RESEARCH CENTRE OF HOME SCIENCE

M.Sc. HUMAN NUTRITION AND NUTRACEUTICALS

For those who joined in June 2019 onwards

MAJOR CORE – 70 CREDITS

PROGRAMME CODE: PSNN

S. No	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. MKs
1.	I	19PG1N1	Advanced Human Nutrition	6	4	40	60	100
2.		19PG1N2	Advanced Dietetics	6	4	40	60	100
3.		19PG1N3	Applied Physiology	6	4	40	60	100
4.		19PG1N4	Advanced Dietetics Lab	4	2	40	60	100
5.		19PG1N5	Clinical Laboratory Techniques Lab	4	2	40	60	100
6.			Library	1	-	-	-	-
7.	II	19PG2N6	Clinical Nutrition & Diet Therapy	6	4	40	60	100
8.		19PG2N7	Functional Foods & Nutraceuticals	6	4	40	60	100
9.		19PG2N8	Research Methodology	6	4	40	60	100
10.		19PG2N9	Clinical Nutrition & Diet Therapy Lab	4	2	40	60	100
11.		19PG2N10	Functional Foods & Nutraceuticals Lab	4	2	40	60	100
12.			Library	1	-	-	-	-
13.	III	19PG3N11	Functional Foods & Nutraceuticals in Preventive Dietetics	6	5	40	60	100
14.		19PG3N12	Community Nutrition	6	5	40	60	100
15.		19PG3N13	Analytical Instrumentation	6	5	40	60	100
16.		19PG3N14	Community Nutrition Lab	4	2	40	60	100

17.		19PG3N15	Techniques for Experimental Nutrition Lab	4	2	40	60	100
18.	**IV**	19PG4N16	Food Microbiology	6	5	40	60	100
19.		19PG4N17	Nutritional Biochemistry	6	5	40	60	100
20.		19PG4N18	Advanced Food Science and Processing Techniques	6	5	40	60	100
21.		19PG4N19	Food Microbiology Lab	4	2	40	60	100
22.		19PG4N20	Nutrient Analysis Lab	4	2	40	60	100
			TOTAL	**106**	**70**			

MAJOR ELECTIVE / EXTRA DEPARTMENTAL COURSE / INTERNSHIP/PROJECT - 20 CREDITS

S. No	SEM.	COURSECODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. Mks
1.	I	19N1EDC	Nutrition & Dietetics	3	3	40	60	100
2.	II	19N2EDC	Nutrition & Dietetics	3	3	40	60	100
3.	III	19PG3NE1/ 19PG3NE2	Food Product Development and Sensory Evaluation/ Institutional Management	4	4	40	60	100
4.		19PG3SIN1	Summer Internship	-	3	40	60	100
5.	IV	19PG4NE3/ 19PG4NE4	Food Safety and Quality Control/ Nutrition in Critical Care and Disasters	4	4	40	60	100
6.		19PG4N21	Project*& Viva Voce	-	3	40	60	100
			TOTAL	**14**	**20**			

OFF-CLASS PROGRAMMES

ADD-ON COURSES

COURSE CODE	COURSES	HRS.	CREDITS	SEMESTER IN WHICH THE COURSE IS OFFERED	CIA MKS	ESE MKS	TOTAL MARKS
19PAD2SS	**SOFT SKILLS**	40	3	I	40	60	100
19PAD2CA	**COMPUTER APPLICATIONS** SPSS	40	4	II	40	60	100
19PAD4CV	**COMPREHENSIVE VIVA** (Question bank to be preparedfor all the papers bythe respective course teachers)	-	2	IV	-	-	100
19PAD4RC	**READING CULTURE**	15 / Semester	1	I-IV	-	-	-

EXTRA CREDIT COURSES

Course Code	Courses	Hrs.	Credits	Semester in which the course is offered	CIA Mks	ESE Mks	Total Marks
21PGNSL1	**SELF LEARNING COURSE for ADVANCED LEARNERS** GERIATRIC SCIENCE	-	2	II	40	60	100
	MOOC COURSES (Department Specific Courses) * Students can opt other than thelisted course from UGC-SWAYAM portal as well as from NPTEL	-	Respective Credits allotted by UGC	-	-	-	100

100% EMPLOYABILITY

I M.Sc.,HUMAN NUTRITION AND NUTRACEUTICALS

SEMESTER –I

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSNN	19PG1N1	Advanced Human Nutrition	Major Core	6	4

COURSE DESCRIPTION

The course provides the knowledge on classification, functions, metabolism and deficiency of macro and micronutrients and its interrelationship.

COURSE OBJECTIVES

- Gain in depth knowledge in the study of major and minor nutrients.
- Understand the recent trends in the study of nutrients
- Develop competence for undertaking nutritional investigations.

UNITS

UNIT –I MACRONUTRIENTS AND WATER (18 HRS.)

Carbohydrate - Definition, classification, functions, sources, requirements, digestion and absorption, Dietary Fibre - Definition, classification, functions, sources, requirements.

Protein - Definition, classification, functions, sources, requirements, digestion and absorption, Evaluation of protein quality- protein efficiency ratio, digestibility coefficient, biological value, net protein utilization, net protein ratio, chemical scores and PDCAAS.

Fat - Definition, classification, functions, sources, requirements, digestion and absorption, Essential fatty acids – functions and effects of deficiencies.

Water- Definition, distribution, functions, sources, water balance, fluid and electrolyte balance, Water Deprivation, dehydration, rehydration.

UNIT –II ENERGY (18 HRS.)

Energy – Definition, Units of energy, Determination of energy value of foods – Direct – Bomb Calorimetry, Indirect Calorimetry – Benedicts Oxy calorimetry, Determination of energy requirements – BMR - Definition and factors influencing BMR, Measurement of Basal metabolism, Direct Calorimetry – Atwatar Rose Respiratory Calorimeter, Indirect Calorimetry –Benedict Roth Apparatus, Determination of BMR using production equations (ICMR), Physiological fuel value, gross energy value, Respiratory Quotient, Thermal effect of foods (SDA), Energy requirements during work, Reference man, reference women, RDA for energy, food sources.

UNIT –III MINERALS (18 HRS.)

Calcium, Phosphorus, Magnesium, Sodium, Potassium, Iron, Iodine, Fluorine, Zinc, Selenium and Vanadium – Introduction, functions, sources, requirements, digestion, absorption, storage, excretion, deficiency and toxicity.

UNIT –IV VITAMINS (18 HRS.)

Fat soluble and water soluble vitamins (Thiamine, riboflavin, niacin, vitamin B12, folic acid,pyridoxin, pantothenic acid, biotin and ascorbic acid - nomenclature, functions, sources,requirements, digestion, absorption, storage, excretion, deficiency and toxicity.

UNIT –V INTERRELATIONSHIP AND INTERDEPENDENCE BETWEEN NUTRIENTS AND DRUG INTERACTION (18 HRS.)

Nutrient and nutrient interaction, Nutrient and drug interaction.

BOOK REFERENCES:

1. Berdanier, C.D.(1988). *Advanced Nutrition- Micronutrients*, Marcel Dekker, inc., New York.
2. Brown,M.L.(1990). *Present knowledge in Nutrition,* VI Edition, International Life Science Institute, Nutrition Foundation, Washington.
3. Gruff, J.L., Gropper, S.S, & Hunt, S.M (1995).*Advanced Nutrition and Human metabolism,* West Publishing Company, Minneapolis.
4. Helen, A. Guthrie. (1989). *Introductory Nutrition*, VII edition, Mosby College Publishing Col, Toranto.
5. Mahtab S. Bamji, Palhad Rao R, & Vinodhini Reddy, (1998). *Text book of Human Nutrition*,Oxford and IBH publishing co., Pvt.Ltd., New Delhi.
6. Sith K.L & Dekker M. (1990) .*Trace Minerals in Foods*, Inc., New York.

JOURNAL REFERENCES:

1. British journal of nutrition, Cambridge University Press, London.
2. Nutrition news, Nutrition Institute of Nutrition, Hyderabad.
3. Nutrition reviews, the Nutrient Foundation, Inc., New York.
4. Nutrition and food science- incorporating home economics and technology, Pvt. Ltd., England.
5. The journal of nutrition, Cambridge University Press, London.
6. World review of Nutrition and Dietetics- all volumes.

Open Educational Resources:

1) https://en.wikibooks.org/wiki/Fundamentals_of_Human_Nutrition

2) http://pressbooks.oer.hawaii.edu/humannutrition/

3) https://www.youtube.com/watch?v=sorIaN6vRBI

4) http://pressbooks.oer.hawaii.edu/humannutrition2/

5)https://oer.galileo.usg.edu/cgi/viewcontent.cgi?article=1006&context=health-textbooks

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**MACRONUTRIENTS AND WATER**			
1.1	Carbohydrate	4	Chalk & Talk, Lecture, Seminar	Black Board,PPT,Videos
1.2	Dietary Fibre	2	Chalk & Talk, Lecture, Seminar	Black/white Board,PPT,Videos
1.3	Protein	4	Chalk & Talk, Lecture, Seminar	PPT & White board
1.4	Fat	3	Lecture, Discussion	PPT & White board,Videos
1.5	Essential Fatty acids	2	Lecture	Black/white Board
1.6	Water	3	Lecture, Group Discussion, Seminar	PPT & White board,Videos
UNIT -2	**ENERGY**			
2.1	Energy	3	Lecture, Group Discussion	PPT & White board
2.2	Direct calorimetry	3	Chalk & Talk, Lecture, Demo	Black/white Board, PPT
2.3	Indirect calorimetry	3	Chalk & Talk, Lecture, seminar	Black/white Board, PPT

2.4	Energy requirements during work	3	Lecture	Black/White board
2.5	BMR-Direct Calorimetry	3	Chalk & Talk, Lecture, seminar	Black/white Board, PPT
2.6	BMR-Indirect Calorimetry	3	Chalk & Talk, Lecture, seminar	Black/white Board, PPT
UNIT-3 MINERALS				
3.1	Introduction, Calcium	3	Lecture, Group Discussion	PPT & White board
3.2	Phosphorus, Magnesium	3	Chalk & Talk, Lecture, seminar	Black/white Board, PPT
3.3	Sodium, Potassium	3	Chalk & Talk, Lecture, Seminar	Black Board, PPT, Videos
3.4	Iron, Iodine	3	Chalk & Talk, Lecture, Seminar	Black Board,PPT,Videos
3.5	Fluorine, Zinc	3	Chalk & Talk, Lecture, Seminar	Black Board,PPT,Videos
3.6	Selenium, Vanadium	3	Chalk & Talk, Lecture, Seminar	Black Board,PPT,Videos
UNIT – 4 VITAMINS				
4.1	Vitamin A,D	3	Lecture, Seminar	Black Board,PPT
4.2	Vitamin E,K	3	Lecture, Seminar	Black Board,PPT

4.3	Vitamin B1,B2	3	Chalk & Talk, Lecture, Seminar	Black Board,PPT,Video
4.4	Niacin,B12	3	Chalk & Talk, Lecture, Seminar	Black Board,PPT,Video
4.5	Pyridoxine, Pantothenic acid	3	Chalk & Talk, Lecture, Seminar	Black Board,PPT,Video
4.6	Biotin,Folic acid, Vitamin C	3	Chalk & Talk, Lecture, Seminar	Black Board,PPT,Vides
UNIT – 5 INTERRELATIONSHIP AND INTERDEPENDENCE BETWEEN NUTRIENTS AND DRUG INTERACTION				
5.1	Interrelationship between Macronutrients	3	Chalk & Talk, Lecture, Seminar	Black Board,PPT
5.2	Vitamins and Vitamins	3	Chalk & Talk, Lecture, Seminar	Black Board,PPT
5.3	Minerals and Minerals	3	Chalk & Talk, Lecture, Seminar	Black Board,PPT
5.4	Vitamins and Minerals	3	Chalk & Talk, Lecture, Seminar	Black Board,PPT
5.5	Macro and micro nutrients	3	Chalk & Talk, Lecture, Seminar	Black Board,PPT
5.6	Nutrients & Drug Interaction	3	Chalk & Talk, Lecture, Seminar	Black Board,PPT

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total
	T1	T2	Seminar	Assignment	OBT/PPT			
	10 Mks.	10 Mks.	5 Mks.	5 Mks	5 Mks	35 Mks.	5 Mks.	40Mks.
K2	4	4	-	-	-	8	-	8
K3	2	2	-	5	-	9	-	9
K4	2	2	-	-	5	9	-	9
K5	2	2	5	-	-	9	-	9
Non Scholastic	-	-	-	-	-		5	5
Total	10	10	5	5	5	35	5	40

CIA	
Scholastic	**35**
Non Scholastic	**5**
	40

- ✓ **All the course outcomes are to be assessed in the various CIA components.**
- ✓ **The levels of CIA Assessment based on Revised Bloom's**

K2-Understand, **K3**-Apply, **K4**-Analyze, **K5**- Evaluate

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTIC	MARKS	
C1	C2	C3	C4	C5	C6	CIA	ESE
10	10	5	5	5	5	40	60

C1 – Internal Test-1

C2 – Internal Test-2

C3 - Seminar

C4 – Assignment

C5 - OBT/PPT

C6 – Non - Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explain the functions,digestion, absorption, deficiency,sources & requirements of Macronutrients and water	K2	PSO1, PSO2,PSO3,PSO8 & PSO12
CO 2	Elaborate the energy value of foods by using different Calorimetric methods	K2	PSO1, PSO2,PSO3,PSO8 &PSO12
CO 3	Identify the functions, digestion, absorption, deficiency,sources & requirements of Minerals	K3	PSO1,PSO2, PSO3,PSO8 & PSO12
CO 4	Analyze the functions, digestion, absorption, deficiency,sources & requirements of Vitamins	K4	PSO1,PSO2, PSO3,PSO8 & PSO12
CO 5	Explain the knowledge on nutrient-nutrient and nutrient- drug interrelationship	K5	PSO1,PSO2, PSO3,PSO8 & PSO12

Mapping of C0s with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	3	3	3	1	1	1	1	3	1	1	1	3	1	1	1
CO2	3	3	3	1	1	1	1	3	1	1	1	3	1	1	1
CO3	3	3	3	1	1	1	1	3	1	1	1	3	1	1	1
CO4	3	3	3	1	1	1	1	3	1	1	1	3	1	1	1
CO5	3	3	3	1	1	1	1	3	1	1	1	3	1	1	1

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	2	2	1	1
CO2	2	2	1	1
CO3	2	2	1	1
CO4	2	2	1	1
CO5	2	2	1	1

Note: Strongly Correlated – 3 ¨ **Moderately Correlated – 2**

¨ **Weakly Correlated -1**

COURSE DESIGNER:

1. Dr. K.KARTHIGA

Forwarded By

(Dr.Vasantha Esther Rani)

100% EMPLOYABILITY

I M.Sc. HUMAN NUTRITION AND NUTRACEUTICALS

SEMESTER –I

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSNN	19PG1N2	Advanced Dietetics	Major Core	6	4

COURSE DESCRIPTION

The course explains the medical nutrition therapy for normal life cycle, common diseases, and special conditions like sports, space, deep sea and air travel.

COURSE OBJECTIVES

- To identify and describe the nutritional needs through life cycle.
- To identify and describe various disease conditions.
- To gain knowledge on appropriate nutritional management.
- To develop the attitude and capacity for taking up dietetics as a profession

UNITS

UNIT –I NUTRITIONAL CARE, NUTRITION DURING PREGNANCY, LACTATION, INFANCY (18 HRS.)

Nutritional Care Process - Definition & Model

Balanced diet, food guide pyramid, meal planning and factors influencing meal planning

RDA- Meaning and importance

Pregnancy – importance, Physiological and biochemical changes, Physiological adjustment that affect energy and nutrient demands, complications.

Lactation – Mechanism, Colostrum, transition milk, mature milk, comparison of cow's and human milk, nutritive value of human milk, nutrient demands.

Infancy – Importance, nutritional requirements, breast feeding – advantageous, bottle feeding- merits and demerits, feeding problems, weaning – definition, need, process, problems, supplementary foods – types.

UNIT –II NUTRITION DURING PRESCHOOL, SCHOOL GOING, ADOLESCENCE, ADULTHOOD, GERIATRICS (18HRS.)

Preschool Children - nutritional requirements, dietary guidelines & healthy food habits PEM – causes, signs, symptoms, biochemical and metabolic changes, treatment.

School going Children – nutritional requirements, importance of packed lunch, feeding problems- obesity, underweight, constipation, dental caries.

Adolescence - nutritional requirements, nutritional problems – obesity, under nutrition, anemia, anorexia, premenstrual syndrome, pre-marital health status.

Adulthood - nutritional requirements according to activity and income levels.

Geriatrics – physical, physiological and psychological changes, nutritional requirements, nutrition related problems –osteoporosis, constipation, degenerative diseases.

UNIT –III THERAPEUTIC DIET (18 HRS.)

Therapeutic diet – Definition, Purpose, Adaptations of normal diet to therapeutic diet, factors to be considered in diet prescription

Hospital diets – normal, clear fluid, full fluid and soft diet

Mode of feeding – enteral, parenteral feeding, TPN, Pre operative and post operative diets

Dietitians- definition, classification, responsibilities & code of ethics

UNIT –IV DIET IN BURNS, FEBRILE CONDITIONS AND WEIGHT MANAGEMENT (18 HRS.)

Diet in burns – classification of burns, dietary management

Diet during fever and infections: typhoid, tuberculosis, malaria, – causes, symptoms, dietary treatment.

Diet in weight management – Obesity: classification, etiology, metabolic aberrations, clinical manifestations and dietary management Underweight: classification, etiology, clinical manifestations and dietary management

UNIT –V SPORTS, SPACE AND SEA & AIR TRAVEL NUTRITION (18 HRS.)

Sports Nutrition

Definition, components of fitness, energy system – aerobic & anaerobic, nutritional demands of sports and dietary recommendations – objectives, nutritional requirements, dietary guidelines- carbohydrate loading, pre and post game meals, sports anaemia, water and electrolyte balance, losses and their replenishments during exercise and sports events, dehydration and its effects

Space Nutrition

Definition, physiological changes & changes in body composition, classification of space foods, nutritional recommendations

Sea and Air Travel Nutrition:

Physiological changes in human body during sea and air travel; Health and nutritional problems encountered during sea and air travel; Nutrient requirements and dietary management during sea and air travel.

BOOK REFERENCES:

1. Antia F.P. (1989).Clinical Dietetics and Nutrition, Oxford University Press, Mumbai
2. Carolynne E. Townsead, Ruth a. Ruth.(2000).*Nutrition and Diet therapy*, (7th ed).Delmar publishers
3. Cornnie H. Robinson & Emena S. Weighly.(1989).*Basic Nutrition and Diet Therapy*, (6th ed), Macmillan Publishing Company, New York,
4. Davidson, S.S. Passmore, P. & Brack, J.F. (1993).Human Nutrition and Dietetics, (9th ed), F&S, Lingstone Ltd., Edinburgh and London,
5. Garrow.J.S. & James W.P.T. (1993) *Human Nutrition and Dietetics*, (9th ed), Chwchill Lurystone,
6. Kathleen Mahan. L. Sylvia Escott-Stump, Janice L Raymond & Krause (2011) .*Food & Nutrition Therapy,* (13th ed), Elsevier Publications.
7. Robinson CH.(1994) . *Normal & Therapeutic Nutrition* XVIII Edition, Macmillan Publishers Company, New York.
8. Srilakshmi.B (1995). *Dietetics,* New Age International Private Ltd., New Delhi.
9. Sue Rodwell Williams. (2001). *Basic Nutrition and Diet therapy*, Mosby publications.

JOURNAL REFERENCES:

1. Food and Nutrition Bulletin United Nations University Press, Japan.
2. Journal of American Dietetic Association, The American Dietetic Association, Mount Marris, Illinois, 61054, USA.
3. Nutrition Abstracts and Reviews, CBB International, UK.
4. Nutrition Reviews, Nutrition Foundation, Washington, DC.
5. The American Journal of Clinical Nutrition, Waverfy Press, USA.
6. The Indian Journal of Nutrition and Dietetics, Sri Avinashilingam University, Coimbatore.
7. The Indian Journal of Medical Research, The Indian Council of Medical Research, New Delhi.

Open Educational Resources

1. https://library.oapen.org/bitstream/20.500.12657/41694/1/9781466567597.pdf
2. http://pressbooks.oer.hawaii.edu/humannutrition2/
3. https://oer.galileo.usg.edu/cgi/viewcontent.cgi?article=1006&context=health-textbooks
4. https://www.sciencedirect.com/science/article/pii/S2210833515000672
5. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1417152/pdf/bmjcred00466-0049.pdf
6. http://ecoursesonline.iasri.res.in/course/view.php?id=190
7. https://arxiv.org/ftp/arxiv/papers/1610/1610.00703.pdf
8. https://www.nasa.gov/sites/default/files/space_nutrition_book.pdf
9. https://pressbooks.oer.hawaii.edu/humannutrition2/chapter/16-sports-nutrition/

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 NUTRITIONAL CARE, NUTRITION DURING PREGNANCY, LACTATION, INFANCY				
1.1	Nutritional Care Process - Definition & Model	3	Lecture	LCD
1.2	Balanced diet, food guide pyramid, meal planning and factors influencing meal planning RDA- Meaning and importance	3	Chalk & Talk	Black Board
1.3	Pregnancy – importance, Physiological and biochemical changes, Physiological adjustment that affect energy and nutrient demands, complications.	4	Lecture	PPT & White board
1.4	Lactation – Mechanism, Colostrum, transition milk, mature milk, comparison of cow's and human milk, nutritive value of human milk, nutrient demands.	4	Lecture	Black Board
1.5	Infancy – Importance, nutritional requirements, breast feeding – advantageous, bottle feeding- merits and demerits, feeding problems, weaning – definition, need, process, problems, supplementary foods – types.	4	Chalk & Talk	Black Board

UNIT -2 NUTRITION DURING PRESCHOOL, SCHOOL GOING, ADOLESCENCE, ADULTHOOD, GERIATRICS				
2.1	Preschool Children - nutritional requirements, dietary guidelines & healthy food habits PEM – causes, signs, symptoms, biochemical and metabolic changes, treatment.	4	Chalk & Talk	Black Board
2.2	School going Children – nutritional requirements, importance of packed lunch, feeding problems- obesity, underweight, constipation, dental caries.	4	Chalk & Talk	Black Board
2.3	Adolescence - nutritional requirements, nutritional problems – obesity, under nutrition, anemia, anorexia, premenstrual syndrome, pre-marital health status.	3	Lecture	Black Board
2.4	Adulthood - nutritional requirements according to activity and income levels.	3	Lecture	Black Board
2.5	Geriatrics – physical, physiological and psychological changes, nutritional requirements, nutrition related problems –osteoporosis, constipation, degenerative diseases.	4	Chalk & Talk	Black Board
UNIT -3 THERAPEUTIC DIET				
3.1	Therapeutic diet – Definition, Purpose, Adaptations of normal diet to therapeutic diet, factors to be considered in diet prescription	5	Lecture	Black Board

3.2	Hospital diets – normal, clear fluid, full fluid and soft diet	4	Chalk & Talk	Black Board
3.3	Mode of feeding – enteral, parenteral feeding, TPN, Pre operative and post operative diets	5	Lecture	PPT & White board
3.4	Dietitians- definition, classification, responsibilities & code of ethics	4	Discussion	Black Board
UNIT -4 DIET IN BURNS, FEBRILE CONDITIONS AND WEIGHT MANAGEMENT				
4.1	Diet in burns – classification of burns, dietary management	5	Lecture	PPT & White board
4.2	Diet during fever and infections: typhoid, tuberculosis, malaria, – causes, symptoms, dietary treatment.	4	Discussion	Black Board
4.3	Diet in weight management – Obesity: classification, etiology, metabolic aberrations, clinical manifestations and dietary management	5	Chalk & Talk	Black Board
4.4	Underweight: classification, etiology, clinical manifestations and dietary management	4	Lecture	Black Board
UNIT -5 SPORTS, SPACE AND SEA & AIR TRAVEL NUTRITION				
5.1	**Sports Nutrition** Definition, components of fitness, energy system – aerobic & anaerobic, nutritional demands of sports and dietary recommendations – objectives, nutritional requirements	4	Lecture	PPT & White board

5.2	Dietary guidelines- carbohydrate loading, pre and post game meals, sports anaemia, water and electrolyte balance, losses and their replenishments during exercise and sports events, dehydration and its effects	4	Chalk & Talk	Black Board
5.3	**Space Nutrition** Definition, physiological changes & changes in body composition, classification of space foods, nutritional recommendations	5	Lecture	PPT & White board
5.4	**Sea and Air Travel Nutrition**: Physiological changes in human body during sea and air travel; Health and nutritional problems encountered during sea and air travel; Nutrient requirements and dietary management during sea and air travel.	5	Lecture	LCD

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total
	T1	T2	Seminar	Assignment	OBT/PPT			
	10 Mks.	10 Mks.	5 Mks.	5 Mks	5 Mks	35 Mks.	5 Mks.	40Mks.
K2	4	4	-	-	-	8	-	8
K3	2	2	-	5	-	9	-	9

K4	**2**	**2**	**-**	**-**	**5**	**9**	**-**	**9**
K5	**2**	**2**	**5**	**-**	**-**	**9**	**-**	**9**
Non Scholastic	**-**	**-**	**-**	**-**	**-**		**5**	**5**
Total	**10**	**10**	**5**	**5**	**5**	**35**	**5**	**40**

CIA

Scholastic	**35**
Non Scholastic	**5**
	40

- ✓ **All the course outcomes are to be assessed in the various CIA components.**
- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy for PG are :**

K2-Understand**,** **K3**-Apply**,** **K4**-Analyse, **K5**-Evaluate

EVALUATION PATTERN

SCHOLASTIC				**NON - SCHOLASTIC**	**MARKS**		
C1	**C2**	**C3**	**C4**	**C5**	**CIA**	**ESE**	**Total**
10	**10**	**10**	**5**	**5**	**40**	**60**	**100**

C1 – Internal Test-1

C2 – Internal Test-2

C3 - Seminar

C4 – Assignment

C5 - OBT/PPT

C6 – Non - Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Illustrate nutritional care process	K2	PSO2 & PSO3
CO 2	Discuss the nutritional needs of different stages of life cycle	K2	PSO2 & PSO3
CO 3	Construct medical nutritional management.	K3	PSO2 & PSO3
CO 4	Discover therapeutic interventions for traumatic conditions	K4	PSO2 & PSO3
CO 5	Recommend specific meal plan for sports, sea and air travel	K5	PSO2 & PSO3

Mapping of COs with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	1	3	3	1	1	2	1	1	1	1	1	1	1	1	1
CO2	1	3	3	1	1	1	1	1	2	1	1	1	1	1	2
CO3	1	3	3	3	1	1	1	1	1	3	1	1	1	1	1
CO4	1	3	3	1	1	2	1	1	1	1	2	1	1	1	2
CO5	2	3	3	2	1	1	1	1	2	1	1	1	1	1	2

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	2	3	3	2
CO2	2	1	2	2
CO3	3	1	2	2
CO4	1	1	1	1
CO5	2	2	1	2

Note: Strongly Correlated – 3 Moderately Correlated – 2
Weakly Correlated -1

COURSE DESIGNER:

1. **Dr.K.Karthiga**
2. **Mrs.D.Mouna**

Forwarded By

(Dr.Vasantha Esther Rani)

100% SKILL DEVELOPMENT

I M.Sc., HUMAN NUTRITION AND NUTRACEUTICALS

SEMESTER –I

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSNN	19PG1N3	Applied Physiology	Major Core	6	4

COURSE DESCRIPTION

The course provides a detailed insight on the anatomy and functions of the various systems of the human body.

COURSE OBJECTIVES

- Organs of the body and their functions
- Different systems of the body, their functions with special reference to the control and feedback mechanisms
- Physiological changes at different stages of life.

UNITS

UNIT –I BLOOD AND ENDOCRINE SYSTEM (18 HRS.)

Blood

Composition and functions of blood and Plasma proteins,RBC – Structure and functions, Bone marrow – functions, Erythropoiesis, Haemoglobin, Life span ,fate, Anaemia, haemolysis, polycythemia, ESR, WBC – Classification and functions, Coagulation, Bleeding time, clotting time.Blood Groups.Blood indices,Use of blood for investigation and diagnosis of specific disorders.

Endocrine system

Structure, functions,role of hormones,regulation of hormonal secretion and disorders of pituitary gland, thryroid gland, parathyroid gland, pancreas and adrenal glands. Emphasis on physiology of Diabetes and stress hormones.

UNIT –II CIRCULATORY SYSTEM (18 HRS.)

Anatomical considerations of heart, valves of heart and its action, layers of heart, blood vessels – arteries, arterioles, capillaries, veins, vasa vasorum.Blood pressure – factors and regulation.

Cardiac centre – heart rate – regulation, cardiac output, cardiac impulse, junctional tissues, cardiac cycle, heart sounds, ECG, coronary circulation, pulmonary circulation, cerebral circulation, hepatic circulation, renal circulation, cutaneous circulation and skeletal muscle circulation.

UNIT –III DIGESTIVE AND EXCRETORY SYSTEM (18 HRS.)

Digestive system

Review of anatomy and functions- secretary, digestive and absorptive functions of the digestive tract – Buccal cavity, stomach, pancreas, liver, small intestine and large intestine. Role of enzymes and hormones in digestion and absorption of carbohydrate, protein and fat. Dysfunction of liver,pancreas and gallbladder.

Excretory system

Anatomy and functions of kidney and nephrons, juxta glomerular apparatus. Formation of urine, micturition. Role of kidney in maintaining pH of blood. Water, electrolyte and acid base balance, diuretics.

UNIT –IV MUSCULO –SKELETAL AND RESPIRATORY SYSTEM (18 HRS.)

Musculo -Skeletal system

Structure and function of Bone tissue – osteocytes, osteoblasts, osteoclasts, structure of osseous tissue, section of femur bone. Types of muscles – structure and functions.

Respiratory system

Review of structure and functions of the respiratory tract, lung unit.Mechanism of respiration, transport of oxygen and carbon dioxide. Regulation of respiration, lung volumes, pulmonary function tests, Cardio – respiratory response to exercise and physiological effects of training.

UNIT –V NERVOUS SYSTEM AND REPRODUCTIVE SYSTEM (18 HRS.)

Nervous System

Review of structure and function of nervous system –central or somatic nervous system - neuron –types, structure, properties, myelin sheath, nerve endings, synapse, neurotransmitters, reflex arc, receptors, brain –cerebrum-cerebral cortex-cerebral lobes-structure and functions, cerebellum, medulla oblongata, - thalamus, hypothalamus. The role of

Hypothalamus in various body functions – obesity, sleep, memory. Autonomic nervous system – sympathetic and parasympathetic – actions, functions of ANS. Blood Brain Barrier, CSF

Reproductive System

Primary and accessory sex organs, secondary sexual characteristics of male, female, Menstrual cycle, menopause and post menopausal changes. Transgender - Definition and characteristics.

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3. Gitanjali Chatterjee (1999) *Handbook of Food and Nutrition*, Rajat Publications.
4. Guyton, A.C& Hall J.B (1996):*Textbook of Medical Physiology*,9th edition W.B Sanders Company, Prism Books (Pvt) Ltd,Bangalore.
5. Kamala Krishnaswami (2000) *Nutrition Research-Current Scenerio and future trends,* Oxford and IBH Publishing Co.Pvt.ltd.,
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5. https://openstax.org/details/books/anatomy-and-physiology

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 BLOOD AND ENDOCRINE SYSTEM				
1.1	Composition and functions of blood	1	Chalk & Talk	Black Board
1.2	Plasma proteins; RBC – Structure and functions; WBC – Classification and functions	3	Chalk & Talk	Black Board
1.3	Bone marrow – functions, Erythropoiesis	2	Lecture	PPT & Videos
1.4	Haemoglobin, Life span, fate, Anaemia, haemolysis, polycythemia	2	Lecture	Black Board
1.5	Coagulation, bleeding time, clotting time, ESR, Blood Groups; Blood indices; Use of blood for investigation and diagnosis of specific disorders	3	Demonstration	Blood coagulation and grouping kits
1.6	Pituitary gland- Structure, functions, role of hormones, secretion, regulation and disorders	2	Lecture	PPT

1.7	Thyroid gland- Structure, functions, role of hormones, secretion, regulation and disorders	2	Lecture	PPT
1.8	Parathyroid gland, pancreas and adrenal glands.	2	Chalk & Talk	Black Board
1.9	Physiology of diabetes and stress hormones	1	Group discussion	Black Board
UNIT -2 CIRCULATORY SYSTEM				
2.1	Anatomical considerations of heart, valves of heart and its action, layers of heart	2	Lecture	Model
2.2	Blood vessel – arteries, arterioles, capillaries, veins, vasovasorum	2	Chalk & Talk	Black Board
2.3	Blood pressure factors and regulation	2	Lecture	PPT
2.5	Cardiac centre – heart rate – regulation	2	Lecture	Smart Board
2.6	Cardiac output, cardiac impulse, functional tissues	2	Lecture	Videos
2.7	Cardiac cycle, ECG, heart sounds	3	Discussion	Videos
2.8	Coronary circulation, Pulmonary circulation, Cerebral circulation, hepatic circulation	3	Chalk & Talk	Black Board

2.9	Renal circulation, cutaneous circulation, and skeletal muscle circulation	2	Chalk & Talk	Black Board
UNIT -3 DIGESTIVE AND EXCRETORY SYSTEM				
3.1	Anatomy of digestive system	2	Lecture	Model
3.2	Secretary, digestive, and absorptive functions of the digestive tract	2	Lecture	PPT
3.3	Buccal cavity, stomach, pancreas, liver	1	Chalk & Talk	Black Board
3.4	Small intestine and large intestine	3	Lecture	Smart class
3.5	Role of enzymes and hormones in digestion and absorption of carbohydrate, protein and fat	2	Discussion	Black Board
3.6	Dysfunction of liver, pancreas and gall bladder	2	Lecture	PPT
3.7	Anatomy and functions of kidney and nephrons, juxta glomerular apparatus	3	Lecture	Model
3.8	Formation of urine, micturition	1	Lecture	Smart class

3.9	Role of kidney in maintaining pH of blood. Water, electrolyte	1	Chalk & Talk	Black Board
3.10	Acid base balance, diuretics	1	Lecture	PPT
UNIT -4	**MUSCULO –SKELETAL AND RESPIRATORY SYSTEM**			
4.1	Structure and function of Bone tissue	2	Lecture	Smart class
4.2	Osteocytes, osteoblasts, osteoclasts	2	Chalk & Talk	Black Board
4.3	Structure of osseous tissue	1	Lecture	PPT
4.4	Section of femur bone	1	Lecture	PPT
4.5	Muscles – Structure, types and functions	3	Lecture	Smart class
4.6	Structure and functions of the respiratory tract, lung unit	2	Lecture	Smart class
4.7	Mechanism of respiration	2	Lecture	PPT
4.8	Regulation of respiration, lung volumes	2	Chalk & Talk	Black Board
4.9	Pulmonary function tests, Cardio – respiratory response to exercise and physiological effects of training	3	Discussion	Black Board

UNIT -5	NERVOUS SYSTEM AND REPRODUCTIVE SYSTEM			
5.1	Structure and function of nervous system – central or somatic nervous system	2	Chalk & Talk	Black Board
5.2	Neuron –types, structure, properties, myelin sheath, nerve endings, synapse, neurotransmitters, reflex arc, receptors	3	Lecture	PPT
5.3	Brain – cerebrum- cerebral cortex- cerebral lobes	2	Chalk & Talk	Black Board
5.4	Structure and functions - cerebellum, medulla oblongata, thalamus, hypothalamus	2	Lecture	Smart class
5.5	Role of hypothalamus in various body functions – obesity, sleep, memory	1	Discussion	Videos
5.6	Autonomic nervous system – sympathetic and para sympathetic – actions	2	Lecture	PPT
5.7	Functions of ANS. Blood Brain Barrier, CSF	2	Chalk & Talk	Black Board
5.8	Primary and accessory sex organs and secondary sex characters;	2	Lecture	Smart class

	Transgender- Definition and Characteristics			
5.9	Menstrual cycle	1	Chalk & Talk	Black Board
5.10	Menopause and post-menopausal changes.	1	Discussion	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total
	T1	T2	Seminar	Assignment	OBT/PPT			
	10 Mks.	10 Mks.	5 Mks.	5 Mks	5 Mks	35 Mks.	5 Mks.	40Mks.
K2	4	4	-	-	-	8	-	8
K3	2	2	-	5	-	9	-	9
K4	2	2	-	-	5	9	-	9
K5	2	2	5	-	-	9	-	9
Non Scholastic	-	-	-	-	-		5	5
Total	10	10	5	5	5	35	5	40

CIA

Scholastic	**35**
Non Scholastic	**5**
	40

- **All the course outcomes are to be assessed in the various CIA components.**
- **The levels of CIA Assessment based on Revised Bloom's Taxonomy for PG are :**

K2-Understand**,** **K3**-Apply**,** **K4**-Analyse, **K5**-Evaluate

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

C1 – Internal Test-1

C2 – Internal Test-2

C3 - Seminar

C4 – Assignment

C5 - OBT/PPT

C6 – Non – Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Describe the functions of blood and endocrine system	K2	PSO1
CO 2	Illustrate the anatomy and functions of circulatory system	K2	PSO1
CO 3	Identify the role of digestive and excretory systems	K3	PSO1
CO 4	Analyse the mechanism of musculoskeletal and respiratory systems	K4	PSO1
CO 5	Explain the structure and functions of nervous and reproductive systems	K5	PSO1

Mapping of C0s with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CO2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CO3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1

CO4	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CO5	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	2	1	1	1
CO2	1	1	1	1
CO3	1	1	1	1
CO4	1	1	1	1
CO5	2	1	1	1

Note: Strongly Correlated – 3 ¨ Moderately Correlated – 2

¨ Weakly Correlated -1

COURSE DESIGNER:

1.Dr.Vasantha Esther Rani

2. Mrs.C.Helen

Forwarded By

(Dr.Vasantha Esther Rani)

100% EMPLOYABILITY

I M.Sc.,HUMAN NUTRITION AND NUTRACEUTICALS

SEMESTER –I

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSNN	19PG1N4	Advanced Dietetics Lab	Lab	4	2

COURSE DESCRIPTION

The practical course offers hands-on experience in the planning, preparation and calculation of nutrients for the menu planned for various stages of normal life cycle, deficiency disorders, hospital diets, sports and space nutrition.

COURSE OBJECTIVES

- To develop skills in planning and preparing diets for various stages of normal life cycle.
- To get expertise in planning and preparing diets for various deficiency disorders.
- To plan diets for weight management, burns and febrile conditions.

UNITS

UNIT –I PLANNING AND PREPARATION OF NORMAL DIETS (12 HRS.)

Planning and preparation of normal diets- diets during pregnancy, lactation, preschool, school going, adolescence and old age.

UNIT –II PREPARATION OF SUPPLEMENTARY FOODS (12 HRS.)

Preparation of supplementary foods for infants and nutritional deficiency disorders.

UNIT –III ROUTINE HOSPITAL DIETS (12 HRS.)

Classification of routine hospital diets – clear fluid, full fluid &soft diet and diet for febrile conditions- acute and chronic.

UNIT –IV DIET PLAN FOR BURNS AND WEIGHT MANAGEMENT (12HRS.)

Diet plan for burns and weight management- obesity & underweight.

UNIT –V DIET PLAN FOR SPORTS ANAEMIA (12 HRS.)

Planning of meals for sports anaemia, pre & post game meals and space.

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4. Srilakshmi.B (1995). *Dietetics*, New Age International Private Ltd., New Delhi.
5. Sue Rodwell Williams. (2001). *Basic Nutrition and Diet therapy*, Mosby publications .

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 PLANNING AND PREPARATION OF NORMAL DIETS				
1.1	Planning and preparation of normal diets- diets during pregnancy, lactation & preschool.	6	Demonstration	Cook wares & Utensils
1.2	Planning and preparation of normal diets- diets during school going, adolescence and old age.	6	Demonstration	Cook wares & Utensils
UNIT -2 PREPARATION OF SUPPLEMENTARY FOODS				
2.1	Preparation of supplementary foods for infants	6	Demonstration	Cook wares & Utensils
2.2	Preparation of supplementary foods for nutritional deficiency disorders.	6	Demonstration	Cook wares & Utensils
UNIT -3 ROUTINE HOSPITAL DIETS				
3.1	Classification of routine hospital diets – clear fluid, full fluid & soft diet	6	Demonstration	Cook wares & Utensils
3.2	Diet for febrile conditions- acute and chronic.	6	Demonstration	Cook wares & Utensils
UNIT -4 DIET PLAN FOR BURNS AND WEIGHT MANAGEMENT				
4.1	Diet plan for burns	6	Demonstration	Cook wares & Utensils

4.2	Diet plan for weight management- obesity & underweight.	6	Demonstration	Cook wares & Utensils
UNIT -5 DIET PLAN FOR SPORTS ANAEMIA				
5.1	Planning of meals for sports anaemia, pre & post game meals and space.	12	Demonstration	Cook wares & Utensils

EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	**C2**	**C3**	**C4**	**C5**	**CIA**	**ESE**	**Total**
10	**10**	**10**	**5**	**5**	**40**	**60**	**100**

C1 – Internal Test - 1

C2 – Internal Test - 2

C3 – Model Practical Exam

C4 – Record

C5 – Non - Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Discuss and prepare menu for normal life cycle.	K2	PSO2 & PSO3
CO 2	Select appropriate supplementary foods for infants.	K2	PSO2 & PSO3
CO 3	Prepare modified diets for nutritional deficiency disorders.	K3	PSO2 & PSO3
CO 4	Categorize hospital diets.	K4	PSO2 & PSO3
CO 5	Recommend diet for sports, burns and weight management.	K5	PSO2 & PSO3

Mapping of C0s with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	1	3	3	1	1	1	1	1	1	1	1	1	1	1	1
CO2	1	3	3	1	1	1	1	1	1	1	1	1	1	1	1
CO3	1	3	3	1	1	1	1	1	1	1	1	1	1	1	1
CO4	1	3	3	1	1	1	1	1	1	1	1	1	1	1	1

CO5	1	3	3	1	1	1	1	1	1	1	1	1	1	1	1

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	2	1	1	1
CO2	1	1	1	1
CO3	1	1	1	1
CO4	1	1	1	1
CO5	2	1	1	1

Note: ¨ Strongly Correlated – 3 ¨ Moderately Correlated – 2 Weakly Correlated -1

COURSE DESIGNER:

1. **Dr.K.Karthiga**
2. **Mrs.D.Mouna**

Forwarded By

(Dr.Vasantha Esther Rani)

100% SKILL DEVELOPMENT

I M.Sc.,HUMAN NUTRITION AND NUTRACEUTICALS

SEMESTER –I

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSNN	19PG1N5	Clinical Laboratory Techniques Lab	Lab	4	2

COURSE DESCRIPTION

The course provides hands on training on the estimation of the qualitative and quantitative analysis of blood and urine constituents**.**

COURSE OBJECTIVES

- To understand the techniques of qualitative and quantitative analysis of blood and urine constituents
- To familiarise with the functioning of the equipments used in clinical lab
- To interpret the biochemical parameters for the diagnosis of diseases.

UNITS

UNIT –I QUALITATIVE ANALYSIS OF URINE (12 HRS.)

A. INORGANIC CONSTITUENTS
- Calcium
- Phosphate

B. ORGANIC CONSTITUENT
- Creatinine
- Urea
- Uric Acid

C. ABNORMAL CONSTITUENT

a. Physical Characteristics
- Colour
- Specific Gravity
- PH

b. Chemical Constituents
- Protein
- Glucose

- Bile Salts
- Bile Pigments
- Ketone Bodies

UNIT –II QUANTITATIVE ANALYSIS OF URINE (12 HRS.)

A. Urea

B. Creatinine

C. Calcium

UNIT –III HAEMATOLOGICAL EXAMINATION (12 HRS.)

A. Haemoglobin

B. Packed Cell Volume

UNIT –IV EXAMINATION OF BLOOD (12 HRS.)

A. Glucose

B. Lipid Profile

- Cholesterol
- TG
- LDL
- HDL
- VLDL

UNIT –V EXAMINATION OF SERUM (12 HRS.)

A. Uric Acid

B. Bilurubin

C. Calcium

D. Total Protein/ Albumin/ Globulin/ AG Ratio

REFERENCES:

1. J. Jayaraman, 1996. Laboratory Manual in Biochemistry. New Age International Ltd. New Delhi.
2. Oser, B.L.Harke's Physiological Chemistry XIV Edition, Tata Mc-Graw Hill, Publishing Company Ltd., Bombay, 1954.
3. Raghuramulu, N.Nair, K.M.Kalyanasundaram, S.A.Manual of laboratory techniques, National Institute of Nutrition, ICMR, Silver Prints, Hyderabad, 1983.
4. S.Sadasivam. and A. Manickam, 1991. Biochemical Methods. New Age International Pvt. Ltd., New Delhi.

WEB REFERENCES:

1. www.msdmanuals.com
2. www.cdc.gov
3. www.labtestsonline.com

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 QUALITATIVE ANALYSIS OF URINE				
1.1	Inorganic constituents - Calcium, Phosphate	3	Lecture cum demonstration	Essential chemicals, instruments and glass wares.
1.2	Organic constituents - Creatinine, Urea, Uric Acid	4	Lecture cum demonstration	Essential chemicals, instruments and glass wares.
1.3	Physical Characteristics - Colour, Specific Gravity, pH	1	Demonstration	Urine Sample
1.4	Chemical Constituents Protein, Glucose, Bile Salts, Bile Pigments, Ketone Bodies	4	Lecture cum demonstration	Essential chemicals, instruments and glass wares.
UNIT -2 QUANTITATIVE ANALYSIS OF URINE				
2.1	Urea	4	Lecture cum demonstration	Essential chemicals, instruments

				and glass wares.
2.2	Creatinine	4	Lecture cum demonstration	Essential chemicals, instruments and glass wares.
2.3	Calcium	4	Lecture cum demonstration	Essential chemicals, instruments and glass wares.
UNIT -3 HAEMATOLOGICAL EXAMINATION				
3.1	Haemoglobin	10	Lecture cum demonstration	Essential chemicals, instruments and glass wares.
3.2	Packed Cell Volume	2	Demonstration	Lab Report
UNIT -4 EXAMINATION OF BLOOD				
4.1	Glucose	3	Lecture cum demonstration	Essential chemicals, instruments and glass wares.
4.2	Cholesterol	3	Lecture cum demonstration	Essential chemicals, instruments and glass wares.
4.3	Triglyceride	3	Lecture cum demonstration	Essential chemicals, instruments

				and glass wares.
4.4	LDL	1	Chalk and talk	Lab Report
4.5	HDL	1	Chalk and talk	Lab Report
4.6	VLDL	1	Chalk and talk	Lab Report
UNIT -5 EXAMINATION OF SERUM				
5.1	Uric Acid	2	Lecture cum demonstration	Essential chemicals, instruments and glass wares.
5.2	Bilurubin	2	Lecture cum demonstration	Essential chemicals, instruments and glass wares.
5.3	Calcium	2	Lecture cum demonstration	Essential chemicals, instruments and glass wares.
5.4	Total Protein	3	Lecture cum demonstration	Essential chemicals, instruments and glass wares.
5.5	Albumin/ Globulin/ AG Ratio	3	Lecture cum demonstration	Essential chemicals, instruments and glass wares.

EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	10	10	5	5	40	60	100

C1 – Internal Test - 1

C2 – Internal Test - 2

C3 – Model Practical Exam

C4 – Record

C5 – Non – Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Trace the organic, inorganic and abnormal constituents of urine	K2	PSO8
CO 2	Interpret the quantitative analysis of urine	K2	PSO8
CO 3	Estimate the haematological examination	K3	PSO8
CO 4	Analyse the blood glucose and lipid profile	K4	PSO8

CO 5	Assess the serum constituents	K5	PSO8

Mapping of C0s with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1
CO2	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1
CO3	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1
CO4	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1
CO5	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	2	1	1	1
CO2	1	1	1	1
CO3	1	1	1	1
CO4	2	1	1	1
CO5	2	1	1	1

Note: Strongly Correlated – 3 ¨ Moderately Correlated – 2 ¨ Weakly Correlated -1

COURSE DESIGNER:

1.Mrs. P. Magdalene Virjini

2.Mrs. C. Helen

Forwarded By

(Dr.Vasantha Esther Rani)

100% SKILL DEVELOPMENT

I M.Sc. HUMAN NUTRITION AND NUTRACEUTICALS

SEMESTER –I

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSNN	19PGNEDC1	Nutrition & Dietetics	EDC	3	3

COURSE DESCRIPTION

This course offers scientific understanding of the role of nutrition in health diseases.

COURSE OBJECTIVES

- To understand the basics of nutrition.
- To learn the menu planning methods for family members.
- To learn the clinical aspects of disease conditions and diet therapy.

UNITS

UNIT –I INTRODUCTION TO NUTRITION (9 HRS.)

Nutrition – definition, nutritional status, nutrients and their function, relationship of food and health – Characteristics of good nutrition – balanced diet – BMI, IBW, Dietary guidelines-basic food groups, food pyramid

UNIT –II MACRO NUTRIENTS (9HRS.)

Classification, functions, sources, deficiency of carbohydrates, protein, lipids.

UNIT –III MICRO NUTRIENTS (9 HRS.)

Functions, sources, deficiency disorders of Vitamins – Fat soluble vitamins A, D, E, K; Water Soluble vitamins – B1, B2, Niacin, B6, B12, Folic acid.

Minerals – Ca, P. Zn, Fe, I, Fl.

UNIT –IV NUTRITION FOR DEVELOPMENTAL MILESTONES (9 HRS.)

Menu planning, Principles of planning meals,

Nutritional importance of pregnancy, changes incurred and complications

Nutritional importance of lactation

Nutrition during infancy – growth and development, advantages of breast feeding and bottle feeding, formulation criteria for bottle milk. Supplementary foods.

Nutritional importance for adolescence.

UNIT –V PRINCIPLE OF DIET THERAPY (9 HRS.)

Definition of Diet therapy, Foods to be included and avoided – obesity and underweight, diabetes mellitus, typhoid, peptic ulcer, anaemia, CVD.

BOOK REFERENCES:

1. Srilakshmi B (2012) *Dietetics*, New Age International Publishers,
2. Antia F.P. (1989) *Nutrition Dietetics*, Oxford University Press
3. Swaminathan M (1988) *Advanced textbook on Food and Nutrition*, Vol I and Vol II, The Bangalore Printing and Publishing Co., Ltd.

JOURNAL REFERENCES:

1. The Indian Journal of Nutrition & Dietetics.
2. Clinical Journal of Nutrition & Dietetics

OPEN EDUCATIONAL RESOURCES:

1. **https://open.umn.edu/opentextbooks/textbooks/622**
2. **https://pressbooks.oer.hawaii.edu/humannutrition/**
3. https://en.wikibooks.org/wiki/Fundamentals_of_Human_Nutrition
4. https://www.youtube.com/watch?v=sorIaN6vRBI
5. https://oer.galileo.usg.edu/cgi/viewcontent.cgi?article=1006&context=health-textbooks

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 INTRODUCTION TO NUTRITION				
1.1	Nutrition – definition, nutritional status, nutrients and their function, relationship of food and health.	4	Lecture	PPT
1.2	Characteristics of good nutrition – balanced diet – BMI, IBW, Dietary guidelines-basic food groups, food pyramid	5	Chalk & Talk	Black Board
UNIT -2 MACRO NUTRIENTS				
2.1	Classification, functions, sources, deficiency of carbohydrates.	3	Lecture	PPT
2.2	Classification, functions, sources, deficiency of protein.	3	Chalk & Talk	Black Board
2.3	Classification, functions, sources, deficiency of lipids.	3	Lecture	PPT
UNIT -3 MICRO NUTRIENTS				
3.1	Functions, sources, deficiency disorders of Vitamins – Fat soluble vitamins A, D,.	1	Lecture	PPT
3.2	Functions, sources, deficiency disorders of E, K; Water Soluble vitamins – B1, B2.	2	Chalk & Talk	Black Board

3.3	Functions, sources, deficiency disorders of Water Soluble vitamins –Niacin, B6, B12, Folic acid.	2	Chalk & Talk	Black Board
3.4	Functions, sources, deficiency disorders of Minerals – Ca, P. Zn	2	Lecture	PPT
3.5	Functions, sources, deficiency disorders of Minerals – Fe, I, Fl.	2	Chalk & Talk	Black Board
UNIT -4 NUTRITION FOR DEVELOPMENTAL MILESTONES				
4.1	Menu planning, Principles of planning meals, Nutritional importance of pregnancy, changes incurred and complications Nutritional importance of lactation.	3	Lecture	PPT
4.2	Nutrition during infancy – growth and development, advantages of breast feeding and bottle feeding, formulation criteria for bottle milk. supplementary foods.	3	Lecture	PPT
4.3	Nutritional importance for adolescence.	3	Chalk & Talk	Black Board
UNIT -5 PRINCIPLE OF DIET THERAPY				
5.1	Definition of Diet therapy, Foods to be included and avoided – obesity and underweight, diabetes mellitus, typhoid.	3	Chalk & Talk	Black Board

5.2	Definition of Diet therapy, Foods to be included and avoided-diabetes mellitus, typhoid.	3	Chalk & Talk	Black Board
5.3	Definition of Diet therapy, Foods to be included and avoided- peptic ulcer, anaemia, CVD.	3	Lecture	PPT & White board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total
	T1	T2	Seminar	Assignment	OBT/PPT			
	10 Mks.	10 Mks.	5 Mks.	5 Mks	5 Mks	35 Mks.	5 Mks.	40Mks.
K2	4	4	-	-	-	8	-	8
K3	2	2	-	5	-	9	-	9
K4	2	2	-	-	5	9	-	9
K5	2	2	5	-	-	9	-	9
Non Scholastic	-	-	-	-	-		5	5
Total	10	10	5	5	5	35	5	40

CIA

Scholastic	**35**
Non Scholastic	**5**
	40

- **All the course outcomes are to be assessed in the various CIA components.**
- **The levels of CIA Assessment based on Revised Bloom's Taxonomy for PG are :**

K2-Understand**,** **K3**-Apply**,** **K4**-Analyse, **K5**-Evaluate

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

C1 – Internal Test-1

C2 – Internal Test-2

C3 - Seminar

C4 – Assignment

C5 - OBT/PPT

C6 – Non - Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Describe different nutrition terms and concepts of food and nutrition.	K2	PSO2
CO 2	Explain the role of macro and micronutrients in human nutrition.	K2	PSO2
CO 3	Estimate the functions and deficiency effects of micronutrients.	K3	PSO2
CO 4	Determine the importance of nutrition in the different stages of lifespan.	K3	PSO3
CO 5	Analyze the principles of diet therapy in the management of diseases.	K4	PSO3

Mapping of C0s with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1
CO2	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1
CO3	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1
CO4	1	2	3	1	1	1	1	1	1	1	1	1	1	1	1
CO5	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	3	1	1	1
CO2	2	1	1	1
CO3	2	2	2	1
CO4	2	1	1	1
CO5	2	1	1	1

COURSE DESIGNER:

1. **Mrs. P.Magdalene Virjini**
2. **Mrs. D. Mouna**

Forwarded By

(Dr.Vasantha Esther Rani)

100% EMPLOYABILITY

I M.Sc.,HUMAN NUTRITION AND NUTRACEUTICALS

SEMESTER –II

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSNN	19PG2N6	Clinical Nutrition and Diet Therapy	Major Core	6	4

COURSE DESCRIPTION

The course provides a comprehensive knowledge required for the prevention and treatment of various diseases.

COURSE OBJECTIVES

- To identify and describe various disease conditions.
- To gain knowledge on appropriate nutritional management.
- To develop the attitude and capacity for taking up dietetics as a profession.

UNITS

UNIT –I DIET IN ENDOCRINE DISORDERS (18 Hrs.)

Diabetes Mellitus - Etiology, classification, signs and symptoms, treatment, changes in metabolism during diabetes, nutritional management, food exchange systems, diabetes education and prevention program.

Hypo and Hyperthyroidism - Etiology, signs and symptoms and medical nutritional therapy.

Gout- Etiology, signs and symptoms and medical nutritional therapy.

UNIT –II DIET AND CARDIOVASCULAR DISEASE (18Hrs.)

Atherosclerosis - Risk factors, causes, signs and symptoms, medical nutritional therapy, Hypertension – Etiology, types, dietary treatment, education and prevention.

UNIT –III DIET AND RENAL DISEASES (18 Hrs.)

Etiology, signs and symptoms, medical nutritional therapy of Glomerulonephritis, Nephrotic syndrome, Renal failure and Kidney stones.

UNIT –IV DIET AND GASTROINTESTINAL PROBLEMS (18 Hrs.)

a. Upper gastrointestinal tract – Etiology, signs and symptoms, medical nutritional therapy of Hiatal hernia and Peptic ulcer.

b. Lower gastro-intestinal tract- Etiology, signs and symptoms, medical nutritional therapy of Celiac sprue, Diverticular disease, Constipation and Diarrhea.

c. Liver diseases- Etiology, signs and symptoms, medical nutritional therapy of Hepatitis, Cirrhosis and Hepatic coma

d. Gallbladder disease – Etiology, signs and symptoms, medical nutritional therapy of Cholecystitis and Cholelithiasis.

e. Pancreatic disease - Etiology, signs and symptoms, medical nutritional therapy of Pancreatitis

UNIT –V NUTRITIONAL SUPPORT IN CANCER, AIDS AND FOOD ALLERGIES (18 Hrs.)

Cancer - Nature and causes of cancer, relation of cancer and foods, effects of cancer, Nutritional therapy and support for cancer treatment, precaution.

AIDS – Definition, Progression and symptoms, malnutrition and AIDS, medical nutrition therapy and practical suggestions for symptom management.

Food allergies and intolerances – Definition, Types of reactions, Types of allergens, diagnosis, treatment.

BOOK REFERENCES:

1. Cornnie H. Robinson and Emena S. Weighly, (1989). *Basic Nutrition and Diet Therapy*, 3nd .Ed, Macmillan Publishing Company, New York.
2. Davidson, S.S. Passmore, P. Brack, J.F. (1993). *Human Nutrition and Dietetics*, 9th Ed, F&S, Lingstone Ltd., Edinburgh and London,
3. Garrow.J.S, W.P.T. James, 9th Ed 1993, *Human Nutrition and Dietetics*, Churchill Livingstone.
4. Kathleen Mahan.L , 13th Ed, (2011), Sylvia Escott-Stump, Janice L Raymond *Krause's Food & Nutrition Therapy*, Elsevier Publications,.
5. Robinson CH (1994), *Normal and Therapeutic Nutrition*, 18th Ed, Macmillan Publishers Company, NewYork.
6. Srilakshmi.B, *Dietetics,* 1995, New Age International Private Ltd., New Delhi.
7. Sue Rodwell Williams, 2001, *Basic Nutrition and Diet therapy*, Mosby publications.

JOURNAL REFERENCES:

1. Food and Nutrition Bulletin, United Nations University Press, Japan.
2. Journal of American Dietetic Association, American Dietetic Association, Mount Marris, Illinois, 61054, USA.
3. Nutrition Abstracts and Reviews, CBB International, UK
4. Nutrition
5. Reviews, Nutrition Foundation, Washington, DC.
6. The American Journal of Clinical Nutrition, Waverfy Press, USA.
7. The Indian Journal of Medical Research, Indian Council of Medical Research, New Delhi.
8. The Indian Journal of Nutrition and Dietetics, Sri Avinashilingam Deemed University, Coimbatore.

OPEN EDUCATIONAL RESOURCES:

1.https://pressbooks.oer.hawaii.edu/humannutrition2/chapter/2-the-endocrine-system/

2.https://clinical-nutrition.imedpub.com/

3.https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4597475/

4.https://nephcure.org/livingwithkidneydisease/diet-and-nutrition/renal-diet/

5.https://sa1s3.patientpop.com/assets/docs/36223.pdf

6.https://www.cancer.org/treatment/survivorship-during-and-after-treatment/staying-active/nutrition-and-physical-activity-during-and-after-cancer-treatment.html

7.https://www.thewellproject.org/hiv-information/nutrition-and-hiv

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 DIET IN ENDOCRINE DISORDERS				
1.1	Diabetes Mellitus - Etiology, classification, signs and symptoms, treatment, changes in metabolism during diabetes.	4	Lecture	PPT
1.2	Nutritional management, Food exchange systems.	3	Chalk & Talk Demonstration	Black Board Charts& Models
1.3	Diabetes education and prevention program.	2	Discussion	Case Study Report
1.4	Hypothryroidism - Etiology, signs and symptoms and medical nutritional therapy.	3	Lecture	PPT
1.5	Hyperthryroidism - Etiology, signs and symptoms and medical nutritional therapy.	3	Lecture	PPT
1.6	Gout- Etiology, signs and symptoms and medical nutritional therapy.	3	Chalk and Talk	Black Board
UNIT -2 DIET AND CARDIOVASCULAR DISEASE				
2.1	Atherosclerosis - Risk factors, causes, signs and symptoms.	6	Lecture	PPT, Videos

2.2	Medical nutritional therapy.	4	Chalk & Talk	Black Board
2.3	Hypertension – Etiology, types.	4	Lecture	PPT
2.4	Dietary treatment, education and prevention.	4	Chalk & Talk	Black Board
UNIT -3 DIET AND RENAL DISEASES				
3.1	Etiology, signs and symptoms, medical nutritional therapy of Glomerulonephritis.	5	Lecture	PPT
3.2	Etiology, signs and symptoms, medical nutritional therapy of Nephrotic syndrome.	5	Chalk & Talk	Black Board
3.3	Etiology, signs and symptoms, medical nutritional therapy of Renal Failure.	3	Demonstration	Model
3.4	Etiology, signs and symptoms, medical nutritional therapy of Kidney Stones.	5	Lecture	PPT
UNIT -4 DIET AND GASTRO INTESTINAL PROBLEMS				
4.1	Upper gastrointestinal tract – Etiology, signs and symptoms, medical nutritional therapy of Hiatal hernia and Peptic ulcer.	5	Lecture	PPT, Videos
4.2	Lower gastro-intestinal tract- Etiology, signs and symptoms, medical nutritional therapy of Celiac sprue, Diverticular disease, Constipation and Diarrhea.	4	Lecture	PPT, Videos

4.3	Liver diseases- Etiology, signs and symptoms, medical nutritional therapy of Hepatitis, Cirrhosis and Hepatic coma.	5	Chalk & Talk	Black Board
4.4	Gall bladder disease – Etiology, signs and symptoms, medical nutritional therapy of Cholecystitis and Cholelithiasis.	2	Lecture	PPT
4.5	Pancreatic disease - Etiology, signs and symptoms, medical nutritional therapy of Pancreatitis.	2	Chalk & Talk	Black Board
UNIT -5 NUTRITIONAL SUPPORT IN CANCER, AIDS AND FOOD ALLERGIES				
5.1	Cancer - Nature and causes of cancer, relation of cancer and foods, effects of cancer, Nutritional therapy and support for cancer treatment, precaution.	4	Chalk & Talk	Black Board
5.2	Effects of cancer, Nutritional therapy and support for cancer treatment, precaution.	4	Chalk & Talk	Black Board
5.3	AIDS – Definition, Progression and symptoms, malnutrition and AIDS.	4	Lecture	PPT, Videos
5.4	Medical nutrition therapy and practical suggestions for symptom management.	3	Lecture	PPT & White board
5.5	Food allergies and intolerances– Definition, Types of reactions, Types of allergens, diagnosis, treatment.	3	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total
	T1	T2	Seminar	Assignment	OBT/PPT			
	10 Mks.	10 Mks.	5 Mks.	5 Mks	5 Mks	35 Mks.	5 Mks.	40Mks.
K2	4	4	-	-	-	8	-	8
K3	2	2	-	5	-	9	-	9
K4	2	2	-	-	5	9	-	9
K5	2	2	5	-	-	9	-	9
Non Scholastic	-	-	-	-	-		5	5
Total	10	10	5	5	5	35	5	40

CIA

Scholastic	**35**
Non Scholastic	**5**
	40

- **All the course outcomes are to be assessed in the various CIA components.**
- **The levels of CIA Assessment based on Revised Bloom's Taxonomy for PG are :**

K2-Understand, **K3**-Apply, **K4**-Analyse, **K5**-Evaluate

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

C1 – Internal Test-1

C2 – Internal Test-2

C3 - Seminar

C4 – Assignment

C5 - OBT/PPT

C6 – Non - Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Discuss the characteristics and diet management of metabolic disorders.	K2	PSO3

CO 2	Describe the medical nutritional management of cardiovascular diseases.	K2	PSO3
CO 3	Plan diets for the management of renal diseases.	K3	PSO3
CO 4	Categorize the foods used in the treatment of gastrointestinal diseases.	K4	PSO3
CO 5	Explain the treatment strategies for AIDS, cancer and food allergy.	K5	PSO3

Mapping of C0s with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1
CO2	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1
CO3	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1
CO4	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1
CO5	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	2	1	1	1
CO2	1	1	1	1
CO3	2	1	1	1
CO4	3	1	1	1
CO5	3	1	1	1

Note: Strongly Correlated – 3 ¨ **Moderately Correlated – 2**

¨ **Weakly Correlated -1**

COURSE DESIGNER:

1. **Mrs.P.Madalene Virjini**
2. **Dr.K.Karthiga**

Forwarded By

(Dr.Vasantha Esther Rani)

100% SKILL DEVELOPMENT

I M.Sc.,HUMAN NUTRITION AND NUTRACEUTICALS

SEMESTER –II

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ • WEEK	CREDITS
PSNN	19PG2N7	Functional Foods and Nutraceuticals	Major Core	6	4

COURSE DESCRIPTION

The course contents are an eye opener to students on the terminologies, importance, therapeutic applications of nutraceuticals from sources through plant, animal and microbes.

COURSE OBJECTIVES

- To enable students understand the relation between Functional Foods, Nutraceuticals to Food and Drugs
- To introduce them to various functional food groups and products
- To enable students understand the regulatory aspects of Functional Foods and nutracueticals

UNITS

UNIT– I INTRODUCTION TO FUNCTIONAL FOODS & NUTRACEUTICALS (18 HRS.)

Functional foods and Nutraceuticals – Definition and history.

Teleology – definition, primary and secondary metabolites.

Organisational Models for Nutraceuticals - a) Food Sources b) Mechanism of Action c) Chemical Nature

Consumer Marketing - Factors for marketing functional foods and nutraceuticals.

UNIT –II FUNCTIONAL COMPONENTS FROM PLANT SOURCES (18 HRS.)

(i) Nutrient Molecules: a) Phospholipids b) Vitamin K c) Carbohydrate Derivatives- Dietary fiber - Types and sources, Physical and Physiological properties d) Minerals – Zinc, Selenium.

(ii) Non Nutrient Molecules: a) Phenolic compounds – Phytoestrogens (Isoflavones, Lignans) Flavonoids – Quercetin, kempferol, Flavones – limonene, Flavols – Catechin, Phenolic acid – Ellagic acid, Caffeic acid b) Phytosterols and phyto stenols c) Saponins d) Tannins e) Carotenoids - Lycopene, Beta-carotene, Lutein and zeaxanthin

(iii) Hypocholesterolemic and antidiabetic components

UNIT–III FUNCTIONAL COMPONENTS FROM ANIMAL SOURCES(18 HRS.)

(i) Major and minor components in cow's Milk and Human Milk
Proteins – lactalbumin, lactoglobulin, lactoferrin, immunoglobulins, Derived peptides – casein phospho peptides, glycomacro peptides, Lactose. Fat. Mineral – zinc, selenium, Calcium

(ii) Dietary lipids - Conjugated Linolenic Acid, linoleic acid, oleic acid, GLA

(iii) Omega 3 and Omega 6 Fatty Acids

(iv) Structured Lipids

UNIT –IV MICROBES AS FUNCTIONAL FOODS (18 HRS.)

General Functions of Intestinal Microflora

Prebiotics - Definition, role of prebiotic as functional ingredient, examples.

Probiotics - Definition, role of prebiotic as functional ingredient, examples.

Symbiotics - Definition, functions, examples.

UNIT –V HERBS AND FLOWERS AS FUNCTIONAL FOODS (18 HRS.)

Action of Herbs and Efficacy on:

a) Nervous System-Ginseng, St.John's wort, Ginkgo biloba, Bacopa Monnieri & Centalla asiatica

b) Heart and Circulatory System-Hawthorn plant

c) Immune System -Echinacea

d) Digestive System-Ginger valerian root fennel

e) Respiratory System-Licorice root, kava kava

f) Urinary System-Cranberry, Saw palmetto

g) Musculoskeletal System-Fever few

Flowers

Medicinal values, nutritional importance, culinary uses, effect of cooking of

Edible flowers – Drumstick, Neem, Agathi, Plantain

Ornamental edible flowers – Hibiscus, lotus, rose

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3. The American Journal of Clinical Nutrition, Waverfy Press, USA.
4. The Indian Journal of Medical Research, The Indian Council of Medical Research, New Delhi.

Open Educational Resources:

1. **https://search.proquest.com/openview/18c319d200432644bfd72f1cb4a1f812/1?pq-origsite=gscholar&cbl=1976406**
2. **https://www.healthline.com/nutrition/functional-foods#bottom-line**
3. **https://www.spinacafarms.com/blog/nutraceuticals-vs-supplements-and-functional-foods-whats-the-difference-anyways#:~:text=Functional%20foods%20look%20like%20food%20and%20are%20modified%20for%20greater,whole%20foods%20to%20augment%20health.**
4. **http://egyankosh.ac.in/bitstream/123456789/38355/1/Uint-9.pdf**
5. **https://chiro.org/nutrition/FULL/Functional_Foods.shtml**
6. **https://fac.ksu.edu.sa/sites/default/files/lectute_1_457_0.pdf**
7. **https://www.researchgate.net/publication/328415909_Traditional_Foods_Functional_Foods_and_Nutraceuticals**

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 INTRODUCTION TO FUNCTIONAL FOODS AND NUTRACEUTICALS				
1.1	Functional foods and Nutraceuticals – Definition and history.	4	Chalk & Talk	PPT & White board
1.2	Teleology – definition, primary and secondary metabolites.	5	Chalk & Talk	PPT & White board
1.3	Organisational Models for Nutraceuticals - a) Food Sources b) Mechanism of Action: c) Chemical Nature	5	Lecture	PPT & White board
1.4	Consumer Marketing - Factors for marketing functional foods and nutraceuticls.	4	Lecture	Black Board
UNIT -2 FUNCTIONAL COMPONENTS FROM PLANT SOURCES				
2.1	Nutrient Molecules: a) Phospholipids b) Vitamin K	3	Lecture	PPT & White board
2.2	c) Carbohydrate Derivatives- Dietary fiber - Types and sources, Physical and Physiological properties	3	Discussion	Black Board

2.3	Non Nutrient Molecules: a) Phenolic compounds – Phytoestrogens (Isoflavones, Lignans) Flavonoids – Quercetin, kempferol,	3	Lecture	PPT & White board
2.4	Flavones – limonene, Flavols – Catechin, Phenolic acid – Ellagic acid, Caffeic acid	3	Lecture	LCD
2.5	b) Phytosterols and phyto stenols c) Saponins d) Tannins	3	Lecture	PPT & White board
2.6	e) Carotenoids - Lycopene, Beta-carotene, Lutein and zeaxanthin	3	Discussio n	Black Board
UNIT -3 FUNCTIONAL COMPONENTS FROM ANIMAL SOURCES				
3.1	Major and minor components in cow's Milk and Human Milk	3	Discussio n	Black Board
3.2	Proteins – lactalbumin, lactoglobulin, lactoferrin, immunoglobulins, Derived peptides – casein phospho peptides, glycomacro peptides,	4	Lecture	Black Board
3.3	Lactose. Fat. Mineral – zinc, selenium, Calcium	3	Chalk & Talk	Black Board
3.4	Dietary lipids - Conjugated Linolenic Acid, linoleic acid, oleic acid, GLA	4	Discussio n	Black Board
3.5	Omega 3 and Omega 6 Fatty Acids Structured Lipids	4	Lecture	Black Board

UNIT -4 MICROBES AS FUNCTIONAL FOODS				
4.1	General Functions of Intestinal Microflora	4	Chalk & Talk	Black Board
4.2	Prebiotics - Definition, role of prebiotic as functional ingredient, examples.	5	Lecture	PPT & White board
4.3	Probiotics - Definition, role of prebiotic as functional ingredient, examples.	5	Lecture	PPT & White board
4.4	Symbiotics - Definition, functions, examples.	4	Lecture	PPT & White board
UNIT -5 HERBS AND FLOWERS AS FUNCTIONAL FOODS				
5.1	a) Nervous System-Ginseng, St.John's wort, Ginkgo biloba, Bacopa Monnieri & Centalla asiatica	3	Chalk & Talk	Black Board
5.2	b) Heart and Circulatory System-Hawthorn plant c) Immune System -Echinacea	3	Lecture	PPT & White board
5.3	d) Digestive System-Ginger valerian root fennel e) Respiratory System-Licorice root, kava kava	3	Lecture	LCD
5.4	f) Urinary System-Cranberry, Saw palmetto g) Musculoskeletal System-Fever few	3	Lecture	PPT & White board

5.5	Medicinal values, nutritional importance, culinary uses, effect of cooking of Edible flowers – Drumstick, Neem, Agathi, Plantain	3	Discussion	Black Board
5.6	Medicinal values, nutritional importance, culinary uses, effect of cooking of Ornamental edible flowers – Hibiscus, lotus, rose	3	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total
	T1	T2	Seminar	Assignment	OBT/PPT			
	10 Mks.	10 Mks.	5 Mks.	5 Mks	5 Mks	35 Mks.	5 Mks.	40Mks.
K2	**4**	**4**	**-**	**-**	**-**	**8**	**-**	**8**
K3	**2**	**2**	**-**	**5**	**-**	**9**	**-**	**9**
K4	**2**	**2**	**-**	**-**	**5**	**9**	**-**	**9**
K5	**2**	**2**	**5**	**-**	**-**	**9**	**-**	**9**
Non Scholastic	**-**	**-**	**-**	**-**	**-**		**5**	**5**
Total	**10**	**10**	**5**	**5**	**5**	**35**	**5**	**40**

CIA

Scholastic	**35**
Non Scholastic	**5**
	40

- **All the course outcomes are to be assessed in the various CIA components.**
- **The levels of CIA Assessment based on Revised Bloom's Taxonomy for PG are :**

K2-Understand**,** **K3**-Apply**,** **K4**-Analyse, **K5**-Evaluate

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

C1 – Internal Test-1

C2 – Internal Test-2

C3 - Seminar

C4 – Assignment

C5 - OBT/PPT

C6 – Non - Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Discuss and understand the concepts of functional foods.	K2	PSO2 & PSO4
CO 2	Classify the bioactive components of functional foods.	K2	PSO2 & PSO4
CO 3	Identify the role of prebiotics, probiotics & synbiotics as functional ingredients.	K3	PSO2 & PSO4
CO 4	Discover the efficacy of herbs and flowers as functional foods	K4	PSO2 & PSO4
CO 5	Explain the role of Nutraceuticals in treating diseases	K5	PSO2 & PSO4

Mapping of C0s with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	1	3	2	3	1	1	1	1	3	1	1	1	1	1	2
CO2	1	3	2	3	1	1	1	1	2	1	1	1	1	1	1
CO3	1	3	2	3	1	1	1	1	1	1	1	1	1	1	1
CO4	1	3	1	3	1	1	1	1	2	1	1	1	1	1	2
CO5	1	3	3	3	1	1	1	1	2	1	1	1	1	1	2

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	1	1	1	2
CO2	1	2	2	1
CO3	1	1	1	1
CO4	1	1	1	1
CO5	2	1	2	1

Note: ¨ Strongly Correlated – 3 ¨ Moderately Correlated – 2

Weakly Correlated -1

COURSE DESIGNER:

1. **Dr. Vasantha Esther Rani**
2. **Mrs. D.Mouna**

Forwarded By

(Dr.Vasantha Esther Rani)

100% SKILL DEVELOPMENT

I M.Sc., HUMAN NUTRITION AND NUTRACEUTICALS

SEMESTER –II

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSNN	19PG2N8	Research Methodology	Lecture	6	4

COURSE DESCRIPTION

The course provides a detailed insight on the types of research, methods of collecting data, sampling techniques, framing hypothesis and ultimately preparing the research report

COURSE OBJECTIVES

- To impart the necessary knowledge to frame an experimental design to carry out systematic research work
- To help the students to do the project systematically.

UNITS

UNIT –I RESEARCH COMPONENTS AND TYPES (18 HRS.)

Meaning of research – objectives of Research – Motivation in Research – Types of Research – Research approaches – Significance of Research and Scientific Method. Qualities of Good Research – Problems Encountered by Researchers in India. Identifying a Research, Necessary condition for Formulation of the research Problem – Criteria for Good Research Project.

UNIT –II METHODS OF DATA COLLECTION (18 HRS.)

Primary data: Observation, Experimentation, Simulation, Interviewing, Questionnaire, Projective technique.

Secondary data: Published and Unpublished sources

UNIT –III SAMPLING TECHNIQUES (18 HRS.)

Characteristics of good sample, advantages and disadvantages of sample.

Sampling techniques – Probability or random sampling, Non Probability or Non random sampling, Sampling and non sampling errors.

UNIT –IV FORMULATION OF HYPOTHESIS (18 HRS.)

Hypothesis – Definition, Role and Types , criteria for useful hypothesis — its formulation. Tabulation – editing – coding – analysis and interpretation of data. Procedure for testing hypothesis.

UNIT –V THESIS AND REPORT WRITING (18 HRS.)

Components or layout of a Thesis – Introduction, Review of Literature, Methodology, Results and discussion, Summary and conclusion, Bibliography, Footnotes and Appendix

Significance of report writing – Types of report, oral presentation, Mechanics of writing and Precautions of writing research report, scientific writing.

Plagiarism - Meaning and significance.

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2. Ghosh B.N., (1987). *Scientific method & Social Research:* (4th Edition), Sterling Publishers Pvt. Ltd., NewDelhi,.
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4. Gopal Lal Jain, (1998), *Research Methodology – Methods tools and Techniques*, Mangal Deep Publications, Jaipur.
5. Gupta S.P. (2001). *Statistics,* S. Chand & Company LTD, New Delhi.
6. Kothari C.R., (2004). *Research Methodology (*3rd reprint Edition), New Age International Publishers, New Delhi,
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9. Sadhu & Singh, (2001) *Research Methodology in Social Sciences (*2nd Edition) Himalaya Publishing House, Mumbai,
10. Santhosh Gupta, (2001). *Research Methodology and Statistical Techniques*, Deep and Deep publications, New Delhi.
11. Sonachalam K.S., (1988). *Research Methodology of Social Science*, Emerald Publishers, Madras.
12. Yogesh Kumar Singh &Ruchikanath, (2005). *Research Methodology,* A.P.H. Publishing Corporation, New Delhi.

JOURNAL REFERENCES:

1. International Journal of Research Methodology.
2. International Journal of Social Research Methodology.

OPEN EDUCATIONAL RESOURCES:

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2. https://bbamantra.com/research-methodology/
3. https://lecturenotes.in/m/21513-research-methodology-
4. http://dcac.du.ac.in/documents/E-Resource/2020/Metrial/31SHOBHNAJHA2.pdf
5. https://www.scribbr.com/methodology/sampling-methods/#:~:text=A%20sample%20is%20a%20subset,data%20from%20in%20your%20research.&text=Probability%20sampling%20methods%20include%20simple,stratified%20sampling%2C%20and%20cluster%20sampling.
6. https://www.jou.ufl.edu/grad/forms/Guidelines-for-writing-thesis-or-dissertation.pdf

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 RESEARCH COMPONENTS AND TYPES				
1.1	Meaning, objectives and motivation in Research	2	Chalk & Talk	Black Board
1.2	Types of Research	6	Lecture	LCD
1.3	Research approaches, significance and scientific method	2	Lecture	PPT & White board
1.4	Qualities of good research, problems encountered by researchers in India	3	Lecture	PPT
1.5	Identifying a research,Formulation of research problem	3	Discussion	PPT & White Board
1.6	Criteria for good research project	2	Lecture	PPT
UNIT – 2 METHODS OF DATA COLLECTION				
2.1	Primary Data-Observation, Experimentation	4	Lecture	PPT
2.2	Simulation, Interviewing	4	Discussion	Black Board
2.3	Projective technique	2	Lecture	White Board

2.4	Secondary Data-Published sources	3	Lecture	PPT
2.5	Unpublished sources	3	Lecture	PPT
2.6	Merits and demerits od primary and secondary data	2	Discussion	Black Board
UNIT – 3 SAMPLING TECHNIQUES				
3.1	Characteristics of good sample	2	Lecture	White Board
3.2	Advantages and disadvantages of sample	3	Discussion	Black Board
3.3	Probability or Random sampling	5	Lecture	LCD
3.4	Non probability or non random sampling	5	Lecture	PPT
3.5	Sampling and non sampling errors	3	Lecture	PPT
UNIT – 4 FORMULATION OF HYPOTHESIS				
4.1	Hypothesis: definition, role and types	2	Lecture	LCD
4.2	Criteria for useful hypothesis	2	Lecture	PPT
4.3	Formulation, Tabulation	4	Lecture	PPT
4.4	Editing, Coding	4	Lecture	PPT

4.5	Analysis and Interpretation of data	4	Lecture	PPT
4.6	Procedure for testing data	2	Lecture	PPT
UNIT – 5 THESIS AND REPORT WRITING				
5.1	Layout of a thesis- Introduction, Review of Literature, Methodology	3	Lecture	LCD
5.2	Results and Discussion, Summary and Conclusion	3	Lecture	PPT
5.3	Bibliography, Footnotes and Appendix	3	Lecture	PPT
5.4	Significance of report writing, Types of report, oral presentation	3	Discussion	Black Board
5.5	Mechanics and precautions of report writing, Scientific writing	3	Lecture	White Board
5.6	Plagiarism-meaning and significance	3	Lecture	PPT

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1	T2	Seminar	Assignment	OBT/PPT				
	10 Mks.	10 Mks.	5 Mks.	5 Mks	5 Mks	35 Mks.	5 Mks.	40Mks.	
K2	4	4	-	-	-	8	-	8	20 %
K3	2	2	-	5	-	9	-	9	22.5 %
K4	2	2	-	-	5	9	-	9	22.5 %
K5	2	2	5	-	-	9	-	9	22.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA

Scholastic	**35**
Non Scholastic	**5**
	40

All the course outcomes are to be assessed in the various CIA components.

The levels of CIA Assessment based on Revised Bloom's Taxonomy for PG are :

K2-Understand**,** **K3**-Apply**,** **K4**-Analyse, **K5**- Evaluate

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

C1 – Internal Test-1

C2 – Internal Test-2

C3 - Seminar

C4 – Assignment

C5 - OBT/PPT

C6 – Non – Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Classify the types of research based on intent and methods	K2	PSO5
CO 2	Summarize the significance and formulation of research	K2	PSO5

CO 3	Compute the methods of data collection	K3	PSO5
CO 4	Categorize the sampling techniques	K4	PSO5
CO 5	Explain the steps in formulation of hypothesis and layout of a thesis	K5	PSO5

Mapping of COs with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1
CO2	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1
CO3	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1
CO4	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1
CO5	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	1	3	1	1
CO2	1	3	1	1
CO3	1	3	1	1
CO4	1	3	1	1
CO5	1	3	1	1

Note: Strongly Correlated – 3 Moderately Correlated – 2 Weakly Correlated -1

COURSE DESIGNER:

1. **Dr. R.Latha**
2. **Ms. J.Josephine Jesintha**

Forwarded By

(Dr.Vasantha Esther Rani)

100% SKILL DEVELOPMENT

I M.Sc. HUMAN NUTRITION AND NUTRACEUTICALS

SEMESTER –II

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSNN	19PG2N9	Clinical Nutrition and Diet Therapy Lab	Lab	4	2

COURSE DESCRIPTION

The course provides skill in assessment, estimation of nutritional requirement, planning and evaluation of menus for various diseases.

COURSE OBJECTIVES

- To estimate the nutritional requirements for therapeutic conditions
- To plan diets for disease conditions
- To develop skills in diet counselling

UNITS

UNIT–I PLANNING AND PREPARATION OF DIET FOR METABOLIC DISORDERS (12 Hrs.)

Diet planning and preparation for diabetes and gout.

UNIT–II PLANNING AND PREPARATION OF DIET FOR CARDIOVASCULAR DISEASES (12 Hrs.)

Diet planning and preparation for atherosclerosis and hypertension.

UNIT–III PLANNING AND PREPARATION OF DIET FOR GASTROINTESTINAL DISORDERS (12 Hrs.)

Diet planning and preparation for peptic ulcer, constipation, diarrhoea, cirrhosis and hepatitis.

UNIT –IV PLANNING AND PREPARATION OF DIET FOR KIDNEY DISEASES (12 Hrs.)

Diet planning and preparation for glomerulonephritis, acute renal failure and nephrolithiasis.

UNIT –V PLANNING AND PREPARATION OF DIET FOR CANCER AND AIDS (12 Hrs.)

Diet planning and preparation for cancer and AIDS

REFERENCES

1. Davidson, S.S. Passmore, P. Brack, J.F. (1993). *Human Nutrition and Dietetics*, 9th Ed, F&S, Lingstone Ltd., Edinburgh and London,
2. Garrow.J.S, W.P.T. James, 9th Ed 1993, *Human Nutrition and Dietetics*, Churchill Livingstone.
3. Kathleen Mahan.L , 13th Ed, (2011), Sylvia Escott-Stump, Janice L Raymond *Krause's Food & Nutrition Therapy*, Elsevier Publications,.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 PLANNING AND PREPARATION OF DIET FOR METABOLIC DISORDERS				
1.1	Diet planning and preparation for diabetes.	6	Real time diet preparation	Essential materials and equipment
1.2	Diet planning and preparation for gout.	6	Real time diet preparation	Essential materials and equipment

UNIT -2 PLANNING AND PREPARATION OF DIET FOR CARDIOVASCULAR DISEASES				
2.1	Diet planning and preparation for atherosclerosis.	6	Real time diet preparation	Essential materials and equipment
2.2	Diet planning and preparation for hypertension.	6	Real time diet preparation	Essential materials and equipment
UNIT -3 PLANNING AND PREPARATION OF DIET FOR GASTROINTESTINAL DISORDERS				
3.1	Diet planning and preparation for peptic ulcer.	3	Real time diet preparation	Essential materials and equipment
3.2	Diet planning and preparation for constipation and diarrhoea.	3	Real time diet preparation	Essential materials and equipment
3.3	Diet planning and preparation for cirrhosis.	3	Real time diet preparation	Essential materials and equipment
3.4	Diet planning and preparation for hepatitis.	3	Real time diet preparation	Essential materials and equipment
UNIT -4 PLANNING AND PREPARATION OF DIET FOR KIDNEY DISEASES				
4.1	Diet planning and preparation for glomerulonephritis.	4	Real time diet preparation	Essential materials and equipment

4.2	Diet planning and preparation for acute renal failure.	4	Real time diet preparation	Essential materials and equipment
4.3	Diet planning and preparation for nephrolithiasis.	4	Real time diet preparation	Essential materials and equipment
UNIT -5 PLANNING AND PREPARATION OF DIET FOR CANCER AND AIDS				
5.1	Diet planning and preparation for cancer.	6	Real time diet preparation	Essential materials and equipment
5.2	Diet planning and preparation for AIDS.	6	Real time diet preparation	Essential materials and equipment

EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	**C2**	**C3**	**C4**	**C5**	**CIA**	**ESE**	**Total**
10	**10**	**10**	**5**	**5**	**40**	**60**	**100**

C1 – Internal Test - 1

C2 – Internal Test - 2

C3 – Model Practical Exam

C4 – Record

C5 – Non – Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Associate the dietary principles for the planning and preparation of diet for metabolic disorders.	K2	PSO2
CO 2	Demonstrate therapeutic diet for cardiovascular disorders.	K2	PSO3
CO 3	Plan diets for the management of gastrointestinal diseases.	K3	PSO3
CO 4	Focus on the aspects of planning and preparation of diet for kidney disorders.	K4	PSO3
CO 5	Criticize the dietary principles in the preparation of diet for cancer and AIDS.	K5	PSO3

Mapping of COs with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1
CO2	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1
CO3	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1
CO4	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1
CO5	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	2	1	1	1
CO2	1	1	1	1
CO3	2	1	1	1
CO4	3	1	1	1
CO5	3	1	1	1

Note: Strongly Correlated – 3 ¨ Moderately Correlated – 2

¨ Weakly Correlated -1

COURSE DESIGNER:

1. **Mrs. P. Magdalene Virjini**
2. **Dr. K. Karthiga**

Forwarded By

(Dr.Vasantha Esther Rani)

100% SKILL DEVELOPMENT

I M.Sc.,HUMAN NUTRITION AND NUTRACEUTICALS

SEMESTER –II

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSNN	19PG2N10	Functional Foods and Nutraceutical Lab	Lab	4	2

COURSE DESCRIPTION

The practical course provides hands –on training in the use of hi-tech precision equipments to identify and analyze the specific nutraceuticals present in the respective functional food.

COURSE OBJECTIVES

- To make the students aware of the principle of analysis, extraction and identification of nutraceuticals.
- To determine qualitatively and quantitatively the presence of certain bioactive components in particular foods.
- To understand the calculation of the quantity of nutraceuticals present in the foods.

UNITS

UNIT –I Estimation of lycopene (12 HRS.)

Estimation of lycopene in food sources like tomato, papaya & watermelon

UNIT –II Estimation of tannins (12 HRS.)

Estimation of tannins in food sources like grapes, pomegranates and chocolates

UNIT –III Estimation of capsaicin (12 HRS.)

Estimation of capsaicin in capsicum, green chillies and dry chillies

UNIT –IV Qualitative analysis of phenols, tannins and saponins **(12 HRS.)**

UNIT –V Qualitative analysis of flavonoids, anthocyanins and phytosterols **(12 HRS.)**

REFERENCES:

1. Berwal. J.S,.Grewal R.B,.Kapoor C.M &.Garg M.R (2004). *Practical Methods in Food Analysis*. Agrotech Publishing Academy, Udaipur.
2. Geetha Swaminathan & Mary George, (2002). *Laboratory Chemical Methods in Food Analysis*. Margham Publications, Chennai.
3. Jayaraman J. (1996), *Laboratory Manual in Biochemistry*. New Age International Ltd. New Delhi.
4. Ranganna S. **(**1986), *Hand Book of Analysis and Quality Control for fruit and Vegetable Products*. Tata Mc Graw –Hill Publishing Company Limited, New Delhi.
5. Sadasivam S. & Manickam A.**(**1991), *Biochemical Methods*. New Age International Pvt. Ltd., New Delhi.
6. Yeshajahu Pomeranz & Clifton E. Meloan,(2004), *Food Analysis –Theory and Practice*. CBS Publishers and Distributors, New Delhi.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 Estimation of lycopene				
1.1	Estimation of lycopene in tomato, papaya & watermelon	12	Demonstration , Chalk & Board	Glass wares & Instruments

UNIT -2 Estimation of tannin				
2.1	Estimation of tannins in grapes, pomegranates & chocolates	12	Demonstration , Chalk & Board	Glass wares & Instruments
UNIT -3 Estimation of capsaicin				
3.1	Estimation of capsaicin in capsicum, green chillies & dry chillies	12	Demonstration , Chalk & Board	Glass wares & Instruments
UNIT -4 Qualitative analysis of phenols, tannins and saponin				
4.1	Qualitative analysis of phenols, tannins and saponins	12	Demonstration , Chalk & Board	Glass wares & Instruments
UNIT -5 Qualitative analysis of flavonoids, anthocyanins and phytosterols				
5.1	Qualitative analysis of flavonoids, anthocyanins and phytosterols	12	Demonstration , Chalk & Board	Glass wares & Instruments

EVALUATION PATTERN

SCHOLASTIC				**NON - SCHOLASTIC**	**MARKS**		
C1	**C2**	**C3**	**C4**	**C5**	**CIA**	**ESE**	**Total**
10	**10**	**10**	**5**	**5**	**40**	**60**	**100**

C1 – Internal Test - 1

C2 – Internal Test - 2

C3 – Model Practical Exam

C4 – Record

C5 – Non - Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Estimate the lycopene content in fruits.	K2	PSO2 & PSO8
CO 2	Compare the tannin content present in different foods.	K2	PSO2 & PSO8
CO 3	Identify the capsaicin content in foods	K3	PSO2 & PSO8
CO 4	Test for qualitative analysis of phenols,tannins and saponins in foods	K4	PSO2 & PSO8
CO 5	Determine the qualitative analysis of flavonoids, anthocyanin & phytosterols	K5	PSO2 & PSO8

Mapping of C0s with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	1	3	1	1	1	1	1	3	1	1	1	1	1	1	1
CO2	1	3	1	1	1	1	1	3	1	1	1	1	1	1	1
CO3	1	3	1	1	1	1	1	3	1	1	1	1	1	1	1
CO4	1	3	1	1	1	1	1	3	1	1	1	1	1	1	1
CO5	1	3	2	1	1	1	1	3	1	1	1	1	1	1	1

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	3	1	1	1
CO2	2	2	1	1
CO3	2	2	2	1
CO4	2	1	1	1
CO5	2	1	1	1

Note: ¨ Strongly Correlated – 3 ¨ Moderately Correlated – 2

Weakly Correlated -1

COURSE DESIGNER:

1. **Dr. Vasantha Esther Rani**
2. **Mrs. D.Mouna**

Forwarded By

(Dr.Vasantha Esther Rani)

100% SKILL DEVELOPMENT

I M.Sc. HUMAN NUTRITION AND NUTRACEUTICALS

SEMESTER –II

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSNN	19PGNEDC2	Nutrition & Dietetics	EDC	3	3

COURSE DESCRIPTION

This course offers scientific understanding of the role of nutrition in health diseases.

COURSE OBJECTIVES

- To understand the basics of nutrition.
- To learn the menu planning methods for family members.
- To learn the clinical aspects of disease conditions and diet therapy.

UNITS

UNIT –I INTRODUCTION TO NUTRITION (9 HRS.)

Nutrition – definition, nutritional status, nutrients and their function, relationship of food and health – Characteristics of good nutrition – balanced diet – BMI, IBW, Dietary guidelines-basic food groups, food pyramid

UNIT –II MACRO NUTRIENTS (9HRS.)

Classification, functions, sources, deficiency of carbohydrates, protein, lipids.

UNIT –III MICRO NUTRIENTS (9 HRS.)

Functions, sources, deficiency disorders of Vitamins – Fat soluble vitamins A, D, E, K; Water Soluble vitamins – B1, B2, Niacin, B6, B12, Folic acid.

Minerals – Ca, P. Zn, Fe, I, Fl.

UNIT –IV NUTRITION FOR DEVELOPMENTAL MILESTONES (9 HRS.)

Menu planning, Principles of planning meals,

Nutritional importance of pregnancy, changes incurred and complications

Nutritional importance of lactation

Nutrition during infancy – growth and development, advantages of breast feeding and bottle feeding, formulation criteria for bottle milk. Supplementary foods.

Nutritional importance for adolescence.

UNIT –V PRINCIPLE OF DIET THERAPY (9 HRS.)

Definition of Diet therapy, Foods to be included and avoided – obesity and underweight, diabetes mellitus, typhoid, peptic ulcer, anaemia, CVD.

BOOK REFERENCES:

1. Srilakshmi B (2012) *Dietetics*, New Age International Publishers,
2. Antia F.P. (1989) *Nutrition Dietetics*, Oxford University Press
3. Swaminathan M (1988) *Advanced text book on Food and Nutrition*, Vol I and Vol II, The Bangalore Printing and Publishing Co., Ltd.

JOURNAL REFERENCES:

1. The Indian Journal of Nutrition & Dietetics.
2. Clinical Journal of Nutrition & Dietetics

OPEN EDUCATIONAL RESOURCES:

https://open.umn.edu/opentextbooks/textbooks/622

https://pressbooks.oer.hawaii.edu/humannutrition/

https://en.wikibooks.org/wiki/Fundamentals_of_Human_Nutrition

https://www.youtube.com/watch?v=sorIaN6vRBI

https://oer.galileo.usg.edu/cgi/viewcontent.cgi?article=1006&context=health-textbooks

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 INTRODUCTION TO NUTRITION				
1.1	Nutrition – definition, nutritional status, nutrients and their function, relationship of food and health.	4	Lecture	PPT
1.2	Characteristics of good nutrition – balanced diet – BMI, IBW, Dietary guidelines-basic food groups, food pyramid	5	Chalk & Talk	Black Board
UNIT -2 MACRO NUTRIENTS				
2.1	Classification, functions, sources, deficiency of carbohydrates.	3	Lecture	PPT
2.2	Classification, functions, sources, deficiency of protein.	3	Chalk & Talk	Black Board
2.3	Classification, functions, sources, deficiency of lipids.	3	Lecture	PPT
UNIT -3 MICRO NUTRIENTS				
3.1	Functions, sources, deficiency disorders of Vitamins – Fat soluble vitamins A, D.	1	Lecture	PPT
3.2	Functions, sources, deficiency disorders of E, K; Water Soluble vitamins – B1, B2.	2	Chalk & Talk	Black Board
3.3	Functions, sources, deficiency disorders of Water-Soluble vitamins –Niacin, B6, B12, Folic acid.	2	Chalk & Talk	Black Board

3.4	Functions, sources, deficiency disorders of Minerals – Ca, P. Zn	2	Lecture	PPT
3.5	Functions, sources, deficiency disorders of Minerals – Fe, I, Fl.	2	Chalk & Talk	Black Board
UNIT -4 NUTRITION FOR DEVELOPMENTAL MILESTONES				
4.1	Menu planning, Principles of planning meals, Nutritional importance of pregnancy, changes incurred and complications Nutritional importance of lactation.	3	Lecture	PPT
4.2	Nutrition during infancy – growth and development, advantages of breast feeding and bottle feeding, formulation criteria for bottle milk. supplementary foods.	3	Lecture	PPT
4.3	Nutritional importance for adolescence.	3	Chalk & Talk	Black Board
UNIT -5 PRINCIPLE OF DIET THERAPY				
5.1	Definition of Diet therapy, Foods to be included and avoided – obesity and underweight, diabetes mellitus, typhoid.	3	Chalk & Talk	Black Board
5.2	Definition of Diet therapy, Foods to be included and avoided-diabetes mellitus, typhoid.	3	Chalk & Talk	Black Board
5.3	Definition of Diet therapy, Foods to be included and avoided- peptic ulcer, anaemia, CVD.	3	Lecture	PPT & White board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total
	T1	T2	Seminar	Assignment	OBT/PPT			
	10 Mks.	10 Mks.	5 Mks.	5 Mks	5 Mks	35 Mks.	5 Mks.	40Mks.
K2	4	4	-	-	-	8	-	8
K3	2	2	-	5	-	9	-	9
K4	2	2	-	-	5	9	-	9
K5	2	2	5	-	-	9	-	9
Non Scholastic	-	-	-	-	-		5	5
Total	10	10	5	5	5	35	5	40

CIA

cholastic	**35**
Non Scholastic	**5**
	40

- **All the course outcomes are to be assessed in the various CIA components.**
- **The levels of CIA Assessment based on Revised Bloom's Taxonomy for PG are :**

K2-Understand**,** **K3**-Apply**,** **K4**-Analyse, **K5**-Evaluate

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

C1 – Internal Test-1

C2 – Internal Test-2

C3 - Seminar

C4 – Assignment

C5 - OBT/PPT

C6 – Non - Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Describe different nutrition terms and concepts of food and nutrition.	K2	PSO2
CO 2	Explain the role of macro and micro nutrients in human nutrition.	K2	PSO2
CO 3	Estimate the functions and deficiency effects of micronutrients.	K3	PSO2
CO 4	Determine the importance of nutrition in the different stages of lifespan.	K3	PSO3
CO 5	Analyze the principles of diet therapy in the management of diseases.	K4	PSO3

Mapping of C0s with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1
CO2	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1
CO3	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1
CO4	1	2	3	1	1	1	1	1	1	1	1	1	1	1	1
CO5	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	3	1	1	1
CO2	2	2	1	1
CO3	2	2	2	1
CO4	2	1	1	1
CO5	2	1	1	1

Note: Strongly Correlated – 3 ¨ Moderately Correlated – 2

¨ Weakly Correlated -1

COURSE DESIGNER:

1. **Mrs. P.Madalene Virjini**
2. **Mrs. C. Helen.**

Forwarded By

(Dr.Vasantha Esther Rani)

100% SKILL DEVELOPMENT

II M.Sc., HUMAN NUTRITION & NUTRACEUTICALS

SEMESTER –III

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSNN	19PG3N11	Functional Foods & Nutraceuticals in Preventive Dietetics	Major Core	6	5

COURSE DESCRIPTION:

The course elicits the role of various bioactive components in the prevention and treatment of therapeutic conditions.

COURSE OBJECTIVES

The students will be able to

- Identify the role of functional foods and nutraceuticals in oral, gut and renal health.
- Describe the importance of functional foods in weight management and CVD
- Categorize the functional foods for bone health and diabetes.
- Summarize the effect of functional foods and Nutraceuticals in cancer
- Choose the functional foods for the management of nervous and respiratory disorders.

UNIT-I	FFN IN ORAL / GUT & RENAL HEALTH	[18 HRS]

FFN in Oral health

Dietary strategies for oral health

Functional Foods for promoting oral health – xylitol

Relationship between dental caries and dietary carbohydrates

FFN in Gut health

Colonic functional foods –Prebiotic, Probiotic and Symbiotic

Host microbe interaction

Improving the effectiveness of probiotics and prebiotics in optimizing gut health.

Dietary fiber and gut health

FFN in Renal health

Role of functional foods in prevention and treatment of renal disorders – urinary infection, glomerulonephritis, nephrosis, acute renal failure.

UNIT-II	FFN FOR OBESITY, CARDIOVASCULAR DISEASES & DIABETES MELLITUS	[18 HRS]

FFN in Obesity

Role of hormones in obesity.

Role of functional foods in the management of obesity.

FFN in CVD

Role of Functional foods in the management of CVD

FFN in Diabetes Mellitus

Role of Functional Foods and nutraceuticals in blood sugar support

UNIT-III	FFN FOR BONE AND REPRODUCTIVE HEALTH	[18 HRS]

FFN in Bone Health

Bone growth and factors affecting bone mass

Role of functional foods in bone health - Osteoporosis.

FFN in Reproductive Health

Role of FFN in reproductive health

Female infertility-types, role of FFN in managing infertility

Functional foods for menopausal health

UNIT-IV	FFN IN CANCER & AIDS	[18 HRS]

FFN in Cancer

Types of Cancer

Risk factors – Endogenous and exogenous risk factors

Role of functional foods in the prevention of cancer – Symbiotics, Glucosinolates, Phytoesterogens, Dietary fiber and vitamins, Antioxidants.

FFN in AIDS

Role of functional foods in the prevention and treatment of AIDS

UNIT-V	FFN IN NERVOUS & RESPIRATORY SYSTEM	[18 HRS]

Brain mechanisms involved in mood

Role of functional foods in Mood and memory

Alzheimers and Parkinsons diseases – Definition, causes,symptoms symptoms,role of functional foods

Role of functional foods in the prevention and treatment of respiratory disorders.

REFERENCES:

1. Chatwick R et al. (2003), *Functional Foods*, Springer, Culinary and Hospitality Industry Publications Services.
2. David H Watson, (2001), *Performance Functional Foods,* Culinary and Hospitality Industry Publications.
3. Hari Niwas Mishra et.al., *Functional Foods*, New India Publishing Agency, New Delhi.
4. Israel Goldberg, (2001), *Functional Foods Designer Foods*, Pharma Food,Nutraceuticals Culinary and Hospitality Industry Publications.
5. Mary K. Schimdl and Theodore P Labuza, (2000), *Essential of Functional Foods, C*ulinary and Hospitality Industry Publications Services.
6. Mazza G. (1998), *Functional Foods Biochemical Processing Aspects,* Culinary and Hospitality Industry Publications
7. Robert E C, (2001), Wildman *Handbook of Nutraceuticals and functional Foods*, Culinary and Hospitality Industry Publications.

JOURNAL REFERENCES:

1. Journal of Functional Foods
2. Nutraceuticals World Magazine - Exclusives, Markts, Health,Jobs, Events
3. The American Journal of Clinical Nutrition, Waverfy Press, USA.
4. The Indian Journal of Medical Research, The Indian Council of Medical Research, New Delhi.

OPEN EDUCATIONAL RESOURCES:

1. http://medcraveonline.com/JNHFE/JNHFE-07-00247.pdf
2. http://ssu.ac.ir/cms/fileadmin/user_upload/Daneshkadaha/dbehdasht/behdasht_imani/book/Functional_Foods.pdf
3. https://www.researchgate.net/publication/283076818_Food_is_Medicine_-_An_introduction_to_Nutraceuticals
4. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3257668/
5. https://ijpsr.com/bft-article/therapeutic-and-preventive-role-of-functional-foods-in-process-of-neurodegeneration/?view=fulltext
6. http://www.ijrpc.com/files/17-382.pdf

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT 1	**FFN IN ORAL / GUT & RENAL HEALTH [18 HRS]**			
1.1	FFN in oral health	1	Chalk & Talk	Black Board
1.2	Dietary strategies for oral health	2	Chalk & Talk	LCD
1.3	Functional Foods for promoting oral health – xylitol.	2	Lecture	PPT & White board
1.4	Relationship between dental caries and dietary carbohydrates	1	Lecture	Smart Board
1.5	FFN in gut health	1	Lecture	Black Board

1.6	Colonic functional foods – Prebiotic, Probiotic and Symbiotic	2	Discussion	Google classroom
1.7	Host microbe interaction	2	Specimen	Green Board
1.8	Improving the effectiveness of probiotics and prebiotics in optimizing gut health.	2	Discussion	Black Board
1.9	Dietary fiber and gut health	1	Lecture	LCD
1.10	FFN in renal health	1	Lecture	Smart Board
1.11	Role of functional foods in prevention and treatment of renal disorders – urinary infection,glomerulonephritis, nephrosis, acute renal failure.	3	Lecture	PPT
UNIT 2 FFN FOR OBESITY, CARDIOVASCULAR DISEASES & DIABETES MELLITUS				**[18 HRS]**
2.1	FFN in Obesity	1	Lecture	Green Board PPT
2.2	Role of hormones in obesity.	2	Chalk & Talk	Green Board
2.3	Role of functional foods in the management of obesity.	3	Lecture	PPT
2.4	FFN in CVD	3	Chalk & Talk	Video
2.5	Role of Functional foods in the management of CVD	3	Lecture	PPT

2.6	FFN in Diabetes Mellitus	3	Lecture	PPT
2.7	Role of Functional Foods and nutraceuticals in blood sugar support	3	Lecture	PPT
UNIT 3	**FFN FOR BONE AND REPRODUCTIVE HEALTH**			**[18 HRS]**
3.1	FFN in Bone Health	2	Lecture	Green Board Charts
3.2	Bone growth and factors affecting bone mass	2	Chalk & Talk	Green Board
3.3	Role of functional foods in bone health - Osteoporosis.	3	Lecture	Black Board
3.4	FFN in Reproductive Health	2	Lecture	LCD
3.5	Role of FFN in reproductive health	3	Lecture	Smart Board
3.6	Female infertility-types, role of FFN in managing infertility	3	Lecture	PPT
3.7	Functional foods for menopausal health	3	Lecture	Black Board
UNIT 4	**FFN IN CANCER & AIDS**			**[18HRS]**
4.1	Types of Cancer	1	Lecture	Green Board
4.2	Risk factors – Endogenous and exogenous risk factors	2	Chalk & Talk	Black Board

4.3	Role of functional foods in the prevention of cancer – Symbiotics, Glucosinolates,	3	Lecture	LCD
4.4	Role of functional foods in the prevention of cancer – Phytoesterogens, Dietary fiber	3	Lecture	LCD
4.5	Role of functional foods in the prevention of cancer –Vitamins, Antioxidants.	3	Lecture	Black Board
4.6	Role of functional foods in the prevention of AIDS	3	Lecture	PPT
4.7	Role of functional foods in the treatment of AIDS	3	Lecture	PPT
UNIT 5 FFN IN NERVOUS & RESPIRATORY SYSTEM [18HRS]				
5.1	Brain mechanisms involved in mood	2	Lecture	PPT
5.2	Role of functional foods in Mood and memory	4	Lecture	PPT
5.3	Alzheimers- Definition, causes, symptoms,role of functional foods in treating Alzheimers	4	Lecture	PPT
5.4	Parkinsons disease-Definition, causes, symptoms,role of functional foods in treating Parkinsons diseases	4	Lecture	PPT
5.5	Role of functional foods in the prevention and treatment of respiratory disorders.	4	Lecture	PPT

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total
	T1	T2	Seminar	Assignment	OBT/PPT			
	10 Mks.	10 Mks.	5 Mks.	5 Mks	5 Mks	35 Mks.	5 Mks.	40Mks.
K2	4	4	-	-	-	8	-	8
K3	2	2	-	5	-	9	-	9
K4	2	2	-	-	5	9	-	9
K5	2	2	5	-	-	9	-	9
Non Scholastic	-	-	-	-	-		5	5
Total	10	10	5	5	5	35	5	40

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **All the course outcomes are to be assessed in the various CIA components.**
- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy for PG are :**

K2-Understand, **K3**-Apply, **K4**-Analyse, **K5**-Evaluate

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTIC	MARKS	
C1	C2	C3	C4	C5	C6	CIA	ESE
10	10	5	5	5	5	40	60

C1 – Internal Test-1

C2 – Internal Test-2

C3 - Seminar

C4 – Assignment

C5 - OBT/PPT

C6 – Non – Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explain the role of functional foods and nutraceuticals in oral, gut and renal health.	K2	PSO2 & PSO4
CO 2	Describe the importance of functional foods in weight management and CVD	K2	PSO2 & PSO4
CO 3	Identify the functional foods for bone health and diabetes	K3	PSO2 & PSO4
CO 4	Analyze the effect of functional foods and Nutraceuticals in cancer	K4	PSO2 & PSO4
CO 5	Choose the functional foods for the management of nervous and respiratory disorders	K5	PSO2 & PSO4

Mapping of C0s with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	1	3	2	3	1	2	1	1	2	1	1	1	1	1	2
CO2	1	3	2	3	1	2	1	1	2	1	1	1	1	1	2
CO3	1	3	2	3	1	2	1	1	2	1	1	1	1	1	2
CO4	1	3	2	3	1	2	1	1	2	1	1	1	1	1	2
CO5	1	3	2	3	1	2	1	1	2	1	1	1	1	1	2

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	3	3	2	1
CO2	3	3	2	1
CO3	3	3	2	1
CO4	3	3	2	1
CO5	3	3	2	1

Note: Strongly Correlated – 3 ¨ Moderately Correlated – 2

Weakly Correlated -1

COURSE DESIGNER:

1. **Dr. Vasantha Esther Rani**
2. **Ms. D.Mouna**

Forwarded By

(Dr.Vasantha Esther Rani)

100% SKILL DEVELOPMENT

II M.Sc., HUMAN NUTRITION AND NUTRACEUTICALS

SEMESTER –III

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSNN	19PG3N12	Community Nutrition	Major Core	6	5

COURSE DESCRIPTION

The course imparts the knowledge on various national nutritional problems and its implications, nutrition awareness among various sections of the population.

COURSE OBJECTIVES

- To understand national nutritional problems and their implications.
- To become familiar with the national and international contributions towards improvement of nutrition in India.
- To impart skills in the planning and execution of nutrition awareness programmes among various sections of the population.

UNITS

UNIT –I NUTRITION AND NATIONAL DEVELOPMENT, NATIONAL NUTRITIONAL PROBLEMS (18 HRS.)

Relation of nutrition to national development in terms of socio-economic, industrial and agricultural development.

National nutritional problems – prevalence, causes, consequences and prevention of PEM, vitamin A deficiency, anaemia, iodine deficiency, and fluorosis

UNIT –II MALNUTRITION, STRATEGIES TO OVERCOME MALNUTRITION (18 HRS.)

Malnutrition - Definition, etiology and consequences

Strategies to overcome malnutrition: Food based strategies – Dietary diversification, Horticulture intervention, Food fortification, Nutrition &

Health education, Nutrition based strategies – Supplementation, Concepts of Selecting / implementing and intervention strategy.

UNIT–III NUTRITION INTERVENTION PROGRAMMES - NATIONAL, INTERNATIONAL (18 HRS.)

Genesis, objectives and operation of nutrition intervention programmes in India – School lunch programme, CMNMP, ICDS organized by government for vulnerable sections of the population.

National organizations – ICMR, CSWB, SSWB, NIN, NNMB, CFTRI, DFRL, NIPCCD.

International organization : FAO, WHO, UNICEF, KGNMT, CARE.

UNIT–IV NATIONAL NUTRITION POLICY, NUTRITIONAL SURVEILLANCE (18 HRS.)

National Nutrition policy – aim, nutrition policy instruments and its implementation; Health indicators.

Nutrition Surveillance System- definition, objectives, uses, infrastructure, Health indicators for successful nutrition surveillance programme.

UNIT –V NUTRITION EDUCATION, ASSESSMENT OF NUTRITIONAL STATUS OF COMMUNITY (18 HRS.)

Nutrition Education - Definition, importance, Process of nutrition education and communication – components of communication process, phases of nutrition education – conceptualization, formulation, implementation and evaluation, Methods of Nutrition education – face to face, mass media, traditional media, and criteria for selecting methods.

Assessment of nutritional status – Direct and indirect methods of assessment.

REFERENCES:

1. Davidson, S.S. Passmore, P. Brack, J.F. (1993) .*Human Nutrition and Dietetics, 9th Edition*, F&S, Lingstone Ltd., Edinburgh and London.
2. Gupta J.P. & Indra Murali (1989) *National Review of Immunisation Programme in India*, National Institute of Health and Family Welfare, New Delhi.
3. Jose M. Conon (1988). *Food Toxicology – Part A Principles and Concepts,* Marceldebber, Inc., New York.
4. King F.S. & Burgess, A. (1992).*Nutrition for Developing Countries, 2nd edition*, Oxford, Oxford University Press, London.
5. Rajammal P. Devadas (1980) *Nutrition and Nutritional Development*, Saradalaya Press, Coimbatore, Tamil Nadu.

6. Sach Dev. H.P.S. & Choudhury, P. (1994).*Nutrition in Children – Developing Country Concerns,* Cambridge Press, New Delhi.
7. Shanthi Ghosh, (1992) .*The Feeding and care of Infants and Young Children,* Voluntary Health Association of India, New Delhi.
8. Shanthi Ghossh (1997) *Nutrition and Child Care, A Practical Guide*, Jay Pee Brothers, Medical Publishers (P) Ltd., New Delhi.
9. UNICEF (1990). *Children and Women in India*, Situation Analysis, New Delhi.

JOURNAL REFERENCES:

1. Journal of Community Health.
2. Journals of Nutrition Education and Behavior.
3. Asia Pacific Journal of Public Health.
4. Indian Journal of Nutrition and Dietetics
5. Journal of Nutrition and Health Sciences

WEB REFERENCES:

1. www.nutritionsociety.org
2. www.who.int
3. www.nin.res.in
4. www.publichealth.org
5. www.fda.gov

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 NUTRITION AND NATIONAL DEVELOPMENT, NATIONAL NUTRITIONAL PROBLEMS				
1.1	Relation of nutrition to national development in terms of socio-economic, industrial and agricultural development	2	Chalk & Talk	Black Board
1.2	Prevalence, causes, consequences and prevention of PEM	4	Lecture	PPT
1.3	Prevalence, causes, consequences and prevention of vitamin A deficiency	4	Lecture	PPT
1.4	Prevalence, causes, consequences and prevention of anaemia	4	Lecture	Videos
1.5	Prevalence, causes, consequences and prevention of iodine deficiency	2	Chalk & Talk	Black Board
1.6	Prevalence, causes, consequences and prevention of iodine deficiency of fluorosis	2	Lecture	PPT

UNIT -2 MALNUTRITION, STRATEGIES TO OVERCOME MALNUTRITION				
2.1	Malnutrition- - Definition, etiology and consequences	3	Chalk & Talk	Black Board
2.2	Food based strategies to overcome malnutrition	2	Chalk & Talk	Black Board
2.3	Dietary diversification, Horticulture intervention	3	Lecture	PPT
2.4	Food fortification, Nutrition & Health education	4	Lecture	Smart Board
2.5	Nutrition based strategies – Supplementation	3	Lecture	Videos
2.6	Concepts of Selecting / implementing and intervention strategy	3	Case study Discussion	Videos
UNIT -3 NUTRITION INTERVENTION PROGRAMMES - NATIONAL, INTERNATIONAL				
3.1	Genesis, objectives and operation School lunch programme	2	Chalk & Talk	Black Board
3.2	Genesis, objectives and operation CMNMP	2	Chalk & Talk	Black Board
3.3	Genesis, objectives and operation ICDS	3	Case study Chalk & Talk	Black Board
3.4	ICMR, NIN, CSWB, SSWB	3	Lecture	Smart class

3.5	NNMB, CFTRI, DFRL, NIPCCD	2	Discussion	Black Board
3.6	FAO, WHO	2	Lecture	PPT
3.7	UNICEF, KGNMT, CARE	4	Lecture	PPT
UNIT -4 NATIONAL NUTRITION POLICY, NUTRITIONAL SURVEILLANCE				
4.1	National Nutrition policy	4	Chalk & Talk	Black Board
4.2	Nutrition policy instruments and its implementation	5	Chalk & Talk	Black Board
4.3	Nutrition Surveillance System- definition, objectives, uses, infrastructure	5	Lecture	PPT
4.4	Health indicators for successful nutrition surveillance programme	4	Discussion	Black Board
UNIT -5 NUTRITION EDUCATION, ASSESSMENT OF NUTRITIONAL STATUS OF COMMUNITY				
5.1	Nutrition Education - Definition, importance	2	Chalk & Talk	Black Board
5.2	Process and components of nutrition education and communication	4	Lecture	PPT
5.3	Phases of nutrition education – conceptualization, formulation, implementation and evaluation	4	Chalk & Talk	Black Board

5.4	Methods of Nutrition education – face to face, mass media, traditional media, and criteria for selecting methods	4	Discussion	Videos
5.5	Assessment of nutritional status- Direct methods	2	Lecture	PPT
5.6	Assessment of nutritional status- Indirect methods	2	Lecture	PPT

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total
	T1	T2	Seminar	Assignment	OBT/PPT			
	10 Mks.	10 Mks.	5 Mks.	5 Mks	5 Mks	35 Mks.	5 Mks.	40Mks.
K2	**4**	**4**	**-**	**-**	**-**	**8**	-	**8**
K3	**2**	**2**	**-**	**5**	**-**	**9**	-	**9**
K4	**2**	**2**	**-**	**-**	**5**	**9**	-	**9**
K5	**2**	**2**	**5**	**-**	**-**	**9**	-	**9**
Non Scholastic	**-**	**-**	**-**	**-**	-		**5**	**5**
Total	**10**	**10**	**5**	**5**	**5**	**35**	**5**	**40**

CIA

Scholastic	**35**
Non Scholastic	**5**
	40

- **All the course outcomes are to be assessed in the various CIA components.**
- **The levels of CIA Assessment based on Revised Bloom's Taxonomy for PG are :**

K2-Understand**,** **K3**-Apply**,** **K4**-Analyse, **K5**-Evaluate

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

C1 – Internal Test-1

C2 – Internal Test-2

C3 - Seminar

C4 – Assignment

C5 - OBT/PPT

C6 – Non – Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Associate Nutrition and National development	K2	PSO6
CO 2	Describe the strategies to overcome malnutrition	K2	PSO6
CO 3	Identify the Nutrition intervention programs and organization	K3	PSO6
CO 4	Analyze the National nutrition policy and Nutrition surveillance system	K4	PSO6
CO 5	Explain Nutrition assessment and Nutrition education	K5	PSO6

Mapping of COs with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	1	1	2	1	1	3	1	1	1	1	1	1	1	1	1
CO2	1	1	2	1	1	3	1	1	1	1	1	1	1	1	1
CO3	1	1	2	1	1	3	1	1	1	1	1	1	1	1	1
CO4	1	1	2	1	1	3	1	1	1	1	1	1	1	1	1
CO5	1	1	2	1	1	3	1	1	1	1	1	1	1	1	1
CO6	1	1	2	1	1	3	1	1	1	1	1	1	1	1	1

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	3	3	2	1
CO2	3	3	2	1
CO3	3	3	2	2
1CO4	3	3	1	2
CO5	3	3	3	1
CO6	3	3	3	2

Note: Strongly Correlated – 3 ¨ Moderately Correlated – 2

¨ Weakly Correlated -1

COURSE DESIGNER:

1. Mrs. C.Helen

Forwarded By

(Dr.Vasantha Esther Rani)

100% SKILL DEVELOPMENT

II M.Sc., HUMAN NUTRITION AND NUTRACEUTICALS

SEMESTER –III

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSNN	19PG3N13	Analytical Instrumentation	Major Core	6	5

COURSE DESCRIPTION

The course offers the understanding of the principles, instrumentation and analytical techniques of food

COURSE OBJECTIVES

- To understand the principle and instrumentation of hi-tech analytical techniques.
- To gain knowledge on applications of different analytical instruments.

UNITS

UNIT –I CHROMATOGRAPHY (18HRS.)

Meaning – Types of Chromatography – principles, components and applications of

i. Paper Chromatography – Ascending and descending – One and two dimensional
ii. Thin Layer Chromatography
iii. Gas Chromatography
iv. Ion exchange
v. Gel filtration
vi. High Performance Liquid Chromatography

UNIT –II ELECTROPHORESIS (18 HRS.)

Meaning –Types –Paper, Starch, Gel, Agar-gel, Poly Acrylamide gel, Moving boundary Electrophoresis, Immuno electrophoresis – Principle – components – Applications.

UNIT –III COLORIMETRY, FLUORIMETRY AND CENTRIFUGATION (18 HRS.)

Photoelectric Colorimeters, Fluorimeters –Principle -Applications.

CENTRIFUGATION:

Types of Centrifuge – Ordinary and Ultracentrifuge - Principle and applications.

MICROBIOLOGICAL ASSAYS

Types of Assays -Principle - Requirements for the conduct of Microbiological assays –Applications.

UNIT –IV SPECTROSCOPY (18 HRS.)

SPECTROSCOPY:

Spectrophotometry – Spectrophotometers – Atomic Absorption Spectrophotometry & ICP.

Spectrophotometers –Principle – Applications.

NMR and NIR:

Nuclear Magnetic Resonance- Application and principle

Near Infra Red -Principle and Application

UNIT –V ISOTOPES (18 HRS.)

Types – Stable and Radioactive, Units of radio-activity – Uses in biological investigations - Geiger Muller Counter and Scintillation Counter – Effects of ionizing radiation-hazards and prevention - Applications.

pH and Buffer:

pH meter –measurement of pH, Buffer – Definition – Types – Buffer system with special reference to living body

BOOK REFERENCES:

1. Ewing. W.W. (1970). *Instrumental Methods of Chemical Analysis.* McGraw Hill Book Company, New Delhi.
2. Mahinder Singh, (2003). *Analytical Chemistry – Instrumental Techniques.* Dominant Publishers and Distributors, New Delhi.
3. Nikelal, (1973). *Experimental methods in Biophysical Chemistry*. John Wiley Publishers.
4. Yadav M.S (2001). *Instrumental Methods of Chemical Analysis*. Campus Books Internationals, New Delhi.

Open Educational Resources:

1.https://microbenotes.com/types-of-chromatography/

2.https://www.slideshare.net/BlueRose9/electrophoresis-78994484

3.https://study.com/academy/lesson/spectrophotometer-definition-uses-parts.html

4.https://www.thermofisher.com/in/en/home/industrial/spectroscopy-elemental-isotope-analysis/spectroscopy-elemental-isotope-analysis-learning-center/molecular-spectroscopy-information/nmr-information/nmr-applications-process-control.html

5.https://dlc.dcccd.edu/biology1-2/ph-and-buffers

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 CHROMOTOGRAPHY				
1.1	Meaning, – principles, components and applications	2	Chalk & Talk	Black Board
1.2	Paper Chromatography – Ascending and descending – One and two dimensional	5	Chalk & Talk	LCD
1.3	Thin Layer Chromatography	3	Seminar	PPT & White board
1.4	Gas Chromatography	2	Seminar	Smart Board
1.5	Ion exchange Chromatography	2	Seminar	Black Board
1.6	Gel filtration Chromatography	2	Chalk & Talk	LCD
1.7	High Performance Liquid Chromatography	2	Chalk & Talk	LCD
UNIT -2 ELECTROPHORESIS				

2.1	Meaning –Types of Electrophoresis	2	Lecture	Black Board
2.2	Pape Electrophoresis	2	Chalk & Talk	LCD
2.3	Starch Electrophoresis	2	Seminar	PPT & White board
2.4	Gel, Agar-gel Electrophoresis	4	Seminar	Smart Board
2.5	Poly Acrylamide gel	3	Seminar	Black Board
2.6	Moving boundary Electrophoresis	2	Chalk & Talk	LCD
2.7	Immuno electrophoresis	3	Chalk & Talk	LCD
UNIT 3	**COLORIMETRY, FLUORIMETRY AND CENTRIFUGATION**			
3.1	Photoelectric Colorimeters, Principle -Applications.	3	Lecture	Black Board
3.2	Fluorimeters –Principle - Applications.	3	Seminar	Smart Board
3.3	Types of Centrifuge – Ordinary Centrifuge - Principle and applications.	3	Seminar	Black Board
3.4	Types of Centrifuge – Ultra Centrifuge -Principle and applications.	3	Chalk & Talk	LCD
3.5	Types of Assays -Principle	3	Chalk & Talk	LCD

3.6	Requirements for the conduct of Microbiological assays	2	Seminar	LCD
3.7	Applications of Microbiological assays	1	Chalk & Talk	LCD
UNIT 4 SPECTROSCOPY				
4.1	Spectrophotometry – Principle – Applications.	4	Seminar	LCD
4.2	Atomic Absorption Spectrophotometers - Principle – Applications.	5	Chalk & Talk	LCD
4.3	Nuclear Magnetic Resonance- Application and principle	5	Seminar	LCD
4.4	Near Infra Red -Principle and Application	4	Seminar	Smart Board
UNIT 5 ISOTOPES				
5.1	Types – Stable and Radioactive Isotopes	2	Seminar	LCD
5.2	Units of radio-activity	1	Chalk & Talk	LCD
5.3	Uses in biological investigations	2	Seminar	Smart Board
5.4	Geiger Muller Counter and Scintillation Counter	3	Seminar	LCD
5.5	Effects of ionizing radiation-hazards and prevention - Applications.	3	Seminar	Black Board
5.6	pH meter –measurement of pH	3	Seminar	LCD

5.7	Buffer – Definition – Types	1	Lecture	Black Board
5.8	Buffer system with special reference to living body.	2	Seminar	Smart Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1	T2	Seminar	Assignment	OBT/PPT				
	10 Mks.	10 Mks.	5 Mks.	5 Mks	5 Mks	35 Mks.	5 Mks.	40Mks.	
K2	**4**	**4**	**-**	**-**	**-**	**8**	-	**8**	20 %
K3	**2**	**2**	**-**	**5**	**-**	**9**	-	**9**	22.5 %
K4	**2**	**2**	**-**	**-**	**5**	**9**	-	**9**	22.5 %
K5	**2**	**2**	**5**	**-**	**-**	**9**	-	**9**	22.5 %
Non Scholastic	**-**	**-**	**-**	**-**	-		**5**	**5**	12.5 %
Total	**10**	**10**	**5**	**5**	**5**	**35**	**5**	**40**	**100 %**

CIA

Scholastic	**35**
Non Scholastic	**5**
	40

- ✓ **All the course outcomes are to be assessed in the various CIA components.**
- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy for PG are**

K2-Understand, **K3**-Apply, **K4**-Analyse, **K5**- Evaluate

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

C1 – Internal Test-1

C2 – Internal Test-2

C3 - Seminar

C4 – Assignment

C5 - OBT/PPT

C6 – Non – Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explain the principle and instrumentation of chromatography	K2	PSO7
CO 2	Summarize the working procedure of electrophoresis	K2	PSO7
CO 3	Apply the principle, procedure and application of Photoelectric Colorimeters, Fluorimeters and Microbiological assays	K3	PSO7
CO 4	Analyze the types of Spectrophotometry its principle, procedure and application	K4	PSO7
CO 5	Explain the different types of pH isotopes, buffers and its application	K5	PSO7

Mapping of COs with PSOs

CO / PSO	PSO1	SO2	SO3	SO4	SO5	SO6	SO7	SO8	SO9	SO10	SO11	PSO12	PSO13	PSO14	PSO15
CO1	1	1	1	1	1	1	3	2	1	1	1	1	1	1	1
CO2	1	1	1	1	1	1	3	2	1	1	1	1	1	1	1
CO3	1	1	1	1	1	1	3	2	1	1	1	1	1	1	1
CO4	1	1	1	1	1	1	3	2	1	1	1	1	1	1	1
CO5	1	1	1	1	1	1	3	2	1	1	1	1	1	1	1

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	2	1	3	3
CO2	2	1	3	3
CO3	3	2	3	3
CO4	3	1	1	1
CO5	2	1	1	1

Note: Strongly Correlated – 3 Moderately Correlated – 2 Weakly Correlated -1

COURSE DESIGNERS:

1. Dr. K.Karthiga

2. Mrs. J.Josephine Jesintha

Forwarded By

(Dr.Vasantha Esther Rani)

II M.Sc., HUMAN NUTRITION AND NUTRACEUTICALS

SEMESTER –III

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSNN	19PG3NE1	FOOD PRODUCT DEVELOPMENT AND SENSORY EVALUATION	Major Elective	4	4

COURSE DESCRIPTION

This course gives in-depth knowledge on the development, evaluation & marketing of food products.

COURSE OBJECTIVES

- To understand the consumer needs and demands in the society.
- To develop innovative food products based on the consumer needs.
- To gain knowledge on the marketing and evaluation of food products.

UNITS

UNIT –I FOOD NEEDS AND CONSUMER PREFERENCE (12 HRS.)

Food needs and population, Hierarchy of food needs- Instrumental food, Novel food, Good- tasting food, Reliable, Ongoing access to food, Acceptable food and Enough food, Factors impacting food choices – Physiological, Psychological, Economical and Social. Consumer Preference – Definition, Meeting consumer demands.

UNIT –II PROCESS OF FOOD PRODUCT DEVELOPMENT (12 HRS.)

Definition and Need for Product development, Classification and Characteristics of food product,Phases in food product development, Factors influencing product development, Consumer acceptance of new food products, Future trends in food product development.

UNIT –III SENSORY EVALUATION OF FOOD PRODUCT (12 HRS.)

Definition, Sensory characteristics of food, Requisites for conducting sensory tests – trained panel members, testing laboratory, preparation of samples, techniques of smelling and tasting, testing time, design of experiment. Types

of tests: Difference tests –Paired comparison test, Duo-trio test, Triangle test. Rating tests – Ranking test, Single sample test, Two sample difference test, Multiple sample difference test, Hedonic rating test, Numeric scoring test, composite scoring test, Sensitivity tests – Sensitivity threshold test, dilution test. Descriptive tests – Descriptive flavour profile method.

UNIT –IV MARKETING OF FOOD PRODUCT (12 HRS.)

Food Marketing, Historical phases of food marketing, Components of food marketing, Requisites of selling a product; Trends in Food Market; Marketing methods, Advantages and disadvantages of marketing methods; Market testing – Where, When, How, What to market; Evaluating the results; Failures in the Market places – Causes of failure – external and internal reasons.

UNIT –V ECONOMIC EVALUATION OF FOOD PRODUCT (12 HRS.)

Costing / Pricing- Steps for determining product price; Calculation of selling price; Product cost-Variable and Fixed cost; Categories of Product Cost-Material, Labor, Overhead cost, Breakeven point. Product launch- Meaning, Benefits, Steps to launch a new product. Commercialization of product-Meaning, Key aspects, Commercialization process, Action plan.

BOOK REFERENCES:

1. Fuller,G.W. (1994) *New Food Product Development from Concept to Market Place'* CRC Press, Boca Raton,USA.
2. Gould,W.A., (1991) 'Research and Development Guidelines for the Food Industry' CTI Pub, Baltimore.
3. Lyon,D.H., (1992) *'Guidelines for Sensory Analysis in Food Product Development and Quality Control'* Chapman and Hall, London.
4. Robinson J, Roberts H, Barnard E, and Shepard T (2001) *'Design and Make It Food Technology'* Nelson Thomes Ltd, UK.
5. Srilakshmi, B. (2008), *Food science,* New age international publishers, New Delhi.

JOURNALS REFERENCES:

1. Journal of Food Products Marketing, Open Access journal, Taylor and Francis publishers, England.
2. Journal of Food Science and Technology. AFST, CFTRI, Mysore.

OPEN EDUCATIONAL RESOURCES:

1. **https://www.researchgate.net/publication/230818950_FOOD_PRODUCT_DEVELOPMENT_AS_OPPORTUNITY_FOR_SUCCESS_OR_SURVIVAL_IN_THE_MARKET**
2. **https://core.ac.uk/download/pdf/7062218.pdf**
3. **http://www.fao.org/3/i4939e/i4939e.pdf**

4. https://nzifst.org.nz/resources/foodproductdevelopment/Chapter-3-1-2.htm
5. http://samples.jbpub.com/9781449694777/9781449603441_CH03.pdf
6. https://idl-bnc-idrc.dspacedirect.org/bitstream/handle/10625/2844/IDL-2844.pdf?sequence=1
7. https://open.lib.umn.edu/principlesmarketing/
8. https://eularis.com/7-steps-to-better-your-product-launch/

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 FOOD NEEDS AND CONSUMER PREFERENCE				
1.1	Food needs and population-Introduction	3	Chalk & Talk,Lecture	Black/white Board
1.2	Hierarchy of food needs	3	Chalk & Talk,Lecture	Black/white Board
1.3	Factors impacting food Choices	3	Lecture	PPT
1.4	Consumer Preference, Meeting consumer demands	3	Chalk & Talk,Lecture	Black/white Board
UNIT – 2 PROCESS OF FOOD PRODUCT DEVELOPMENT				
2.1	Definition and Need for Product development	2	Chalk & Talk,Lecture, seminar	PPT & White/Black board
2.2	Classification,Characteristics and phases of food product development	3	Lecture,Discussion	PPT & White board
2.3	Factors influencing product development	3	Lecture	Black/white Board
2.4	Consumer acceptance & Future trends in food product development.	4	Lecture,Group Discussion,seminar	PPT & White board

UNIT -3 SENSORY EVALUATION OF FOOD PRODUCT				
3.1	Definition and sensory characteristics of food	3	Lecture,Discussion	Black/white Board
3.2	Requisites for food product development	3	Lecture,Discussion	Black/white Board
3.3	Difference and Rating test	3	Lecture	Black/white Board
3.4	Sensitivity & Descriptive test	3	Lecture	Black/white Board
UNIT -4 MARKETING OF FOOD PRODUCT				
4.1	Food Marketing,Historical phases of food marketing, Requisites of selling a product	3	Lecture,Group Discussion,seminar	PPT & White board
4.2	Components of food marketing	3	Lecture	Black/white Board
4.3	Trends in Food Market,Marketing methods	3	Lecture	Black/white Board
4.4	Market testing & Evaluating the results	3	Lecture,Survey	Black/white Board, Questionnaire
UNIT – 5 ECONOMIC EVALUATION OF FOOD PRODUCT				
5.1	Costing / Pricing	3	Lecture,Group Discussion,seminar	PPT & White board
5.2	Steps for determining product price	3	Lecture	Black/white Board
5.3	Product cost-Variable and Fixed cost	3	Lecture	Black/white Board
5.4	Product launch & Commercialization of product	3	Lecture,Survey	Black/white Board, Questionnaire

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1	T2	Seminar	Assignment	OBT/PPT				
	10 Mks.	10 Mks.	5 Mks.	5 Mks	5 Mks	35 Mks.	5 Mks.	40Mks.	
K2	4	4	-	-	-	8	-	8	20 %
K3	2	2	-	5	-	9	-	9	22.5 %
K4	2	2	-	-	5	9	-	9	22.5 %
K5	2	2	5	-	-	9	-	9	22.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA

Scholastic	35
Non Scholastic	5
	40

- ✓ **All the course outcomes are to be assessed in the various CIA components.**
- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy for PG are :**

K2-Understand**,** **K3**-Apply**,** **K4**-Analyse, **K5**- Evaluate

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

C1 – Internal Test-1

C2 – Internal Test-2

C3 - Seminar

C4 – Assignment

C5 - OBT/PPT

C6 – Non – Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Compare the food needs and consumer demands in the society	K2	PSO9
CO 2	Explain the classification, characteristics and future trends in food product development	K2	PSO9 & PSO15
CO 3	Choose the different sensory tests employed for food evaluation	K3	PSO5, PSO9 & PSO15
CO 4	Correlate the different marketing methods of food products	K4	PSO9 & PSO15
CO 5	Estimate the economic evaluation of food products	K5	PSO9 & PSO15

Mapping of COs with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	1	1	1	1	2	1	1	1	3	1	1	1	2	1	1
CO2	1	1	1	1	2	1	1	1	3	1	1	1	2	1	3
CO3	1	1	1	1	3	1	1	1	3	1	1	1	2	1	3
CO4	1	1	1	1	2	1	1	1	3	1	1	1	2	1	3
CO5	1	1	1	1	2	1	1	1	3	1	1	1	2	1	3

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	2	1	1	3
CO2	2	1	1	3
CO3	1	1	1	3
CO4	1	1	1	3
CO5	1	1	1	3

Note: ¨ **Strongly Correlated – 3** ¨ **Moderately Correlated – 2**

¨ **Weakly Correlated -1**

COURSE DESIGNER:

1.Dr. K.KARTHIGA

Forwarded By

(Dr.Vasantha Esther Rani)

II M.Sc., HUMAN NUTRITION AND NUTRACEUTICALS SEMESTER –III

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSNN	19 PG3NE2	INSTITUTIONAL MANAGEMENT	Major Elective	4	4

COURSE DESCRIPTION

The course will describe the concepts of organization and management approaches of food service establishment.

COURSE OBJECTIVES

- To develop a knowledge base in key areas of institutional food administration.
- To impart necessary expertise to function as a food service manager.
- To understand the basic principles of organization and management in food service units.

UNIT –I [12 HRS]

INTRODUCTION TO FOOD SERVICE INSTITUTIONS

Definition of food service institutions, Evolution of food service systems, Characteristics of the various types of food service units.

Kinds of food service systems - Conventional, commissary, ready prepared, assembly/serve

UNIT –II [12 HRS]

INSTIUTUTIONAL MANAGEMENT

Theories - Classical, Scientific, Behavioral, Systems approach, Contingency approach, Management By Objective(MBO), Just-in- Time(JIT), Total Quality Management (TQM). Functions of management, Principles of management, management tools

UNIT –III [12 HRS]

PERSONNEL MANAGEMENT

Personnel management -Definition, scope, concept of personnel management, approaches of personnel management, personnel policies, Functions of personnel manager.

Selection- Definition, Steps. Induction- Definition, Methods, Check list

Staff welfare provisions- Physical needs, Physiological needs, Psychosocial Needs

Training- Need for training, Katz and Kahn point about change in an organization, Training programmes, Areas of training. Staff development- Principles of development, Process of development.

UNIT –IV [12 HRS]

FOOD COST MANAGEMENT

Costing-Definition of costing, Definition of Cost, Cost components, Behaviour of cost,

Cost control-Definition, Factors responsible for losses, Methods of controlling food cost

Food cost analysis. Pricing-Definition, Methods of pricing- Cost plus pricing, Rate of return pricing.

UNIT –V

LAWS GOVERNING FOOD SERVICE ESTABLISHMENTS [12 HRS]

Labour laws- The Indian Contract Act, Workmen's Compensation Act, The Trade Unions Act, Payment of Wages Act, Industrial Disputes Act, The Factories Act, The Minimum Wages Act, Employees State Insurance (ESI) Act, Employees Pension Scheme, Shops and Establishments Act, Hostel Scheme, Annapurna Scheme.

REFERENCES:

1. Knosotz, H.O Donnel C (1968) *Principles of Management,* McGraw Hill Book Company.
2. Kotas Richard & Jayawardardene.C (1994): *Profitable food and Beverage Management*, Hodder & Sloughton Publication.
3. Sethi Mohini (2000), *Catering Management An integrated Approach*, 2nd Ed Wiley Publication.
4. West, B Bessie & Wood, Levelle (1986) *Food Service in Institutions* 6th Ed, Macmillian Publication Company, New York.

JOURNAL REFERENCES:

1. Journal of Foodservice Management & Education.
2. Journal of Foodservice.

OPEN EDUCATION RESOURCES:

1. **http://oer.nios.ac.in/wiki/index.php/Tourism_and_Hospitality_Management**
2. **https://open.umn.edu/opentextbooks/textbooks/71**
3. **https://openstax.org/details/books/principles-management**
4. **https://link.springer.com/referenceworkentry/10.1007%2F978-94-007-0929-4_80**
5. **https://digitalcommons.fiu.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1190&context=hospitalityreview**
6. **https://tygroupa.files.wordpress.com/2010/03/chapter-29-food-cost-control.pdf**
7. **https://www.oracle.com/webfolder/s/delivery_production/docs/FY16h1/doc29/Cost-Control-F-B-Report.pdf**

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 INTRODUCTION TO FOOD SERVICE INSTITUTIONS				
1.1	Definition of food service institutions, Evolution of food service systems.	4	Chalk & Talk	Black Board
1.2	Characteristics of the various types of food service units.	4	Chalk & Talk	Black Board
1.3	Kinds of food service systems - Conventional, commissary, ready prepared, assembly/serve.	4	Lecture	PPT
UNIT -2 INSTITUTIONAL MANAGEMENT				
2.1	Theories - Classical, Scientific, Behavioral, Systems approach, Contingency approach, Management By Objective(MBO), Just-in-Time(JIT), Total Quality Management (TQM).	4	Lecture	PPT
2.2	Functions and Principles of management.	4	Lecture	PPT
2.3	Management tools	4	Lecture	PPT
UNIT -3 PERSONNEL MANAGEMENT				
3.1	Personnel management - Definition, scope, concept of personnel management, approaches of personnel management.	3	Chalk & Talk	Black Board

3.2	Personnel policies, Functions of personnel manager.	2	Chalk & Talk	Black Board
3.3	Selection- Definition, Steps. Induction- Definition, Methods, Check list.	2	Chalk & Talk	Black Board
3.4	Staff welfare provisions- Physical needs, Physiological needs, Psychosocial Needs	2	Chalk & Talk	Black Board
3.5	Training- Need for training, Katz and Kahn point about change in an organization, Training programmes, Areas of training. Staff development- Principles of development, Process of development.	3	Lecture	PPT
UNIT -4 FOOD COST MANAGEMENT				
4.1	Costing-Definition of costing, Definition of Cost, Cost components, Behaviour of cost.	4	Lecture	PPT
4.2	Cost control-Definition, Factors responsible for losses, Methods of controlling food cost.	4	Chalk & Talk	Black Board
4.3	Food cost analysis. Pricing-Definition, Methods of pricing-Cost plus pricing, Rate of return pricing.	4	Chalk & Talk	Black Board
UNIT -5 LAWS GOVERNING FOOD SERVICE ESTABLISHMENTS				

5.1	Labour laws- The Indian Contract Act, Workmen's Compensation Act, The Trade Unions Act, Payment of Wages Act, Industrial Disputes Act, The Factories Act.	6	Lecture	PPT
5.2	The Minimum Wages Act, Employees State Insurance (ESI) Act, Employees Pension Scheme, Shops and Establishments Act, Hostel Scheme, Annapurna Scheme.	6	Lecture	PPT

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total
	T1	T2	Seminar	Assignment	OBT/PPT			
	10 Mks.	10 Mks.	5 Mks.	5 Mks	5 Mks	35 Mks.	5 Mks.	40Mks.
K2	**4**	**4**	**-**	**-**	**-**	**8**	-	**8**
K3	**2**	**2**	**-**	**5**	**-**	**9**	-	**9**
K4	**2**	**2**	**-**	**-**	**5**	**9**	-	**9**
K5	**2**	**2**	**5**	**-**	**-**	**9**	-	**9**
Non Scholastic	**-**	**-**	**-**	**-**	-		**5**	**5**
Total	**10**	**10**	**5**	**5**	**5**	**35**	**5**	**40**

CIA

Scholastic	**35**
Non Scholastic	**5**
	40

- **All the course outcomes are to be assessed in the various CIA components.**
- **The levels of CIA Assessment based on Revised Bloom's Taxonomy for PG are :**

K2-Understand**,** **K3**-Apply**,** **K4**-Analyse, **K5**-Evaluate

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTIC	MARKS		
C1	**C2**	**C3**	**C4**	**C5**	**C6**	**CIA**	**ESE**	**Total**
10	**10**	**5**	**5**	**5**	**5**	**40**	**60**	**100**

C1 – Internal Test-1

C2 – Internal Test-2

C3 - Seminar

C4 – Assignment

C5 - OBT/PPT

C6 – Non - Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Outline the key areas of food service institutions.	K2	PSO14
CO 2	Discuss the theories and concepts of institutional management.	K2	PSO14
CO 3	Determine the scope and theories of personnel management.	K3	PSO14
CO 4	Examine the aspects of food cost management.	K4	PSO14
CO 5	Explain the different laws governing food service establishment.	K5	PSO14

Mapping of C0s with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1
CO2	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1
CO3	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1
CO4	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1
CO5	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	2	1	1	1
CO2	2	1	1	1
CO3	2	1	1	1
CO4	2	1	1	1
CO5	2	1	1	1

Note: Strongly Correlated – 3 ¨ **Moderately Correlated – 2**

¨ **Weakly Correlated -1**

COURSE DESIGNER:

Mrs. P.Madalene Virjini

Forwarded By

(Dr.Vasantha Esther Rani)

100% SKILL DEVELOPMENT

II M.Sc. HUMAN NUTRITION AND NUTRACEUTICALS

SEMESTER –III

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSNN	19PG3N14	Community Nutrition Lab	Lab	4	2

COURSE DESCRIPTION

The practical course provides hands -on training on assessing the nutritional status, preparation of supplementary foods and imparting nutritional education for the vulnerable groups in the community.

COURSE OBJECTIVES

- To impart skills in the planning and execution of nutrition awareness programmes among various sections of the population.
- To develop skill in the assessment of nutritional status

UNITS

UNIT –I Assessment of nutritional status (ABC) (12 HRS.)

Assessment and interpretation of nutritional status (ABC) - pregnant woman, lactating mother, preschool children, school going children and elderly people.

UNIT –II Assessment of nutritional status (D) (12 HRS.)

Dietary assessment- 24 hour recall method, weighment method and food frequency method.

UNIT –III Audio-Visual Aids (12 HRS.)

Preparation of audio- visual aids- charts, posters, pamphlets, folders and videos. Principles of campaign, exhibition and demonstration.

UNIT –IV Nutrition education (12 HRS.)

Planning nutrition education for different age group.

UNIT –V Supplementary foods (12 HRS.)

Formulation of supplementary foods.

REFERENCES:

1. Rajammal P. Devadas (1980) *Nutrition and Nutritional Development*, Saradalaya Press, Coimbatore, Tamil Nadu.
2. Sach Dev. H.P.S. & Choudhury, P. (1994).*Nutrition in Children – Developing Country Concerns,* Cambridge Press, New Delhi.
3. Shanthi Ghosh, (1992) .*The Feeding and care of Infants and Young Children,* Voluntary Health Association of India, New Delhi.
4. Shanthi Ghossh (1997) *Nutrition and Child Care, A Practical Guide*, Jay Pee Brothers, Medical Publishers (P) Ltd., New Delhi.
5. UNICEF (1990). *Children and Women in India*, Situation Analysis, New Delhi.

WEB REFERENCES:

1. www.icmr.nic.in
2. www.who.int

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 Assessment of nutritional status (ABC)				
1.1	Assessment of nutritional status of pregnant woman	3	Hands on experience	Weighing balance, measuring tape & callipers.
1.2	Assessment of nutritional status of lactating mother	3	Hands on experience	Weighing balance, measuring

				tape & callipers.
1.3	Assessment of nutritional status of pre-school and school going children	3	Hands on experience	Weighing balance, measuring tape & callipers.
1.4	Assessment of nutritional status of elderly people	3	Hands on experience	Weighing balance, measuring tape & callipers.
UNIT -2 Assessment of nutritional status (D)				
2.1	Dietary assessment- 24 hour recall method	4	Hands on experience	Standard measuring cups
2.2	Dietary assessment- weighment method	4	Hands on experience	Standard measuring cups
2.3	Dietary assessment- food frequency method	4	Hands on experience	Standard measuring cups
UNIT -3 Audio-Visual Aids				
3.1	Preparation of audio-visual aids- charts, posters, pamphlets, folders and videos.	6	Hands on experience	Essential materials

3.2	Principles of campaign, exhibition and demonstration.	6	Hands on experience	Essential materials
UNIT -4 Nutrition education				
4.1	Planning nutrition education for different age group	12	Role play	Audio-visual aids
UNIT -5 Supplementary foods				
5.1	Formulation of supplementary foods	12	Demonstration	Raw materials

EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	**C2**	**C3**	**C4**	**C5**	**CIA**	**ESE**	**Total**
10	**10**	**10**	**5**	**5**	**40**	**60**	**100**

C1 – Internal Test - 1

C2 – Internal Test - 2

C3 – Model Practical Exam

C4 – Record

C5 – Non – Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Interpret the nutritional status of various age groups	K2	PSO6
CO 2	Estimate the dietary assessment of various age groups	K2	PSO6
CO 3	Develop different audio visual aids	K3	PSO6
CO 4	Examine the nutrition awareness programmes for community	K4	PSO6
CO5	Choose and plan supplementary foods for the vulnerable groups in the community	K5	PSO6

Mapping of COs with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	1	1	2	1	1	3	1	1	1	1	1	1	1	1	1
CO2	1	1	2	1	1	3	1	1	1	1	1	1	1	1	1
CO3	1	1	2	1	1	3	1	1	1	1	1	1	1	1	1

CO4	1	1	2	1	1	3	1	1	1	1	1	1	1	1	1
CO5	1	1	2	1	1	3	1	1	1	1	1	1	1	1	1

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	3	3	2	1
CO2	3	3	2	1
CO3	3	3	2	2
1CO4	3	3	1	2
CO5	3	3	3	1

Note: Strongly Correlated – 3 ¨ Moderately Correlated – 2

¨ Weakly Correlated -

COURSE DESIGNER:

1. **Mrs. C.Helen**
2. **Mrs. D.Mouna**

Forwarded By

(Dr.Vasantha Esther Rani)

100% SKILL DEVELOPMENT

II M.Sc., HUMAN NUTRITION AND NUTRACEUTICALS

SEMESTER –III

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSNN	19PG3N15	Techniques for Experimental Nutrition Lab	Lab	4	2

COURSE DESCRIPTION

The practical course provides hands –on training in the use of hi-tech precision equipments to identify and analyze the various nutrients present in the food.

COURSE OBJECTIVES

- To understand the techniques involved in analyzing the nutrients present in foods.
- To familiarize in handling analytical instruments.

UNITS

UNIT –I Estimation of Carotene (12 HRS.)

Carotene in Fruits

Carotene in Vegetables

UNIT –II Estimation of Ascorbic acid (12 HRS.)

Ascorbic acid in Fruits

Ascorbic acid in Vegetables

UNIT –III Estimation of Carbohydrate & Peroxide Value (12 HRS.)

Estimation of Carbohydrate

Peroxide value

UNIT –IV Estimation of Free fatty acids & Saponification Value(12 HRS.)

Saponification value in fats & oils

Free fatty acids

UNIT –V Estimation of Antioxidants (12 HRS.)

Antioxidant in Fruits

Antioxidant in Vegetables

REFERENCES:

1. Berwal. J.S,.Grewal R.B,.Kapoor C.M &.Garg M.R (2004).*Practical Methods in Food Analysis*. Agrotech Publishing Academy, Udaipur.
2. Horwitz W.,(2000).*Official Methods of Analysis of AOAC International*.AOAC International publishers,Rockville,Mary Land.
3. Jayaraman J. (1996), *Laboratory Manual in Biochemistry*. New Age International Ltd. New Delhi.
4. Ranganna S. **(**1986), *Hand Book of Analysis and Quality Control for fruits and Vegetable Products*. Tata Mc Graw –Hill Publishing Company Limited, New Delhi.
5. Sadasivam S. & Manickam A. **(**1991), *Biochemical Methods*. New Age International Pvt. Ltd.,New Delhi.
6. Swaminathan.G & George.M (2002). *Laboratory Chemical Methods in Food Analysis*.Margham Publications, Chennai.
7. Yeshajahu Pomeranz & Clifton E. Meloan,(2004), *Food Analysis –Theory and Practice*. CBS Publishers and Distributors, New Delhi.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 ESTIMATION OF CAROTENE				
1.1	Carotene in Vegetables Carotene in Fruits	12	Chalk & Talk, Demonstration	Glasswares ,

				Equipment
UNIT -2 ESTIMATION OF ASCORBIC ACID				
2.1	Ascorbic acid in Fruits Ascorbic acid in Vegetables	12	Chalk & Talk, Demonstration	Glasswares , Equipment
UNIT -3 Estimation of Carbohydrate & Peroxide Value				
3.1	Estimation ofCarbohydrate Peroxide value	12	Chalk & Talk, Demonstration	Glasswares
UNIT -4 Estimation of Free fatty acids & Saponification Value				
4.1	Saponification value in fats & oils Free fatty acids	12	Chalk & Talk, Demonstration	Glasswares
UNIT -5 Estimation of Antioxidants				
5.1	Antioxidant in Fruits Antioxidant in Vegetables	12	Chalk & Talk, Demonstration	Glasswares , Equipment

EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	**C2**	**C3**	**C4**	**C5**	**CIA**	**ESE**	**Total**
10	**10**	**10**	**5**	**5**	**40**	**60**	**100**

C1 – Internal Test - 1

C2 – Internal Test - 2

C3 – Model Practical Exam

C4 – Record

C5 – Non - Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explain the principles of analytical techniques	K2	PSO7& PSO8
CO 2	Trace the amount of ascorbic acid in foods	K2	PSO2 &PSO8
CO 3	Compute the procedure for the estimation of β-carotene	K3	PSO2 &PSO8
CO 4	Examine the amount of free fatty acid and peroxide values in fats and oil	K4	PSO2 &PSO8
CO 5	Choose the method of analyzing amount of antioxidant present in foods	K5	PSO2 &PSO8

Mapping of C0s with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	1	1	1	1	1	1	3	3	1	1	1	1	1	1	1
CO2	1	3	2	1	1	2	1	3	1	1	1	1	1	1	1
CO3	1	3	2	1	1	2	1	3	1	1	1	1	1	1	1
CO4	1	3	2	1	1	2	1	3	1	1	1	1	1	1	1
CO5	1	3	2	1	1	2	1	3	1	1	1	1	1	1	1

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	3	3	2	1
CO2	3	3	2	1
CO3	3	3	2	2
CO4	3	3	1	2
CO5	3	3	2	1

Note: Strongly Correlated – 3 ¨ Moderately Correlated – 2

¨ Weakly Correlated -1

COURSE DESIGNER:

1. **Dr. K.KARTHIGA**
2. **Mrs. J.JOSEPHINE JESINTHA**

Forwarded By

(Dr.Vasantha Esther Rani)

100% SKILL DEVELOPMEN

II M.Sc., HUMAN NUTRITION AND NUTRACEUTICALS

SEMESTER –IV

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSNN	19PG4N16	Food Microbiology	Major Core	6	5

COURSE DESCRIPTION

The course outlines the role of micro-organism in food spoilage, preservation and processing.

COURSE OBJECTIVES

- To gain knowledge of role of micro-organisms in humans and environment
- To understand the importance of micro-organisms in food spoilage and to learn advanced, techniques used in food preservation.
- To understand the latest procedures adopted in various food operations to prevent food-borne disorders and legal aspects involved in these areas.

UNITS

UNIT –I FOOD AND MICROORGANISMS (18 HRS.)

Food Microbiology – Definition, Basic concept, History of Food Microbiology

Food as substrate for microorganisms – Hydrogen ion concentration, Water activity, Oxidation-Reduction potential, Nutrient content.

Microorganisms important in Food – Industrial importance of Mold, Yeast and Bacteria.

UNIT –II FOOD BORNE INFECTIONS (18 HRS.)

Classification of Food borne diseases

Food infection – Definition, Classification, Types – Salmonellosis, *Clostridium perfringes* Gastroenteritis, *Bacillus cereus* Gastroenteritis, E.coli infection, Shigellosis

UNIT–III FOOD BORNE INTOXICATION (18 HRS.)

Food Intoxication – Bacterial food intoxication – Botulism, Staphyloccocal gastroenteritis, Mycotoxins – Definition, Types – Ochratoxin, Aflatoxin, Patulin.

Identification and Enumeration of Microbes in food – Preparation and Distribution of Culture Media, Inoculation of Culture media, Examination of Organisms, Plating techniques.

UNIT–IV CONTAMINATION, SPOILAGE AND PRESERVATION OF FOODS (18 HRS.)

Contamination, Spoilage and Preservation - Cereals, Vegetables, Fruits, Meat, Fish, Egg, Poultry, Milk and its products, Canned foods.

General Principles of Food Preservation; Methods of Food Preservation- Asepsis, Removal of microorganisms, Maintenance of anaerobic conditions, Use of high temperature, Use of low temperature, Use of chemicals, Drying, Use of Radiation, Non thermal methods – Ohmic heating, High Pressure Processing, Cold Plasma Processing, Pulsed electric field.

UNIT –V WATER MICROBIOLOGY (18 HRS.)

Microbial analysis of water- Sanitary tests for coliforms, MPN of coliforms

Water borne diseases – Definition – common microorganism involved in water borne diseases.

Typhoid - Causes- incubation period – clinical symptoms – mode of transmission – prevention and control.

Diarrhoea- Causes- incubation period – clinical symptoms – mode of transmission- prevention and control.

Cholera – Causes- incubation period – clinical symptoms – mode of transmission- prevention and control.

REFERENCES:

1. Adams M.R.and M.O.Moss (2005), *Food Microbiology*, New Age International (P) Ltd., Publishers, New Delhi.
2. FrazierW.C, (2000), *Food Microbiology*, New Age International (P) Ltd., Publishers, New Delhi.
3. George J.Banwart (2004), *Basic Food Microbiology*, S.K.Jain for CBS Publishers and Distributors, New Delhi.
4. James.M.Jay, (1996), *Modern Food Microbiology*, S.K.Jain for CBS Publishers and Distributors ,4596/1A,11 Darya Ganj,New Delhi- 110 002,.
5. Pelczar.J, Jr.E.C.S.Chan, Noel R.Kieg, (1993), 5th edition *Microbiology*, Tata McGraw Hill Publishing Co., New Delhi,.
6. Rao A.S., (1998), *Introduction to Microbiology*, Asoke K, Ghosh, Pentice-Hall of India Pvt., New Delhi-110 001,
7. Sharma.P.D, (1996), *Microbiology*, Rakesh Kumar Rastogi for rastogi Publications "Gangotri" Shivaji road, Meerut.

JOURNAL REFERENCES:

1. International Journal of Food Microbiology.
2. Frontiers in Microbiology.
3. Annals of Microbiology.
4. Indian Journal of Microbiology.
5. Applied Microbiology and Biotechnology.

OPEN EDUCATION RESOURCES

1. https://mediahub.unl.edu/media/9239#:~:text=This%20lecture%20provides%20an%20overview,affect%20bacterial%20growth%20and%20survival.
2. https://www.researchgate.net/publication/285514362_Basic_Food_Microbiology
3. https://www.frontiersin.org/articles/10.3389/fmicb.2020.00237/full4
4. https://courses.lumenlearning.com/boundless-microbiology/chapter/food-preservation/#:~:text=Preservation%20usually%20involves%20preventing%20the,or%20otherwise%20reduce%20food%20spoilage.
5. https://food.unl.edu/food-poisoning-foodborne-illness

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 FOOD AND MICROORGANISMS				
1.1	Food Microbiology – Definition, Basic concept	2	Chalk & Talk	Black Board
1.2	History of Food Microbiology	4	Lecture	PPT
1.3	Food as substrate for microorganisms – Hydrogen ion concentration, Water activity, Oxidation-	4	Lecture	PPT

	Reduction potential, Nutrient content			
1.4	Industrial importance of Mold, Yeast	5	Lecture	Videos
1.5	Industrial importance of bacteria	3	Chalk & Talk	Black Board
UNIT -2 FOOD BORNE INFECTIONS				
2.1	Classification of Food borne diseases Food infection – Definition, types	4	Chalk & Talk	Black Board
2.2	Salmonellosis, Clostridium Perfringes	5	Chalk & Talk	Black Board
2.3	Gastroenteritis, Bacillus cereus gastroenteritis	5	Lecture	PPT
2.4	E.coli infection, Shigellosis	4	Lecture	PPT
UNIT -3 FOOD BORNE INTOXICATIONS				
3.1	Food Intoxication – Bacterial food intoxication – Botulism, Staphyloccocal gastroenteritis,	4	Lecture	PPT
3.2	Mycotoxins – Definition, Types – Ochratoxin, Aflatoxin, Patulin.	4	Lecture	PPT
3.3	Identification and Enumeration of Microbes in food – Preparation and	5	Lecture cum demonstration	Hands on training

	Distribution of Culture Media, Inoculation of Culture media			
3.4	Examination of Organisms, Plating techniques.	5	Lecture cum demonstration	Hands on training
UNIT -4 CONTAMINATION, SPOILAGE AND PRESERVATION OF FOODS				
4.1	Contamination, Spoilage and Preservation - Cereals, Vegetables, Fruits	3	Lecture	PPT
4.2	Contamination, Spoilage & Preservation - Meat, Fish	2	Lecture	PPT
4.3	Contamination, Spoilage & Preservation - Egg, Poultry	3	Lecture	PPT
4.4	Contamination, Spoilage & Preservation - Milk and its products, Canned foods	2	Lecture	Smart Board
4.5	General Principles of Food Preservation; Methods of Food Preservation- Asepsis, Removal of microorganisms, Maintenance of anaerobic conditions	2	Lecture	Videos
4.6	Use of high temperature, Use of low temperature, Use of chemicals, Drying, Use of Radiation	3	Lecture	Videos

4.7	Non thermal methods – Ohmic heating, High Pressure Processing, Cold Plasma Processing, Pulsed electric field	3	Chalk & Talk	Black Board
UNIT -5 WATER MICROBIOLOGY				
5.1	Microbial analysis of water- Sanitary tests for coliforms, MPN of coliforms	4	Chalk & Talk	Black Board
5.2	Water borne diseases – Definition – common microorganism involved in water borne diseases	3	Lecture	PPT
5.3	Typhoid - Causes- incubation period – clinical symptoms – mode of transmission – prevention and control	4	Chalk & Talk	Black Board
5.4	Diarrhoea- Causes- incubation period – clinical symptoms – mode of transmission- prevention and control	4	Discussion	Videos
5.5	Cholera – Causes- incubation period – clinical symptoms – mode of transmission- prevention and control	3	Lecture	PPT

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1	T2	Seminar	Assignment	OBT/PPT				
	10 Mks.	10 Mks.	5 Mks.	5 Mks	5 Mks	35 Mks.	5 Mks.	40Mks.	
K2	4	4	-	-	-	8	-	8	20 %
K3	2	2	-	5	-	9	-	9	22.5 %
K4	2	2	-	-	5	9	-	9	22.5 %
K5	2	2	5	-	-	9	-	9	22.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA

Scholastic	35
Non Scholastic	5
Total	40

- ✓ **All the course outcomes are to be assessed in the various CIA components.**
- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy for I PG are :**

K2-Understand**,** **K3**-Apply**,** **K4**-Analyse, **K5**- Evaluate

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

C1 – Internal Test-1

C2 – Internal Test-2

C3 - Seminar

C4 – Assignment

C5 - OBT/PPT

C6 – Non - Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Discuss the basic concepts of food microbiology	K2	PSO11
CO 2	Describe food borne infections	K2	PSO11
CO 3	Identify food borne intoxications	K3	PSO11
CO 4	Analyze the contamination, spoilage and food preservation of foods	K4	PSO11
CO 5	Assess the water quality and explain water borne diseases	K5	PSO11

Mapping of C0s with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	1	1	1	1	1	1	1	1	1	1	3	1	2	1	1
CO2	1	1	1	1	1	1	1	1	1	1	3	1	2	1	2
CO3	1	1	1	1	1	1	1	1	1	1	3	1	2	1	1
CO4	1	1	1	1	1	1	1	1	1	1	3	1	2	1	2
CO5	1	1	1	1	1	1	1	1	1	1	3	1	2	1	1

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	3	2	2	1

CO2	**3**	**2**	**2**	**2**
CO3	**1**	**1**	**1**	**1**
CO4	**3**	**2**	**1**	**3**
CO5	**2**	**2**	**2**	**3**

Note: Strongly Correlated – 3 ¨ Moderately Correlated – 2

¨ Weakly Correlated -1

COURSE DESIGNER:

1. Mrs. C.Helen

Forwarded By

(Dr.Vasantha Esther Rani)

100% EMPLOYABILITY

II M.Sc., HUMAN NUTRITION AND NUTRACEUTICALS

SEMESTER –IV

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSNN	19PG4N17	Nutritional Biochemistry	Major Core	6	5

COURSE DESCRIPTION

The course provides understanding on the structure, metabolism and energetic of macro and micro nutrients and the integration of metabolic systems.

COURSE OBJECTIVES

- To understand the application of biochemistry in the field of foods and nutrition.
- To understand the mechanisms adopted by the human body for regulation of metabolic pathways.
- To understand integration of cellular level metabolic events to nutritional disorders and imbalances.

UNITS

UNIT –I CARBOHYDRATE (18 HRS.)

Structure, Metabolism –Definition, Types of metabolism, Carbohydrate metabolism – Glycogenesis, Glycogenolysis, Glycolysis, Fate of pyruvic acid, Citric Acid cycle, Energetics of glucose metabolism, Hexose Monophosphate Shunt, Gluconeogenesis, Cori Cycle,Uronic Acid pathway.

Inborn errors of carbohydrates metabolism- galactosaemia, fructose intolerance, lactose intolerance

UNIT –II PROTEIN (18 HRS.)

Structure, Mechanism of protein synthesis, Metabolism - Oxidative and non-oxidative Deamination, Transamination, Decarboxylation, Transmethylation, Krebs Urea Cycle, Linkage of Krebs Urea Cycle and Krebs Citric Acid Cycle, Catabolism of Ketogenic amino acids, Catobolism of Glycogenic amino acids, Catabolism of amino acids that are both Ketogenic and Glycogenic, Biosynthesis of amino acids, Energetics of amino acids.

Inborn errors of amino acid metabolism – albinism, phenylketonuria (PKU), maple syrup urine disease (MSUD)

UNIT –III LIPID (18 HRS.)

Structure, Metabolism of fat – β-Oxidation Cycle, Energetics of fatty acid oxidation, Ketosis, Ketogenesis, Ketolysis, Biosynthesis of fatty acids.

Inborn errors of fat metabolism - Gaucher's disease, Tay-sachs disease, Niemann-Pick disease.

UNIT –IV NUCLEIC ACIDS (18 HRS.)

Nucleic acid - Definition and types.

DNA – Structure, Replication, Enzymes involved in replications.

RNA- types and comparison of DNA and RNA.

Metabolism of Nucleic acids - Synthesis and breakdown of purine and pyrimidine.

UNIT –V CELL RESPIRATION AND BIOLOGICAL OXIDATION (18 HRS.)

Site of biological oxidation, pathway of biological oxidation, electron transport system, bioenergetics system.

REFERENCES:

1. Abraham Cantrarow and Bernard Schepartz, (1967). *Biochemistry.* W.B.Saunders Company, London.
2. Albert L.Lehninger, (1984). *Principles of Biochemistry*. CBS Publishers and Distributors, Delhi.
3. Ambika Shanmugam, (1983). *Fundamentals of Biochemistry for Medical Students*. Published by the author, Madras.
4. Jain.J.L., (1988). *Fundametals of Biochemistry*. S.Chand and company (Pvt.) Ltd., New Delhi.
5. Joseph S. Fruton and Sofia Simmonds, (1960). *Biochemistry*. Asia Publishing House, New Delhi.
6. Singh.S.P, (1998). *A Text Book of Biochemistry*. CBS Publishers and Distributors, New Delhi.

JOURNAL REFERENCES:

1. Journal of Nutritional Biochemistry
2. Journal of Biochemistry
3. International Journal of Biochemistry and Cell Biology
4. Journal of Biological Chemistry

5. Indian Journal of Medical Biochemistry

OPEN EDUCATIONAL REFERENCES:

1. **https://www.chem.purdue.edu/courses/chm333/**
2. **https://nios.ac.in/media/documents/dmlt/Biochemistry/Lesson-04.pdf**
3. **https://courses.lumenlearning.com/suny-ap2/chapter/carbohydrate-metabolism-no-content/#:~:text=Carbohydrate%20metabolism%20begins%20in%20the,down%20complex%20sugars%20into%20monosaccharides.&text=In%20the%20cells%2C%20glucose%2C%20a,inside%20the%20molecule%20is%20released.**
4. **https://courses.lumenlearning.com/ap2/chapter/lipid-metabolism/**
5. **http://ocw.ump.edu.my/pluginfile.php/9893/mod_resource/content/1/Nucleic%20Acid%20Metabolism.pdf**
6. **http://yengage.yenepoya.edu.in/idata/YenepoyaUniversity/ilFile/4/89/file_48906/001/Biological%20oxidation.pdf**

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 CARBOHYDRATE				
1.1	Structure of carbohydrate	2	Chalk & Talk	Black Board
1.2	Glycogenesis, Glycogenolysis, Gluconeogenesis	3	Chalk & Talk	Black Board
1.3	Glycolysis, Fate of pyruvic acid	2	Lecture	PPT
1.4	Citric Acid cycle	2	Lecture	Smart class

1.5	Hexose Monophosphate Shunt	3	Chalk & Talk	Black Board
1.6	Cori Cycle, Uronic Acid pathway	3	Lecture	PPT
1.7	Galactosaemia, fructose intolerance, lactose intolerance	3	Lecture and Group Discussion	PPT
UNIT -2 PROTEIN				
2.1	Structure of protein	2	Chalk & Talk	Black Board
2.2	Mechanism of protein synthesis	3	Lecture	Videos
2.3	Oxidative and non-oxidative Deamination, Transamination, Decarboxylation, Transmethylation	2	Lecture	PPT
2.5	Krebs Urea Cycle, Linkage of Krebs Urea Cycle and Krebs Citric Acid Cycle	2	Lecture	Smart Board
2.6	Catabolism of Ketogenic amino acids, Catabolism of Glycogenic amino acids, Catabolism of amino acids that are both Ketogenic and Glycogenic	3	Lecture	PPT
2.7	Biosynthesis of amino acids, Energetics of amino acids.	3	Lecture	PPT
2.8	Inborn errors of amino acid metabolism – albinism, phenyl	3	Discussion	Videos

	ketonuria, maple syrup urine disease			
UNIT -3	**LIPID**			
3.1	Structure of fats	3	Lecture	Model
3.2	Metabolism of fat – β-Oxidation Cycle, Energetics of fatty acid oxidation	3	Lecture	PPT
3.3	Ketosis, Ketogenesis, Ketolysis	4	Chalk & Talk	Black Board
3.4	Biosynthesis of fatty acids	3	Lecture	Smart class
3.5	Inborn errors of fat metabolism - Gaucher's disease, Tay-sachs disease, Niemann-Pick disease	5	Discussion	Black Board
UNIT -4	**NUCLEIC ACIDS**			
4.1	Nucleic acid - Definition and types	3	Lecture	Smart class
4.2	Structure of DNA & RNA	4	Chalk & Talk	Black Board
4.3	Replication of DNA Enzymes involved in replication	3	Lecture	Smart class
4.4	RNA- types and comparison of DNA and RNA	4	Lecture	PPT

4.5	Metabolism of Nucleic acids - Synthesis and breakdown of purine and pyrimidine	4	Lecture	Smart class
UNIT -5 CELL RESPIRATION AND BIOLOGICAL OXIDATION				
5.1	Site of biological oxidation	2	Chalk & Talk	Black Board
5.2	Pathway of biological oxidation	3	Lecture	PPT
5.3	Electron transport system	2	Lecture	Smart class
5.4	Bioenergetics system	2	Lecture	Smart class

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total
	T1	T2	Seminar	Assignment	OBT/PPT			
	10 Mks.	10 Mks.	5 Mks.	5 Mks	5 Mks	35 Mks.	5 Mks.	40Mks.
K2	4	4	-	-	-	8	-	8
K3	2	2	-	5	-	9	-	9
K4	2	2	-	-	5	9	-	9
K5	2	2	5	-	-	9	-	9

Non Scholastic	-	-	-	-	-		5	5
Total	10	10	5	5	5	35	5	40

CIA

Scholastic	**35**
Non Scholastic	**5**
	40

- **All the course outcomes are to be assessed in the various CIA components.**
- **The levels of CIA Assessment based on Revised Bloom's Taxonomy for PG are :**

K2-Understand**,** **K3**-Apply**,** **K4**-Analyse, **K5**-Evaluate

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTIC	MARKS		
C1	**C2**	**C3**	**C4**	**C5**	**C6**	**CIA**	**ESE**	**Total**
10	**10**	**5**	**5**	**5**	**5**	**40**	**60**	**100**

C1 – Internal Test-1

C2 – Internal Test-2

C3 - Seminar

C4 – Assignment

C5 - OBT/PPT

C6 – Non - Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Describe the structure of carbohydrates	K2	PSO12
CO 2	Discuss protein metabolism	K2	PSO12
CO 3	Determine the metabolism of fat	K3	PSO12
CO 4	Compare the structure and metabolism of RNA & DNA	K4	PSO12
CO 5	Explain biological oxidation	K5	PSO12

Mapping of COs with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1
CO2	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1
CO3	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1

CO4	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1
CO5	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	2	1	1	1
CO2	2	1	1	1
CO3	2	1	1	1
CO4	2	1	1	1
CO5	2	1	1	1

Note: Strongly Correlated – 3 Moderately Correlated – 2 Weakly Correlated -1

COURSE DESIGNER:

1. Dr. K.Karthiga

2. Mrs. C.Helen

Forwarded By

(Dr.Vasantha Esther Rani)

100% SKILL DEVELOPMEN

II M.Sc., HUMAN NUTRITION AND NUTRACEUTICALS

SEMESTER –IV

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSNN	19PG4N18	Advanced Food Science and Processing Techniques	Major Core	6	5

COURSE DESCRIPTION

The course offers the understanding of processing techniques involved to transform raw ingredients into processed food products for human consumption.

COURSE OBJECTIVES

- To understand the science behind processing of foods and its impact on physic-chemical properties of foods
- To provide in-depth knowledge on production of processed food products.

UNITS

UNIT –I CEREAL PROCESSING (18 HRS.)

Structure, Processing of Rice and Wheat- Parboiling and Milling, Physico-chemical changes during parboiling. Corn-dry and wet milling, Oats-Milling, Ragi and Samai - Milling. Processing of Cereal products- Puffed rice, Flaked rice, Quick cooking rice, Rice flour. Wheat products - Vermicelli, Semolina, Extruded products. By- products – Rice bran, Rice bran oil and Husk.

UNIT –II PULSE PROCESSING AND OILSEED PROCESSING (18 HRS.)

Pulse Processing: Structure, Processing of pulses- Decortication, Milling, Germination, Fermentation, Parching, Puffing, Extrusion. Antinutritional factors, Methods to eliminate toxic constituents. Pulse products- dhal, Instant

legume powders, Legume protein concentrates. Effect of processing on the physiochemical properties of pulses.

Oil Seed Processing: Structure, Processing of edible oil, Hydrogenated fat and Margarine, Effect of processing on the physiochemical properties of oil seeds. By- products- Oilseed cake, Rancidity-Types and prevention methods

UNIT –III VEGETABLE PROCESSING AND FRUIT PROCESSING (18 HRS.)

Vegetable Processing: Classification of vegetables, General structure of edible portion of vegetables and fruits, Harvesting and storage, Post harvest practices, Vegetable products-Dehydrated vegetables, Canned vegetables, frozen vegetables, Paste, Powder, Pickled vegetables-Sauerkraut, Gherkins.

Fruit Processing: Classification, Maturity concepts, Ripening- Definition, Chemicals for ripening,Changes occurred during ripening and senescence, Harvesting and processing, Storage. Fruit products- dried fruits, Canned fruits, Powders, Fruit juice concentrates.

UNIT –IV MILK AND EGG PROCESSING (18 HRS.)

Milk Processing: Milk processing steps, Properties of milk, Effect of heat on milk.Milk products: Definition, Manufacturing process -Milk powder, Ice cream, Butter, Cheese,Yoghurt and Sweetened condensed milk.

Egg processing: Structure, Egg storage, Egg quality- Evaluation, deterioration during storage, Eggproduct- Egg powder.

UNIT –V MEAT PROCESSING (18 HRS.)

Meat- Structure, Classes, Post-mortem changes, Ageing, Tenderizing, Curing, Cuts and grades and changes during cooking.

Fish- Classification, Selection criteria, - Processing of Smoked fish and canned fish

Poultry- Classification, Processing of poultry and storage. Products- Ham, Sausages, Bacon.

BOOK REFERENCES:

1. Avantina Sharma, (2006)), *Textbook of Food Science and Technology***,** International book distributing company, Lucknow.
2. Potter, N.N. (1978), *Food Science*. AVI Publishing company, INC, Westport, Connecticut.
3. Shakuntala Manay. N., *Foods, Facts and Principles*, New Age International Publishers, New Delhi, II edition.
4. Sivasankar.B, (2002), *Food Processing and Preservation*, PHI Learning Private Limited, New Delhi.
5. Subbulakshmi.G and Udipi.A.S, (2006), *Food Processing and Preservation*, New Age International Publisher,New Delhi.
6. Vijaya Khader, (2001), *Textbook of Food Science and Technology*, Indian Council of Agricultural Research, New Delhi.

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2. Journal of Food Science. The Institute of Food Technologies, Illinois, USA.

OPEN EDUCATIONAL RESOURCES:

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2.https://www.unido.org/sites/default/files/2009-04/Small_scale_cereal_milling_and_bakery_products_0.pdf
3.https://ccsuniversity.ac.in/bridge-library/pdf/FST-Paper-II%20Technology%20of%20cereals,%20pulses%20and%20oilseeds-%20II%20Semester.pdf
4.http://ecoursesonline.iasri.res.in/mod/page/view.php?id=805
5.http://ecoursesonline.iasri.res.in/mod/page/view.php?id=807
6.http://www.fao.org/3/V5030E/V5030E03.htm#1.2%20Importance%20of%20fruit%20and%20vegetables%20in%20world%20agriculture
7.https://meridian.allenpress.com/jfp/article/33/2/64/425033/EGG-PROCESSING-TECHNOLOGY-PROGRESS-AND-SANITATION
8.https://www.britannica.com/technology/meat-processing

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**CEREAL PROCESSING**			
1.1	Structure, Processing of Rice and Wheat	4	Chalk & Talk,Lectures,Discussion	Black/white Board,ppt,videos
1.2	Corn and Oats milling	3	Chalk & Talk, Lectures,Discussion	Black/white Board,ppt,videos
1.3	Ragi and Samai milling	3	Chalk & Talk, Lectures,Discussion	PPT & White/black board
1.4	Processing of rice products	3	Lecture,seminar	PPT & White/black board,videos

1.5	Processing of wheat products	3	Lecture,seminar	Black/white Board,ppt,videos
1.6	By products of rice	2	Discussion,seminar, Lectures	PPT & White/black board,videos
UNIT -2 PULSE PROCESSING AND OILSEED PROCESSING				
2.1	Structure and Processing of pulses	4	Chalk & Talk,Lectures,Discussion	Black/white Board,ppt,videos
2.2	Anti-nutritional factors	3	Chalk & Talk, Lectures,Discussion	Black/white Board,ppt,videos
2.3	Pulse products	3	Chalk & Talk, Lectures,Discussion	PPT & White/black board
2.4	Structure and oilseed processing	4	Lecture,seminar	PPT & White/black board,videos
2.5	By-products of oilseed processing	3	Lecture,seminar	Black/white Board,ppt,videos
2.6	Rancidity	1	Lectures	PPT & White/black board
UNIT 3- VEGETABLE PROCESSING AND FRUIT PROCESSING				
3.1	General structure & Classification of vegetables	3	Chalk &talk,Lectures	White/black board

3.2	Harvesting and Storage	2	Lectures,seminar	Black/white Board,ppt,videos
3.3	Vegetable processing	4	Lectures,Discussion	PPT,Videos
3.4	General structure & Classification of fruits	3	Chalk &talk,Lectures	White/black board
3.5	Harvesting and Storage	2	Lecture,seminar	Black/white Board,ppt,videos
3.6	Fruit Processing	4	Lectures,Discussion	PPT,Videos
UNIT – 4 MILK AND EGG PROCESSING				
4.1	Milk processing steps	3	Chalk & Talk,Lectures,Discussion	Black/white Board,ppt,videos
4.2	Properties of milk, Effect of heat on milk	3	Chalk & Talk, Lectures,Discussion	Black/white Board,ppt,videos
4.3	Fermented Milk Products	3	Chalk & Talk, Lectures,Discussion	PPT & White/black board
4.4	Non-Fermented Milk Products	3	Lecture,seminar	PPT & White/black board,videos
4.5	Egg structure & storage	3	Lecture,seminar	Black/white Board,ppt,videos

4.6	Egg quality & egg product	3	Discussion,seminar, Lectures	PPT & White/black board,videos
UNIT – 5			**MEAT PROCESSING**	
5.1	Meat-Structure and Classes	3	Chalk & Talk,Lectures,Discussion	Black/white Board,ppt,videos
5.2	Post-mortem changes, Ageing, Tenderizing	3	Chalk & Talk, Lectures,Discussion	Black/white Board,ppt,videos
5.3	Curing, Cuts and grades and changes during cooking.	3	Chalk & Talk, Lectures,Discussion	PPT & White/black board
5.4	Fish-Processing	3	Lecture,seminar	PPT & White/black board,videos
5.5	Poultry-Processing	3	Lecture,seminar	Black/white Board,ppt,videos
5.6	Products-Ham, Sausages, Bacon	3	Lectures	PPT & White/black board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total
	T1	T2	Seminar	Assignment	OBT/PPT			
	10 Mks.	10 Mks.	5 Mks.	5 Mks	5 Mks	35 Mks.	5 Mks.	40Mks.
K2	4	4	-	-	-	8	-	8
K3	2	2	-	5	-	9	-	9
K4	2	2	-	-	5	9	-	9
K5	2	2	5	-	-	9	-	9
Non Scholastic	-	-	-	-	-		5	5
Total	10	10	5	5	5	35	5	40

CIA

Scholastic	**35**
Non Scholastic	**5**
	40

All the course outcomes are to be assessed in the various CIA components.

- **The levels of CIA Assessment based on Revised Bloom's Taxonomy for PG are :**

K2-Understand**,** **K3**-Apply**,** **K4**-Analyse, **K5**-Evaluate

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

C1 – Internal Test-1

C2 – Internal Test-2

C3 - Seminar

C4 – Assignment

C5 - OBT/PPT

C6 – Non – Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Illustrate the structure and milling of cereals.	K2	PSO2 & PSO15
CO 2	Explain the processing methods of pulses and oilseeds.	K2	PSO2 & PSO15
CO 3	Identify the methods of harvesting & storage of vegetables and fruits	K3	PSO2 & PSO15
CO 4	Analyze the processing methods of milk & egg products	K4	PSO2 & PSO15

CO 5	Assess the processing & preservation methods of fleshy foods	K5	PSO2 & PSO15

Mapping of COs with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	2	3	2	1	2	1	1	1	1	1	1	1	1	2	3
CO2	2	3	2	1	2	1	1	1	1	1	1	1	1	2	3
CO3	2	3	2	1	2	1	1	1	1	1	1	1	1	2	3
CO4	2	3	2	1	2	1	1	1	1	1	1	1	1	2	3

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	2	1	1	3
CO2	2	1	1	3
CO3	2	1	1	3
CO4	2	1	1	3
CO5	2	1	1	3

Note: Strongly Correlated – 3¨ Moderately Correlated – 2
Weakly Correlated -1

COURSE DESIGNER:

1. **Mrs. P. MAGDALENE VIRJINI**
2. **Dr. K. KARTHIGA**

Forwarded By

(Dr.Vasantha Esther Rani)

100% SKILL DEVELOPMENT

II M.Sc. HUMAN NUTRITION AND NUTRACEUTICALS SEMESTER –IV

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSNN	19PG4NE3	FOOD SAFETY AND QUALITY CONTROL	Major Elective 3	4	4

COURSE DESCRIPTION

The course provides an outline on the standards, tools and techniques to ensure safety and integrity of foods in food preparation and processing.

COURSE OBJECTIVES

- To develop approaches to identify food safety hazards in food processing.
- To apply preventive measures and control methods to minimize microbiological hazards and maintain quality of foods.
- To identify the wide variety of parameters affecting food quality.
- To develop quality control strategies.

UNITS

UNIT –I BASIC CONCEPTS OF FOOD SAFETY AND FOOD LAWS (12 Hrs.)

Food and its safety concerns, Importance of safe food, Factors affecting food safety, Threats to safety of food supply, Principles of food quality.

Food Laws: PFA, Essential Commodity Act, Standards of Weights and measures Act, Export Act.

Voluntary Laws: BIS, AGMARK, Consumer Protection Act, FSSAI

International Laws: Codex Alimentarius. Code India, ISO, FAO, WHO.

UNIT –II NATURAL TOXINS IN FOOD (12 Hrs.)

Toxicants in animal foods – Shellfish

Toxicants in plant foods - Favism, Gossypol, Toxic amino acids, Toxic alkaloids, Cyanogens, Lima beans, Mushroom poisoning.

Antinutritional factors – Protease inhibitors, Trypsin inhibitors, Haemagglutanins, Phytates, Tannins, Oxalates, Goitrogens

Environmental Toxins - Mercury; Polybrominated biphenyl (PBB); Polychlorinated biphenyl (PCB); Lead; Cadmium; Pesticide residues; Contaminants from plastics

. UNIT – III FOOD ADDITIVES (12 Hrs.)

Definition, Importance of use in foods, Classification, Types - Preservatives, antioxidants, artificial colours, Flavour enhancers, bleaching agents, nutrient additives, Thickening and stabilizing agents, anticaking, antifoaming, sequestrants sweetening agents, GRAS - Generally Recommended As Safe (GRAS).

UNIT – IV QUALITY ASSURANCE IN FOOD (12 Hrs.)

HACCP – Definition, principles, Guidelines for application of HACCP principles.

ISO 22000, Halal

UNIT – V FOOD PACKAGING (12 Hrs.)

Definition, Functions of Packaging, Classification of Packaging materials, Packaging methods, Moisture Sorption Properties of foods and selection of packaging materials,

Interaction between packaging and foods.

Nutrition labeling and nutrition claims.

REFERENCES:

1. Judith E. Brown, (2002), 3rd Ed, Nutrition Now, Wadsworth, London.
2. Pomeranz Y and Meloan CE (1996), *Food Analysis : Theory and Practice*, CBS Publishers and Distributors, New Delhi.
3. Shirley J. Van Grade, Margy Woodburn. (1999), "*Food Preservation and Safety Principles & Practice"*; Surabhi Publications.
4. Subbulakshmi.G; Shobha.A.Udipi, (2001), "*Food Processing and Preservation*", New Age International Publishers.

JOURNAL REFERENCES:

1. Journal of Food Quality Hazards Control
2. Journal of Food Safety
3. International Journal of Food Safety and Public Health

OPEN EDUCATION RESOURCES:

1. **https://old.fssai.gov.in/Portals/0/Training_Manual/Presentation%20on%20concepts%20of%20Food%20Safety%20and%20Quality%20Management%20Systems**

2. https://www.ag.ndsu.edu/foodlaw/overview/introhaccp
3. https://www.sesotec.com/apac/en/resources/blog/what-is-food-safety
4. https://ncert.nic.in/textbook/pdf/lehe106.pdf
5. https://www.who.int/news-room/fact-sheets/detail/natural-toxins-in-food#:~:text=Cassava%2C%20sorghum%2C%20stone%20fruits%2C,important%20foods%20containing%20cyanogenic%20glycosides.
6. https://www.cfs.gov.hk/english/multimedia/multimedia_pub/multimedia_pub_fsf_11_02.html
7. https://www.who.int/news-room/fact-sheets/detail/food-additives
8. https://foodinsight.org/food-additives-and-ingredients-resources-you-can-use/
9. https://fssai.gov.in/upload/uploadfiles/files/Chapter1.pdf
10. https://fssai.gov.in/upload/uploadfiles/files/FSSAI-regulations.pdf

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 BASIC CONCEPTS OF FOOD SAFETY AND FOOD LAWS				
1.1	Food and its safety concerns, Importance of safe food, Factors affecting food safety, Threats to safety of food supply, Principles of food quality.	3	Chalk & Talk	Black Board
1.2	Food Laws: PFA, Essential Commodity Act, Standards of Weights and measures Act, Export Act.	3	Lecture	PPT
1.3	Voluntary Laws: BIS, AGMARK, Consumer Protection Act, FSSA.	3	Lecture	PPT

1.4	International Laws: Codex Alimentarius. Code India, ISO, FAO, WHO.	3	Lecture	PPT
UNIT -2 NATURAL TOXINS IN FOOD				
2.1	Toxicants in animal foods – Shellfish.	3	Lecture	PPT
2.2	Toxicants in plant foods - Favism, Gossypol, Toxic amino acids, Toxic alkaloids, Cyanogens, Lima beans, Mushroom poisoning.	3	Lecture	PPT, Video
2.3	Antinutritional factors – Protease inhibitors, Trypsin inhibitors, Haemagglutanins, Phytates, Tannins, Oxalates, Goitrogens.	3	Lecture	PPT
2.4	Environmental Toxins - Mercury; Polybrominated biphenyl (PBB); Polychlorinated biphenyl (PCB); Lead; Cadmium; Pesticide residues; Contaminants from plastics.	3	Lecture	PPT
UNIT -3 FOOD ADDITIVES				

3.1	Definition, Importance of use in foods, Classification.	3	Chalk & Talk	Black Board
3.2	Types - Preservatives, antioxidants, artificial colours, Flavour enhancers, bleaching agents, nutrient additives.	3	Lecture	PPT, Samples
3.3	Thickening and stabilizing agents, anticaking, antifoaming, sequestrants sweetening agents.	3	Lecture	PPT, Samples
3.4	GRAS - Generally Recommended As Safe (GRAS).	3	Chalk & Talk	Black Board
UNIT -4 QUALITY ASSURANCE IN FOOD				
4.1	HACCP – Definition, principles, Guidelines for application of HACCP principles. ISO 22000, Halal	6	Lecture	PPT
4.2	ISO 22000, Halal	6	Lecture	PPT
UNIT -5 FOOD PACKAGING				
5.1	Definition, Functions of Packaging, Classification of Packaging materials,	6	Lecture	PPT
5.2	Packaging methods, Moisture Sorption Properties of foods and	6	Chalk & Talk	Black Board

	selection of packaging materials,			

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total
	T1	T2	Seminar	Assignment	OBT/PPT			
	10 Mks.	10 Mks.	5 Mks.	5 Mks	5 Mks	35 Mks.	5 Mks.	40Mks.
K2	4	4	-	-	-	8	-	8
K3	2	2	-	5	-	9	-	9
K4	2	2	-	-	5	9	-	9
K5	2	2	5	-	-	9	-	9
Non Scholastic	-	-	-	-	-		5	5
Total	10	10	5	5	5	35	5	40

CIA

Scholastic	**35**
Non Scholastic	**5**
	40

- **All the course outcomes are to be assessed in the various CIA components.**
- **The levels of CIA Assessment based on Revised Bloom's Taxonomy for PG are :**

K2-Understand**,** **K3**-Apply**,** **K4**-Analyse, **K5**-Evaluate

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

C1 – Internal Test-1

C2 – Internal Test-2

C3 - Seminar

C4 – Assignment

C5 - OBT/PPT

C6 – Non - Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Outline the concept of food safety and food laws.	K2	PSO13
CO 2	Explain the toxicants in animal and plant foods.	K2	PSO13
CO 3	Identify food additives	K3	PSO13
CO 4	Examine the various quality assurance systems in food industries.	K4	PSO13
CO 5	Determine the functions, methods and properties of packaging and its materials.	K5	PSO13

Mapping of C0s with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1
CO2	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1
CO3	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1

CO4	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1
CO5	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	2	1	1	1
CO2	2	1	1	1
CO3	1	2	1	1
CO4	1	2	1	1
CO5	2	1	1	1
CO6	1	1	2	1

Note: Strongly Correlated – 3 ¨ Moderately Correlated – 2

¨ Weakly Correlated -1

COURSE DESIGNER:

1. Mrs.P.Madalene Virjini

Forwarded By

(Dr.Vasantha Esther Rani)

100% SKILL DEVELOPMENT

II M.Sc. HUMAN NUTRITION AND NUTRACEUTICALS SEMESTER –IV

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSNN	19PG4NE4	NUTRITION IN CRITICAL CARE AND DISASTERS	Major Elective	4	4

COURSE DESCRIPTION

The course offers comprehensive knowledge on the assessment and management of nutritional support systems for critically ill.

COURSE OBJECTIVES

- To understand the physiology, metabolism and special nutritional requirements of the critically ill.
- To be familiar with special nutritional support techniques and feeding formulations to meet their nutritional requirements.

UNITS

UNIT –I NUTRITIONAL SCREENING AND ASSESSMENT FOR THE CRITICALLY ILL (12 HRS.)

Nutritional screening and nutritional status assessment of the critically ill. Nutritional support system and other life saving measures for the critically ill.

UNIT –II IMMUNO ENHANCERS AND SPECIAL DIETS IN CRITICAL CARE (12 HRS.)

Role of immuno enhancers, conditionally essential nutrients, immuno suppressants and special diets in critical care.

UNIT –III SPECIAL NUTRITIONAL THERAPY IN CRITICAL ILLNESSES – BURNS, CV AND KIDNEY (12 HRS.)

Patho physiological, clinical and metabolic aspects, understanding the special nutritional requirements, nutritional goals and monitoring the therapy in

critical illnesses like stress, trauma, sepsis, burns, CV complications and surgery, dialysis, transplant, multiple organ failure.

UNIT –IV SPECIAL NUTRITIONAL THERAPY IN CRITICAL ILLNESSES –GI AND LIVER (12 HRS.)

Patho physiological, clinical and metabolic aspects, understanding the special nutritional requirements, nutritional goals and monitoring the therapy in critical illnesses like
GI tract surgery, hepatic transplants.

UNIT –V REFEEDING SYNDROME AND ETHICAL ISSUES IN TERMINALLY ILL (12 HRS.)

Complications of nutritional support system including refeeding syndrome
Diet related ethical issues in the terminally ill.

REFERENCES:

1. Escott – Stump.S. (2000), *Krause's food Nutrition and Diet Therapy*, 10th Ed.W.S.Saunders Ltd.
2. Shields, R. (1992), *Bailliere's Clinical Gastroentrology*, Baillere Tindall London.
3. Shikora, S.A. and Blackburn. G.L. (1999). Nutritional Support – Theory and Therapeutics, Chapman and Hall, ITP (International Thompson Publishing).

JOURNAL REFERENCES:

1. Indian Journal of Critical Care Medicine.
2. Journal of Parenteral and Enteral Nutrition
3. Journal of American Dietetic Association, American Dietetic Association, Mount Marris, Illinois, 61054, USA.
4. The American Journal of Clinical Nutrition, Waverfy Press, USA.
5. The Indian Journal of Medical Research, Indian Council of Medical Research, New Delhi

OPEN EDUCATIONAL RESOURCES:

1https://scholar.google.co.in/scholar?q=oer+nutritional+support+for+

2.https://www.sciencedirect.com/science/article/abs/pii/S0899900704001649

3.https://www.sciencedirect.com/science/article/abs/pii/S0012369215321097

4.https://www.nejm.org/

5.https://aspenjournals.onlinelibrary.wiley.com/doi/abs/10.1177/0148607103027005355

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 NUTRITIONAL SCREENING AND ASSESSMENT FOR THE CRITICALLY ILL				
1.1	Nutritional screening and nutritional status assessment of the critically ill.	6	Lecture	PPT
1.2	Nutritional support system and other life saving measures for the critically ill.	6	Chalk & Talk Demonstration	Black Board Models
UNIT -2 IMMUNO ENHANCERS AND SPECIAL DIETS IN CRITICAL CARE				
2.1	Role of immuno enhancers, conditionally essential nutrients in critical care.	6	Lecture	PPT
2.2	Role of immuno suppressants and special diets in critical care.	6	Lecture	PPT
UNIT -3 SPECIAL NUTRITIONAL THERAPY IN CRITICAL ILLNESSES – BURNS, CV AND KIDNEY				
3.1	Patho physiological, clinical and metabolic aspects, understanding the special nutritional requirements, nutritional goals and	4	Lecture	PPT

	monitoring the therapy in critical illnesses like stress, trauma, sepsis, burns.			
3.2	Patho physiological, clinical and metabolic aspects, understanding the special nutritional requirements, nutritional goals and monitoring the therapy in critical illnesses like CV complications and surgery.	4	Chalk & Talk	Black Board
3.3	Patho physiological, clinical and metabolic aspects, understanding the special nutritional requirements, nutritional goals and monitoring the therapy in critical illnesses like dialysis, transplant, multiple organ failure.	4	Demonstration	Model
UNIT -4 SPECIAL NUTRITIONAL THERAPY IN CRITICAL ILLNESSES –GI AND LIVER				
4.1	Patho physiological, clinical and metabolic aspects, understanding the special nutritional requirements, nutritional goals and monitoring the therapy in critical illnesses like GI tract surgery.	6	Lecture	PPT
4.2	Patho physiological, clinical and metabolic aspects, understanding the special nutritional requirements, nutritional goals and monitoring the therapy in critical illnesses like hepatic transplants.	6	Lecture	PPT
UNIT -5 REFEEDING SYNDROME AND ETHICAL ISSUES IN TERMINALLY ILL				

5.1	Complications of nutritional support system including refeeding syndrome.	6	Lecture	PPT
5.2	Diet related ethical issues in the terminally ill.	6	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total
	T1	T2	Seminar	Assignment	OBT/PPT			
	10 Mks.	10 Mks.	5 Mks.	5 Mks	5 Mks	35 Mks.	5 Mks.	40Mks.
K2	4	4	-	-	-	8	-	8
K3	2	2	-	5	-	9	-	9
K4	2	2	-	-	5	9	-	9
K5	2	2	5	-	-	9	-	9
Non Scholastic	-	-	-	-	-		5	5
Total	10	10	5	5	5	35	5	40

CIA

Scholastic	**35**
Non Scholastic	**5**

40

- **All the course outcomes are to be assessed in the various CIA components.**
- **The levels of CIA Assessment based on Revised Bloom's Taxonomy for PG are :**

K2-Understand**,** **K3**-Apply**,** **K4**-Analyse, **K5**-Evaluate

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

C1 – Internal Test-1

C2 – Internal Test-2

C3 - Seminar

C4 – Assignment

C5 - OBT/PPT

C6 – Non - Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explain nutritional screening, assessment and support system for critically ill	K2	PSO10
CO 2	Discuss the role of immuno-enhancers and special diets in critical care	K2	PSO10
CO 3	Plan special nutrition therapy in critical illness - stress, burns, cardiovascular and kidney	K3	PSO10
CO 4	Examine the special nutrition therapy in gastrointestinal tract surgery and hepatic transplant	K4	PSO10
CO 5	Determine the refeeding syndrome and ethical issues in terminally ill	K5	PSO10

Mapping of C0s with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1
CO2	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1
CO3	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1
CO4	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1
CO5	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	22	1	1	1
CO2	2	1	1	1
CO3	1	1	2	1
CO4	1	1	2	1
CO5	1	1	1	3

Note: Strongly Correlated – 3 ¨ **Moderately Correlated – 2**

¨ **Weakly Correlated -1**

COURSE DESIGNER:

Dr.Vasantha Esther Rani

Forwarded By

(Dr.Vasantha Esther Rani)

100% SKILL DEVELOPMENT

II M.Sc.,HUMAN NUTRITION AND NUTRACEUTICALS

SEMESTER –IV

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSNN	19PG4N19	Food Microbiology Lab	Lab	4	2

COURSE DESCRIPTION

The course gives the clear idea of assessing the microbes present in foods causing spoilage

COURSE OBJECTIVES

- To enable the students to identify the microbes causing spoilage in foods
- To determine the shelf life of the foods by assessing the microbial count
- To provide insight on the effect of packaging on the microbial load in foods

UNITS

UNIT–I INTRODUCTION TO MICROBIOLOGICAL LABORATORY TECHNIQUES (12 HRS.)

Safety Procedures and Precautions, General Laboratory Directions, Good microbiological laboratory practice (GMLP), Spillage management, Use of equipments, apparatus and materials of microbiological lab.

UNIT –II MICROSCOPY (12 HRS.)

Principles, construction and mode of operation of microscopes; Care and handling of microscopes; Microscopic examination of slide preparation.

UNIT–III STERILIZATION AND DISINFECTANTS (12 HRS.)

Sterilization using the autoclave/pressure cooker, Sterilization of equipment and materials; Choice, preparation and use of disinfectants.

UNIT–IV CULTURE MEDIA (12HRS.)

Culture media –types, preparation, sterilization and storage

UNIT –V INOCULATION, INCUBATION, ENUMERATION (12HRS.)

Serial dilution; Inoculation/Plating techniques – Pour Plate method, Spread Plate method, Streak Plate method; Incubation; Enumeration

REFERENCES:

1. Manual of methods of analysis of foods, FSSAI, Govt. of India, New Delhi.

2. Josephine A. Morello, (2003). *Laboratory manual and workbook in Microbiology*, The McGraw−Hill Companies.

JOURNAL REFERENCES:

1. International Journal of Food Microbiology.

2. Frontiers in Microbiology.

WEB REFERENCES:

1. www.biosci.org.uk/misac

2. www.microbiologyonline.org

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 INTRODUCTION TO MICROBIOLOGICAL LABORATORY TECHNIQUES				
1.1	Safety Procedures and Precautions, General Laboratory Directions	3	Chalk & Talk	Black board
1.2	Good microbiological laboratory practice (GMLP), Spillage management	4	Demonstration	Equipments & apparatus
1.3	Use of equipments, apparatus and	5	Demonstration	Equipments & apparatus

	materials of microbiological lab.			
UNIT -2 MICROSCOPY				
2.1	Principles, construction and mode of operation of microscopes	3	Demonstration & hands on training	Microscope
2.2	Care and handling of microscopes	4	Demonstration & hands on training	Microscope
2.3	Microscopic examination of slide preparation	5	Demonstration & hands on training	Microscope
UNIT -3 STERILIZATION AND DISINFECTANTS				
3.1	Sterilization using the autoclave/pressure cooker	4	Hands on training	Equipments & apparatus
3.2	Sterilization of equipment and materials	4	Hands on training	Equipments & apparatus
3.3	Choice, preparation and use of disinfectants	4	Hands on training	Equipments & apparatus
UNIT -4 CULTURE MEDIA				
4.1	Types & preparation of Culture media	6	Hands on training	Equipments & apparatus

4.2	Sterilization and storage of culture media	6	Hands on training	Equipments & apparatus
UNIT -5 INOCULATION, INCUBATION, ENUMERATION				
5.1	Serial dilution	2	Hands on training	Equipments & apparatus
5.2	Pour Plate method	2	Hands on training	Equipments & apparatus
5.3	Spread Plate method	3	Hands on training	Equipments & apparatus
5.4	Streak Plate method	3	Hands on training	Equipments & apparatus
5.5	Incubation; Enumeration	2	Hands on training	Equipments & apparatus

EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	**C2**	**C3**	**C4**	**C5**	**CIA**	**ESE**	**Total**
10	**10**	**10**	**5**	**5**	**40**	**60**	**100**

C1 – Internal Test - 1

C2 – Internal Test - 2

C3 – Model Practical Exam

C4 – Record

C5 – Non – Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Describe the microbiological laboratory techniques	K2	PSO11, PSO13
CO 2	Demonstrate the working principles of microscope	K2	PSO11, PSO13
CO 3	Select the optimum sterilization and disinfection techniques	K3	PSO11, PSO13
CO 4	Analyse the preparation and storage of culture media	K4	PSO11, PSO13
CO5	Choose the different enumeration techniques	K5	PSO11, PSO13

Mapping of COs with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	1	1	1	1	1	1	1	1	1	1	3	1	2	1	1
CO2	1	1	1	1	1	1	1	1	1	1	3	1	2	1	2
CO3	1	1	1	1	1	1	1	1	1	1	3	1	2	1	1

CO4	1	1	1	1	1	1	1	1	1	1	3	1	2	1	2
CO5	1	1	1	1	1	1	1	1	1	1	3	1	2	1	1

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	3	2	2	1
CO2	3	2	2	2
CO3	1	1	1	1
CO4	3	2	1	3
CO5	2	2	2	3

Note: Strongly Correlated – 3 ¨ Moderately Correlated – 2

¨ Weakly Correlated -1

COURSE DESIGNER:

1. Mrs. C.Helen

Forwarded By

(Dr.Vasantha Esther Rani)

100% SKILL DEVELOPMENT

II M.Sc.,HUMAN NUTRITION AND NUTRACEUTICALS

SEMESTER –IV

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
PSNN	19PG4N20	Nutrient Analysis Lab	Lab	4	2

COURSE DESCRIPTION

The practical course provides hands –on training in the use of hi-tech precision equipments to identify and analyze the various nutrients present in the food.

COURSE OBJECTIVES

- To enable the students to get practical experience in the laboratory
- To develop the skill to undertake research work and carryout experiments in nutrition individually

UNITS

UNIT –I ESTIMATION OF CALORIES AND MOISTURE (8 HRS.)

- Calories in Cereals
- Moisture in foods

UNIT –II ESTIMATION OF ACIDITY AND PROTEIN (12 HRS.)

- Acidity in Fruits
- Protein in pulses

UNIT –III ESTIMATION OF FATS (8 HRS.)

- Fats in Nuts
- Fats in Oilseeds

UNIT –IV ESTIMATION OF CRUDE FIBRE (12 HRS.)

- Crude Fibre in Vegetables
- Crude Fibre in Fruits

UNIT –V ESTIMATION OF ASH & MINERALS (20 HRS.)

- Ash in foods
- Calcium in Green leafy Vegetables
- Calcium in Millets
- Phosphorus
- Iron

REFERENCES:

1. Berwal. J.S,.Grewal R.B,.Kapoor C.M &.Garg M.R (2004).*Practical Methods in Food Analysis*. Agrotech Publishing Academy, Udaipur.
2. Horwitz W.,(2000).*Official Methods of Analysis of AOAC International*.AOAC International publishers,Rockville,Mary Land.
3. Jayaraman J. (1996), *Laboratory Manual in Biochemistry*. New Age International Ltd. New Delhi.
4. Ranganna S. **(**1986), *Hand Book of Analysis and Quality Control for fruits and Vegetable Products*. Tata Mc Graw –Hill Publishing Company Limited, New Delhi.
5. Sadasivam S. & Manickam A. **(**1991), *Biochemical Methods*. New Age International Pvt. Ltd.,New Delhi.
6. Swaminathan.G & George.M (2002). *Laboratory Chemical Methods in Food Analysis*.Margham Publications, Chennai.
7. Yeshajahu Pomeranz & Clifton E. Meloan,(2004), *Food Analysis –Theory and Practice*. CBS Publishers and Distributors, New Delhi.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 ESTIMATION OF CALORIES AND MOISTURE				
1.1	Calories in Cereals Moisture in foods	8	Chalk & Talk, Demonstration	Glasswares, Instruments
UNIT -2 ESTIMATION OF ACIDITY AND PROTEIN				
2.1	Acidity in Fruits Protein in pulses	12	Chalk & Talk, Demonstration	Glasswares, Equipments
UNIT -3 ESTIMATION OF FATS				
3.1	Fats in Nuts Fats in Oilseeds	8	Chalk & Talk, Demonstration	Glasswares Apparatus
UNIT -4 ESTIMATION OF CRUDE FIBRE				
4.1	Crude Fibre in Vegetables Crude Fibre in Fruits	12	Chalk & Talk, Demonstration	Glasswares Equipments
UNIT -5 ESTIMATION OF ASH & MINERALS				
5.1	Ash in foods Calcium in Green leafy Vegetables Calcium in Millets Phosphorus Iron	20	Chalk & Talk, Demonstration	Glasswares, Instruments

EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
10	10	10	5	5	40	60	100

C1 – Internal Test - 1

C2 – Internal Test - 2

C3 – Model Practical Exam

C4 – Record

C5 – Non - Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Estimate the calories and moisture content present in foods.	K2	PSO2& PSO8
CO 2	Explain the estimation of acidity and protein content in foods.	K2	PSO2& PSO8
CO 3	Calculate the amount of fat present in Nuts and oilseeds.	K3	PSO7 &PSO8
CO 4	Analyze the amount of crude fibre present in fruits and vegetables.	K4	PSO7 & PSO8
CO5	Determine the Ash and Mineral content present in foods.	K5	PSO2 &PSO8

Mapping of COs with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	1	3	1	1	1	1	1	3	1	1	2	1	2	1	1
CO2	1	3	1	1	1	1	1	3	1	1	2	1	2	1	2
CO3	1	1	1	1	1	1	3	3	1	1	2	1	2	1	1
CO4	1	1	1	1	1	1	3	3	1	1	2	1	2	1	2
CO5	1	3	1	1	1	1	1	3	1	1	2	1	2	1	1

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	3	2	2	1
CO2	3	2	2	2
CO3	1	1	1	1
CO4	3	2	1	3
CO5	2	2	2	3

Note: Strongly Correlated – 3 ¨ Moderately Correlated – 2

¨ Weakly Correlated -1

COURSE DESIGNER:

1. **Dr. K.KARTHIGA**
2. **Mrs. D.MOUNA**

Forwarded By

(Dr.Vasantha Esther Rani)

I M.Sc. HUMAN NUTRITION AND NUTRACEUTICALS

SEMESTER–II

For those who joined in 2021 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSNN	21PG2NSL1	GERIATRIC SCIENCE	SELF LEARNING	-	2

COURSE DESCRIPTION:

This course analyzes the social aspects of aging in by giving an introduction to the field of gerontology, its history, theories, and research methods.

COURSE OBJECTIVES:

To make the students aware of the problems of the old people in the present-day situation and its sociological implications.

To equip the learners to explores the sociological aspects of aging.

UNIT –I INTRODUCTION TO SOCIAL GERONTOLOGY

Nature (Self Study) and Scope of Social Gerontology. Theories of Social Gerontology- Activity Theory, Disengagement Theory, Continuity Theory, Age Stratification Theory, Labelling Theory

UNIT –II CHANGES DURING OLD AGE

Physical aging: Changes in body composition, organ systems - Psychological aging: changes in memory and learning- Social aging: Role changes, age norms and role adaptation (Self Study).

UNIT –III GERIATRIC NUTRITION

Definition, Aging Society and Nutrition Epidemiology, Physical and Physiological Changes, Nutritional Assessment

UNIT –IV AGEING & NUTRITION

Nutritional Changes and Requirement, Role of Nutrition in the Prevention of Age-Associated Diseases, Health and Feeding Problems among Elderly, Nutrition Support-Parenteral/ Enteral/ Oral

UNIT –V SUPPORT SYSTEM OF THE ELDERLY

Role of family (Self Study), Government and Non government in the care of elderly, Rights of Elderly – Care and maintenance, Indian Laws and welfare schemes related to Elderly. Palliative Care, Dying and Death, Bereavement

TEXT BOOK:

1. Krishanandsanwal, Fundamentals of Gerontology Akansha publishing house, New Delhi, 2008.

REFERENCES:

1. Simone de Behavior, Old Age, Cox and Wyman Ltd. London, 1972.

2. S. IrudayaRajan, U.S. Mishra and P. Sankarasarma, India's Elderly Burden or Challenge, Sage publications, New Delhi, 1999.

3. L. Thara Bhai, Aging Indian, Perspective Decent Books, New Delhi, 2002.

4. P.V.Ramamurti, Handbook of Indian gerontology, D. Jamuna Serialspublications,New Delhi, 2004.

5. K. Kapoor, India's Elderly, satwanti Kapoor amittal publications, New Delhi, 2004.

6. R. K. A. Subrahmanya, Social Security for the elderly, shiprapublications ,2005.

7. D. P. Saxena, Sociology of Aging, Concept publishing company, New Delhi,2006.

8. Asiya Nasreen. "Urban elderly – coping strategies and societal responses", Concept publishing company, New Delhi,2009.

9. Shills, M.E and Young, M.E, (1996), Modem Nutrition in Health and Disease. Varghese Company (Indian).

10. John E. Morley and David R. Thomas, (2007), Geriatric Nutrition. CRC Press Taylor & Francis Group.

OPEN EDUCATIONAL RESOURCES:

https://www.allpsychologycareers.com/topics/social-gerontology.html

https://www.encyclopedia.com/medicine/encyclopedias-almanacs-

transcripts-and-maps/geriatric-nutrition-0

https://www.bestvalueschools.com/faq/what-is-social-gerontology

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

COURSE OUTCOMES (CO)

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Recall the nature, scope and theories of Social Gerontology	K1	PSO1& PSO2
CO 2	Classify the physical, psychological and social changes of aging	K2	PSO3
CO 3	Interpret the geriatric nutrition and its importance	K3	PSO5

CO 4	Analyze the nutritional change and requirement of old age people	K4	PSO5
CO 5	Analyse the rights and care for old age people provided by government	K4	PSO4

Mapping of C0s with PSOs

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	PSO 11	PSO 12	PSO 13	PSO 14	PSO 15
CO1	2	2	2	3	1	3	1	1	2	1	1	1	2	1	1
CO2	2	2	2	3	1	3	1	1	2	1	1	1	2	1	1
CO3	2	2	2	3	1	3	1	1	2	1	1	1	2	1	1
CO4	2	2	2	3	1	3	1	1	2	1	1	1	2	1	1
CO5	2	2	2	3	1	3	1	1	2	1	1	1	2	1	1

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
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CO4	3	3	2	1
CO5	3	3	2	1

Note: Strongly Correlated – 3 ¨ Moderately Correlated – 2

Weakly Correlated -1

COURSE DESIGNERS:

Ms.P. Magdalene Virjini

Forwarded By

(Dr. Vasantha Esther Rani)