V.V.VANNIAPERUMAL COLLEGE FOR WOMEN
(Belonging to Virudhunagar Hindu Nadars)
An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai
Reaccredited with 'A++' Grade (4th Cycle) by NAAC
VIRUDHUNAGAR
Quality Education with Wisdom and Values

OUTCOME BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM REGULATIONS AND SYLLABUS
(with effect from Academic Year 2023 - 2024)

V.V.Vanniaperumal College for Women, Virudhunagar, established in 1962, offers 13 UG Programmes (Aided), 15 UG Programmes (SF), 15 PG Programmes and 6 Ph.D. Programmes. The curricula for all these Programmes, except Ph.D. Programmes, have been framed as per the guidelines given by the and University Grants Commission (UGC) & Tamil Nadu State Council for Higher Education (TANSCHE) under Choice Based Credit System (CBCS) and the guidelines for Outcome Based Education (OBE).

The Departments of Commerce, English, History, Mathematics, Biochemistry and Tamil upgraded as Research Centres offer Ph.D. Programmes as per the norms and regulations of Madurai Kamaraj University, Madurai and do not come under the purview of CBCS.

A. CHOICE BASED CREDIT SYSTEM (CBCS)

The CBCS provides an opportunity for the students to choose courses from the prescribed Courses. The CBCS is followed as per the guidelines formulated by the UGC. The performance of students is evaluated based on the uniform grading system. Computation of the Cumulative Grade Point Average (CGPA) is made to ensure uniformity in evaluation system.

List of Programmes in which CBCS/Elective Course System is implemented

UG PROGRAMMES

Arts & Humanities	:	History (E.M. & T.M.), English, Tamil
Physical & Life Sciences	:	Mathematics, Zoology, Chemistry, Physics, Biochemistry, Home Science - Nutrition and Dietetics, Costume Design and Fashion, Microbiology, Biotechnology, Computer Science, Information Technology, Data Science, Computer Applications and Computer Applications - Graphic Design
Commerce & Management	:	Commerce, Commerce (Computer Applications), Commerce (Professional Accounting), Business Administration

PG PROGRAMMES

Arts & Humanities	:	History, English, Tamil
Physical & Life Sciences	:	Mathematics, Physics, Chemistry, Zoology, Biochemistry, Home Science - Nutrition and Dietetics, Biotechnology, Computer Science (Data Science) and Computer Applications (MCA) *
Commerce & Management	:	Commerce, Business Administration (MBA) *

* AICTE approved Programmes

OUTLINE OF CHOICE BASED CREDIT SYSTEM- PG

1. Core Courses
2. Elective Courses
   - Discipline Specific Elective Courses (DSEC)
   - Generic Elective Courses
   - Non-Major Elective Course (NMEC)
3. Skill Enhancement Courses
4. Self Study Course (Online)
5. Extension Activity
6. Extra Credit Courses (Optional)

List of Non Major Elective Courses (NME)
(2023-2024 onwards)

PG PROGRAMMES

Name of the Course	Course Code	Department
Tourism in Tamilnadu	23PHIN31	History
Functional English	23PENN31	English
தமிழும் பிற துறைகளும்	23PTAN31	Tamil
Taxation Concepts and Assessment	23PCON31	Commerce
Entrepreneurship	23PBAN31	Business Administration
Statistics for Life and Social Sciences	23PMTN31	Mathematics
Advanced Chemistry for Competitive Examination	23PCHN31	Chemistry
Nutrition and Health	23PHSN31	Home Science - Nutrition and Dietetics
Molecular Basis of Diseases and Therapeutic Strategies	23PBCN31	Biochemistry
Web Programming	23PCSN31	Computer Science
Fundamentals of Web Design	23PCAN31	Computer Applications

B. OUTCOME BASED EDUCATION (OBE) FRAMEWORK

The core philosophy of Outcome Based Education rests in employing a student - centric learning approach to measure the performance of students based on a set of pre- determined outcomes. The significant advantage of OBE is that it enables a revamp of the curriculum based on the learning outcomes, upgrade of academic resources, quality enhancement in research and integration of technology in the teaching-learning process. It also helps in bringing clarity among students as to what is expected of them after completion of the Programme in general and the Course in particular. The OBE directs the teachers to channelise their teaching methodologies and evaluation strategies to attain the Programme Educational Objectives (PEOs) and fulfill the Vision and Mission of the Institution.

Vision of the Institution

The founding vision of the Institution is to impart Quality Education to the rural womenfolk and to empower them with knowledge and leadership quality.

Mission of the Institution

The mission of the Institution is to impart liberal education committed to quality and excellence. Its quest is to mould learners into globally competent individuals instilling in them life-oriented skills, personal integrity, leadership qualities and service mindedness.

B.1 Programme Educational Objectives, Programme Outcomes and Programme Specific Outcomes

It is imperative for the Institution to set the Programme Educational Objectives (PEOs), Programme Outcomes (POs) and Course Outcomes (COs), consistent with its Vision and Mission statements. The PEOs and the POs should be driven by the Mission of the Institution and should provide distinctive paths to achieve the stated goals. The PEOs for each Programme have to fulfill the Vision and Mission of the Department offering the Programme.

Vision of the Department of M.Sc. HOME SCIENCE - NUTRITION AND DIETETICS

To develop scientific, technical, research and entrepreneurial skills to uphold professionalism and ethics for bringing out successful professionals and contribute for the betterment of family and community in the contemporary world.

Mission of the Department of M.Sc. HOME SCIENCE - NUTRITION AND DIETETICS

To empower the students by providing quality education through scientific aspects of Home Science and ensure health for the family, community and nation.

Programme Educational Objectives (PEOs)

PEOs are broad statements that describe the career and professional achievements that the Programme is preparing the graduates to achieve within the first few years after graduation. PEOs are framed for each Programme and should be consistent with the Mission of the Institution.

Programme Educational Objectives (PEOs) of M.Sc.Home Science and Nutrition and Dietetics Programme The Students will be able to

- become health professionals in hospitals, fit ness centres, food service industries, teachers in educational institution or to be self – employed, to enhance the quality of life of the people.
- advance in the standards of academia through research which contribute the wellbeing of the people.
- follow the professio nal and ethical standards in their concerned fields and work with social concern, in promoting the health status of thefamily and community

Key Components of the Mission Statement	PEO1	PEO2	PEO3
empower the students	√	√	√
providing quality education through scientific aspects of food science, nutrition and dietetics	√	√	√
ensure health for the family, community and nation.	√	√	√

B.1.1 Programme Outcomes (POs)

POs shall be based on Graduate Attributes (GAs) of the Programme. The GAs are the attributes expected of a graduate from a Programme in terms of knowledge, skills, attitude and values. The Graduate Attributes include Disciplinary Knowledge,

Communication Skills, Critical Thinking, Problem Solving, Analytical Reasoning, Research Related Skills, Co-operation/Team Work, Scientific Reasoning, Reflective Thinking, Information/Digital Literacy, Multicultural Competence, Moral and Ethical Awareness/Reasoning, Leadership Qualities and Lifelong Learning.

On successful completion of the Programme, the students will be able to

1 apply their in-depth domain knowledge and practical skills in interdisciplinary fields for research-based endeavours, employment and entrepreneurship development. (*Disciplinary Knowledge)*

2 communicate proficiently and confidently with the ability to present complex ideas both in spoken and written forms in a concise manner to assorted groups. (*Communication Skills*)

3 identify, formulate and solve problems in a consistent and systematic way with updated skills using modern tools and techniques. (*Scientific Reasoning and Problem Solving*)

4 analyze the data, synthesis the findings and provide valid conclusion by critical evaluation of theories, policies and practices for the fulfillment of the local, national, regional and global developmental needs. (*Critical Thinking and Analytical Reasoning*)

5 explore and evaluate globally competent research methodologies to apply appropriately in interdisciplinary research; Develop and sustain the research capabilities to meet the emerging needs for the welfare of the society. (*Research Related Skills*)

6 use ICT to mould themselves for lifelong learning activities to face career challenges in the changing environment. (*Digital Literacy, Self - directed and Lifelong Learning*)

7 self-manage and function efficiently as a member or a leader in diverse teams in a multicultural society for nation building. (*Co-operation/Team Work and Multicultural Competence*)

8 uphold the imbibed ethical and moral values in personal, professional and social life for sustainable environment. (*Moral and Ethical Awareness*)

B.1.2 Programme Specific Outcomes (PSOs)

Based on the Programme Outcomes, Programme Specific Outcomes are framed for each PG Programme**.** Programme Specific Outcomes denote what the students would be able to do at the time of graduation. They are Programme-specific and it is mandator that each PO should be mapped to the respective PSO.

On Successful completion of M.Sc. Home Science - Nutrition and Dietetics Programme, the students will be able to

PO 1: *Disciplinary Knowledge*

PSO 1.a: apply professional knowledge and entrepreneurial skills involved in the various branches of Home Science for empowering themselves and the community.

PSO 1.b: apply the obtained knowledge and skills efficiently to pursue research activities and to grab more career opportunities in educational institutions, hospitals, healthcare and service industries, food service institutions, entreprises, government and non-government organizations.

PO2: *Communication Skills*

PSO 2: interact productively and transmit technical information in a clear and concise manner to the professionals, diverse workforce and to the public by using a variety of communication strategies.

PO3: *Scientific Reasoning and Problem Solving*

PSO 3a: synthesis the scientific and systematic thinking with their hands on experience in cookery, diet planning, diet counseling, food analysis, food preservation, food safety and quality control, bakery and confectionery, textiles and clothing, resource management, interior decoration and housekeeping to promote healthy environment in the community through various outreach programmes.

PSO 3b :apply modern techniques, updated resources and advanced technological tools to meet the needs and challenges of the contemporary society for promoting the holistic welfare of the family, community and the nation.

PO4: *Critical thinking and Analytical Reasoning*

PSO 4: analyse critically the prevailing issues in global nutrition in their venture to find out valid solutions through experimentation and research for the welfare of the people.

PO5: *Research Related Skills*

PSO 5: adopt appropriate statistical tools to analyze the data that enhances interdisciplinary research activities and find appropriate remedies for the existing health issues in the society and handling risks in enterprises.

PO6: *Digital Literacy, Self - directed and Lifelong learning*

PSO 6: develop higher order thinking skills and professionalism using the ICT to nurture the capability for lifelong self-learning

PO7: *Cooperation/Team Work and Multicultural Competence*

PSO 7: build the interpersonal qualities of coordination, leadership, time management and team spirit through their group project, industrial visit and internship that enable them to become responsible citizens which help to uplift their career to strengthen the nation

PO8: *Moral and Ethical awareness*

PSO 8 practice the inculcated human values, constitutional values, moral values and ethics in their personal, professional and social life for the sustainable environment.

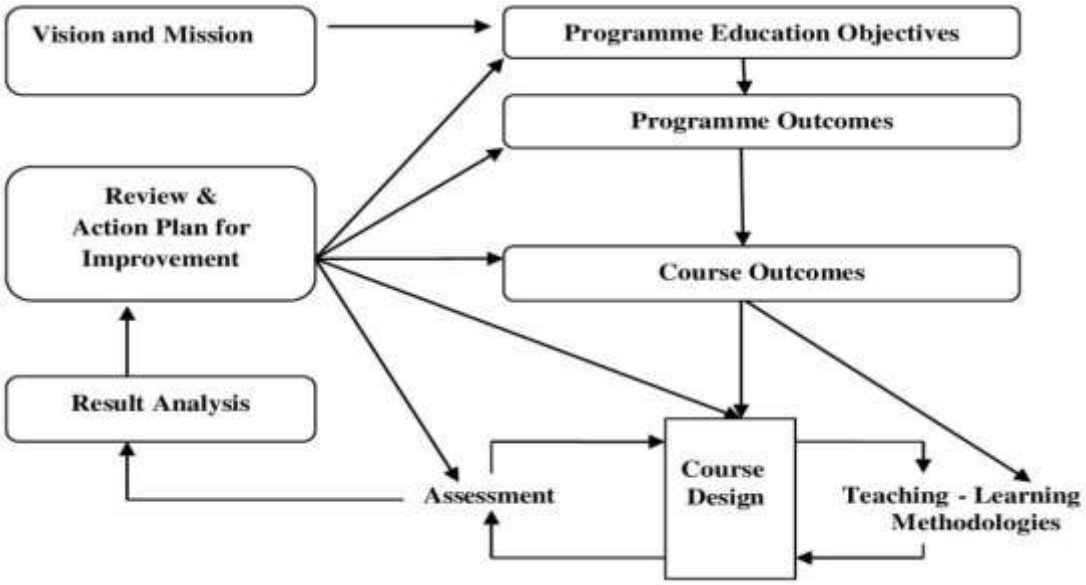
PO-PEO Mapping Matrix

Attainment of PEOs can be measured by a PO-PEO matrix. PEOs should evolve through constant feedback from alumnae, students, industry, management, *etc*. It is mandatory that each PEO should be mapped to at least one of the Pos.

PEOs / POs/PSOs	PEO1	PEO2	PEO3
PO1/PSO1	✓	✓	✓
PO2/PSO2	✓	✓	✓
PO3/PSO3	✓	✓	✓
PO4/PSO4	✓	✓	-
PO5/PSO5	-	✓	✓
PO6/PSO6	✓	✓	✓
PO7/PSO7	✓	✓	✓
PO8/PSO8	✓	✓	-

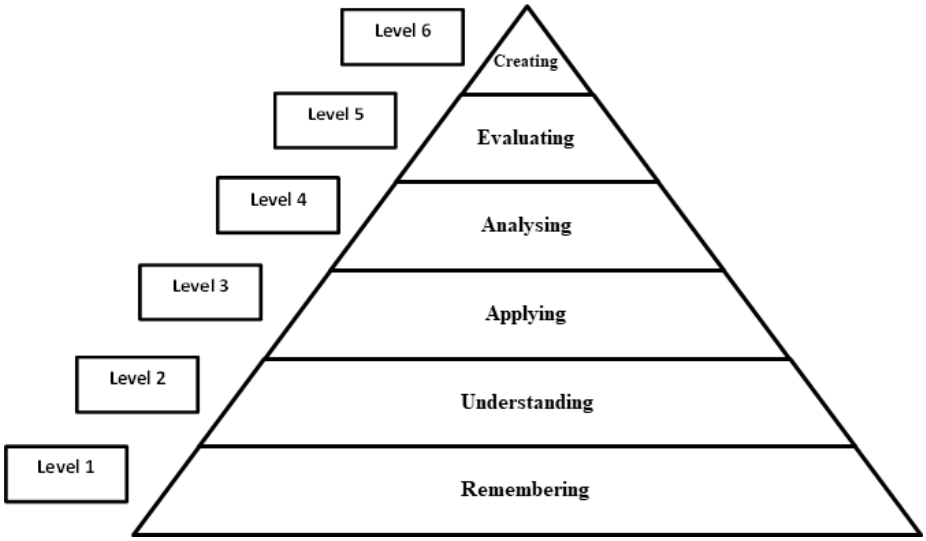
B.1.3 Course Outcomes (COs)

Course Outcomes are narrow statements restricted to the course contents given in five units. Course Outcomes describe what students would be capable of, after learning the contents of the Course. They reflect the level of knowledge gained, skills acquired and attributes developed by the students after learning of Course contents. COs are measurable, attainable and manageable in number. COs contribute to attain POs in such a way that each CO addresses at least one of the POs and also each PO is reasonably addressed by adequate number of COs.



It is important to determine the methods of assessment. A comprehensiveassessment strategy may be outlined using the revised Bloom's Taxonomy levels.

BLOOM'S TAXONOMY



CO - PO Mapping of Courses

After framing the CO statements, the COs framed for each course is mapped with POs based on the relationship that exists between them. The COs which are not related to any of the POs is indicated with (-), signifying Nil. Measurement Mapping is based on Four Points Scale [High (H), Medium (M), Low (L) and Nil (-)]. For calculating weightedpercentage of contribution of each Course in the attainment of the respective POs, the weights assigned for H, M and L are 3, 2 and 1 respectively.

CO-PO/PSO Mapping Table (Course Articulation Matrix)

PO/PSOs / COs	PO1/ PSO1	PO2/ PSO2	PO3/ PSO3	PO4/ PSO4	PO5/ PSO5	PO6/ PSO6	PO7/ PSO7	PO8/ PSO8
CO1								
CO2								
CO3								
CO4								
CO5								

ELIGIBILITY FOR ADMISSION

The candidate should have passed B.Sc. Home Science - Nutrition and Dietetics in any recognized University

DURATION OF THE PROGRAMME

The candidates shall undergo the prescribed Programme of study for a period oftwo academic years (four semesters).

MEDIUM OF INSTRUCTION

English

B.2 EVALUATION SCHEME

Components	Internal Assessment Marks	External Examination Marks	Total Marks
Theory	25	75	**100**

B.2.1 Core Courses, Elective Courses (Discipline Specific Elective Courses, Generic Elective Courses & Non Major Elective Courses

INTERNAL ASSESSMENT
Distribution of Marks

Theory

Mode of Evaluation	Marks
Periodic Test	20
Assignment	5
Total	**25**

Three Periodic Tests - Average of the best two will be considered
Two Assignments - Better of the two will be considered

Practical

Mode of Evaluation		Marks
Practical Test	:	30
Record Performance	:	10
Total	**:**	**40**

Practical Test - Average of the two Practical Tests will be considered

Performance - Attendance and Record

Question Pattern for Periodic Test **Duration: 2 Hours**

Section	Q. No.	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A	1 - 5	Multiple Choice Questions	5	5	1	5
B	6-9	Internal Choice – Either… or Type	4	4	5	20
C	10 - 11	Internal Choice – Either…. or Type	2	2	10	20
					Total	**45***

*The total marks obtained in the Periodic Test will be calculated for 20 marks

Summative Examination

External Assessment

Distribution of Marks

Mode of Evaluation		Marks
Summative Examination	**:**	60
Seminar Presentation	**:**	15
Total	**:**	**75**

SUMMATIVE EXAMINATION

Question Pattern **Duration: 3 Hours**

Section	Q. No.	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A	1 - 5	Multiple Choice Questions	5	5	1	5
B	6 - 10	Internal Choice - Either ….or Type	5	5	5	25
C	11 - 13	Internal Choice - Either …or Type	3	3	10	30
					Total	**60**

B.2.2 Project

Individual Project is compulsory for II PG Students in IV Semester.

Distribution of Marks

Mode of Evaluation		Marks
Internal Assessment	:	40
External Examination	:	60
Total	**:**	**100**

Internal Assessment: Pre-submission Presentation - 10 Marks

Review Report - 20 Marks

One Open Online Course related to the Project - 10 Marks

External Examination: Project Report - 40 Marks

Viva Voce - 20 Marks

B. 2.3 SKILL ENHANCEMENT COURSES

INTERNAL ASSESSMENT

Distribution of Marks

Theory

Mode of Evaluation		Marks
Periodic Test	:	20
Assignment	:	5
Total	**:**	**25**

Three Periodic Tests - Average of the best two will be considered

Two Assignments - Better of the two will be considered

Practical

Mode of Evaluation		Marks
Practical Test	:	30
Record Performance	:	10
Total	**:**	**40**

Practical Test - Average of the two Practical Tests will be considered

Performance - Attendance and Record

Question Pattern for Periodic Test **Duration: 2 Hours**

Section	Q. No.	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A	1 - 4	Internal Choice – Either… or Type	4	4	5	20
B	5	Internal Choice – Either… or Type	1	1	10	10
					Total	**30***

*The total marks obtained in the Periodic Test will be calculated for 20 marks

SUMMATIVE EXAMINATION

External Assessment

Distribution of Marks

Mode of Evaluation		Marks
Seminar Paper		10
Seminar Presentation	:	15
Summative Examination	:	50
Total	**:**	**75**

SUMMATIVE EXAMINATION

Question Pattern **Duration: 3 Hours**

Section	Q. No.	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A	1 - 5	Multiple Choice Questions	5	5	1	5
B	6 - 10	Internal Choice - Either ….or Type	5	5	5	25
C	11 - 12	Internal Choice - Either …or Type	2	2	10	20
					Total	**50**

B. 2.3.1 Skill Enhancement Course - Professional Competency Skill

Types of Question – Multiple Choice Questions Only

INTERNAL ASSESSMENT

Distribution of Marks

Mode of Evaluation		Marks
Periodic Test	:	20
Assignment	:	5
Total	**:**	**25**

Three Periodic Tests - Average of the best two will be considered

Two Assignments - Better of the two will be considered

Question Pattern for Periodic Test **Duration: 2 Hours**

Section	Q. No.	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A	1 - 5	Multiple Choice Questions	5	5	1	5
B	6-9	Internal Choice – Either… or Type	4	4	5	20
C	10 - 11	Internal Choice – Either…. or Type	2	2	10	20
	Total					**45***

*The total marks obtained in the Periodic Test will be calculated for 20 marks

SUMMATIVE EXAMINATION

External Assessment

Distribution of Marks

Mode of Evaluation		Marks
Summative Examination	:	60
Seminar Presentation	:	15
Total	:	**75**

Summative Examination

Question Pattern **Duration: 3 Hours**

Section	Q. No.	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A	1 - 5	Multiple Choice Questions	5	5	1	5
B	6 - 10	Internal Choice - Either ….or Type	5	5	5	25
C	11 - 13	Internal Choice - Either …or Type	3	3	10	30
					Total	**60**

B.2.4. Self Study - Online Course

Practice for CSIR NET-General Paper –Online
Internal Examination only

- Two Periodic Tests (online) with Multiple Choice Questions will be conducted in III Semester.
- Model Examination will be conducted after two periodic tests.

Distribution of Marks

Mode of Evaluation		Marks
Periodic Test	:	25
Model Examination	:	75
Total	**:**	**100**

Two Periodic Tests - Better of the two will be considered

B.2.5. Extension Activities

Assessment by Internal Examiner only

Distribution of Marks

Mode of Evaluation		**Marks**
Attendance	:	5
Performance	:	10
Report	:	10
Total	**:**	**25***

*The marks obtained will be calculated for 100 marks

B.2.6. EXTRA CREDIT COURSES (OPTIONAL)

2.6.1 Extra Credit Course offered by the Department.

Assessment by Internal Examiner Only (To be conducted along with the III Periodic Test)

Distribution of Marks

Mode of Evaluation		**Marks**
Quiz (Multiple Choice Questions)	:	25
Model Examination	:	75
Total	**:**	**100**

Question Pattern for Model Examination

Section	**Types of Question**	**No. of Questions**	**No. of Questions to be answered**	**Marks for each Question**	**Total Marks**
A Q.No.(1-5)	Internal Choice-Either or Type	5	5	7	35
B Q.No.(6-9)	Internal Choice-Either or Type	4	4	10	40
				Total	**75**

2.6.2 Extra credit Course offered by MOOC (Massive Open Online Course)

- The Courses shall be completed within the first III Semesters of the Programme.
- The allotment of credits is as follows **(Maximum of 15 credits)**

4weeks Course - 1 credit

8 weeks Course - 2 credits

12 weeks Course - 3 credits

ELIGIBILITY FOR THE DEGREE

- The candidate will not be eligible for the Degree without completing the prescribedCourses of study and a minimum of 50% Pass marks in all the Courses.
- No Pass minimum for Internal Assessment for other Courses.
- Pass minimum for External Examination is 27 marks out of 60 marks for Core Courses, Discipline Specific Elective Courses and Non-Major Elective Course.
- Pass minimum for Practice for SET/NET - General Paper is 50 Marks.
- Attendance

➢ The students who have attended the classes for 76 days (85%) and above are permitted to appear for the Summative Examinations without any condition.

➢ The students who have only 60-75days (66% -84%) of attendance are permitted to appear for the Summative Examinations after paying the required fine amount and fulfilling other conditions according to the respective cases.

➢ The students who have attended the classes for 59 days and less – upto 45 days (50% - 65%) can appear for the Summative Examinations only after getting special permission from the Principal.

➢ The students who have attended the classes for 44 days or less (<50%) cannot appear for the Summative Examinations and have to repeat the whole semester.

➢ These rules are applicable to UG, PG and M.Phil. Programmes and come into effect from 2020-2021 onwards.

➢ For Certificate, Diploma, Advanced Diploma and Post Graduate Diploma Programmes, the students require 75% of attendance to appear for the Theory/Practical Examinations.

B.3 ASSESSMENT MANAGEMENT PLAN

An Assessment Management Plan that details the assessment strategy both at the Programme and the Course levels is prepared. The continuous assessment is implemented using an assessment rubric to interpret and grade students.

B.3.1 Assessment Process for CO Attainment

Assessment is one or more processes carried out by the institution that identify, collect and prepare data to evaluate the achievement of Course Outcomes and Programme Outcomes. Course Outcome is evaluated based on the performance of students in the Continuous Internal Assessments and in End Semester Examination of a course. Target levels of attainment shall be fixed by the Course teacher and Heads of therespective departments.

Direct Assessment (Rubric based) - Conventional assessment tools such as Term Test, Assignment, Quiz and End Semester Summative Examination are used.

Indirect Assessment - Done through Course Exit Survey.

CO Assessment Rubrics

For the evaluation and assessment of COs and POs, rubrics are used. Internal assessment contributes 40% and End Semester assessment contributes 60% to the total attainment of a CO for the theory courses. For the practical courses, internal assessment contributes 50% and Semester assessment contributes 50% to the total attainment of a CO. Once the Course Outcome is measured, the PO can be measured using a CO-PO matrix.

CO Attainment

Direct CO Attainment

Course Outcomes of all courses are assessed and the CO - wise marks obtained by all the students are recorded for all the assessment tools. The respective CO attainment level is evaluated based on set attainment rubrics.

Target Setting for Assessment Method

For setting up the target of internal assessment tools, 55% of the maximum mark is fixed as target. For setting up the target of End Semester Examination, the averagemark of the class shall be set as target.

Formula for Attainment for each CO

Attainment = Percentage of students who have scored more than the target marks

$$\text{Percentage of Attainment} = \frac{\text{Number of Students who Scored more than the Target}}{\text{Total Number of Students}} \times 100$$

Attainment Levels of COs

Assessment Methods	**Attainment Levels**	
Internal Assessment	Level 1	50% of students scoring more than set target marks in Internal Assessment tools
	Level 2	55% of students scoring more than set target marks in Internal Assessment tools
	Level 3	60% of students scoring more than set target marks in internal Assessment tools
End Semester Summative Examination	Level 1	50% of students scoring more than average marks in End Semester Summative Examination
	Level 2	55% of students scoring more than average marks in End Semester Summative Examination
	Level 3	60% of students scoring more than average marks in End Semester Summative Examination

Indirect CO Attainment

At the end of each Course, an exit survey is conducted to collect the opinion of the students on attainment of Course Outcomes. A questionnaire is designed to reflect the views of the students about the Course Outcomes.

Overall CO Attainment=75% of Direct CO Attainment + 25 % of Indirect CO Attainment

In each Course, the level of attainment of each CO is compared with the predefined targets. If the target is not reached, the Course teacher takes necessary steps for the improvement to reach the target.

For continuous improvement, if the target is reached, the Course teacher can set the target as a value greater than the CO attainment of the previous year.

B.3.2 Assessment Process for Overall PO Attainment

With the help of CO - PO mapping, the PO attainment is calculated. PO assessment is done by giving 75% weightage to direct assessment and 25% weightage to indirect assessment. Direct assessment is based on CO attainment, where 75% weightage is given to attainment through End Semester examination and 25 % weightage is given to attainment through internal assessments. Indirect assessment is done through Graduate Exit Survey and participation of students in Co-curricular/Extra-curricular activities.

PO Assessment Tools

Mode of Assessment	Assessment Tool	Description
Direct Attainment (Weightage -75%)	CO Assessment	This is computed from the calculated CO Attainment value for each Course.
Indirect Attainment (Weightage - 25%)	Graduate Exit Survey 10%	At the end of the Programme, Graduate Exit Survey is collected from the graduates and it gives the opinion of the graduates on attainment of Programme Outcomes.
	Co-curricular / Extra-curricular activities 15%	For participation in Co-curricular/Extra-curricular activities during the period of their study.

Programme Articulation Matrix (PAM)

Course Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
Average Direct PO Attainment									
Direct PO Attainment in percentage									

Indirect Attainment of POs for all Courses

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
Graduate Exit Survey								
Indirect PO Attainment								

Attainments of POs for all Courses

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
Direct Attainment(Weightage - 75%)								
Indirect Attainment(Weightage - 25%)								
Overall PO Attainment								

Overall PO Attainment= 75% of Direct PO Attainment +
25% of Indirect PO Attainment (Graduate Exit Survey & Participation in Co- curricular andExtra-curricular Activities)

Expected Level of Attainment for each of the Programme Outcomes

POs	Level of Attainment
Attainment Value ≥70%	Excellent
60% ≤ Attainment Value < 70%	Very Good
50% ≤ Attainment Value < 60%	Good
40% ≤ Attainment Value < 50%	Satisfactory
Attainment Value <40%	Not Satisfactory

Level of PO Attainment

Graduation Batch	Overall PO Attainment(in percentage)	Whether Expected Level ofPO is Achieved? (Yes/No)

B.3.3 Assessment Process for PEOs

The curriculum is designed so that all the courses contribute to the achievement of PEOs. The attainment of PEOs is measured after 3 years of completion of the Programme only through Indirect methods.

Target for PEO Attainment

Assessment Criteria	Target (UG)	Target (PG)
Record of Employment	15% of the class strength	30 % of the class strength
Progression to Higher Education	50% of the class strength	5 % of the class strength
Record of Entrepreneurship	2 % of the class strength	5 % of the class strength

Attainment of PEOs

Assessment Criteria & Tool	Weightage
Record of Employment	10
Progression to Higher Education	20
Record of Entrepreneurship	10
Feedback from Alumnae	30
Feedback from Parents	10
Feedback from Employers	20
Total Attainment	**100**

$$\text{Percentage of PEO Attainment from Employment} = \frac{\text{Number of Students who have got Employment}}{\text{Target}} \times 100$$

$$\text{Percentage of PEO Attainment from Higher Education} = \frac{\text{Number of Students who pursue Higher Education}}{\text{Target}} \times 100$$

$$\text{Percentage of PEO Attainment from Entrepreneurship} = \frac{\text{Number of Students who have become Entrepreneurs}}{\text{Target}} \times 100$$

Expected Level of Attainment for each of the Programme Educational Objectives

POs	Level of Attainment
Attainment Value ≥70%	Excellent
60%≤Attainment Value < 70%	Very Good
50%≤Attainment Value < 60%	Good
40%≤Attainment Value < 50%	Satisfactory
Attainment Value <40%	Not Satisfactory

Level of PEO Attainment

Graduation Batch	Overall PEO Attainment (in percentage)	Whether Expected Level of PEO is Achieved? (Yes/No)

C. PROCESS OF REDEFINING THE PROGRMME EDUCATIONAL OBJECTIVES

The college has always been involving the key stakeholders in collecting information and suggestions with regard to curriculum development and curriculum revision. Based on the information collected, the objectives of the Programme are defined, refined and are inscribed in the form of PEOs. The level of attainment of PEOs defined earlier will be analysed and will identify the need for redefining PEOs. Based on identified changes in terms of curriculum, regulations and PEOs, the administrative system like Board of Studies, Academic Council and Governing Body may recommend appropriate actions. As per the Outcome Based Education Framework implemented from the Academic Year 2020 - 2021, the following are the Programme Structure, the Programme Contents and the Course Contents of M.Sc. Home Science – Nutrition and Dietetics Programme.

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN
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VIRUDHUNAGAR
Quality Education with Wisdom and Values

MASTER OF HOME SCIENCE –NUTRITION AND DIETETICS (7022)

Programme Structure - Allotment of Hours and Credits
For those who join in the Academic Year 2023-2024

Components	Semester				Total Number of Hours (Credits)
	I	II	III	IV	
Core Course	6(5)	6(5)	6 (4)	6 (5)	24 (19)
Core Course	6(5)	6(5)	6 (4)	6 (5)	24 (19)
Core Course	6(5)	6(5)	6 (4)	-	18 (14)
Core Course Practical	6(3)	6(3)	5(3)	-	17 (9)
Project	-	-	-	6 (5)	6(5)
Elective Course (DSEC)	6 (4)	6 (4)	-	6 (5)	18 (13)
Elective Course (NME)	-	-	5 (3)	-	5 (3)
Skill Enhancement course / Professional Competency Skill	-	-	2(2)	6 (3)	8(5)
Self-study Course			0(1)	-	0(1)
Internship			0(2)	-	0(2)
Total	**30 (22)**	**30 (22)**	**30 (23)**	**30 (23)**	**120 (90)**
Extra Credit Course(Optional) - Offered by the Department	-	-	0(2)	-	0(2)
Extra Credit Course(Optional) - MOOC					Limited to a maximum of 15 credits

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VIRUDHUNAGAR

Quality Education with Wisdom and Values

M.Sc. HOME SCIENCE - NUTRITION AND DIETETICS – 7022
PROGRAMME CONTENT

For those who join in the Academic Year 2023- 2024

SEMESTER I

S.No.	Components	Title of the Course	Course Code	Hours Per Week	Credits	Exam. Hours	Marks		
							Int.	Ext.	Total
1.	Core Course -1	Advanced Food Science	23PHSC11	6	5	3	25	75	100
2	Core Course -2	Advanced Human Physiology	23PHSC12	6	5	3	25	75	100
3.	Core Course -3	Macronutrients	23PHSC13	6	5	3	25	75	100
4.	Core Practical - 1	Advanced Food Science Practical	23PHSC11P	6	3	3	40	60	100
5.	Discipline Specific Elective Course - 1	Food Processing and Technology /Instrumentation in Food Analysis / Food Biotechnology	23PHSE11/ 23PHSE12/ 23PHSE13	6	4	3	25	75	100
			Total	**30**	**22**				**500**

SEMESTER II

S.No.	Components	Title of the Course	Course Code	Hours Per Week	Credits	Exam. Hours	Marks		
							Int.	Ext.	Total
1.	Core Course -4	Micronutrients and Dietetics	23PHSC21	6	5	3	25	75	100
2	Core Course -5	Clinical Biochemistry	23PHSC22	6	5	3	25	75	100
3.	Core Course -6	Research Methodology	23PHSC23	6	5	3	25	75	100
4.	Core Course Practical- 2	Clinical Nutrition and Dietetics Practical	23PHSC21P	6	3	3	40	60	100
5.	Discipline Specific Elective Course -2	Composite Home Science / Public Nutrition /Nutrition in Emergencies and Disasters	23PHSE21/ 23PHSE22/ 23PHSE23	6	4	3	25	75	100
			Total	**30**	**22**				**500**

M.Sc. HOME SCIENCE - NUTRITION AND DIETETICS
PROGRAMME CONTENT
SEMESTER III

S.No.	Components	Title of the Course	Course Code	Hours Per Week	Credits	Exam. Hours	Marks		
							Int.	Ext.	Total
1.	Core Course - 7	Advanced Dietetics	23PHSC31	6	4	3	25	75	100
2	Core Course - 8	Performance Nutrition	23PHSC32	6	4	3	25	75	100
3.	Core Course - 9	Food Microbiology	23PHSC33	6	4	3	25	75	100
4.	Core Course Practical - 3	Advanced Dietetics Practical	23PHSC31P	5	3	3	40	60	100
5.	Elective Course -3 (NME)	Nutrition and Health	23PHSN31	5	3	3	25	75	100
6	Skill Enhancement course / Professional Competency Skill	Techniques in Food Analysis Practical	23PHSS31P	2	2	3	40	60	100
7	Self-study Course	Practice for SET/NET General Paper - Online	23PGOL31	-	1	2	100	-	100
8	Internship	Internship - Dietetics	23PHSI31	-	2	-	40	60	100
			Total	**30**	**23**				**800**

9	Extra Credit Course	Scientific Writing and Presentation Skills	23PHSO31	-	2	3	100	-	100

SEMESTER IV

S.No.	Components	Title of the Course	Course Code	Hours Per Week	Credits	Exam. Hours	Marks		
							Int.	Ext.	Total
1.	Core Course -10	Public Health Nutrition	23PHSC41	6	5	3	25	75	100
2	Core Course -11	Advanced Food Service Management	23PHSC42	6	5	3	25	75	100
3.	Core Course -12	Project	23PHSC41PR	6	5	-	40	60	100
4.	DSEC - 3	Food Product Development/Statistics and Computer Applications/ Food Packaging Technology	23PHSE41/ 23PHSE42/ 23PHSE43	6	5	3	25	75	100
5.	Professional Competency Skill - 2	Home Science for Competitive Examinations	23PHSS41	6	3	3	25	75	100
			Total	**30**	**23**				**500**

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M.Sc. Home Science – Nutrition and Dietetics
(2023-2024 onwards)

Semester I	**ADVANCED FOOD SCIENCE**	Hours/Week: 6	
Core Course- 1		Credits: 5	
Course Code **23PHSC11**		Internal 25	External 75

COURSE OUTCOMES

On successful completion of the course the student will be able to

CO1: explain the chemical structure and the properties of the main components in food. [K2]

CO2: write the composition and types of food, food additives and food commodities. [K3]

CO3: find the cooking quality of foods and apply food science knowledge in food industries. [K3]

CO4: analyze the role of food and food additives in food industries. [K4]

CO5: examine the effect of cooking and processing on food components and food commodities and analyze the proper use of food colors and food additives in safe food preparation.[K4]

UNIT I

Properties of food- Food nutrients, solids, solutions and colloids, Solutions-

Physical properties of solutions, classification of foods based on viscosity characteristics. Solutes-chemical properties, Food dispersion: Colloids- Types of colloid and properties of colloids and rheology of food dispersions; Structure, formation and stability of gels, sols, emulsion and foams.

Starch - Sources, Structure and composition of starch; Properties and characteristics of food starches; Modified food starches-Structure and composition, Effect of heat on food starch properties, gluten formation in wheat flour, influencing factors[gluten], gelatinization, gelation and retrogradation, dextrinization and factors affecting gelatinization. (18 Hours)

UNIT II

Proteins-Structure and composition, Classification and properties of proteins; Effect of heat on physio-chemical properties of proteins; Role of proteins in food products; Texturized vegetable protein, protein concentrates.

Enzymes: Classification and its nature; Mechanism of action; Factors influencing enzyme activity; Role of enzymes in food products; Immobilized enzymes and its application in food industries. (18 Hours)

UNIT III

Fats and oil -Structure, composition and properties of fats and oil; storage of fat, characteristics [shortening, plasticity, flavor, retention of moisture, melting point, optical activity, color, specific gravity], Hydrogenation, winterization, flavor reversion, smoking point, Rancidity-Types, Mechanism and prevention; Role of fat/oil in food products; Fat substitutes.

Sugar and sugar products-Types of sugar, Types of granulated sugar, Physical and chemical properties, Sugar products -Types of honey, Jaggery, corn syrup, various forms of sugar used in cookery and Crystallization of sugar. (18 Hours)

UNIT IV

Milk components- water, carbohydrate, milk fat, milk protein, minerals and other components in milk, Physiochemical properties of milk, Effect of physical and chemical factors on milk components [Effect of heat, protein, factors affecting coagulation, casein coagulation, minerals, Non-enzymatic browning], [Effects of acid], Effects of enzymes-renin, fermented and non-fermented milk products

Egg-proteins in Egg, microscopic structure of egg, characteristics [color, size], Nutritional qualities, quality check, functional properties- foaming, factors affecting foam formation.

(18 Hours)

UNIT V

Food additives- Definition, different food additives and Need for food additives. Flavour compounds in vegetables, fruits and spices; Effect of processing on food flavours; Role of colours and flavours in food products.

Sweetners- Properties, Artificial and Natural sweetners and role of sweetners in food industry. (18 Hours)

TEXT BOOKS

1. Srilakshmi B. (2015). *Food Science*.New Age International (P) Ltd. Publishers.
2. S.M. Reddy (2015). *Basic Food science and technology*. New Age International publishers.
3. AvantinaSharma (2017).*Text* book of food science and Technology. CBS Publisheres and distributes ltd. 3rd Edition.
4. Swaminathan A.(2018) . *Handbook of Food and Nutrition*, Bangalore press.
5. Serpil Sahin and ServetGulumSumnu.(2006).*Physical properties of Foods*. Springer publications

REFERENCES

Gerard L. Hasenhuettl , Richard W. Hartel. (2019).Food Emulsifiers and Their Applications.Springer publications. 3rd edition.

Vickie.A. Vaciavik. (2021). Essentials of Food science. Springer publications. 5th edition.

Dr.M.Swaminathan.(2015). Advanced text book of Food and Nutrition. volume-2.Bapco publications.

Eskein.(2012). Biochemistry of Food. Elsievier publications.

Lyn O brienNabors.(2001).Alternative Sweetners. Taylor and Francis publications.

Janet D. Ward and Larry Ward.(2006). Principles of Food Science. Stem Publishers. 4th Edition.

ELEARNING RESOURCES:

www.fao.org www.wfp.org

www.foodrisk.org.

http://www.fsis.usda.gov/

https://www.fda.gov/food

PEDAGOGY:

Lecture, Case study, journal reviewing, Assignments, Group discussion, Power point presentation

Course Code 23PHSC11	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
	PSO 1.a	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO 1	3	3	3	-	-	1	1	2	-	-
CO 2	3	3	2	2	2	2	3	3	-	-
CO 3	3	3	2	2	2	2	3	3	-	-
CO 4	3	3	2	3	3	2	3	3	-	-
CO 5	3	3	2	3	3	3	3	3	-	-

Strong (3) Medium (2) Low (1)

Mrs.S.Balasaraswathi

Dr.D.Vijayarani Mrs.C.Midhuna

Head of the Department **Course Designers**

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M.Sc. Home Science – Nutrition and Dietetics
(2023-2024 onwards)

Semester I	**ADVANCED HUMAN PHYSIOLOGY**	Hours/Week: 6	
Core Course- 2		Credits: 5	
Course Code **23PHSC12**		Internal 25	External 75

COURSE OUTCOMES

On successful completion of the course the student will be able to-

CO1: describe the structure and parts of the cell, glands, vital organs and systems in the human body. [K2]

CO2: identify the functions of cell, glands, vital organs and systems in human body. [K3]

CO3: determine the physiological mechanism, process and formation of various secretions in human organs and systems. [K3]

CO4: classify the types of various physiological systems in human body. [K4]

CO5: analyse the abnormalities found in various organs and systems in the human body by assessing the composition and secretions of various glands. [K4]

UNIT I

Cell - Structure and Function - Transportation across cell membrane - Cell theory and Cycle - Difference between Meiotic and Mitotic cell - Stem cells- types and functions

Tissue - Structure and Function. (18 Hours)

UNIT II

Blood - Composition& Functions - Blood Group – ABO System &Rh factor - Blood Coagulation.

Heart - Structure &Function of Heart and Blood Vessels - Systemic &Pulmonary circulation - Cardiac cycle and Conduction - Heart rate and Cardiac output - ECG - Blood pressure & their regulations. (18 Hours)

UNIT III

Respiratory System - Structure and function - Gas Laws pertaining to Gas Exchange (Meaning only)-Henry's Law of Partial Pressure, Boyle - Mariotte's Law of Volume and Pressure, Dalton's Law of Partial Pressure, Charles's Law of Ideal Gas Equation and Fick's Law of Diffusion - Mechanism of respiration - Circulation and Exchange of respiratory gases. Internal and External Respiration - Chloride shift - Definitions of Lung volumes and Lung capacities - Ventilation and Artificial Respiration.

Immunity - Definition and types Innate and Acquire immunity.

Endocrine System - Hormones and its type - Syndromes resulting from hypo and hyperactivity of Pituitary, Thyroid, Adrenals and Pancreas. (18 Hours)

UNIT IV

Gastrointestinal System - Structure and function of GI tract and its accessory organs - Digestion and absorption of Carbohydrates, Proteins and Fats.

Reproductive System - Role of hormones in reproduction and Lactation - Menstrual Cycle and Menopause - Invitro (I V) fertilization - Spermatogenesis. (18 Hours)

UNIT V

NERVOUS SYSTEM - Structure and Function of Neuron. Afferent and Efferent Nerves - Conduction of Nerve Impulse- Synapses, Neurotransmitters, Summation and Action Potential - Sympathetic and Parasympathetic nervous System - Cerebrospinal fluid (CSF) – composition and function - Blood-brain barrier (BBB) - Electroencephalogram (EEG)

EXCRETORY SYSTEMS

Renal system - Organs in the Urinary System - Structure and functions of Nephron - Juxtaglomerular Cell - Mechanism of formation of urine - Role of kidney to regulate Blood pressure, Water, Electrolytes and Acid Base Balance.

Skin - Structure and function - Regulation of temperature of the body. (18 Hours)

TEXT BOOKS

1. K.Sembulingam & Prema Sembulingam (2019), *Essentials of Medical Physiology*. Jaypee publications. Eighth edition.
2. Waugh A, Ross and Wilson (2018). *Anatomy and Physiology in Health and Illness*. Elsevier publications. 13ed.
3. CC Chatterjee (2020). *Human Physiology*. CBS publishers. 13 ed.

4. Indu Khurana (2020). *Medical Physiology for Undergraduate Students*. Elsevier Publication. 2 Edition.
5. GK Pal (2019). *Textbook of human physiology*, Elsevier publications. 3edition.

REFERENCES

1. Guyton, A.G. and Hall, J.B. (2005): Text Book of Medical Physiology. W.B.Sanders Company, Prism Books (Pvt.) Ltd., Bangalore. 9th Edition.
2. Wilson, K.J.W and Waugh, A. (2003): Ross and Wilson *Anatomy and Physiology in Heath and Illness*. Churchill Livingstone. 8th Edition.
3. Jain, A.K.: *Textbook of Physiology*. Avichal Publishing Co., New Delhi. Vol.I and II.
4. McArdle, W.D., Katch, F.I. and Katch V.L(2001): *Exercise Physiology. Energy, Nutrition and Human Performance*. Williams and Wilkins, Baltimore. 4th Edition.
5. Ganong, W.F. (1985): *Review of Medical Physiology*. lange Medical Publication. , 12th Edition.
6. Moran Campell E.J., Dickinson, C.J., Slater, J.D., Edwards. C.R.W. and Sikora, K. (1984): *Clinical Physiology*. ELBS, Blackwell Scientific Publications. , 5th Edition.
7. McArdle, W.D., Katch, F.1. and Katch, V.L. (1996): *Exercise Physiology*. Energy, Nutrition and Human Performance, Williams and Wilkins, Baltimore. 4th Edition.
8. Jain, A.K.: *Textbook of Physiology*. Avichal Publishing Co., New Delhi. Vol. I and II.
9. Winword. Sear's *Anatomy and Physiology for nurses*. London, Edward Arnell.
10. Chatterjee ChandiCharan : *Text Book of Medical Physiology*,London W.B.

E LEARNING CONTENT

https://youtu.be/MZDy0RvA52Y-Osmosis

https://youtu.be/TgcyiVQnVBs- Respiratory system

https://youtu.be/44B0ms3XPKU- nervous system

Course Code 23PHSC12	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
	PSO 1.a	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO 1	3	3	3	-	-	1	1	2	-	-
CO 2	3	3	2	2	2	2	3	3	-	-
CO 3	3	3	2	2	2	2	3	3	-	-
CO 4	3	3	2	3	3	2	3	3	-	-
CO 5	3	3	2	3	3	3	3	3	-	-

Strong (3) Medium (2) Low (1)

Dr.D.Vijayarani
Head of the Department

Dr.S.Mathangi
Course Designer

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M.Sc. Home Science – Nutrition and Dietetics
(2023-2024 onwards)

Semester I	**MACRONUTRIENTS**	Hours/Week: 6	
Core Course- 3		Credits: 5	
Course Code **23PHSC13**		Internal 25	External 75

COURSE OUTCOMES

On successful completion of the course the student will be able to

CO1: state the concept, sources, types and essentials of major nutrients in growth and development of human. [K2]

CO2: find the mechanisms behind the metabolic regulations for the proper functioning of human body.[K3]

CO3: identify the role of protein, fat, carbohydrate, water and energy in maintaining human health. [K3]

CO4: analyse the factors affecting BMR, body fluid and consequences of nutrient deficiency diseases. [K4]

CO5: examine the total energy and water requirements, protein quality, glycemic index of foods and the methods to meet dietary recommendations of the community. [K4]

UNIT I

Energy- Energy content of foods, physiological fuel value, Estimation of total energy requirements (BMR, REE and physical cost of activities) TEE, Energy balance, Basal metabolic rate, total energy requirements, BMR& RMR, Factors affecting BMR, Thermic effect of food. Changes in body weight and body composition with the changing energy balance, Regulation of food intake- role of hunger and satiety centres. Energy balance and obesity. (18 Hours)

UNIT II

Carbohydrates – Classification, sources, functions, review of carbohydrate metabolism, Therapeutic uses of carbohydrates, sugars in parenteral nutrition. Glycemic index of foods and its uses. Toxic effects of fructose, xylitol and galactose. Sugar alternatives, Role of dietary fiber in health and disease. Role of carbohydrates in health and disease (18 Hours)

UNIT III

PROTEIN – Classification, sources, functions, Historical review of protein metabolism, Amino acid patterns in protein & of animals and vegetable origin, critical study of methods of assessment of protein quality. Physiological functions of proteins. Essential Amino Acids, amino acid balance and imbalance, Role of protein in health and disease. Supplementation of individual amino acid. (18 Hours)

UNIT IV

Lipids – Concepts of visible and invisible fats, EFA, SFA, MUFA, PUFA, omega–6 to omega–3 ratios. – sources and physiological functions and their role in health and disease. Adipose tissue – Lipogenesis and Lipolysis, lipoproteins – types and health implication.
Storage of body fat, Effects of deficiency. Fat substitutes, Hypocholesterolaemic foods – garlic, fiber and plant proteins. (18 Hours)

UNIT V

Water – Sources, Function, Requirement, Distribution of water in the body and Factors influencing distribution of body fluid. Exchange of water in the body. Water imbalance – dehydration- water intoxication, water and electrolyte mechanism – ADH. (18 Hours)

TEXT BOOKS:

1. Srilakshmi, B. (2015). *Human Nutrition*, 1st Edition, New Delhi: New Age InternationalLtd.
2. Srilakshmi, B. (2018). *Nutrition Science*, 6th Edition, New Delhi: New Age International Ltd.
3. Satyanarayana, U., & Chakrapani, U. (2013). Biochemistry, Book and Allied Pvt. Ltd., Kolkata.

4. Wardlaw, G. M., Byrd-Bredbenner, C., Moe, G., Berning, J. R., & Kelley, D. S. (2013). Wardlaw's perspectives in nutrition. McGraw-Hill.
5. Williams, S. R. (2004). Nutrition and diet therapy. Nutrition and diet therapy. Sizer, F., Whitney, E., & Webb, F. (2003). Nutrition Concepts and Controversy, Thomas Wadsworth, Australia. 9th edition.
6. Shils, M. E., Olson, J. A., &Shike, M. (2000). Modern nutrition in health and disease. Modern Nutrition in Health and Disease . Vol I and II. Lea &Febiger Philadelphia, A Waverly Company. Eighth edition.
7. Mahan, L.K., & Stump, S.E. (2002). Krause's Food Nutrition and Diet Therapy. W.B. Saunder's company, Philadelphia. 10th edition.

REFERENCES:

1. Guthire, H.A., (2001). Introductory Nutrition. C.V. Mosby Company, St. Louis. Tenth edition.
2. Bogert, J.G.V., Briggs, D.H., & Calloway, (2000). Nutrition and physical fitness. W.B. Saunders Co., Philadelphia, London, Toronto. 11th edition.
3. Brown, J.E., (2002). Nutrition Now. Wadsworth Thomson Learning New York. 3rd edition.
4. Toteja, G. S. (2004). Micronutrient profile of Indian population. Indian Council of Medical Research Publication, New Delhi.
5. Swaminathan, M., (2002). Principles of Nutrition and Dietetics. BAPPCO, 88, Mysore Road. Bangalore – 560 018.
6. Jain, J.L., Jain, S., & Jain, N., (2005). Fundamentals of Biochemistry. S. CHAND & COMPANY Ltd. Ram nagar, New Delhi-110 055. 6th revised edition.

E- LEARNING RESOURCES:

www.nutrition.gov – Service of National agricultural library, USDA
www.nal.usdfa.gov/fnic - Food and nutrition information center
www.fantaproject.org- Fanta technical assistance for nutrition
http://dietary-supplements.info.nih.gov – Officer of dietary supplements, national institute of health.

Course Code 23PHSC13	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
	PSO 1.a	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO 1	3	3	3	-	-	1	1	2	-	2
CO 2	3	3	2	2	2	2	3	3	-	2
CO 3	3	3	2	2	2	2	3	3	-	2
CO 4	3	3	2	3	3	2	3	3	-	2
CO 5	3	3	2	3	3	3	3	3	-	2

Strong (3) Medium (2) Low (1)

Ms.A.Jeevarathinam

Dr.D.Vijayarani — Mrs.R.Subha

Head of the Department — **Course Designers**

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M.Sc. Home Science – Nutrition and Dietetics
(2023-2024 onwards)

Semester I	**ADVANCED FOOD SCIENCE PRACTICAL**	Hours/Week: 6	
Core Practical - 1		Credits: 3	
Course Code **23PHSC11P**		Internal 40	External 60

COURSE OUTCOMES

On successful completion of the course the student will be able to

CO1: write the procedure for analysing the food samples. [K2]

CO2: trace the structure of starches and physical properties of food samples. [K2]

CO3: find the cooking quality of foods and apply the knowledge and skills in food industries.[K3]

CO4: identify the factors affecting the cooking quality of different foods.[K3]

CO5: examine the appropriate food preparation and processing methods to ensure the food quality standards[K4]

UNIT I

Sensory method –Analysis of taste sensitivity-Threshold test Duo –Trio test

Multiple sample difference

Starch Microscopic structure and gelatinization. Factors affecting gelatinization –sag test.

Gluten formation

UNIT II

PULSE

Factors affecting cooking quality

FRUIT

Enzymatic browning Pectin test

Firmness of gel

UNIT III

VEGETABLE

Various method of cooking fat soluble and water-soluble pigment.

MILK

Detecting the presence of starch, soda, starch, urea in milk sample. pH of milk sample.

Effect of acid on milk Maillard reaction.

UNIT IV

SUGAR

Relative sweetness of sugar- sucrose, maltose, lactose, fructose, dextrose, glucose, artificial sweeteners Stages of sugar cookery.Effect of dextrose, jaggery, honey and cream of tartar on sucrose.

FATS AND OIL

Smoking point – Groundnut oil, coconut oil, Gingelly oil, Olive oil, Vanaspati, Ghee, Refined Sunflower oil, Rice bran oil. Cooking temperature and fat absorption- – Groundnut oil, coconut oil, Gingelly oil, Refined Sunflower oil, Rice bran oil.

UNIT V

PHYSICAL PROPERTIES

Thousand grain weight

Thousand grain volume

Hydration capacity

Hydration index

Swelling capacity

Specific gravity

Seed displacement test

Viscosity - Line spread test, Viscometer.

Adulteration

TEXT BOOKS

Srilakshmi B. (2015). Food Science, New Age International (P) Ltd. Publishers.

Potter N. and Hotchkiss J.H. (1996). Food Science, Fifth ed., CBS Publishers and Distributors, New Delhi

Avantinasharma (2017). Text book of food science and Technology. CBS Publisheres and distributes ltd. 3rd Edition.

Reddy S M. (2015). Basic Food science and technology. New Age International publishers. 2nd edition.

REFERENCES

Swaminathan A (1979) . Food Science And Experimental Foods, Ganesh And Company Madras. 3rd edition.

Bennion, Marion and O. Hughes (2001). Introductory Foods. Edi: mac millian N. Y. 1st edition.

Eskein . (2012). Biochemistry of Food. Elsievier publications

Desrosier, N.W. and James N. (2007). Technology of food preservation. AVI Publishers.

Manay, S. and Shadaksharamasamy, (2004) .Food: Facts and Principles, New Age International Publishers, New Delhi. 1st edition.

E-LEARNING RESOURCES

http://www.fao.org/3/V5030E/V5030E00.htm

https://fmtmagazine.in/fruits-vegetables-processing-technologies

www.fao.org www.wfp.org

Learn Microbiology with Online Courses and Classes| edX

Course Code 23PHSC11P	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
	PSO 1.a	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO1	3	3	3	3	2	3	3	3	1	2
CO2	3	3	1	3	3	3	3	3	3	2
CO3	3	3	2	3	3	3	3	3	3	2
CO4	3	3	2	3	3	3	3	3	3	2
CO5	3	3	3	3	3	3	3	3	3	2

Strong (3) Medium (2) Low (1)

Dr.D.Vijayarani — **Head of the Department**

Mrs.R.Subha — **Course Designer**

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN
(Belonging to Virudhunagar Hindu Nadars)
An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai
Re-accredited with 'A' Grade (3rd Cycle) by NAAC
VIRUDHUNAGAR - 626 001

M.Sc. Home Science – Nutrition and Dietetics
(2023-2024 onwards)

Semester I	**FOOD PROCESSING AND TECHNOLOGY**	Hours/Week: 6	
DSEC – 1		Credits: 4	
Course Code **23PHSE11**		Internal 25	External 75

COURSE OUTCOMES

On successful completion of the course the student will be able to

CO1: describe the concept, scope, importance and principles of food processing and discuss the classification and nutritive value of various food commodities. [K2]

CO2: find the physiochemical properties, selection, storage and preservation of various foods [K3]

CO3: identify the different methods and steps involved in processing of various foods. [K3]

CO4: analyse the changes that occur during processing of different foods and the factors influencing it. [K4]

CO5: focus on the various processed food products and by-products from food processing.[K4]

UNIT I

Processing of foods: Primary, secondary and tertiary processing, historical perspective, traditional technologies used in food processing. Effects of processing on components, properties and nutritional value of foods.

Enzymes in Food Processing: Enzyme- Review of classification, enzyme inhibitors, enzymatic browning. (18 Hours)

UNIT II

Cereal Processing and Technology:

Rice: parboiling, milling and pearling; Processing and milling of wheat, maize, barley, oats and rye. Millets: processing of millets; Cereal Products: Flours and its quality; Processed products of rice, wheat and maize; By products utilization; breakfast cereals and extrusion; Effect of processing on nutritive value of cereals; changes in physiochemical properties of cereal starch

and protein due to processing. Milling process: Complete milling process, break rolls, reduction rolls, milled products and their nutritive value and applications

Pulse Processing and Technology:

Dals, flours, protein concentrates, isolates and hydrolysates; By products utilization; Effect of processing on nutritive value and physiochemical properties of pulses.

Nuts and Oil Seeds Processing and Technology:

Nuts Processing methods, Oil seeds processing: Oil extraction methods and refining process; byproducts utilization; Effect of processing on nutritive value and physiochemical properties of vegetable oils. (18 Hours)

UNIT III

Vegetables Processing and Technology:

Pigments: Classification, effects on processing of vegetables; Preliminary processing of vegetables; Vegetable products: Fermented and non-fermented and its shelf life; Vegetable waste utilization; Effect of processing on nutritive value and physiochemical properties of vegetable

Fruits Processing and Technology:

Concept of maturity, ripening and senescence; Methods of fruit processing technologies: traditional and new methods.

Fruit products: fermented and non fermented; Effect of processing on nutritive value and physiochemical properties of fruits;

Browning reactions: types and mechanism; prevention methods; Fruit waste utilization.

Milk Processing and Technology:

Milk types, composition, physiochemical properties; Milk processing- Separation, centrifugal process, natural creaming, pasteurization, sterilization, homogenization. Milk storage; Effects of processing on nutritive value and physicochemical properties of milk (18 Hours)

UNIT IV

Egg Processing and Technology:

Egg processing and storage; Effect of processing on nutritive value and physiochemical properties of eggs; changes in egg quality during storage and preservation methods.

Meat Processing and Technology:

Meat processing and storage; Factors influencing meat quality; Ageing and tenderization of meat.

Poultry: Processing and storage of poultry meat; Preservation methods for poultry.

Fish: Processing and storage; Preservation methods for fish. Effect of processing on nutritive value and physiochemical properties of meat, poultry and fish. (18 Hours)

UNIT V

Introduction of post-harvest technology

Introduction to post-harvest technology of agricultural produce; Status of Production, Losses, Need, Scope and Importance.

Post-Harvest Loss- Definition, Factors contributing to Post-harvest Loss; and Technologies and Practices to reduce Post-harvest Losses. (18 Hours)

TEXT BOOKS

1. Shakuntala Manay N ShadakCheraswamyM . (2004) *Food Facts and Principles*. New age publisher . 2nd edition.
2. Roday S. (2011) .*Food Science*. Oxford publication . 1st edition.
3. B Srilakshmi (2015)*Food science*. New Age Publishers. 6th edition.
4. Fellows P.(2000). *Food Processing Technology,* 2nd Edition. Woodhead Publishing Limited and CRC Press LLC. 1st edition.
5. Avantina Sharma. (2017).*Text book of food science and Technology*. CBS Publisheres and distributes ltd. 3rd edition.

REFERENCES:

1. Raocg . (2006).*Essentials of food process engineering* . PHI learning private ltd.
2. Janet D Ward and Larry Ward.(2006). *Principles of Food Science*. Stem Publishers. 4th edition.
3. Srivastava R P and Kumar S. (2006) *Fruits and Vegetables Preservation- Principles and Practices*. International Book Distributing Co. 3rd edition.
4. W B Crusess.(2004). *Commercial Unit and Vegetable Products*. W.V. Special Indian Edition,Pub Agrobios India . 2nd edition.
5. Forsythe S J and Hayes P R (1998). *Food Hygiene, Microbiology and HACCP*. Gaitersburg Maryland Aspen.
6. Eskein .(2012). *Biochemistry of Food*. Elsievier publications. 1st edition

ELEARNING RESOURCES:

http://www.fao.org/3/V5030E/V5030E00.htm https://fmtmagazine.in/fruits-vegetablesprocessing- technologies/
https://www.actioncontrelafaim.org/wpcontent/uploads/2018/01/technical _paper_phl.pdf
https://www.nutsforlife.com.au/resource/nuts-and-processing/ https://www.fssai.gov.in/

Course Code	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
23PHSE11	**PSO 1.a**	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO 1	3	3	2	1	1	1	3	1	-	-
CO 2	3	3	3	2	2	2	3	2	-	-
CO 3	3	3	3	2	2	3	3	3	-	-
CO 4	3	3	3	3	2	3	3	3	-	-
CO 5	3	3	3	3	2	3	3	3	-	1

Strong (3) Medium (2) Low (1)

Dr.S.Mathangi
Dr.D.Vijayarani Ms.W.Jeyanthi Selva Sundari
Head of the Department **Course Designers**

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN
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VIRUDHUNAGAR - 626 001

M.Sc. Home Science – Nutrition and Dietetics
(2023-2024 onwards)

Semester I	**INSTRUMENTATION IN FOOD ANALYSIS**	Hours/Week: 6	
DSEC – 1		Credits: 4	
Course Code **23PHSE12**		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: explain the concept and need of various instruments used in food and nutrition field. [K2]

CO2: identify the working principle of various instruments used in food sectors. [K3]

CO3: illustrate the instrumentation and working mechanism of instruments used in food analysis. [K3]

CO4:categorize the instrumental techniques based on their applications in analysis of macro and micro food components. [K4]

CO5: focus on the appropriate analytical instrument to measure, identify, separate and purify the unknown minor and major components in foods.[K4]

UNIT I

Instrumentation - introduction, need for food analysis and instrumentation, criteria for selecting technique. Principles and applications - densimetry, coulometry, balance - analytical balance, double pan analytical balance, single pan analytical balance, physical balance and methods of weighing. (18 Hours)

UNIT II

Principle and applications - pH and pH meter, colorimeter, bomb calorimeter, spectrophotometer, fluorimeter, refractometer and centrifugation - types. (18 Hours)

UNIT III

Principle and applications - chromatography – classification - paper chromatography, thin layer chromatography, column chromatography, gas chromatography, liquid chromatography and high-performance liquid chromatography. (18 Hours)

UNIT IV

Microscopy - basic principles and applications, types - Light, Compound, Phase contrast , Dark Field, Fluorescence Microscopy Scanning Electron Microscopy (SEM)-Transmission Electron Microscopy(TEM). (18 Hours)

UNIT V

Electrophoretic Techniques: General principles. Paper and Gel Electrophoresis. Polyacrylamide Gel Electrophoresis, SDS. (18 Hours)

REFERENCE BOOKS

1. Ajay Paul,(2012). *Basic and Applied Biochemistry-A practical Manual,* Haryana: CCS Hariyana University.
2. Gurumani,N.(2006). *Research Methodology,* Chennai: MJP Publishers.
3. Kothari ,G.R.(2019). *Research Methodology Methods and Techniques,* New Delhi: Wiley Eastern Limited.
4. Meloan,C.E.(1996). *Food Analysis,* New Delhi: CBS Publishers and distributors.
5. Prem, S.M.(2007). *Introductory Statistics*, 6th edition, Singapore: John wiley.
6. Sadasivam ,S. and Manickam, B. (2004). *Biochemical Methods,* New Delhi: New Age International Publishers.
7. Sathe, A.Y. (1999). *A First Course in Food Analysis,* New Delhi: New Age International (P) Ltd.
8. Veer Bala, R. (2011*) Fundamentals of Statistics,* New Delhi: Ane books Pvt(Ltd).
9. Wilkinson, T.S. and Bhandarkar P.L, (1984).*Methodology and Techniques of Social Research,* Bombay: Himalaya Publishing House.

Course Code	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
23PHSE12	**PSO 1.a**	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO 1	3	3	2	1	1	2	3	3	-	-
CO 2	3	3	1	2	2	2	3	3	-	1
CO 3	3	3	2	3	3	3	3	3	-	1
CO 4	3	3	2	3	3	3	3	3	-	2
CO 5	3	3	2	3	3	3	3	3	-	2

Strong (3) Medium (2) Low (1)

Dr.D.Vijayarani
Head of the Department

Ms.A.Jeevarathinam
Course Designer

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M.Sc. Home Science – Nutrition and Dietetics
(2023-2024 onwards)

Semester I	**FOOD BIOTECHNOLOGY**	Hours/Week: 6	
DSEC – 1		Credits: 4	
Course Code **23PHSE13**		Internal 25	External 75

COURSE OUTCOMES

On completion of the course students will be able to

CO1: explain the concept of biotechnology, single cell protein, fermentation technology and genetically modified foods. [K2]

CO2: apply the biotechnology techniques to produce SCP, enzymes, GMO and recovery process of the commercial products. [K3]

CO3: determine the applications of biotechnology in food processing, mushroom production, industries GMO and fermentation process. [K3]

CO4: analyze the role of biotechnology in food processing sectors and regulations to ensure the safety of biotechnology products.[K4]

CO5: examine the pros and cons of food biotechnology on public health and food safety. [K4]

UNIT I

Biotechnology - definition, scope, potential benefits and risks of modern food biotechnology. Role of biotechnology in food processing. (18 Hours)

UNIT II

Single Cell Protein (SCP) **–** definition, properties, nutritional value and advantages. Production process of spirulina, baker's yeast and mushroom- paddy straw mushroom, button mushroom and oyster mushroom. Preservation of mushrooms, identification of poisonous mushroom, safety and nutritional evaluation of SCP, economic importance of SCP. (18 Hours)

UNIT III

Fermentation Technology- introduction, types of fermentation process, steps involved in fermentation process. Fermenter (Bioreactor)-types- stirred tank fermenter and air lift fermenter.

Downstream Processing- stages in downstream processing-solid liquid separation, release of intracellular products, concentration, purification and formulation. (18 Hours)

UNIT IV

Processing of fermented products – organic acids- citric acid, lactic acid and acetic acid.Vitamins- vitamin B_{12}, vitamin B_2 and beta carotene.Amino acids - lysine and glutamic acid.Polysaccharides - xanthan, dextran and alginate.

Enzyme Technology – enzyme production - amylase, protease, pectinase, phosphatase and lipase. Applications of enzymes in food industry. (18 Hours)

UNIT V

Genetically Modified Foods - production, benefits and risks, safety issues of GM foods.

Regulations in biotechnology- biosafety -RDAC, IBSC, RCGM and GEAC.

Intellectual Property Rights (IPR). (18 Hours)

REFERENCE BOOKS

1. Dubey, R .C. (1993). *A Textbook of Biotechnology*, Chennai: S.Chand and Company Ltd.
2. Kumaresan, V. (2013).*Biotechnology*, Nagarkovil: Saras Publication.
3. Kalaichelvan, P.T. (2007).*Bioprocess Technology*, Chennai: MJP Publishers.
4. Lohar,S. (2012).*Text Book of Biotechnology*, Chennai: MJP Publishers.
5. Patel, A.H. (2010). *Industrial Microbiology*, New Delhi: Macmillan Publishers India Ltd.
6. Sathyanarayana, U. (2013). *Biotechnology*, Kolkata: Books and Allied Pvt Ltd.

Course Code 23PHSE13	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
	PSO 1.a	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO 1	3	3	2	1	1	2	1	1	-	-
CO 2	3	3	2	3	3	2	2	2	-	1
CO 3	3	3	2	3	3	3	2	2	-	1
CO 4	3	3	2	3	3	3	2	3	-	3
CO 5	3	3	3	3	3	3	2	3	-	3

Strong (3) Medium (2) Low (1)

Ms.A.Jeevarathinam

Dr.D.Vijayarani. T.Devi

Head of the Department **Course Designers**

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN
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M.Sc. Home Science – Nutrition and Dietetics
(2023-2024 onwards)

Semester II	**MICRONUTRIENTS AND DIETETICS**	Hours/Week: 6	
Core Course - 4		Credits: 5	
Course Code **23PHSC21**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: review the basic concepts of nutrition science, micronutrients and overview of normal and special diet. [K2]

CO2: identify the role of micronutrients in human life cycle and special conditions. [K3]

CO3: find out consequences of micronutrients deficiencies and physical changes occur during different stages of human life cycle and in special conditions. [K3]

CO4: analyse the requirements of micronutrients needed duringdifferent stages of lifecycle and in special conditions. [K4]

CO5: correlate the relation between different micronutrients and plan the suitable menu and dietary modifications required for normal, specialconditions persons and for sports persons. [K4]

UNIT I

Nutrition Science - Basic concepts - nutritional requirements - definition of concepts in relation to human nutritional requirements- basic terminology in relation to nutritional requirements - methods for studying the nutrient requirements. National and International recommendations on nutrient requirements - goals of National and International requirement estimates and RDA's dietary guidelines.

Minerals- Distribution in the body; functions, effects of deficiency, food sources, requirement , toxicity and recent research of macro minerals - Calcium, Phosphorous, Magnesium, Potassium, Sodium and Chloride.

Micro minerals – iron, zinc, fluoride, copper, iodine and manganese. Trace Minerals - Selenium, cobalt, chromium, silicon, boron and nickel. Selenium and Vitamin E relationship, Chromium and glucose tolerance factor. (18 Hours)

UNIT – II

Vitamins - Distribution in the body, functions, food sources, requirement deficiency, toxicity and recent research of Fat Soluble Vitamins A, D, E and K. Water soluble vitamins: vitamin C, thiamine, riboflavin, niacin, pantothenic acid, biotin, folic acid, vitamin B12, vitamin B 6, choline and inositol. (18 Hours)

UNIT III

Pregnancy - Physiological changes during pregnancy, nutritional needs during pregnancy, nutritional assessment and guidance in prenatal care. Nutritional problems and complications occur during pregnancy

Lactation - Physiology of lactation, human milk composition and infant growth and development, malnutrition - effects on milk and effects on mothers, maternal nutrition during lactation.

Infants and Preschool Children - growth and development, nutrient needs and recommended dietary (18 Hours)

UNIT IV

Older Children and Adolescents - changes in physical development and body composition, sexual maturity, psycho-social change, nutrient needs and recommended dietary intakes, diet and dietary patterns. Nutritional problems of school going children and adolescents.

Adult- Nutritional recommendations, food requirements, low cost balanced diet and dietary guidelines (18 Hours)

UNIT V

Old Age - nutrition and ageing, physiological changes associated with ageing, nutritional requirements and dietary modifications, guidelines for planning balanced diets for elderly.

Sports Nutrition - energy systems, nutritional requirements, sports anemia, water and electrolytes, pre-event meals, weight and body composition of athletes, nutritional supplements and dietary guidelines.

An Overview of Special Diets – purine restricted diet, ketogenic diet, paleo diet and diet in cleft lip or palate. (18 Hours)

REFERENCE BOOKS

1. Abraham, S. (2016). *Nutrition through Life Cycle*, New Delhi: New Age InternationalLtd.
2. Gopalan, C. (2007). *Nutritive Value of Indian Foods*, Hyderabad: NIN/ICMR.
3. Gopalan,C.and Vijayaragavan,K.(1971).*Nutrition*,Hyderabad:Atlaso India NIN/ICMR.
4. Kravse, M.V. and Mohan, (1984). Food, *Nutrition and Diet Therapy*, Philadelphia: Pa. W.B. Saunder
5. Mary kay Mitchell. (2015). *Nutrition Across the Life Span*, 2nd Edition, New Delhi: Scientific International PVT,LTD.
6. Rajalakshmi, R. (2013). *Applied Nutrition*, 4th Edition, New Delhi: Oxford & IBH Publishing Co. Pvt. Ltd.
7. Robinson, H.C.(1978). *Fundamentals of Normal Nutrition*, 3rd Edition, Macmillan:Collier Macmillan International Edition.
8. Sharma, R.(1999). *Diet Management*. 2nd Edition, London: Churchill Livingstone.
9. Srilakshmi, B. (2015). *Human Nutrition*, 1stEdition, New Delhi: New Age International Ltd.
10. Srilakshmi, B. (2022). *Nutrition Science*, 7th Edition, New Delhi: New Age International Ltd.
11. Srilakshmi, B.(2023). *Dietetics*. 9 th Edition, New Delhi: New Age International Publishers.
12. Swaminathan, M. (2018). *Essentials of Food and Nutrition*, Vol I & II, Bangalore: The Bangalore printing and Publishing Co Ltd.
13. Williams and Sue Rodewell, (1985). *Nutrition and Diet Therapy*, 5th edition, St. Louis: Times Mirror/Mosby College Publications.

Course Code 23PHSC21	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
	PSO 1.a	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO1	3	2	3	2	1	2	2	3	-	1
CO2	3	2	3	2	2	3	3	3	-	1
CO3	3	2	3	3	2	3	3	3	-	1
CO4	3	2	3	3	3	3	3	3	-	1
CO5	3	3	3	3	3	3	3	3	-	3

Strong (3) Medium (2) Low (1)

Ms.A.Jeevarathinam

Dr.D.Vijayarani
Head of the Department

Mrs.R.Subha
Course Designers

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VIRUDHUNAGAR - 626 001

M.Sc. HOME SCIENCE - NUTRITION AND DIETETICS

(2023 - 2024 onwards)

Semester II	**CLINICAL BIOCHEMISTRY**	Hours/Week: 6	
Core Course -5		Credits: 5	
Course Code **23PHSC22**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: outline the basic concept of macronutrients, functions of liver and kidney in human body. [K2]

CO2: write the biosynthesis and metabolic pathway of macronutrients.[K3]

CO3: determine the role of macronutrients, enzymes and major organs in clinical diagnosis.[K3]

CO4: analyse the metabolic disorders associated with carbohydrates, protein, fat and nucleic acids.[K4]

CO5: analyse the clinical procedure involved in the diagnosis of various disorders.[K4]

UNIT I

Carbohydrate Metabolism- Glycolysis, TCA cycle, HMP shunt, glycogenesis, glycogenolysis, gluconeogenesis. Regulation of Glycolysis and glycogen metabolism- regulation of blood glucose level. Glucose Tolerance Test, Galactose Tolerance Test

Metabolic disorders- glycosuria, galactosemia, lactose intolerance and glycogen storage diseases. (18 Hours)

UNIT II

Protein Metabolism – Transamination reaction, deamination reaction and urea cycle. Biosynthesis of nonessential amino acids, synthesis of specialized products from amino acids.

Metabolic disorders- Alkaptonuria, Phenyl ketonuria, Tyrosinemia, Albinism and Maple syrup urine disease

Enzymes - Mechanism of enzyme action, factors affecting enzyme activity, role of enzymes in metabolism , enzymes and coenzymes in clinical diagnosis. (18 Hours)

UNIT III

Lipid Metabolism – Lipogenesis, synthesis of fatty acids**,** oxidation of fatty acids, ketogenesis, biosynthesis of cholesterol, catabolism of cholesterol.

Metabolic disorders - Ketosis, Gaucher's disease**,** Tay-Sach's disease and Niemann Pick disease. (18 Hours)

UNIT IV

Nucleotide Metabolism - Purine Nucleotide synthesis - De Novo synthesis and Salvage pathway. Primidine synthesis - deoxyribonucleotide synthesis.

Metabolic disorders - Gout and Lesch -Nyhan syndrome. (18 Hours)

UNIT V

Liver and Renal Function Tests - functions of liver - estimation of plasma fibrinogen - flocculation tests, hippuric tests, BSP retention test and Rose bengal dye test.

Functions of kidney - Glomerular filtration tests - urea clearance, creatinine clearance and inulin clearance test- concentration test, water dilution/ elimination test and phenol sulphthalein excretion test. (18 Hours)

REFERENCE BOOKS

1. Allan Gaw. (2008). *Clinical Biochemistry,* 7th Edition, United Kingdom: Elsvier Health Sciences.
2. Arumugam, N. (2014). *Biochemistry,* Nagercoil: Saras Publications.
3. Chatterjea, M.N. (2012). *Textbook of Medical Biochemistry*,8th Edition, New Delhi: Jaypee Brothers Medical Publishers.
4. Nagini, S. (2007). *Textbook of Biochemistry,* 2nd Edition, Chennai: Scitech Publications.
5. Sharma, D.C. (2017). *Nutritional Biochemistry*, New Delhi: CBS Publishers & Distributors.
6. Singh,S.P. (2006). *Principles of Biochemistry*, New Delhi: CBS Publishers.

7. Thomas, M. Devlin (2010). *Text book of Biochemistry with Clinical Correlations*, 7th Edition, New York: A John Wiley & Sons, INC Publications.
8. Shanmugam, A (2016). *Fundamentals of Biochemistry For Medical Students,* 8th Edition, New Delhi: Wolters Kluwer India Pvt. Ltd.

Course Code 23PHSC22	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
	PSO 1.a	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO1	3	3	3	-	-	-	-	2	-	-
CO2	3	3	3	2	2	2	-	3	-	-
CO3	3	3	3	2	2	2	2	3	-	-
CO4	3	3	2	2	2	3	2	3	-	-
CO5	3	3	2	3	3	3	3	3	-	-

Strong (3) Medium (2) Low (1)

Mrs.T.Devi

Dr.D.Vijayarani Mrs.C.Midhuna

Head of the Department **Course Designers**

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M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS

(2023 - 2024 onwards)

Semester: II	**RESEARCH METHODOLOGY**	Hours/Week : 6	
Core Course - 6		Credits : 5	
Course Code **23PHSC23**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: explain the concept of good research, sampling, collection of data, reliability, validity and report writing. [K2]

CO2: apply the correct procedure to construct research design, select sampling methods, collect data, frame hypothesis and measure the quality of research to provide good report. [K3]

CO3: manipulate the data of the research process and present the results in a scientific manner to solve the research problems. [K3]

CO4: categorize research, hypothesis, variables, and collection of data, reliability, validity and report to pursue the research. [K4]

CO5: examine the research report of a contemporary problem and conclude the data by adopting software and research ethics. [K4]

UNIT I

Research- definition, objectives, importance, criteria of good research, types of research – historical, descriptive, experimental, Applied, case study and social research, definition and identification of a research problem.

Research design – meaning, need, features of good design – Experimental design - basic principles, informal experimental design and formal experimental designs. (18 Hours)

UNIT II

Variables – definition and types.

Hypothesis - definition, characteristics and types

Theory of probability – Sampling - definition, advantages and disadvantages, types-probability sampling - simple random sampling, restricted random sampling, systematic random sampling, stratified random sampling and multistage sampling, Non probability sampling-judgment, convenience and quota sampling. (18 Hours)

UNIT III

Collection of data-definition, sources of data, methods of collection – questionnaire, interview, observation, case study. Participatory Rural Appraisal (PRA) and Rapid Rural Appraisal (RRA). (18 Hours)

UNIT IV

Reliability – Meaning, definition, theory of reliability, types of reliability – inter-rater reliability, test-retest reliability, parallel forms reliability and internal consistency reliability. Factors affecting reliability

Validity – meaning, definition, approaches and types – faces and content validity, criterion related validity – convergent, discriminant, concurrent and predictive validity. Measurement of validation. (18Hours)

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UNIT V

Report writing - definition, characteristics of good report, types of report, format of a good report and chapterisation, references, figures, formatting and typing of research report. Citation Software – Mendeley, Research ethics-objectives, principle, ethical practices in research, Plagiarism – meaning and importance. (18 Hours)

REFERENCE BOOKS

1. Kothari, G.R. (2022). *Research Methodology Methods and Techniques*,4th Edition, New Delhi: Wiley Eastern Limited.

2. Peer Mohammed, S. (2019).*Research Methodology*,5th Edition, Madurai : Pass Publications.
3. Chawla, D. and Sondhi, N. (2018). *Research Methodology*, 2nd Edition, Noida: VIKAS Publications Pvt(Ltd).
4. Vijayalakshmi,G. and Sivapragasam,C.(2016).*Research Methods Tips and Techniques*, Chennai: MJP Publishers.
5. Gurumani, N.(2006). *Research Methodology*, Chennai: MJP Publishers.
6. Prem, S.M.(2007). *Introductory Statistics*, 6th edition, Singapore: John wiley.
7. Singh,Y.K.(2006). *Fundamentals of Research Methodology and Statistics*.New Delhi: New Age International (P) Ltd., Publishers
8. Thomas, G.C. (2016). *Research Methodology and Scientific Writing*, New Delhi: Ane books Pvt(Ltd).
9. Veer Bala, R. (2011*). Fundamentals of Statistics*, New Delhi: Ane books Pvt(Ltd).
10. Louis Cohen, Lawrence Manion and Keith Morrison.(2018).Research Methods in Education,8th edition, London: Taylor & Francis Group.

Course Code	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
23PHSC23	**PSO 1.a**	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO1	3	3	2	2	2	2	3	1	-	-
CO2	3	3	2	3	3	3	3	1	-	2
CO3	3	3	3	3	3	3	3	2	-	2
CO4	3	3	3	3	3	3	3	2	-	2
CO5	3	3	3	3	3	3	3	2	-	3

Strong (3) Medium (2) Low (1)

Dr.D.Vijayarani

Dr.D.Vijayarani Mrs.A.Jeevarathinam

Head of the Department **Course Designers**

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN
(Belonging to Virudhunagar Hindu Nadars)
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Re-accredited with 'A' Grade (3rd Cycle) by NAAC
VIRUDHUNAGAR - 626 001

M.Sc. HOME SCIENCE - NUTRITION AND DIETETICS

(2023 - 2024 onwards)

Semester II	**CLINICAL NUTRITION AND DIETETICS PRACTICAL**	Hours/Week: 6	
Core Course Practical -2		Credits: 3	
Course Code **23PHSC21P**		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: describe the procedure for qualitative and quantitative analysis of biochemical constituents in urine and blood. [K2]

CO2: write the principles of diet in planning a suitable balanced diet for the different age groups. [K2]

CO3: estimate the amount of biochemical constituents present in blood, prepare the meal, calculate the nutrients present in the prepared meal and document the record. [K3]

CO4: use the results and write the interpretations. [K3]

CO5: analyse the situation and plan the menu suitable for different stages of life and for various clinical conditions. [K4]

Biochemical Analysis in Urine and Blood

- Methods of collecting urine and blood samples.
- Separation of serum and plasma.
- Qualitative analysis of sugar in urine sample.
- Qualitative analysis of urea, creatinine, bilirubin and bile pigments in urine sample.
- Quantitative estimation of blood for glucose.
- Quantitative estimation of blood cholesterol.

- Quantitative estimation of urea, creatinine and protein in blood.

Dietetics Practical

- Planning, preparation and calculation of nutrient content of meals for high, middle and low income families and diet for an adult man and woman doing different physical activities - sedentary, moderate and heavy.
- Planning, preparation and calculation of nutrient content of a balanced diet for a pregnant and lactating woman with modification of normal meal pattern including special foods given during lactation.
- Preparation of supplementary foods, planning, preparation and calculation of nutrient content of diet for a pre - school child.
- Planning, preparation and calculation of nutrient content of meals/ packed lunch for school children.
- Planning, preparation and calculation of nutrient content of meals for adolescent boys and girls.
- Planning, preparation and calculation of nutrient content of diet for elderly considering their special needs.
- Planning, preparation and calculation of nutrient content of diet for athletes.

Visit to Clinical and Dietetics Lab

REFERENCE BOOKS

1. Anusha, B.(2014). *Biochemical Methods - A Practical Approach*, New Delhi: Narosa Publishing House.
2. Biswajit,M. and Sharbaribasu, (2006). *Fundamentals of Practical Clinical Biochemistry*, New Delhi: B.I.PublicationsPvt Ltd.
3. Gopalan, C. (2018). *Nutritive Value of Indian Foods*, Hyderabad: NIN/ICMR.
4. Sharma, R. (1999). *Diet Management*. 2nd Edition, London: Churchill Livingstone.
5. Singh,S.P.(2013). *Practical Manual of Biochemistry*, New Delhi: CBS Publishers and Distributors.
6. Srilakshmi,B.(2019). *Dietetics*. 8th Edition, New Delhi: New Age International Publishers.

Course Code 23PHSC21P	PO1		PO2	PO3		PO4	PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1	3	3	1	1	1	1	3	3	3	3
CO2	3	3	2	3	3	3	3	3	3	3
CO3	3	3	2	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3

Strong (3) Medium (2) Low (1)

Mrs.S.Balasaraswathi

Dr.D.Vijayarani — Mrs.R.Subha

Head of the Department — **Course Designers**

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN
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M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS

(2023 - 2024 onwards)

Semester: II	**COMPOSITE HOME SCIENCE**	Hours/Week:6	
DSEC - 2		Credits: 4	
Course Code - **23PHSE21**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: explain the concepts of Food Science, Nutrition, Dietetics and Institutional management, Textiles and Clothing, Family Resource Management, Human development and Extension Education. [K2]

CO2: identify the role of nutrition in health and fibre in fabric manufacturing, resources in home management, peers, family, school, community and culture on child development and teaching aids in community development. [K3]

CO3: apply the scientific principles of various aspects in branches of Home Science in their day today life. [K3]

CO4: focus the scientific skills in the management of resources and develop basic skills for career options in the fields of dietetics, interior designing, textiles and clothing and extension education. [K4]

CO5: analyse the various aspects in the branches of Home Science for healthy human upliftment and community.[K4]

UNIT I

Food, Nutrition, Dietetics and Institutional Management

Food - food groups, balanced diet and food pyramid. Food - Quality evaluation of foods – objective and subjective perspectives. Effects of cooking and processing techniques on nutritional components. Nutrients - role of nutrients, deficiencies and

requirements of nutrients for Indians. Nutrition through life span-nutritional needs and dietary guidelines for adequate nutrition.

Food service management at institutional level-hospital, educational, social and special institutions. (18 hours)

UNIT II

Textiles and Clothing

Fibre - Classification and Properties, Manufacturing process of major natural fibres – cotton, silk and wool and manmade fibres – rayon, nylon and polyster. Identification of fibres. Classification of yarns and Types of weaves. Methods of fabric construction: Woven, Knitted and non-woven fabrics - Its properties and uses. Finishes Classification, processing and purposes.

Dyeing and printing - Classification, Method of block printing, tie and dye, batik, roller printing, screen printing, discharge, heat transfer printing and digitized printing. Traditional textiles of India. Testing of colour - Fastness, shrinkage, pilling and GSM of fabrics. Wardrobe planning for different age group (18 Hours)

UNIT III

Family Resource Management

Management - Concept, Management of time, energy, money and space. Resources - classification, characteristics and factors affecting resources. Time management, Energy management, work simplification techniques, classes of change and fatigue. Money Management - Family income, types, budgeting, household accounts, family savings and investment. Consumer - Definition, role, rights and responsibilities, consumer behaviour, consumer problems and consumer education.

Design Fundamentals: Elements and principles of design. Colour - Dimensions of colour and colour schemes. Space planning and design-housing - Need, principles of planning spaces, types of house planning for different income groups. (18 Hours)

UNIT IV

Human Development

Principles of growth and development, prenatal care, prenatal development and various domains of growth and development from infancy to old age.

Theories of human development – Freud's Theory, Erikson's Theory, Piaget Theory, Kohlberg's Theory and Pavlov's Theory. role of peers, family, school, community and culture and personality development on children. childlabour, child abuse and trafficking. Developmental Task of various stages of life span. (18 Hours)

UNIT V

Extension Education

Extension Education – meaning, history, objectives, principles and Philosophy. Communication - definition, elements, models, types and barriers of communication. Different approaches of extension education. Audio-visual aids- classification, preparation and selection criteria. Extension programme Planning – meaning, need, developmental process. Community development programme and Three tier systems of panchayat raj. National programmes related to rural development. (18 Hours)

REFERENCE BOOKS

1. Antia, F.P and Abraham, P. (2002). *Clinical Dietetics and Nutrition*, 4th Edition, New Delhi: Oxford University Press.
2. Berk, L.E. (2007). Development through the Life Span, New Delhi: Pearson Education.
3. Dahama,O.P. and Bhatnagar,O.P. (1985). *Education and Communication for Development,* New Delhi: Oxford and IBH publishing Co pvt Ltd.
4. Dantyagi, S. (1980).*Fundamentals of Textiles and their Care*, New Delhi: Orient Longman Ltd.
5. Durga,D.(1991). *Household Textiles and Laundry Work*, New Delhi: Alma Ram and Sons.

6. Frazier, W.C. and Westhoff, D.C. (2015). *Food microbiology*, 4thEdition, New York: John Wiley & sons, inc.
7. Gajalakshmi, R. (2014), *Nutrition Science*, New Delhi: CBS Publishers and Distributors Pvt Ltd.
8. Goldstein,H. and Goldstein,V.(1958*). Art in Everyday Life*, U.S.A: Macmillan Company.
9. Hurlock, B. (1980). *Developmental Psychology*, New Delhi: McGraw- Hill Publishing Company Ltd.
10. Lutz and Przytulski, (2004). *Nutrition and Diet Therapy*, Philadelphia: F.A. Davis Company.
11. Manay,S.N. and Shadaksharaswamy, M. (2008). *Foods Facts and Principles*, New Delhi: New Age International Ltd.
12. Mohini,S. and Surjeet,M.(1993). *Catering Management and Integrated Approach*, New Delhi: Wiley Eastern Ltd.
13. Nickell, P. and Dorsey, J.M. (1978). *Management in Family Living*, New Delhi: John Wiley and Sons.
14. Paul,S. (2005). *Textbook of Bio-Nutrition, Curing Diseases through Diet*, 1st Edition, India: CBS Publications.
15. Potter,N.N. and Hotchkiss,J.H. (2006). *Food Science*, New Delhi: CBS Publishers.
16. Premlata.M, (2012).*Textbook of Home Science*, New Delhi: Kalyani Publications.
17. Reddy, A. A. (1971). *Extension Education*, Andhra Pradesh: Sri Lakshmi Press.
18. Robinson,C.H. (1986). *Normal and Therapeutic Nutrition*, 17th Edition, U.S.A: Macmillan Publishing Co.
19. Shuchi, R. (2018). *UGC NET/SET (JRF& LS) Home Science Paper II and III*, New Delhi: Arihant Publications (India) Limited.
20. Srilakshmi, B. (2018). *Dietetics*, 7th Edition, New Delhi: New Age International Ltd.
21. Suganthi,M. and kumari, P.(2017). *Food Service Management*, Chennai: Dipti press PVT Ltd.
22. Suriakanthi, A. (2005). *Child Development an Introduction*, Tamilnadu: Kavitha Publications.
23. Swaminathan, M. (2018). *Essentials of Food and Nutrition*, Vol I & II. Bangalore: The Bangalore printing and Publishing Co Ltd.

24. Varghese, M.A., Ogale, N. N. and Srinivasan, K. (2000). *Home Management*, New Delhi: New Age International (P) Limited Publishers.

Course Code	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
23PHSE21	**PSO 1.a**	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO1	3	3	2	1	1	1	2	3	-	-
CO2	3	3	2	3	3	3	2	3	-	-
CO3	3	3	3	3	3	3	3	3	-	2
CO4	3	3	3	3	3	3	3	3	-	3
CO5	3	3	3	3	3	3	3	3	-	3

Strong (3) Medium (2) Low (1)

Dr.D.Vijayarani

Dr.D.Vijayarani Mrs.S.Balasaraswathi

Head of the Department **Course Designers**

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN
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VIRUDHUNAGAR - 626 001

M.Sc. HOME SCIENCE - NUTRITION AND DIETETICS

(2023 - 2024 onwards)

Semester II	**PUBLIC NUTRITION**	Hours/Week: 6	
DSEC -2		Credits: 4	
Course Code		Internal	External
23PHSE22		25	75

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: outline the definition, need, scope, objectives and importance of public nutrition, malnutrition, food and nutrition security, nutritional assessment, nutrition education, intervention programmes and national and international organizations. [K2]

CO2: identify the factors influencing community nutrition and macro and micro nutrients problems, principles of food and nutrition security, nutritional assessment, theory of nutrition education and functions of national and international organizations.[K3]

CO3: find the types of PEM, health, and methods of assessing nutritional status, Nutrition education, intervention programmes, preventive measures of PEM and examine the interrelationship of food and nutrition security and the role of national and international organizations in improving the community health. [K3]

CO4: analyse the consequences of macro and micro nutrient problems, strategies to combat public nutrition, food security, activities of national and international programmes and the process of nutrition education and communication. [K4]

CO5: focus the suitable strategies to overcome the nutritional problems in the community. [K4]

UNIT I

Public Nutrition- definition, factors influencing community nutrition and health.

Malnutrition - PEM – causes, consequences and preventive measures.

Food and Nutrition Security- meaning, determinants, assessment of food security, principles of food and nutrition security and its interrelationship (18 Hours)

UNIT II

Major Nutritional Problems and Intervention Programmes – macro and micro nutrient deficiency diseases - etiology, prevalence, clinical manifestation, preventive and therapeutic measures. Intervention programmes - National Nutritional Anaemia Control Programme, Vitamin A Prophylaxis Programme, Iodine Deficiency Disorders Programme, Policy on use of Zinc in the National Programme for Management of Diarrhoea, Mid-Day Meal Programme, ICDS. (18 Hours)

UNIT III

Nutritional Assessment - objectives, methods - clinical examination, anthropometric measurement, biochemical evaluation and dietary assessment.

Strategies to Combat Public Nutrition Problems – Diet based strategies, Immunization, Supplementary feeding programmes. (18 Hours)

UNIT IV

National Organizations - ICMR, NIN, CFTRI, NIPCCD

International Organizations - FAO, WHO, UNICEF, UNESCO, World Bank. (18 Hours)

UNITV

Nutrition Education – definition, need, scope , importance, theory and methods of Nutrition Education, Process of Nutrition education and Communication. (18 Hours)

REFERENCE BOOKS

1. Bamji,S.(2019). *Text Book of Human Nutrition*, 4th Edition, New Delhi:Oxford Publishing Pvt .Ltd.

2. Darshan,S. (2011). *Nutrition,* India: Vikas and Company.
3. Park,K.(2011). *Textbook of Preventive and Social Medicine,* 21st Edition. India: Banarasi das Bhanot Publishers.
4. Roday. S, (2011). *Food Hygiene and Sanitation*,2ndEdition, New Delhi: TATA McGraw - Hill Publishing Company Limited.
5. Shanthi,G. (1992). *The Feeding and Care of Infants and Young Children*, New Delhi: Voluntary Health Association of India.
6. Srilakshmi,B. (2016). *Nutrition Science,* New Delhi : New Age International (p) Ltd

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Course Code 23PHSE22	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
	PSO 1.a	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO1	2	2	2	-	-	-	3	2	-	-
CO2	2	2	2	3	3	3	3	3	-	-
CO3	3	3	3	3	3	3	3	3	-	-
CO4	3	3	2	2	2	2	3	3	-	-
CO5	2	2	3	3	3	3	2	2	-	-

Strong (3) Medium (2) Low (1)

Dr.D.Vijayarani
Head of the Department

Mrs.T.Devi
Course Designer

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN
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VIRUDHUNAGAR - 626 001

M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS

(2023 - 2024 onwards)

Semester II	**NUTRITION IN EMERGENCIES AND DISASTERS**	Hours/Week:6	
DSEC -2		Credits: 4	
Course Code **23PHSE23**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: explain the concept of various natural and manmade emergencies, nutritional relief, rehabilitation and health care and methods of assessing the nutritional status of the victims.[K2]

CO2: identify the method of assessing the nutritional and health status of emergency and disaster affected population.[K3]

CO3: apply the nutritional relief and rehabilitation of the victims of emergencies and disasters and principles of health care to tackle the nutritional and health problems.[K3]

CO4: analyse the causes for nutritional and communicable diseases, clinical sign for screening acute malnutrition, survey of diseases and approach it to tackle nutritional and health problems in emergencies. [K4]

CO5: examine the process involved in disease investigation, reporting and control measures during various emergencies and disasters conditions.[K4]

UNIT I

Emergencies and Disaster Management – concept, disaster cycle – Natural and Manmade disasters resulting in emergency situation - famine, drought, flood, earthquake, cyclone, war, civil and political emergencies. Factors contributing to the rise and development of emergency situations.

Nutritional Problems and Communicable Diseases - Causes, major deficiencies and communicable diseases in emergencies - PEM and other specific deficiencies, cholera, typhoid, measles, TB, plague, chikungunya, dengue and Corona. Control and prevention, role of immunization and sanitation.

Nutritional Management of target group in disaster and emergencies situation – packet food and common kitchen in during and post disaster period. (18 Hours)

UNIT II

Assessment of nutritional status in emergency affected populations - Scope of assessment of malnutrition in emergencies, Indicators of malnutrition, clinical signs for screening acute malnutrition. Organization of nutritional surveillance and individual screening. (18 Hours)

UNIT III

Host Defense Mechanisms, types of immunization, Hazards of immunization, Cold Chain and Cold life, Universal and National Immunization Schedules. Screening and Survey of a Disease, Disease Investigation and Reporting. Disease monitoring and Surveillance. Emergence of new diseases, Prevention and control. (18 Hours)

UNIT IV

Nutritional Relief and Rehabilitation - Assessment of food needs in emergency situation, food distribution strategy – identifying and reaching the vulnerable group - Targeting Food Aid, mass and supplementary feeding, special foods and rations for nutritional relief.

Organizations for mass feeding, food distribution, transportation storage and feeding centers. Assessment process for nutritional rehabilitation at post disaster period. (18 Hours)

UNIT V

Health Care of the community – concept and levels of health care. Elements and Principles of primary health care – Health care delivery

Household food security and nutrition in emergencies. Public nutrition, sanitation and hygiene and approach to tackle nutritional and health problems in emergencies and ethical considerations (18 Hours)

REFERENCE BOOKS

1. Edelstein S. (2006). *Nutrition in Public Health: A Handbook for Developing Programmes and Services*, 2nd Edition, UK: Jones and Bartlett Publishers.
2. FAO. (1983) *Selecting Interventions for Nutrition Improvement*. A Manual of Nutrition in Agriculture. No. 3.
3. Gibney, M.J., Margetts, B.M., Kearney, J. M. and Arab, I. (2004). *Public Health Nutrition*, UK: NS Blackwell Publishing.
4. Goyet, V. Seaman, J. and Geijer, U. (1978). *The Management of Nutritional Emergencies in Large Populations*, World Health Organization, Geneva.
5. Klein, R. E.(1979). *Evaluating the Impact of Nutrition and Health Programmes*, London and New York: Plenum Press.
6. WFP/ UNHCR (1998) WEP/ UNHCR Guidelines for Selective Feeding Programmes in Emergency Situations. Rome and Geneva: WEP & UNHCR.

Course Code	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
23PHSE23	**PSO 1.a**	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO1	3	3	3	1	1	1	1	2	-	-
CO2	3	3	3	2	2	3	2	3	-	-
CO3	3	3	3	3	3	3	3	3	-	1
CO4	3	3	3	3	3	3	3	3	-	1
CO5	3	3	3	3	3	3	3	3	-	2

Strong (3) Medium (2) Low (1)

Dr.D.Vijayarani
Head of the Department

Dr.D.Vijayarani
Dr.S.Mathangi
Course Designers

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VIRUDHUNAGAR
Quality Education with Wisdom and Values

M.Sc. Home Science – Nutrition and Dietetics
(for those who join in 2023-2024)

Semester III	**ADVANCED DIETETICS**	Hours/Week: 6	
Core Course- 7		Credits: 4	
Course Code **23PHSC31**		Internal 25	External 75

COURSE OUTCOMES

On successful completion of the course the student will be able to

CO1: explain the purpose, importance, principles of diet therapy and elaborate the concept of Nutritional Care Process, diet therapy and medical Nutrition therapy for different diseases and disorders and also its Nutritional Management.[K2]

CO2: write the different types of hospital diet, stages of different diseased and disorder conditions, causes and consequences of various diseases and disorders. [K3]

CO3: find the Nutritional care process, special feeding methods and analyze the signs, symptoms and complications of different diseases and disorders. [K3]

CO4: assess the Nutritional support systems and recommend the suitable diet for various diseases, disorders and critically ill patients based on the principles, nutrient requirements and dietary management guidelines. [K4]

CO5: plan the dietary guidelines for various diseases and disorders. [K4]

UNIT I

Nutritional Care Process - Nutritional screening, Nutritional Assessment, Nutritional diagnosis, Nutritional Intervention, Monitoring and evaluation.

Basic concepts of diet therapy – Therapeutic adaptations of Normal diet, Principles and classification of therapeutic diets. Routine Hospital diets – Regular, soft, fluid diet

Nutritional Management in critical care -Nutritional screening and nutritional Status assessment of critically ill, Nutritional requirement according to the critical condition

Nutritional support systems: Enteral and parenteral nutrition support- Types, composition and complications. (18 hours)

UNIT II

Medical Nutrition therapy for gastrointestinal and liver disorders Upper Gastrointestinal tract Diseases – Nutritional care and diet therapy in Diseases of oesophagus - Oesophagitis, Gastro esophageal reflux disease[GERD] and Hiatus hernia.

Disorders of stomach: Indigestion, Gastritis, Gastric and duodenal ulcers, and dumping syndrome Lower gastrointestinal tract Diseases/Disorders-Common Symptoms of Intestinal dysfunction –Flatulence, constipation, haemorhoids, diarrhoea, steatorrhoea, Diseases of the large intestine-Diverticular disease, Irritable bowel syndrome, inflammatory bowel disease

Diseases of Small intestine-Celiac disease, tropical sprue, intestinal brush border enzyme deficiencies.

Diseases of the Liver- hepatitis, hepatic coma, cirrhosis, cholecystits, cholelithiasis and pancreatitis, Zollinger Ellison syndrome and Biliary dyskinesia.

(18 hours)

UNIT III

Medical Nutrition therapy for Pulmonary disease-Effect of Malnutrition on pulmonary system, effect of pulmonary disease on nutritional status, chronic pulmonary diseases-Asthma, cystic fibrosis, chronic obstructive pulmonary disease and Pneumonia-Pathophysiology and dietary management.

Medical Nutrition therapy for Rheumatic disease- Etiology, Pathophysiology of Inflammation of Rheumatic diseases, Rheumatoid Arthritis, Osteoarthritis and sjogren syndrome.

Nutritional management of physiological stress- Classification, Complications, Metabolic changes in protein and electrolytes and Dietary management of burns, dietary management of trauma and stress. (18 hours)

UNIT IV

Nutritional Management on Weight imbalance -Regulation of food intake and pathogenesis of obesity and malnutrition and starvation; Weight Imbalance: prevalence and classification.

Underweight -Etiology and Dietary management**;** Obesity-Etiology, classification, Energy balance, dietary modifications and Bariatric surgery- types and dietary modifications of pre and post bariatricsurgery.

Nutritional Management in metabolic disorders- Prevalence, Etiology, risk factors, complications and dietary modifications of diabetes mellitus. (18 hours)

UNIT V

Nutritional management of cardiovascular diseases-etiology, risk factors, clinical features and dietary modifications of Dyslipidemias, Atherosclerosis , Hypertension, Ischemic heart disease, Congestive cardiac failure.

Nutrition Management of Renal Disease -Etiology, Clinical and metabolic manifestations, Diagnostic tests, Types-Glomerulonephritis, Nephrotic syndrome , Renal Failure: Acute and chronic, ESRD, Nephrolithiasis and dietary modifications.

Nutritional management in cancer- Pathogenesis and progression of cancer, types Symptoms and dietary management. ` (18 hours)

TEXT BOOKS

Srilakshmi, B. (2024). *Dietetics*, 9th Edition, New Delhi: New Age International Pvt., Ltd Publications,

Mahan L.K., Sylvia Escott-Stump.(2000).*Krause's Food Nutrition and Diet Therapy*. 10thedition.W.B. Saunders Company London.

Antia F.P. And Philip Abraham.(2001).*Clinical Nutrition and Dietetics*. Oxford Publishing Company.

Passmore P. And M.A. East Wood.(Digitised in 2010). *Human Nutrition and Dietetics*. ChurchillLiving Stone.

S.R.Mudambi.(2009).*Fundamentals, Food Nutrition and Diet therapy*. 5th Edition. New Age Publishers.

Robinson Ch., M.B. Lawlea, W.L., Chenoweth, And A.E., Carwick.(1990).*Basic Nutrition and Diet therapy*, Macmillan Publishing Company.

REFERENCES:

Garrow JS, James WPT, Ralph A.(2000). *Human Nutrition and Dietetics*. 10th edition. Churchill Livingstone, NY.

Groff L James, Gropper S Sareen.(2000). *Advanced Nutrition and Human Metabolism*. 3rd edition.West / Wadsworth, UK.

Sue Rodwell Williams. (1993).*Nutrition, Diet Therapy*. 7th edition.W.B.Saunders Company London.

Whitney, E. N. and C. B..Cataldo. (1983). *Understanding Normal and Clinical Nutrition*. West Pub. S1. Paul.

E-LEARNING RESOURCES

www.nutrition.gov - Service of National agricultural library, USDA.

www.nal.usda.gov/fnic -Food and Nutrition information centre.

www.healthyeating.org.

www.eatrightpro.org.

https://www.globalhealthlearning.org.

Course Code	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
23PHSC31	**PSO 1.a**	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO1	3	2	3	2	1	2	2	3	-	1
CO2	3	2	3	2	2	3	3	3	-	1
CO3	3	2	3	3	2	3	3	3	-	1
CO4	3	2	3	3	3	3	3	3	-	1
CO5	3	3	3	3	3	3	3	3	-	3

Strong (3) Medium (2) Low (1)

Dr.D.Vijayarani — **Head of the Department**

Mrs.S.Balasaraswathi — **Course Designer**

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Quality Education with Wisdom and Values

M.Sc. Home Science – Nutrition and Dietetics
(for those who join in 2023-2024)

Semester III	**PERFORMANCE NUTRITION**	Hours/Week: 6	
Core Course- 8		Credits: 4	
Course Code **23PHSC32**		Internal 25	External 75

COURSE OUTCOMES

On successful completion of the course the student will be able to

CO1: explain the nutritional assessment and nutritional requirement of athlete and for special needs. [K2]

CO2: find the role of macro and micronutrients towards athletic performance.[K3]

CO3: identify the role of nutrition in competitive performance and for special needs. [K3]

CO4: analyse the factors affecting the energy, protein, fluid requirements of athletes and special needs and categories the ergogenic aids and sports foods. [K4]

CO5: focus on personalized nutrition guidance in the area of sports nutrition. [K4]

UNIT I

Nutritional assessment for athletes-assessment of body composition, techniques of measuring body composition, surface anthropometry, Biochemical, clinical and dietary assessment, Body composition and sports performance.

Energy requirements for optimal athletic performance- Energy production, Energy metabolism in Athletes, Fatigue and exercise, energy requirements of athletes, factors affecting energy requirements of athletes. (18 hours)

UNIT II

Carbohydrates in sports performance- Carbohydrate types, Glycaemic index and Glycaemic load, carbohydrate utilization during exercise, carbohydrate loading,

fuelling before during and after exercise, carbohydrate requirements for athletes.

Protein and fat requirement for sports performance -protein and exercise, requirements of protein and fat for athletes, factors affecting protein requirements, protein needs and vegetarian athletes. (18 hours)

UNIT III

Micronutrients in sports- vitamins and mineral requirements in athletes, sports anaemia, antioxidants and exercise induced free radicals.

Hydration for athletes- Fluid balance and thermoregulation, fluid and electrolyte requirements for athletes, Effects of dehydration, factors affecting fluid intake, gastric emptying and fluid delivery to working muscles, Fluid intake before, during and after exercise. (18 hours)

UNIT IV

Nutrition for competition performance-Nutrient timing, pre-competition nutritional guidelines, nutrition during exercise and nutrition after exercise, nutrition plan for specific sports events.

Ergogenic aids- Categories of Ergogenic aids and Ergolytics.

Sports foods-sports drinks, sports gels, Sports energy bars and sports gels.(18 hours)

UNIT V

Nutrition for athletes with special dietary needs- Nutrition for special population like children, young and older athlete, Female athlete triad, weight loss and weight gain in athletes, vegetarian athlete, diabetic athlete, athletes with disabilities, factors affecting nutritional needs for travel athlete, GI stress and athletes. (18 hours)

TEXT BOOKS

Swaminathan, T. (2018). *Essential of Food and Nutrition*, Bangalore: The Bangalore Press Pvt.

Johri, P. (2010), Vitamins, NewDelhi: Sonali Publications.

Johri, P. (2005), Carbohydrates, NewDelhi: Sonali Publications.

Sontakki, C.N. (2010), Marketing, NewDelhi:Kalyani Publishers.

Gupta, S.L. (2004), Product Development, NewDelhi: Wisdom Publications.

Deakin, Burke.(2006). *Clinical Sports Nutrition*. 3rd Edition. McGraw-Hill Australia.

Bean, Anit. (2010).*The complete guide to Sports Nutrition*. 6th Edition. A&C.Black. London.

Bourns, Fred.(2002).*Essentials of Sports Nutrition*. 2nd Edition John and Wiley.

B.Srilakshmi, Suganthi.v, C.Kalaivani Ashok.(2017). *Exercise physiology fitness and sports Nutrition*, 1st edition. New age publishers.

Benardot, Dan. (2000).*Advanced Sports Nutrition*. Human Kinetics.

Werner,.W. K. and Hoejer, (1989). *Lifetime Physical Fitness and Wellness,* Colorado: Morton Publishing Company.

Srilakshmi, B. (2020). *Exercise Physiology Fitness and Sports Nutrition,* NewDelhi:New age publishers PLd.

REFERENCES

Burke, Louise. (2007).*Practical Sports Nutrition*. Human Kinetics.

Gleeson, Jeukendrup. (2004).*Sports Nutrition*: An Introduction to Energy Production and Performance. Human Kinetics.

Suzanne Girard Eberle. (2000).*Endurance Sports Nutrition*. Human Kinetics. Natalie DigateMuth. (2015).*Sports Nutrition for health professionals*. Quincy Mcdonald.

Enette Larson-Meyer.(1963).*Vegetarian sports nutrition*. Human kinetics.

William, D.(1996). *Exercise Nutrition: Energy Nutrition and Human Performance*, USA: William and Wilkin Publishing.

linsky, I. (1998). *Nutrition in Exercise and Sports,* 3rd Edition, Francis: CRC Press.

Mahan, L.K. and Ecott-Stump, S. (2000). *Food and Nutrition and Diet Therapy,* USA: W.B Saunders Company.

Melvin,H.W. (2002). *Nutrition for Health, Fitness and Sports,* 6th Edition, New York:McGraw –Hill Companies.

Rath, S.S. (2018). *Physical Fitness and Wellness*, New Delhi: Sports Publication

Singh, N.P. (2019). *Anatomy and Physiology in Physical Education*, New Delhi: KhelSahitya Kendra Publication.

Sizer,F. and Whitney, E. (2000). *Nutrition-Concepts and Controversies*, 8th Edition, Wadsworth: An International Thomson Publishing Co.

Whitney, E.N. and Rolfes, S.R. (1999). *Understanding Nutrition*, 6th Edition, Wadsworth: An International Thomson Publishing Co.

E-LEARNING RESOURCES

http://ijpnpa.biomedcentral.comwww.acsm.orgwww.ausport.govt.auwww.sportsci.org www.gssiweb.com

Course Code	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
23PHSC32	**PSO 1.a**	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO1	3	3	3	1	1	2	1	3	-	-
CO2	3	3	2	3	3	3	1	3	-	-
CO3	3	3	2	3	3	3	1	3	-	-
CO4	3	3	2	3	3	3	1	3	-	-
CO5	3	3	2	3	3	3	1	3	-	1

Strong (3) Medium (2) Low (1)

Dr.D.Vijayarani
Head of the Department

Dr.S.Mathangi
Course Designer

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN
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M.Sc. Home Science – Nutrition and Dietetics
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Semester - III	**FOOD MICROBIOLOGY**	Hours/Week: 6	
Core Course- 9		Credits: 4	
Course Code **23PHSC33**		Internal 25	External 75

COURSE OUTCOMES

On successful completion of the course the student will be able to

CO1: explain the concept of food spoilage, food borne diseases, food safety regulation and microbial techniques to understand the microbial world [K2].

CO2: apply the standard procedures to isolate, cultivate, preserve, examine, investigate and monitor the food safety risks [K3].

CO3: identify the factors affecting food safety and food spoilage and preventive measures to ensure the microbiological safety of foods [K3].

CO4: analyze the role of microbes in food spoilage, food borne diseases , acceptability criteria of foods and functions of food regulations to keep the food safe [K4].

CO5: examine the equipments and techniques used to test the quality of foods in food analysis laboratory [K4].

UNIT I

General microbiology and Cleaning and sterilization of glass wares, Handling of hot air oven and autoclave, Uses and study of microscopes. Morphology of microorganism- Staining of bacteria - Simple staining and Gram staining. Microscopic test for bacterial motility by hanging drop method. Preparation of culture media and their sterilization. Cultivation of bacteria - Pour plate method. Spread plate method and Streak plate method. Maintenance and preservation of cultures. (18 hours)

UNIT II

Isolation of micro organisms from different sources - Air, water, and milk,

Determination of viable count of microorganisms - Total plate count, Yeast and mold count .

Indicators of food microbial quality and safety - Coliforms, Enterococci, Bifidobacteria, Coliphages/Enteroviruses. (18 hours).

UNIT III

Food spoilage - sources of food contamination, factors affecting the growth of microorganisms in food, causes of food spoilage. Spoilage, Microbiological criteria and sampling plans of different foods- cereals and cereal products, vegetables and fruits, milk and milk products, fish and sea foods, meat and meat products , poultry and poultry products, canned foods, control of food spoilage.

(18 hours)

UNIT IV

Food borne diseases – bacterial food borne diseases - Staphylococcal poisoning, Bacillus cereus poisoning, Botulism, Salmonellosis, Shigellosis. Non-bacterial food borne diseases - Aflatoxicosis, Ergotism. Investigation of food borne disease out breaks and preventive measures. Risk analysis - risk assessment, risk management and risk communication. (18 hours)

UNIT V

Food safety - definition, importance of safe food and factors affecting food safety. Food regulation and standards in India - National – Food Safety and Standard Authority of India (FSSAI), BIS, AGMARK and PFA, Essential Commodities Act. International Organizations and Agreement – FAO and Codex Alimentarius, HALAL. GMP, GHP and HACCP. (18 hours)

Activity

Production and Microbiological examination of fermented food (any two) - Fermented fruits and vegetables, Fermented dairy product, Wine production, Pickle fermentation, Fermented cereal and legume-based product. Production of edible mushroom.

TEXT BOOKS

Dushyant Kumar Sharma. (2013). *Microbiology*, New Delhi: Narosa publishing house.

Satyanarayana,U. (2019). *Biotechnology*, Kolkata: Books and allied ltd.

Frazier, W.C. and Westhoff, D.C. (2017). *Food microbiology*, 5th Edition. New York: John wiley and sons, inc.

Arora,B. and Arora, D.R. (2007). *Practical Microbiology*, New Delhi: CBS Publishers.

Gunasekaran, P. (2005). *Laboratory Manual in Microbiology*, New Delhi: New Age International (P) Limited Publishers.

Kalaiselvan,P.T.(2006). *Microbiology and Biotechnology - a Laboratory manual*, Tamilnadu: MJP Publishers.

Rajan,S. and Selvichristy,R. (2011). *Experimental Procedures in Life Sciences*, Chennai: Anjanaa Book House

Annak.Joshua, (2001).*Microbiology*, Popular Book Depot.Chennai-15.

Ray, B. (2001) Fundamental Food Microbiology, 2nd Edition, CRC press, Bocaraton, F.

Joshi V.K & Pandey (2004).*Biotechnology: food, fermentation, microbiology, biochemistry and technology*, Vol I &II, Educational publishers and distributors, New Delhi.

Crueger W and Crueger A (2003) *Biotechnology: A textbook of Industrial Microbiology* 2nd Edition, Panima Publishing Corpoartion, New Delhi.

REFERENCES

Guttierrez-Lopez GF and Barbosa-Canovas GV (2003) *Food Science and Food Biotechmolgy* CRC press, USA.

Halford NG (2003) 'Genetically Modified Crops' Imperial College Press, UK

Modern Food Micro-Biology by James M. Jay, (2000), 6th Edition, An Aspen Publication, Maryland, USA.

Food Microbiology: Fundamentals and frontiers by M.P. Doyle, L.R. Beuchat and Thoma J. Montville, (2001), 2nd Edition, ASM press, USA.

Micheal Pelczar MJ, Chan ECS, Krieg N. (2001) Microbiology. 5th Edition. Tata McGraw-Hill Publishing Co. Ltd.

Prescott LM, Harley JP, Klein DA.(2008) Microbiology. 6th Edition. WMC Brown

E-LEARNINGRESOURCES

Top Microbiology Courses - Learn Microbiology Online | CourseraLearn

Microbiology with Online Courses and Classes | edX

72 Online studies in Microbiology - DistanceLearningPortal.comMicrobiology

Free Online Courses and MOOCs | MOOC List (mooc-list.com)

Virtual Microbiology Classroom: 8-week micro course from Science Prof Online

Course Code	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
23PHSC33	**PSO 1.a**	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO1	3	3	2	2	2	2	-	3	-	
CO2	3	3	2	2	2	2	2	3	-	1
CO3	3	3	2	3	3	3	3	3	-	1
CO4	3	3	3	3	3	3	3	3	-	1
CO5	3	3	3	3	3	3	3	3	-	2

Strong (3) Medium (2) Low (1)

Dr.D.Vijayarani
Head of the Department

Mrs.A.Jeevarathinam
Course Designer

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Semester III	**ADVANCED DIETETICS PRACTICAL**	Hours/Week: 5	
Core Course Practical - 3		Credits: 3	
Course Code **23PHSC31P**		Internal 40	External 60

COURSE OUTCOMES

On successful completion of the course the student will be able to

CO1: explain the nutrition and diet principles, RDA recommended by ICMR and identify the foods to be included and excluded for the persons suffering from various diseases and disordered conditions. [K2]

CO2: select the suitable diet for the persons suffering from various diseases and disordered conditions.[K2]

CO3: prepare the planned menu for the persons suffering from various diseases and disordered conditions and compute the nutritional value for the prepared menu and also prepare the record. [K3]

CO4: calculate the obtained nutritive value of the planned menu.[K3]

CO5: analyze the results and conclude the interpretation.[K4]

PRACTICALS:

1. Routine hospital diet : Regular diet, Clear liquid, Soft diet, Full liquid diet and Planning and preparing Enteral feed plan.
2. Assessing requirements and planning diet for obese and underweight individual
3. Planning and preparing diet for Diabetes Mellitus[IDDM and NIDDM]
4. Planning and preparation of diet for Atherosclerosis with hypertension
5. Assessing and planning diets for the following conditions.

a) Celiac disease

b) Lactose intolerance.

c) GERD

d) Peptic ulcer

e) Hepatitis

f) Cirrhosis

6. Planning and preparing diet for Pneumonia
7. Planning and preparing diet for Rheumatic arthritis
8. Planning and preparation of diet for Glomerulonephritis
9. Planning and preparation of diet for cancer according to the condition.
10. Planning and Preparing diet for pre and post Bariatric surgery patients.
11. Assessment and planning diet for post burn condition.

TEXTBOOKS

Srilakshmi, B. (2024). *Dietetics*, 9 th Edition, New Delhi: New Age International Pvt., Ltd Publications.

Suganthi, V. (2017). *Manual on Diet Therapy, Dipti Press (OPC) Pvt, Ltd.,*

Stump SE.(2012).*Nutrition and diagnosis related care*. 7th Edition. Lippincott Williams and Wilkins.Canada.

Width.M&Reinhardt.T.(2018).*The Essential Pocket Guide for Clinical Nutrition*. 2nd Edition. Wolters Kluwer Publishers.

Whitney EN and RolfesSR.(2002). *Understanding Nutrition,* 9th Edition, West/Wordsworth.

Guthrie H.(2002). *Introductory Nutrition*.CV Mosby Co.St. Louis.

Elia M, Ljunggvist O, Stratton RJ, Lanham SA.(2013). *Clinical Nutrition*. 2nd Edition. *The Nutrition Society Textbook*.Wiley Blackwell Publishers.

Mitch, W. and Ikizler, Alp.(2010). *Handbook of Nutrition and the Kidney*. 6th Edition. Lippincott Williams and Wilkins, New Delhi.

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

REFERENCES

Gopalan C., Ram Sastri B.V. and BalSubramaniam S.C. (2006).*Nutritive Value of Indian Foods*. Hydrabad, National Institute of Nutrition.Indian Council of Medical Research.

Clinical Dietetics Manual. (2018). *Indian Dietetic Association*. 2nd Edition. Peggy Stanfield.

Y.H.Hui.(2010). Nutrition and Diet therapy. 14th Edition. Jones andBartlett publishers.

E-LEARNING RESOURCES

www.nutrition.gov - Service of National agricultural library, USDA.

www.nal.usda.gov/fnic -Food and Nutrition information centre.www.healthyeating.org.

www.eatrightpro.org.

https://www.globalhealthlearning.org.

Course Code	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
23PHSC31P	**PSO 1.a**	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO1	3	3	1	1	1	1	3	3	3	3
CO2	3	3	2	3	3	3	3	3	3	3
CO3	3	3	2	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3

Strong (3) Medium (2) Low (1)

Dr.D.Vijayarani
Head of the Department

Mrs.S.Balasaraswathi
Course Designer

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Semester III	**NUTRITION AND HEALTH**	Hours/Week: 5	
Elective Course - 3 (NME)		Credits: 3	
Course Code **23PHSN31**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: describe the health, nutrition, nutrients, nutritional status and list the sources of nutrients.[K1]

CO2: classify the food groups, macro and micro nutrients and identify the factors affecting BMR.[K2]

CO3: explain the importance of balanced diet, food pyramid and the effects of nutrient deficiency diseases on human health.[K2]

CO4: write the dimensions of health, energy value of food, BMR, RDA and functions of macro and micro nutrients. [K3]

CO5: focus the nutritional requirements of macro and micro nutrients for various age group.[K4]

UNIT I

Health – definition and dimensions of health. Food-definition, classification, food groups (four, five and seven food groups), importance of food groups. Balanced diet - definition, importance, food pyramid. Nutrition - definition, nutritional status and malnutrition. (15 Hours)

UNIT II

Energy-definition, unit of measurement, BMR–definition and factors affecting BMR.

Carbohydrate and Dietary fibre - classification, sources, functions, nutrient requirements and deficiency. (15 Hours)

UNIT III

Protein and Fat - definition, classification, sources, functions, nutrient requirements and deficiency. (15 Hours)

UNIT IV

Vitamins - definition, classification, food sources, functions, nutrient requirements and deficiency of the following vitamins

Water soluble vitamins - vitamin B1, B2, B6, B12, niacin, folic acid and vitamin C and Fat soluble vitamins - vitamin A, D, E, K. (15 Hours)

UNIT V

Minerals - definition, classification. Calcium, phosphorus, iron, iodine and zinc - food sources, functions, nutrient requirements and deficiency.

Water - functions and requirement, fluid and electrolyte balance. (15 Hours)

TEXT BOOK

Sri Lakshmi, B. (2020). Nutrition Science, 7th Edition, New Delhi: New Age International Ltd.

REFERENCE BOOKS

1. Gajalakshmi, R. (2014). Nutrition Science, 1st Edition, Chennai: CBS Publishers & Distributors Pvt Ltd.
2. Krause, M.V and Mahan, L.K. (1986).Food, Nutrition and Diet Therapy, London: Alan R Liss, Saunders Co.
3. Raheena Begum, M. (2010).Food, Nutrition and Dietetics, 3rd Edition, New Delhi: Sterling Publishers Pvt Ltd,

4. Robinson, C.H., Lawler, M.R., Chenoweth,W.L. and Garwick, A.E. (1986). Normal and Therapeutic Nutrition, New York: Macmillan Publishing Company.
5. Swaminathan, M. (2018). Essentials of Nutrition, Vol I & II, Madras: Ganesh and Company.

Course Code	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
23PHSN31	**PSO 1.a**	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO1	3	2	2	2	2	1	3	1`	-	-
CO2	3	2	2	2	2	1	3	2	-	-
CO3	3	2	2	3	3	3	3	2	-	-
CO4	3	2	2	3	3	3	3	2	-	-
CO5	3	2	2	3	3	3	3	2	-	2

Strong (3) Medium (2) Low (1)

Dr.D.Vijayarani — Mrs.S.Balasaraswathi

Head of the Department — **Course Designer**

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Semester III	**TECHNIQUES IN FOOD ANALYSIS PRACTICAL**	Hours/Week: 2	
SEC-1 Professional Competency Skill		Credits: 2	
Course Code **23PHSS31P**		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO 1: describe the various equipment used in food analysis laboratory. [K1]

CO 2: write the aim, principle and procedure of the food analysis methods. [K2]

CO 3: explain the quality of food by using various food analytical techniques. [K2]

CO 4: calculate the amount of nutrients present in the food sample and record it. [K3]

CO 5: comment on the reagents, reactions and techniques involved in analyzing the food samples. [K4]

UNIT I

Introduction to Laboratory Practices

Instrumental Techniques – Autoclave , Hot Air Oven , pH Meter , Electronic Weighing Balance , Centrifuges, Hot Plate, Spectrophotometer, Water Bath , Muffle Furnace, Viscometer , IR Moisture Analyzer, Colorimeter (6 hours)

UNIT II

Preparation and Standardisation of Solution (6 hours)

UNIT III

Ashing of Food (Thermogravimetric Method) and Preparation of Ash Solution (6 hours)

UNIT IV

Food Analysis Experiments – Estimation of –

- Moisture Content – Thermogravimetric Analysis -Air Oven Method and Infrared Radiation(IR) Moisture Analyzer Method
- Crude Fibre–Gravimetric Method
- Iodine Number of oils – Wij's Method
- Acid Number of oils - Titrimetric Method
- Peroxide Value of oils - Titrimetric Method
- Ascorbic Acid – 2, 6- Dichloroindophenol Titrimetric Method
- Calcium -Precipitation Titrimetric Method
- Iron – Wong's Method
- Phosphorus–Colorimetric Method (6 hours)

UNIT V

Demonstration Experiments

- Estimation of protein content in food by Kjeldahl method
- Estimation of fat content in food by Soxhlet method
- Pigment Analysis by Paper Chromatography Techniques (6 hours)

TEXT BOOKS AND REFERENCES

Suzanne Nielsen (2017). *Food Analysis Laboratory Manual*. 3rd Edition. Springer International Publishing.

Suzanne Nielsen (2017). *Food Analysis.* 5th Edition. Springer International Publishing.

Ajay Paul,(2012). Basic and Applied Biochemistry-A practical Manual, Haryana: CCS Hariyana University.

Otles, S. (2005). *Methods of Analysis of Food Components and Additives*. CRC Press, USA.

Sadasivam ,S. and Manickam, B. (2004). *Biochemical Methods*, New Delhi: New Age International Publishers.

Ranganna, S. (2001).“*Handbook of Analysis and Quality Control for Fruit and Vegetable Products”*. 2nd Edition. Tata-McGraw- Hill, India.

Sathe, A.Y. (1999). *A First Course in Food Analysis*, New Delhi: New Age International (P) Ltd.

Sadasivam, S and Manickam, A (1997). “*Biochemical Methods*”. 2nd Edition. New Age International Publishers, New Delhi.

Meloan,C.E.(1996). Food Analysis, New Delhi: CBS Publishers and distributors.

Jayaram, I, (1996), “Laboratory Manual in Biochemistry”, 5th Edition. New Age International Publishers, New Delhi.

Raghuramulu, N, Nair K.M &Kalayanasundaram, S.A, (1983), “*Manual of Laboratory Techniques*”, National Institute of Nutrition, ICMR.

Swaminathan A (1979). *Food Science and Experimental Foods*, 3rd Edition. Ganesh And Company Madras.

Course Code	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
23PHSS31P	**PSO 1.a**	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO1	3	3	2	1	1	2	3	3	-	-
CO2	3	3	1	2	2	2	3	3	-	1
CO3	3	3	2	3	3	3	3	3	-	1
CO4	3	3	2	3	3	3	3	3	-	2
CO5	3	3	2	3	3	3	3	3	-	2

Strong (3) Medium (2) Low (1)

Dr.D.Vijayarani — **Head of the Department**

Mrs.A.Jeevarathinam — **Course Designer**

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Semester III	**PRACTICE FOR SET/NET – GENERAL PAPER**	Hours/Week: -
Self Study Course		Credits: 1
Course Code **23PGOL31**		Internal 100

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: discuss various concepts related to higher education system, teaching, communication, research, ICT and environmental studies.[K2]

CO2: apply the skills of communication, mathematical, internet and research aptitude in competitive examinations. [K3]

CO3: analyse the circumstances, instances, contents and arrive at / choose the Best option. [K3]

CO4: evaluate the data using ICT tools and logical reasoning.[K4]

CO5: develop self-learning activities to face challenges in their life.[K4]

UNIT I

TEACHING & RESEARCH APTITUDE

Teaching: Concept, Objectives, Levels of teaching, Factors affecting teaching, Methods of teaching of Higher learning, Evaluation systems

Research: Meaning, Types, Methods of Research, Steps of Research, Thesis and Article writing, Application of ICT in Research

UNIT II

COMMUNICATION AND HIGHER EDUCATION SYSTEM

Communication: Meaning, Types, Characteristics, Verbal and Non–verbal Communication and Barriers to Communication

Higher Education System: Professional, Technical, Skill Based Education, Value Education, Policies, Governance and Administration

UNIT III

PROSE COMPREHENSION

A text passage followed by a set of questions to be answered based on students' comprehensive ability

UNIT IV

MATHEMATICAL, LOGICAL REASONING AND DATA INTERPRETATION

Mathematical Logical Reasoning: Number series, letter series, Analogies, Venn diagram and Mathematical Aptitude

Data Interpretation: Graphical representation and mapping of Data, Data and Governance

UNIT V

ICT AND ENVIRONMENTAL STUDIES

ICT: General abbreviations, Basics of Internet, E-mail, Digital initiatives in higher education

Environmental Studies: Pollution, Impacts of Pollutants, Natural and energy sources, Natural Disasters and Environmental Protection Act

TEXT BOOKS

Madan KVS (2019), NTA – UGC NET/SET/JRF- Teaching and Research Aptitude, Pearson India Education Services Pvt.Ltd., Noida.

REFERENCES

Jain, Usha Rani. (2018), *UGC-NET* New Delhi: Mital Books India Ltd.

Singh, Rashmiand Asim Khan (2019), *UGC-NET Paper- I*, New Delhi:Disha Publication.

Course code 23PGOL31	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
CO1	3	3	-	-	2	1	-	1
CO2	3	3	1	2	3	2	-	2
CO3	3	2	2	3	3	2	-	2
CO4	3	2	3	3	3	3	-	1
CO5	3	1	2	1	1	3	-	1

Strong(3) Medium (2) Low(1)

Dr.M.C. Maheswari — Mrs. K.Anitha

Dr. V. Navaneethamani — Dr.S. Malathi

Heads of the Departments — **Course Designers**

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN
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VIRUDHUNAGAR
Quality Education with Wisdom and Values

M.Sc. Home Science – Nutrition and Dietetics
(for those who join in 2023-2024)

Semester III	**INTERNSHIP -DIETETICS**	Hours/Week: -	
		Credits: 2	
Course Code **23PHSI31**		Internal 40	External 60

COURSE OUTCOMES

On completion of the course students will be able to

CO1: identify the procedure followed in the dietary department of the hospital, make use of the nutritional assessment techniques and find out the clinical manifestations of the patients.[K3]

CO2:plan and prepare the routine hospital and special feeding diet for the diseased persons based on the diet principles and RDA recommended by ICMR.[K3]

CO3:make use of ICMR recommended RDA value and compute the nutritional value for the planned menu of the diseased persons and prepare the record. [K3]

CO4: analyze the nutritive values for the planned menu and infer the result.[K4]

CO5:recommend the suitable therapeutic diet to overcome the health issues of the patients. [K5]

CONTENT

1. Observation and study of organization and management of the dietary department.
2. Understanding the medical history of the patients, study of case sheets and diagnostic tests used.

3. Planning therapeutic diets and computation of nutritive value.
4. Observation and study of
    a. Purchase storage and issue
    b. Production
    c. Service
    d. Evaluation and follow up
5. Participation in diet counselling units, experience in imparting diet counselling and understanding the records maintained in diet counseling units.
6. develop practical experience in the management of the dietary department and patient counseling for a period of one month

Course Code 23PHSI31	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
	PSO 1.a	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO1	3	3	3	3	3	3	3	3	3	3
CO2	3	3	2	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	2	3
CO4	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3

Dr.D.Vijayarani
Head of the Department

Dr.D.Vijayarani
Course Designer

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M.Sc. Home Science – Nutrition and Dietetics
(for those who join in 2023-2024)

Semester III	**SCIENTIFIC WRITING AND PRESENTATION SKILLS**	Hours/Week: -
Extra Credit Course		Credits: 2
Course Code **23PHSO31**		Internal 100

COURSE OUTCOMES

On completion of the course students will be able to

• develop a framework for scientific writing.

• describe, compare and interpret various means for poster, oral presentation and copy editing.

• evaluate the use of websites, search engine, E-journals and E-library for research

•propose the authenticity of the research article using plagiarism checking software.

UNIT I

Scientific writing - abstract, full paper, clinical update and manuscripts. Process of copy editing journals

UNIT II

Presentation skills – Thematic, poster, oral, principles to be followed for presentation

UNIT III

Computer application for research: Use of Internet in Research –Websites, search Engines, E-journal and E-Library – INFLIBNET, SHODHGANGA. Plagiarism–

Citation and acknowledgement–reproducibility and accountability, Softwares available in the market for plagiarism

REFERENCES

1. Best J W and Kahn J V. (2000). Research in Education, 7th Edition, New Delhi. Prentice Hall of India Pvt. Ltd.,
2. Campbell W G (2008). Form and style in Thesis writing. Boston. Houghton Mifflin Company.
3. Koul L, (2019). Methodology of Educational Research ,5th Edition. New Delhi . Vikas Publishing House Pvt.Ltd.,
4. John W.Best and James V.Kahn (2000). Research in Education, 7th Edition. New Delhi. PrenticeHallofIndiaPvt. Ltd,.
5. Elhance. D. N Veena and Elhance and Agarwal.B.M. (2005). Fundamentals of Statistics,48th Edition. Allahabad. Kitabmahal.
6. Sadhu A N ,Amarjit Singh (1992). Research Methodology in Social Sciences. Himalaya Publishing House. Gurgoan. Mumbai.
7. Marylin Anderson, Pramod K.Nayar, Madhucchandason. (2008). Critical Thinking, Academic Writing and Presentation Skills. India. Pearson Education.

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M.Sc. Home Science – Nutrition and Dietetics
(for those who join in 2023-2024)

Semester IV	**PUBLIC HEALTH NUTRITION**	Hours/Week: 6	
Core Course -10		Credits: 5	
Course Code **23PHSC41**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: outline the concept, objectives and importance of health and nutrition, food security, nutritional surveillance, immunization, health care delivery system, malnutrition, nutritional status, intervention programmes, national and international organizations and nutrition education. [K2]

CO2: identify the factors influencing community nutrition and macro and micro nutrients problems, nutritional and health status, nutrition education and functions of national and international organizations. [K3]

CO3: find the causes and symptoms of nutritional deficiency disorders and nutritional requirement for space mission, sea voyage and army and determine the suitable strategies to overcome the nutritional problems in the community. [K3]

CO4: categorize the health care delivery system and determinants of Health Status, methods of assessing nutritional status, nutrition education, intervention programmes and role of national and international organizations. [K4]

CO5: assess the consequences of macro and micro nutrients problems, strategies to overcome malnutrition in India, activities of national and international programmes and nutrition education programmes. [K4]

UNIT I

Concept of public nutrition

Nutrition and Health in National Development

Relationship between health and nutrition, National Health Care Delivery System,

Determinants of Health Status, Indicators of Health.

Nutritional deficiency disorders in India -Prevalence, Etiology, Symptoms, Current status and Recent updates- PEM, VADD, IDD, Anemia.

Nutrition and infection

Role of public nutritionists in the health care delivery system. (18 hours)

UNIT II

Assessment of Nutritional Status

Direct methods: Direct methods of Nutritional assessment, Nutritional anthropometry, biochemical, clinical and dietary assessment and Growth charts

- plotting of growth charts, growth monitoring and promotion (GMP).

Indirect methods: Demography, population dynamics and vital health statistics and their health implications. Food balance sheets, recent nutritional assessment methods- MUST, SGA, SOAP. Indicators of health and nutrition. Causes of Malnutrition- Vicious cycle of malnutrition

Basic concepts of Nutritional Surveillance- Millennium Development Goals (MDG)

(18 hours)

UNIT III

Strategies for Improving Nutrition Status and Health Status of the Community

Immunization: Awareness, types of vaccines, Importance and schedule of Immunization.

Measures to overcome malnutrition in India

Food Security -Concepts, Meaning and significance, Food security act. Food fortification and Food enrichment, Genetic improvement of foods, National nutrition policy and action plan

Nutrition intervention programmes - Mid day Meal Programme, Balwadi Feeding Programme. Public Distribution System (PDS), Antyodaya Anna Yojana (AAY), Annapurna Scheme, Food for Work Programme, Special Nutrition Programme,

Nutrition Intervention Schemes and programmes operating in India- Control programmes - National Nutrition Mission, Anaemia Mukt Bharat,Vitamin A and Protein Calorie Deficit.

Environmental sanitation and health (18 hours)

UNIT IV

Organizations to Combat malnutrition and nutrition During Emergencies and Special Conditions

International organizations concerned with food and nutrition FAO, WHO, UNICEF, AFPRO, CWS, CRS, World Bank.

National organizations – NIN, CFTRI, ICMR, ICAR, CFTRI, CHEB, NIPCCD, DFRL, NGOs.

Nutritional deficiency diseases in emergencies- Major and micro nutrient. Control of communicable diseases in emergencies- Factors responsible for spread of communicable disease, mode of transmission and prevention of chicken pox, malaria, swine flu, tuberculosis, COVID-19 and AIDS.

Nutritional requirements in special conditions: Nutritional requirement for space mission, sea voyage and army. (18 hours)

UNIT V

Nutrition Education and Extension of Better Nutrition

Nutrition education for the community –Objectives, Definition and Importance of nutrition education to the community, Principles of planning, executing and evaluating nutrition education programmes.

Conventional and Modern Technology -Charts, flip chart, posters, flannel board, models, puppets and Modern techniques in teaching. (18 hours)

ACTIVITY

1. Planning and evaluation of nutrition education programmes in community. Preparation of communication aids for different groups.
2. Development of low-cost recipes for infants, pre-schoolers, elementary school children, adolescents, pregnant and lactating mothers.
3. Field visits to ongoing national nutrition programmes.

TEXT BOOKS

1. Park, K. (2013). Text Book of Preventive and Social medicine. M/s.BanarsidasBhanot Publishers, Jabalpur. 22nd Edition.

2. Suryatapa Das (2020). Textbook of Community Nutrition. Academic Publishers, Kolkata. 4th Edition
3. Srilakshmi, B (2017). Nutrition Science. New Age International Publishers. Multi Colour 6th Edition.
4. Connolly, M.A. (2005). Communicable Disease Control in Emergencies: WHO, WHO Library Cataloguing-in-Publication Data.
5. WHO (2002). The management of Nutrition in Major Emergencies. Published by AITBS Publishers, New Delhi.

REFERENCES

1. Bamji,S.(2019). Text Book of Human Nutrition, 4th Edition, New Delhi:Oxford Publishing
2. Pvt .Ltd.
3. Darshan,S. (2011). Nutrition, India: Vikas and Company.
4. Park,K.(2011). Textbook of Preventive and Social Medicine, 21st Edition. India: Banarasi
5. das Bhanot Publishers.
6. Roday. S, (2011). Food Hygiene and Sanitation, 2nd Edition, New Delhi: TATA McGraw – Hill Publishing Company Limited.
7. MuthuVK (2014). A Short Book of Public Health, 2nd Edition Jaypee Brothers Medical Publishers.
8. Dr.SrridharRao B (2018). Principles of Community Medicine, 6th Edition. AITBS Publishers India.
9. Scott M. Smith, Sara R. Zwart and Martina Heer (2014). Human Adaptation to Space Flight: The role of nutrition. NASA Publication.
10. Owen, A.Y. and Frackle, R.T., (2002). Nutrition in the Community. 2nd Edition. The Art of Delivering Services. Times Mirror/Mosby.
11. Carolyn D. Berdanier Johanna T. Dwyer David Heber (2014). Handbook of Nutrition and Food, 3rd Edition. CRC Press, New York.

e- LEARNING RESOURSES:

https://apps.who.int/irishttp://egyankosh.ac.in/bitstream/123456789/33312/1/Unit-18.pdfhttps://www.seafarerswelfare.org/assets/documents/ship/SHIP-HealthyFood_A5_20151209_LR.pdf

Course Code	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
23PHSC41	**PSO 1.a**	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO1	2	2	2	-	-	-	3	2	-	-
CO2	2	2	2	3	3	3	3	3	-	-
CO3	3	3	3	3	3	3	3	3	-	-
CO4	3	3	2	2	2	2	3	3	-	-
CO5	2	2	3	3	3	3	2	2	-	-

Strong (3) Medium (2) Low (1)

Dr.D.Vijayarani — **Head of the Department**

Mrs.B.Ameena Beebi — **Course Designer**

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M.Sc. HOME SCIENCE - NUTRITION AND DIETETICS
(for those who join in 2023-2024)

Semester IV	**ADVANCED FOOD SERVICE MANAGEMENT**	Hours/Week: 6	
Core Course -11		Credits: 5	
Course Code		Internal	External
23PHSC42		25	75

COURSE OUTCOMES

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

CO1: describe the history, concept, setting and planning, quantity food production and service, hygiene, sanitation and safety in food service establishments. [K2]

CO2: find the different types of food service establishment, storage areas, menus, styles of service, delivery service system, accidents and planning in food service establishments. [K3]

CO3: identify the procedure for food and personnel management, laws of food service management, factors influencing menu planning and safety in food service establishments.[K3]

CO4: analyze the functions of management, menu planning and safety measures in food service establishments. [K4]

CO5: focus on the method of purchasing, storage, receiving of food, menu planning and safe handling of food in food service establishments.[K4]

UNIT I

History, Development of Food Service System, Menu Planning

History and development, recent trends, types of food service establishments, commercial establishments, non-commercial establishments, understanding management, approaches to food service management

Menu planning – importance, definition, need use and function Knowledge and skills required for planning menu, Types of menu and its applications Steps in menu planning and its evaluation, construction of menu, characteristics of a good menu, displaying a menu and evaluation of menu. (18 hours)

UNIT II

Purchase and Storage, Quality and Food Production

Mode of purchasing, centralized purchasing, group purchasing, methods of purchasing, identifying needs and amounts to buy, minimum stock level, maximum stock level, receiving and inspecting deliveries

Storage space, dry storage, low temperature storage, store room management

Production control, use of standardized recipes, developing a program for recipe standardization, safeguard in food production, quality control in food preparation and cooking**.** (18 hours)

UNIT III

Food Management: Delivery and Service Styles

Methods of delivery service system- centralized delivery system, decentralized delivery system, conventional food service system, commissary food service system - ready prepared food service system, assembly service system

Different types of service in food service establishments- table and counter service, self-service, tray service, types of service in a restaurant, silver service, plate service cafeteria service, and buffet service. specialized forms of service, hospital tray service, airline tray service, rail service, home delivery, catering and banquet, floor/room service, lounge service. (18 hours)

UNIT IV

Personnel Management, Work Place Safety

Definition of leadership, components approaches, qualities, leadership styles recruitment, selection and induction, Employee facilities and benefits , laws governing employees, work productivity improvement measures , Training and development.

Hygiene and sanitary practices, types of accidents , precautions to prevent accidents ,

Garbage and refuse sanitation- inside and outside storage , Pest control- pests, signs of infestation and Integrated Pest Management (IPM) Laws governing food service establishment. (18 hours)

UNIT V

Setting Up and Planning Food Service Unit

Layout and design – Phases of planning layout-developing a prospectus, Determining work centers equipment, Factors influencing layout design, Architectural features, evaluation of plan , Energy and time management .

Planning- steps and types of planning, Preparing a planning guide , Registration of unit , Application for a licence , Rules regarding grading of hotels and restaurants, Loan facilities for startup. (18 hours)

- **Visit to a hotel**

TEXTBOOKS

1. Suganthi,M. and Kumari, P. (2017). Food Service Management. Chennai: Dipti press PVT Ltd.
2. Mohini,S. and Surjeet,M. (2018). Catering Management and Integrated Approach. 3rd Edition, New Delhi: Wiley Eastern Ltd.
3. Mohini Sethi. (2008). Institutional Food Management. New Delhi. New Age Publications.
4. June Payne-Palacio, Monica Theis. (2011). Food Service Management: Principles and Practices. Prentice Hall
5. Sudhir Andrews. (2013). Food and Beverage Service - Training Manual. Tata McGraw Hill Publishing Co.
6. Bessie B and West Le Wood. (1986). Food Service in Institutions. 6th Ed. Macmillan Publishing Co.

REFERENCES

1. Mohinder Chand. (2009). Managing Hospitality Operations. 1st Edition, New Delhi. Anmol Publications Pvt. Ltd.

2. Goel S.L. (2009). Health Care System and Hospital Administration. Vol.7. Deep and Deep Publications Pvt. Ltd.

3. Kalkar S .A. (2010). Hospital Information Systems. Published by AsokeK. Ghosh, PHI Learning Pvt. Ltd.

3. Shring Y, P. (2001). Effective Food Service Management, New Delhi, Anmol publications Pvt Ltd.,

5. Stephen, B. Williams, S, R. Bill Jardine and Richard, J, N. (2001). Introduction to Catering, Ingredients for Success, Delmar- Thomson learning.

6. Yadav,C, P. (2003). Management of Hotel and Catering Industry, New Delhi, Anmol Publications Pvt. Ltd.

E LEARNING RESOURCES

https://seafoodacademy.org/pdfs/haccp-training-folder-contents-_v2.pdf

https://psu.pb.unizin.org/hmd329/chapter/ch4/

https://www.plantautomation-technology.com/articles/types-of-food-processing-equipment

https://dmi.gov.in/GradesStandard.aspx

https://www.fssai.gov.in/cms/food-safety-and-standards-regulations.php

Course Code	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
23PHSC42	**PSO 1.a**	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO1	3	1	2	-	-	-	1	1	1	1
CO2	3	1	2	2	1	2	1	2	1	1
CO3	3	2	2	2	3	2	1	2	1	1
CO4	3	2	3	2	2	3	1	2	1	1
CO5	3	3	3	3	3	3	2	3	1	3

Strong (3) Medium (2) Low (1)

Dr.D.Vijayarani — **Head of the Department**

Mrs. R.Subha — **Course Designer**

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M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS
(for those who join in 2023-2024)

Semester IV	**PROJECT**	Hours/Week : 6	
Core Course -12		Credits : 5	
Course Code **23PHSC41PR**		Internal 40	External 60

COURSE OUTCOMES

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

CO1: find out the existing problems of the community based on the secondary data and construct the objectives.[K3]

CO2:plan the research design, write the methodology for the study and carry out it.[K3]

CO3: make use of the collected data and statistical tools to interpret the data and prepare the research report.[K3]

CO4: analyze the results and infer it.[K4]

CO5: defend the research findings.[K5]

The Project work should be done in the IV Semester. Students have to submit their thesis and they have to appear the viva voce Examination.

Course Code 23PHSC41PR	PO1		PO2	PO3		PO4	PO5	PO6	PO7	PO8
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8
CO1	3	3	3	3	3	3	3	3	-	1
CO2	3	3	3	3	3	3	3	3	-	3
CO3	3	3	3	3	3	3	3	3	-	3
CO4	3	3	3	3	3	3	3	3	-	3
CO5	3	3	3	3	3	3	3	3	-	3

Strong (3) Medium (2) Low (1)

Dr.D.Vijayarani
Head of the Department

Dr.D.Vijayarani
Course Designer

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M.Sc. HOME SCIENCE - NUTRITION AND DIETETICS
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Semester IV	**FOOD PRODUCT DEVELOPMENT**	Hours/Week: 6	
Elective Course – 4 (DSEC)		Credits: 5	
Course Code **23PHSE41**		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: describe the concept of new food product, sensory evaluation, packaging, labeling, quality control, pricing and marketing of food items. [K2]

CO2: apply a product development process to generate ideas, design and develop the new food products.[K3]

CO3: find the techniques involved in packaging, labelling, pricing and marketing the new food products.[K3]

CO4: analyse the quality of the food products. [K4]

CO5: examine the food regulation and standards at the national and international levels and focus on availing patents for the newly developed food products.[K4]

UNIT I

Introduction to New Food Product Development

Definition, significance of product development, food needs and consumer preferences, market survey and designing a questionnaire to find consumer needs for a product.

Steps involved in product development, formulation of nutritious food products and standardization, Factors that influence new product development success,

Intellectual Property Rights and patenting of foods. (18 hours)

UNIT II

Sensory Evaluation of the Product

Assessing the sensory characteristics of food - colour, texture, harma, odor and taste. Sensory evaluation of foods – Laboratory set up, equipment, panel selection and training, judging quality.

Subjective evaluation techniques – Difference tests: paired comparison test, duo-trio test, triangle test. Rating tests – Ranking single sample, two samples and multiple samples.

Objective tests to assess the sensory properties of foods. (18 hours)

UNIT III

Essentials of Food Packaging

Importance, definition, principles design requirement and basic FSSAI laws governing food packaging.

Selection criteria and types of packaging material – metal, glass, paper, plastic, edible and wooden. Packages with special features – Boil-in-bag package, plastic-shrink package, cryovac film, microwave oven packaging, aseptic packaging and distribution packaging. (18 hours)

UNIT IV

Product Labelling and Regulations

Definition,purpose, importance, Function ,Nutritional information and laws governing product labelling.

Types of labelling – smart labels, barcode labels, radioactive labels, antimicrobial labels, security labels and other specialized food labels.

Standards and regulations for nutrition harming and Nutrition claims in food labels.

(18 hours)

Unit V

Quality Control, Pricing and Marketing

Analyzing the product stability, evaluation of shelf life, determining the changes in sensory attributes due to environmental conditions.

Pricing a product , Methods of pricing-cost plus pricing, Demand pricing, Competitive pricing ,mark up pricing, Principles of pricing, determining the selling price and profit margin, price bundling, promotional pricing and quantity discounts. Advertising and marketing strategies- Basic techniques, Food advertising regulations ,Marketing mix "four P's". (18 hours)

ACTIVITY

Conduct a market survey and develop a new food product based on the needs of your target audience. Conduct sensory analysis tests for the formulated product. Identify a suitable packaging material and design a label for your product. Determine the selling price and devise any two marketing strategies to promote your product.

TEXTBOOKS

Pillai R.S.N & Bagavathi. (2015).*Modern Marketing*, New Delhi: S.Chand and Company Ltd.

Gupta, S.L. (2004), Product Development, NewDelhi: Wisdom Publications.

Reddy S M. (2003) .*Basic food science and technology* . New age publisher.

Subbulakshmi G and Udipi A Shobha .(2017). *Food processing and preservation*. 1st edition.New age publisher.

Manay S and Shadaksharamasamy. (2009) .*Food: Facts and Principles*. New Age International (P) Publishers New Delhi.

Avantina Sharma. (2017) *Text book of food science and Technology*. 3rd edition CBSOU Publishers and distributers Ltd.

REFERENCES

1. Lyon D H and Francombe M A and Hasdell T A Lawson . (2002) .*Guidelines for Sensory Analysis in Food Products Development and Quality Control* .Chepman and Hall London. 1st edition.
2. Fuller G W. (1994). New Food Product Development from Concept to Market Place. RC Press New York. 2ndedition .
3. Man C M D andJomes A A. (1994) . Shelf Life Evaluation of Foods. Blackie Academic and Professional London. 2nd edition.

4. Frewer L And Van TrijpH .(2007). Understanding consumers of food products. Florida USACRC Press.1st edition.
5. Srilakshmi,B. (2015).Food Science, New Delhi: New Age International Ltd.
6. Early, R. (1995). Guide to Quality Management Systems for the Food Industry, London: Blackie, Academic and Professional.
7. Gould, W.A. and Gould, R.W. (1998). Total Quality Assurance for the Food Industries, Baltimore: CTI publications Inc.
8. Askar, A. and Treptow, H. (1993). Quality Assurance in Tropical Fruit Processing, Berlin: Springer-Verlag.
9. Parmar, M. (2014). Food Safety and Preservation, New Delhi: Black Prints.

E RESOURCES

https://www.fssai.gov.in/

https://nzifst.org.nz/resources/foodproductdevelopmenthttps://nzifst.org.nz/resources/foodproductdevelopment/Chapter-3-1-2.htmhttps://www.fssai.gov.in/

https://theintactone.com/2019/07/23/im-u3-topic-3-packaging-and-labelling/

Course Code	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
23PHSE41	PSO 1.a	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO1	3	3	3	3	3	3	3	2	-	1
CO2	3	3	3	3	3	3	3	2	-	1
CO3	3	3	2	2	3	3	3	2	-	1
CO4	3	3	2	2	3	3	3	3	-	2
CO5	3	3	3	3	3	3	3	3	-	2

Strong (3) Medium (2) Low (1)

Dr.D.Vijayarani

Dr.D.Vijayarani Dr.S.Mathangi

Head of the Department **Course Designers**

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M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS
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Semester IV	**STATISTICS AND COMPUTER APPLICATIONS**	Hours/Week: 6	
Discipline Specific Elective Course - 3		Credits: 5	
Course Code **23PHSE42**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: explain the concepts of frequency distribution, classification and tabulation of data, statistical analysis and statistical tool packages. [K2]

CO2 : write the formulae and steps involved in the calculation of various statistical analysis by using various methods. [K3]

CO3: compute the statistical data using measures of central tendency, dispersion, parametric and non parametric methods. [K3]

CO4: analyse the properties, applications, merits and demerits of various statistical methods. [K4]

CO5: interpret the statistical skills in MS office and SPSS package for analyzing the data. [K4]

UNIT I

Classification and tabulation of data, frequency distribution, measures of central tendency and dispersion: Arithmetic mean – median – mode, measures of dispersion – range, quartile deviation, mean deviation, standard deviation. Co-efficient of variation. Binomial distribution and normal distribution. (18 Hours)

UNIT II

Parametric test – t-test, 'f'- test and ANOVA - Advantages and limitations.

Non-parametric test –chi-square, mann-whitney U test, kruskal-wallis or H- test – advantages and limitations. Response Surface Methodology (RSM)

Testing of hypothesis. (18 Hours)

UNIT III

Correlation analysis – definition, properties, significance, causation, types, methods - Karlpearson's and Spearman's rank correlation - merits and limitations.

Regression analysis– definition, uses, regression lines, regression equations, limitations- correlation and regression differences.

Trend analysis and factor analysis. (18 Hours)

UNIT IV

MS word – introduction-menubar, toolbar, formatting, tables, mail merge, short cut keys

MS Excel- introduction, editing, formatting, functions and chart

MS Power point-menu, toolbar, working with power point. (18 Hours)

UNIT V

SPSS - introduction, menu commands and sub-commands, basic steps in data analysis -defining, editing and entering data, data file management functions, running a preliminary analysis-six characteristics of a data set, data transformation, graphical presentation of data. (18 Hours)

REFERENCE BOOKS

1. Agarwal,B.L. (2018). *Basic Statistics*, New Delhi: New Age International Publishers.
2. Gupta, S.P. (2005). *Statistical Methods*, New Delhi: Sultan Chand and Sons.
3. Gurumani,N. (2005). *An Introduction to Biostatistics*, Chennai: MJP Publishers.
4. Khan,(2004). *Fundamentals of Biostatistics*, Hyderabad: Ukaaz Publications.
5. NellaiKannan, C .(2012).*MS-Office*, Thirunelveli: Nels Publications.
6. Pillai, R.S.N. (2005).*Statistics*, New Delhi: Chand and Company Ltd.
7. Rajathi, A. and Chandran, P. (2010). *SPSS for You*, Chennai: MJP Publishers.

8. Subathra,R. (2006).*Probability and Statistics*, Pune :Tech Max Publications.

Course Code	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
23PHSE42	**PSO 1.a**	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO1	3	3	2	2	2	2	2	1	-	-
CO2	3	3	2	3	3	3	3	1	-	-
CO3	3	3	2	3	3	3	3	1	-	-
CO4	3	3	3	3	3	3	3	1	-	-
CO5	3	3	3	3	3	3	3	1	-	-

Strong (3) Medium (2) Low (1)

Dr.D.Vijayarani — **Head of the Department**

Dr.S.Mathangi — **Course Designer**

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN
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VIRUDHUNAGAR
Quality Education with Wisdom and Values

M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS
(for those who join in 2023-2024)

Semester IV	**FOOD PACKAGING TECHNOLOGY**	Hours/Week:6	
Elective Course –3		Credits: 5	
Course Code **23PHSE43**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: describe the concept and functions of packaging, methods of packaging, packaging laws, types of packaging materials and its requirements for food items. [K2]

CO2: plan the packaging environment and laws needed for packing various food items safely. [K3]

CO3: apply the principles involved in food packaging, packaging materials, methods of packaging and packaging of various food items. [K3]

CO4: categories the levels of packaging, packaging methods, food regulations and packaging requirements for various food items. [K4]

CO5: analyse the pros and cons of various packaging materials and methods of packaging by following the food standards. [K4]

UNIT I

Introduction to Food Packaging – definition, levels of packaging, functions of packaging, need of food packaging, packaging environment. (18 Hours)

UNIT II

Flexible Packaging Materials – paper, edible films, aluminium foils and laminations.

Semi rigid packaging materials – aluminium containers, paper board cartons, folding paper board cartons, molded pulp and plastic containers.

Rigid packaging materials – glass containers, composite containers, cans, aerosol containers, solid and corrugated fibre board containers – wooden boxes and crates, shipping containers.

Caps, closures, wads, adhesives, inks, lacquers, cushioning materials and reinforcements. Labeling – evaluations of packaging materials, labeling requirements for trade. (18 Hours)

UNIT III

Packaging material and requirements - food grains and food grain products, fruits and vegetables, meat, fish and poultry products, milk and milk products, fats and oils, bakery and confectionary products, stimulant foods, spices and condiment (18 Hours)

UNIT IV

Methods of packaging -Controlled Atmosphere Packaging (CAP), Modified Atmosphere Packaging (MAP), vacuum packaging, aseptic packaging, retort packaging, bag – in- box packaging. (18 Hours)

UNIT V

Packaging laws and regulations – CODEX Alimentarius - SWMA rules – PFA rules – FPO rules –MFPO rules – Edible oil packaging order - AGMARK rules. (18 Hours)

REFERENCE BOOKS

1. EIRI board of consultants and engineers, (2006). Handbook of *Food Packaging Technology*, New Delhi: Engineers India Research Institute.
2. Han, J.H. (2005). *Innovation in Food Packaging*, California: Elsevier Academic Press.
3. Jacob John, P. (2010). *Handbook on Food Packaging*, New Delhi: Daya Publishing House.
4. NIIR. (2010). *Handbook on Modern Packaging Industries*, 2nd Edition, New Delhi: Asia Pacific Business Press.
5. Robertson, G.L. (1992). *Food Packaging Principles and Practices*, New York: Marcel Dekker, Inc.

Course Code	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
23PHSE43	**PSO 1.a**	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
CO1	3	3	3	1	1	2	1	1	-	2
CO2	3	3	3	3	3	3	2	1	-	2
CO3	3	3	3	3	3	3	3	1	-	2
CO4	3	3	3	3	3	3	3	1	-	3
CO5	3	3	3	3	3	3	3	2	-	3

Strong (3) Medium (2) Low (1)

Dr.D.Vijayarani

Dr.D.Vijayarani Dr.S.Mathangi

Head of the Department **Course Designers**

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M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS
(for those who join in 2023-2024)

Semester: IV	**HOME SCIENCE FOR COMPETITIVE EXAMINATIONS**	Hours/Week:6	
SEC- 2 Professional Competency Skill		Credits: 3	
Course Code - **23PHSS41**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: describe the concepts of Food Science, Nutrition, Dietetics and Institutional management, Textiles and Apparel Designing, Family Resource Management and Housing, Human development and family studies , Extension Education and Community Development .[K1]

CO2: Explain the role of nutrition in health, microorganism in food spoilage, design in apparel making, resources in home management, peers, family, school, community and culture on child development and teaching aids in community development. [K2]

CO3: write the scientific principles of various aspects in branches of Home Science in their day today life. [K2]

CO4: determine the scientific skills in the management of resources and develop basic skills for career options in the fields of dietetics, preschool education, interior designing, textiles and clothing and extension education. [K3]

CO5: assess the various aspects in the branches of Home Science for healthy human upliftment and community. [K4]

UNIT I

Food, Nutrition, Dietetics and Institutional Management

Food groups – balanced diet, food pyramid, macro and micro. Properties of food – physical and chemical properties .Quality evaluation of foods- objectives and Food pigments and Additives. Food standards, microbiological safety of food, HACCP, food. Nutrients-role of

nutrients in the body, nutrient deficiencies and requirements for different age groups. Diet Counselling and Management.

Perspectives of food service -menu planning and food cost analysis. Food service management of institutional level-hospital, educational, social and special institutions.

(18 hours)

UNIT II

Textiles and Apparel Designing

Body measurements-procedure, needs, figure types and anthropometry. Equipment and tools used for manufacturing garments-advancements and attachments used for sewing. Types of machines used and their parts. Elements and principles of design and its application to apparel. Illustrations and parts of Garments. Fashion-Terminologies, fashion cycle, fashion theories, fashion adoption, fashion forecasting and factors affecting fashion. (18 hours)

UNIT III

Family Resource Management and Housing

Functions of management-planning, supervision, controlling, organizing, evaluation, use of resources. Space planning and design-housing need and important, principles of planning spaces, types of house plans, economy in construction, planning for different income groups. Building regulations-norms and standards, zoning, housing for special groups and areas and housing finance. (18 hours)

UNIT IV

Human Development and Family Studies

Theories of human development and behavior. Influence of family, peers, school, community and culture on personality development of the children. Dynamics of marriage and family relationships. Family welfare approaches, programmes and challenges, role in national Development. Domestic violence, marital disharmony, conflict, resolution of conflicts.

Parent education, positive parenting, community education. Family disorganization, single parent families.

Pre-school education – meaning, importance, objectives, types and programme planning

(18 hours)

UNIT V

Extension Education and Community Development

Historical perspectives of extension–genesis of extension education and extension systems in India and other countries, Programme management- need assessment, situation analysis, planning, organization, implementation, monitoring and evaluation.

Extension methods and materials- interpersonal, small and large group methods, audiovisual aids-need, importance, planning, classification, preparation and field testing, use and evaluation of audio-visual materials.

Curriculum development and planning for extension education and development activities, Bloom's taxonomy of educational objectives and learning. (18 hours)

REFERENCES

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2. Berk, L.E. (2007). Development through the Life Span, New Delhi:Pearson Education.
3. Dahama,O.P. and Bhatnagar,O.P. (1985). *Education and Communication for Development,* New Delhi: Oxford and IBH publishing Co pvt Ltd.
4. Dantyagi, S. (1980).*Fundamentals of Textiles and their Care*, New Delhi: Orient Longman Ltd.
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8. Goldstein,H. and Goldstein,V.(1958*). Art in Everyday Life*, U.S.A: Macmillan Company.
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12. Mohini,S. and Surjeet,M.(1993). *Catering Management and Integrated Approach*, New Delhi: Wiley Eastern Ltd.
13. Nickell, P. and Dorsey, J.M. (1978). *Management in Family Living*, New Delhi: John Wiley and sons.
14. Paul,S. (2005). *Textbook of Bio-Nutrition, Curing Diseases through Diet*, 1st Edition, India: CBS Publications.
15. Potter,N.N. and Hotchkiss,J.H. (2006). *Food Science*, New Delhi: CBS Publishers.
16. Premlata.M, (2012).*Textbook of Home Science*, New Delhi: Kalyani Publications.
17. Reddy, A. A. (1971). *Extension Education*, Andhra Pradesh: Sri Lakshmi Press.
18. Robinson,C.H. (1986). *Normal and Therapeutic Nutrition*, 17th Edition, U.S.A: Macmillan Publishing Co.
19. Shuchi, R. (2018). *UGC NET/SET (JRF& LS) Home Science Paper II and III*, New Delhi: Arihant Publications (India) Limited.
20. Srilakshmi, B. (2018). *Dietetics*, 7th Edition, New Delhi: New Age International Ltd.
21. Suganthi,M. and kumari, P.(2017). *Food Service Management*, Chennai: Dipti press PVT Ltd.
22. Suriakanthi, A. (2005). *Child Development an Introduction*, Tamilnadu: Kavitha Publications.
23. Swaminathan, M. (2018). *Essentials of Food and Nutrition*, Vol I & II. Bangalore: The Bangalore printing and Publishing Co Ltd.
24. Varghese, M.A., Ogale, N. N. and Srinivasan, K. (2000). *Home Management*, New Delhi: New Age International (P) Limited Publishers.

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23PHSS41	**PSO 1.a**	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**
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CO3	3	3	3	3	3	3	3	3	-	2
CO4	3	3	3	3	3	3	3	3	-	3
CO5	3	3	3	3	3	3	3	3	-	3

Strong (3) Medium (2) Low (1)

Dr.D.Vijayarani
Head of the Department

Dr.D.Vijayarani
Mrs.S.Balasaraswathi
Course Designers