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 2024 - 2025)

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)
(2024-2025 onwards)

PG PROGRAMMES

Name of the Course	Course Code	Department
Introduction to Epigraphy	24PHIN21	History
Functional English	24PENN21	English
தமிழ் இலக்கிய வரலாறு	24PTAN21	Tamil
Taxation Concepts and Assessment	24PCON21	Commerce
Entrepreneurship Development	24PBAN21	Business Administration
Mathematics for Life Sciences	24PMTN21	Mathematics
Solid Waste Management	24PPHN21	Physics
Chemistry in Everyday Life	24PCHN21	Chemistry
Food Preservation	24PHSN21	Home Science - Nutrition and Dietetics
Nutritional Biochemistry	24PBCN21	Biochemistry
Tissue engineering	24PBON21	Biotechnology
Web Programming	24PCSN21	Computer Science
Fundamentals of Web Design	24PCAN21	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. Italso 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 professional and ethical standards in their concerned fields and work with social concern, in promoting the health status of the family 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

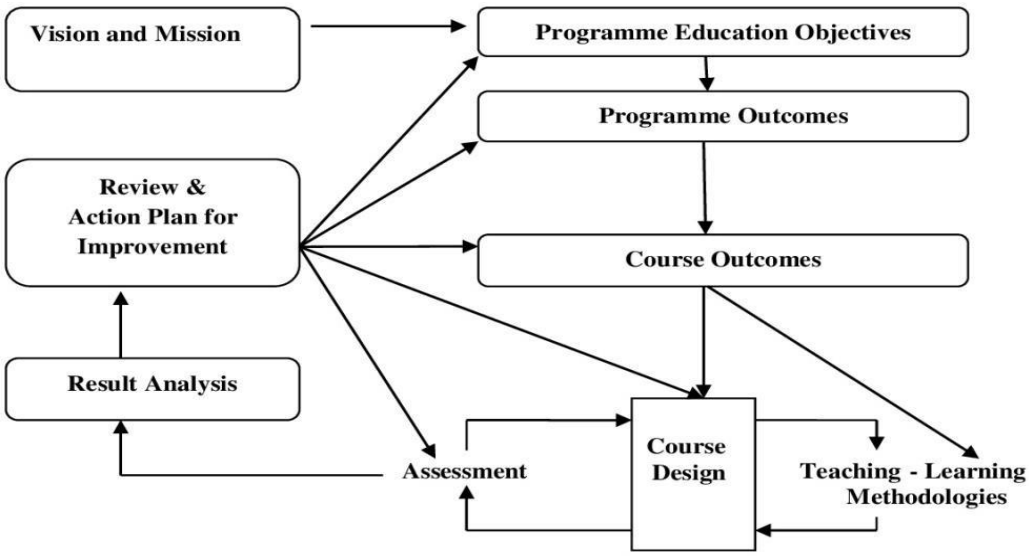
Attainment of PEOs can be measured by a PO-PEO matrix. PEOs should evolve through constant feedback from alumnae, students, industry, management, *etc*. It is mandatory that each PEO should be mapped to at least one of the Pos.

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)

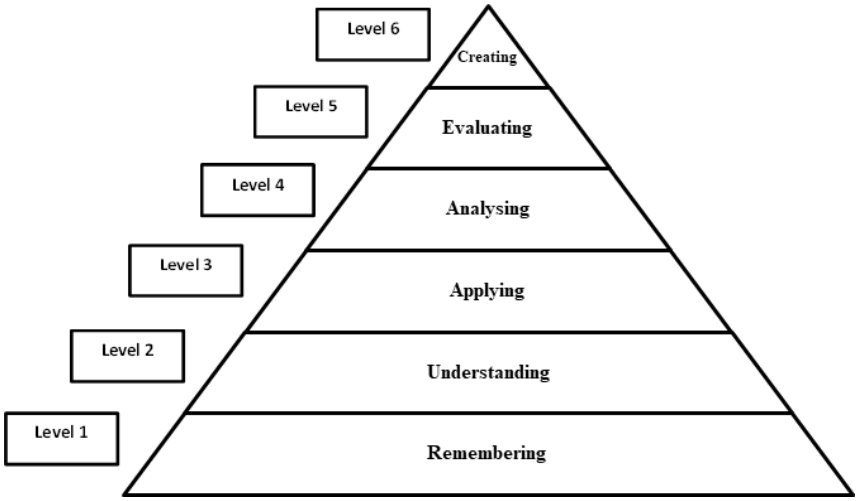
Course Outcomes are narrow statements restricted to the course contents given in five units. Course Outcomes describe what students would be capable of, after learningthe contents of the Course. They reflect the level of knowledge gained, skills acquired and attributes developed by the students after 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 comprehensive assessment 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 of two 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
Periodic Test	:	30
Record Performance	:	10
Total	**:**	**40**

Periodic Test - Average of the best two 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
Periodic Test	:	30
Record Performance	:	10
Total	:	**40**

Periodic Test - Average of the best two 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 CoreCourses, 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 arepermitted 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
	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

POs	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
(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

MASTER OF HOME SCIENCE –NUTRITION AND DIETETICS

Outcome Based Education with Choice Based Credit System
Programme Structure - Allotment of Hours and Credits
For those who join in 2024-2025

Components	Semester				Total Number of Hours (Credits)
	I	II	III	IV	
Core Course	6 (5)	6 (5)	6 (5)	6 (5)	24 (20)
Core Course	6 (5)	6 (5)	6 (5)	6 (5)	24 (20)
Core Course	-	-	6 (5)	-	6 (5)
Core Course Practical	6 (4)	6 (4)	6 (4)	-	18 (12)
Project	-	-	-	6 (5)	6(5)
Elective Course (DSEC)	6 (3)	4 (3)	3 (3)	-	13 (9)
Elective Course (Generic)	6 (3)	4 (3)	-	-	10 (6)
Elective Course(NME)	-	4 (2)	3 (2)	-	7 (4)
Elective Course- (Industry / Entrepreneurship) 20% Theory 80 % Practical	-	-		6 (3)	6 (3)
Skill Enhancement Course/ Professional Competency Skill	-	-	-	6 (3)	6 (3)
Self Study Course	-	-	0 (1)	-	0 (1)
Internship/Industrial Activity	-	-	0 (2)	-	0 (2)
Extension Activity	-	-	-	0 (1)	0 (1)
Total	**30 (20)**	**30 (22)**	**30 (27)**	**30 (22)**	**120 (91)**
Extra Credit Course(Optional) - Offered by the Department	0(2)	-	-	-	-
Extra Credit Course(Optional) - MOOC	-	-	-	-	Limited to a maximum of 15 credits

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

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

For those who join in 2024- 2025

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	24PHSC11	6	5	3	25	75	100
2	Core Course -2	Macronutrients	24PHSC12	6	5	3	25	75	100
3.	Core Course -3 Practical - 1	Advanced Food Science Practical	24PHSC11P	6	4	3	40	60	100
4.	Elective Course – 1 (DSEC)	Food Processing and Technology	24PHSE11	6	3	3	25	75	100
5.	Elective Course – 2 (Generic)	Advanced Human Physiology	24PHSE12	6	3	3	25	75	100
			Total	**30**	**20**				**500**

6.	Extra Credit Course	Principles of Menu Planning	24PHSO11	-	2	3	100	-	100

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	Advanced Dietetics	24PHSC21	6	5	3	25	75	100
2	Core Course -5	Research Methods in Nutrition	24PHSC22	6	5	3	25	75	100
3.	Core Course -6 Practical- 2	Advanced Dietetics Practical	24PHSC21P	6	4	3	40	60	100
4.	Elective Course -3 (DSEC)	Nutritional Biochemistry	24PHSE21	4	3	3	25	75	100
5	Elective Course – 4 (Generic)	Perspectives of Home Science	24PHSE22	4	3	3	25	75	100
6	Elective Course – 5 (NME)	Food Preservation	24PHSN21	4	2	3	25	75	100
Total				**30**	**22**				**600**

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	Micronutrients	24PHSC31	6	5	3	25	75	100
2	Core Course - 8	Performance Nutrition	24PHSC32	6	5	3	25	75	100
3.	Core Course -9	Food Product Development	24PHSC33	6	5	3	25	75	100
4.	Core Course - 10 Practical-3	Techniques in Food Analysis Practical	24PHSC31P	6	4	3	40	60	100
5.	Elective Course-6 (DSEC)	Food Microbiology	24PHSE31	3	3	3	25	75	100
6.	Elective Course -7 (NME)	Nutrition and Health	24PHSN31	3	2	3	25	75	100
7.	Self Study Course	Practice for SET/NET General Paper - Online	24PGOL31	-	1	2	100	-	100
8.	Internship / Industrial Activity	Internship - Dietetics	24PHSI31	-	2	-	40	60	100
			Total	**30**	**27**				**800**

SEMESTER IV

S. No.	Components	Title of the Course	Course Code	Hours Per Week	Credits	Exam. Hours	Marks		
							Int.	Ext.	Total
1.	Core Course -11	Public Health Nutrition	24PHSC41	6	5	3	25	75	100
2	Core Course -12	Advanced Food Service Management	24PHSC42	6	5	3	25	75	100
3.	Project	Project	24PHSC41PR	6	5	-	40	60	100
4.	Elective Course-8 (Industry/ Entrepreneurship)	Entrepreneurial Skill Development Practical	24PHSE41P	6	3	3	40	60	100
5	Skill Enhancement Course / Professional Competency Skill	Home Science for Competitive Examinations	24PHSS41	6	3	3	25	75	100
6	Extension Activity			-	1	-	100	-	100
			Total	**30**	**22**				**600**

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

M.Sc. Home Science – Nutrition and Dietetics
(for those who join in 2024-2025)

Semester I	**ADVANCED FOOD SCIENCE**	Hours/Week: 6	
Core Course- 1		Credits: 5	
Course Code 24PHSC11		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.

Cereal 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

Pulse 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: 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. (2020). *Food Science*. New Age International (P) Ltd. Publishers.
2. S.M. Reddy (2015). *Basic Food science and technology*. New Age International publishers.
3. Avantina Sharma (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 Servet GulumSumnu.(2006).*Physical properties of Foods*. Springer publications

REFERENCE BOOKS

1. Abraham,S.(2016).*Nutrition through Life Cycle*,New Delhi: NewAge International Ltd.
2. Gopalan,C.(2007). *Nutritive Value of Indian Foods,* Hyderabad:NIN/ICMR.
3. Gopalan,C.and Vijayaragavan,K.(1971).*Nutrition*,Hyderabad:AtlasoIndia NIN/ICMR.
4 Kravse,M.V.andMohan,(1984).Food,*NutritionandDietTherapy*,Philadelphia:Pa. W.B.Saunder
5. MarykayMitchell.(2015).*Nutrition Across the Life Span*, 2nd Edition, NewDelhi:Scientific International PVT,LTD.
6. Rajalakshmi,R .(2013). *Applied Nutrition*, 4th Edition, NewDelhi : 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*.2ndEdition,London:ChurchillLivingstone.
9. Srilakshmi,B.(2015).*Human Nutrition*, 1st Edition, NewDelhi: New Age International Ltd.
10. Srilakshmi,B.(2022).*Nutrition Science*,7th Edition, NewDelhi: New Age International Ltd.
11. Srilakshmi,B.(2023).*Dietetics*. 9 th Edition, NewDelhi: New Age International Publishers.
12. Swaminathan,M.(2018).*Essentials of Food and Nutrition*, Vol I & II, Bangalore: The Bangalore printing and Publishing CoLtd.
13WilliamsandSueRodewell,(1985).*NutritionandDietTherapy*,5thedition,St.Louis:TimesMirror/MosbyCollegePublications

ELEARNING RESOURCES:

www.fao.orgwww.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 24PHSC11	**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

Mrs.S.Balasaraswathi
Course Designer

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

M.Sc. Home Science – Nutrition and Dietetics
(for those who join in 2024-2025)

Semester I	**MACRONUTRIENTS**	Hours/Week: 6	
Core Course- 2		Credits: 5	
Course Code **24PHSC12**		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: Write the classifications of different macronutrients [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, Basalmetabolic 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, 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, 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.(2020).*Human Nutrition*, NewDelhi:New Age InternationalLtd.
2. Srilakshmi,B.(2018).*Nutrition Science*, 6th Edition, NewDelhi: 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 perspectivesinnutrition.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.

REFERENCE BOOKS

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 24PHSC12	**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
Head of the Department

Mrs.R.Subha
Course Designers

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

M.Sc. Home Science – Nutrition and Dietetics
(for those who join in 2024-2025)

Semester I	**ADVANCED FOOD SCIENCE PRACTICAL**	Hours/Week: 6	
Core Course -3 Practical - 1		Credits: 4	
Course Code **24PHSC11P**		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. (2020). *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*. CBSPublisheres and distributes ltd. 3rd Edition.

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

REFERENCE BOOKS

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.orgwww.wfp.org

Learn Microbiology with Online Courses and Classes| edX

Course Code 24PHSC11P	**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
Reaccredited with 'A++' Grade (4th Cycle) by NAAC
VIRUDHUNAGAR
Quality Education with Wisdom and Values

M.Sc. Home Science – Nutrition and Dietetics
(for those who join in 2024-2025)

Semester I	**FOOD PROCESSING AND TECHNOLOGY**	Hours/Week: 6	
Elective Course -1 (DSEC)		Credits: 3	
Course Code **24PHSE11**		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

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)

UNIT III

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; Byproducts utilization; Effect ofprocessing 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 IV

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 V

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)

TEXT BOOKS

1. ShakuntalaManay N ShadakCheraswamyM . (2004) *Food Facts and Principles*. New Age Publisher .
2. Roday S. (2011) .*Food Science*. Oxford publication .
3. B Srilakshmi (2020) *Food science*. New Age Publishers.

4. Fellows P.(2000). *Food Processing Technology*, 2nd Edition. Woodhead Publishing Limited and CRC Press LLC.
5. Avantina Sharma. (2017).*Text book of food science and Technology*. CBS Publisheres and distributes ltd.

REFERENCE BOOKS

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,PubAgrobios 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
24PHSE11	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.D.Vijayarani
Head of the Department

Dr.S.Mathangi
Course Designer

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

M.Sc. Home Science – Nutrition and Dietetics
(for those who join in 2024-2025)

Semester I	**ADVANCED HUMAN PHYSIOLOGY**	Hours/Week: 6	
Elective Course -2 (Generic)		Credits: 3	
Course Code **24PHSE12**		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. Arumugam, N. (2016), Human Physiology, India : Saras Publication.
2. 2. Ganong,W.F. (1985). Review of Medical Physiology,12 th Edition, Lange Medical
3. Publication.
4. K.Sembulingam & PremaSembulingam (2019), *Essentials of Medical Physiology*. Jaypee publications.
5. Waugh A, Ross and Wilson (2018). *Anatomy and Physiology in Health and Illness*. Elsevier publications.
6. Chatterjee (2020). *Human Physiology*. CBS publishers.
7. Indu Khurana (2020). *Medical Physiology for Undergraduate Students*. Elsevier Publication. 2nd Edition.
8. GK Pal (2019). *Textbook of human physiology*, Elsevier publications. 3rd Edition.

REFERENCE BOOKS

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 KatchV.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 Chandi Charan :*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 24PHSE12	**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

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

M.Sc. Home Science – Nutrition and Dietetics
(for those who join in 2024-2025)

Semester I	**PRINCIPLES OF MENU PLANNING**	Hours/Week: -	
Extra Credit Course 1		Credit :1	
Course Code **24PHSO11**		Internal 100	External -

COURSE OUTCOMES

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

CO1: describe the concept, importance and principles of menu planning.

CO2: identify the factors influencing the RDA, nutritional requirements, changes that occur during the various stages of life span.

CO3: find the steps involved in planning a diet and dietary guidelines to be followed in various age groups.

CO4: focus on the components of energy expenditure and nutrition related problems of various age groups.

CO5: plan the menu for various stages of lifespan and examine the preventive measures and treatment of various nutritional problems

UNIT I

Recommended Allowances - RDA for Indian basis for requirement, computation of allowance based on energy expenditure, components of energy expenditure. General concepts about growth and development through different stages of life.

UNIT II

Preschool -, Food habits and nutrient intake of preschool children. Dietary allowances and supplementary foods.

School going age -, Nutritional status of school children, school lunch program, factors to be considered in planning a menu, food habits and nutritional requirement, packed lunch.

UNIT III

Adolescence: Changes of growth characteristics of adolescents. Nutritional needs of the adolescents.

Adults: Nutrition for adults. Basis for requirement. Nutrition and work efficiency.

UNIT IV

Nutrition in Pregnancy - ICMR Nutrient allowances, Dietary guidelines. Common nutrition related problem of pregnancy and Lactation.

UNIT V

Geriatric -Nutrition allowances - Dietary Guidelines -- psycho social and economical factors affecting eating behaviour.

Infant -Rate of growth, weight as the indicator, Nutrition allowances for the infants. Breast feeding. Weaning foods suitable for infants. Premature infant and their feeding infant formulas.

TEXT BOOK

1. Srilakshmi, B. (2024).*Dietetics*, 9th Edition, New Delhi: New age International Publishers.

REFERENCES

1. Nix,S. (2016). Basic Nutrition and Diet Therapy, Elsevier Fifteenth Edition, Mosby: First South Asia Edition.
2. Simon Langley-Evans, (2015) Nutrition, Health and Disease: A Lifespan Approach, 2nd Edition, New Jersey: Wiley Blackwell.
3. Jacalyn, J. et al., (2010).The Active Female: Health Issues Throughout the Lifespan, New Jersey:Humana Press Inc.

4. Aleta, L. Meyer and Thomas, P. Gullotta, (2014). Physical Activity Across the Lifespan: Prevention and Treatment for Health and Well-Being (Issues in Children and Families39; Lives), New York: Springer-Verlag Inc.
5. Antia, F.P. (2002), Clinical Dietetics and Nutrition, 4th Edition, New Delhi: Oxford University Press.
6. Nutrient Requirements for Indians Recommended Dietary Allowances Estimated Average Requirements - A Report of the Expert Group, (2020). New Delhi: Indian Council of Medical Research.
7. Dietary guidelines for Indians, 2nd Edition, (2011). NIN, New Delhi:Generic.
8. Bamji et al, (2019). Textbook of Human Nutrition, 4th Edition, New Delhi: Oxford and IBH Publishing co. Pvt. Ltd.

E- LEARNING RESOURCES

- www.four-h.purdue.edu
- www.ingenta.connect.com
- nal.usda.gov/fnic/lifecycle

Course Code	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
24PHSO11	**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	3
CO2	3	3	3	3	3	3	3	3	1	3
CO3	3	3	3	3	3	3	3	3	1	3
CO4	3	3	3	3	3	3	3	3	1	3
CO5	3	3	3	3	3	3	3	3	1	3

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

Dr.D.Vijayarani
Head of the Department

Mrs.T.Devi
Course Designer

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

M.Sc. HOME SCIENCE - NUTRITION AND DIETETICS
(for those who join in 2024-2025)

Semester II	**ADVANCED DIETETICS**	Hours/Week: 6	
Core Course -4		Credits: 5	
Course Code		Internal	External
24PHSC21		25	75

COURSE OUTCOMES

On completion of the course, the students 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)

UNITV

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, Diagnostictests, Types-Glomerulonephritis, Nephroticsyndrome , 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*. Churchill Living 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.

REFERENCE BOOKS

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 24PHSC21	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)

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

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

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

M.Sc. Home Science – Nutrition and Dietetics

(for those who join in 2024-2025)

Semester II	**RESEARCH METHODS IN NUTRITION**	Hours/Week: 6	
Core Course - 5		Credits: 5	
Course Code 24PHSC22		Internal 25	External 75

COURSE OUTCOMES

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

CO1: explain the concept of research design, sampling, and collection of data, data analysis, computer and report writing. [K2]

CO2: apply the correct procedure to construct research design, select sampling methods, collect data, frame hypothesis, data preparation, data analysis 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 design, hypothesis, scales, 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 to get solution for the Nutrition research problem [K4]

UNIT I : Foundation of Nutrition Research

Meaning, Objectives and Classification of Research Designs – **Exploratory, Descriptive** – Longitudinal and Cross sectional, Observation-Participant and Non-participant, Epidemiological Surveillance, Retrospective, IN VIVO, IN VITRO and **Experimental** – Pre-Experimental, Quasi Experimental, True Experimental and Statistical Experimental designs.

Need of Research in Food Science and Nutrition

Research Process- Selection and Formulation of Research Problem, Objectives of Research: Explanation, Control and Prediction, Hypothesis: Definition, Importance, Types and Errors - I & II, Deciding Variables (18 Hours)

UNIT II: Sampling and Sample Design

Sampling Process and Characteristics of good Sampling. Classification of Sampling Techniques - Probability and Non Probability Sampling . Preparation of Laboratory Food Samples . Sampling and Non- Sampling Errors

Measurements and Scaling -

Fundamental and Comparative Scales – Meaning and types , Nominal Scale , Ordinal Scale, Interval Scale , Ratio Scale

Non comparative Scales– Meaning and types - Continuous Rating Scale , Itemized Rating Scale - Likert Scale, Semantic Differential Scale, Stapel Scale

(18 Hours)

UNIT III: Data Collection and Preparation

Data Collection – Tools - Primary Data Interviews -structured and unstructured, Case studies , Questionnaire, Surveys – Pilot & KAP, Laboratory Experiments

Secondary Data- Published Sources, Unpublished Sources

Reliability and Validity of Tools– Meaning

Data Preparation Process – Editing, Coding, Classification, Tabulation

(18 Hours)

UNIT IV: Statistical Methods

Parametric and Non-Parametri tests –Difference and Applications

Data Analysis Process-Descriptive Analysis- Graphical and Diagrammatic Presentations, Central Tendency – Mean, Median and Mode, Dispersion -Standard Deviation. **Statistical Inference – Tests of Hypothesis** - t – test, ANOVA – One Way and Two Way, Chi- square test – Goodness of Fit and Test of Independence

(18 Hours)

UNIT V: Reporting the Findings and Computer Applications

Report Writing – Importance, Types, Mechanics, Guidelines and Precautions , End Notes- Bibliography, Appendices, Footnotes and Glossary of term

Computer applications in nutrition research - importance and uses

Applicable Statistical Analysis Software-Literature Searching-PubMed, Data Analysis- Micro Soft

Excel, SPSS, Minitab, Plagiarism Checker – Turnitin, Scribbr (18 Hours)

TEXT BOOKS

G. Vijayalakshmi, C. Sivapragasam. (2019). *Research Methods Tips and Techniques*. New Delhi: MJP Publisher.

Kothari ,G.R.(2019). *Research Methodology Methods and Techniques*, New Delhi: Wiley Eastern Limited.

Peer Mohamed and Shazuli Ibrahim.(2015). Research Methodology.Madurai :Pass publications.

Gurumani,N.(2006). *Research Methodology*, Chennai: MJP Publishers.

Chawla,Deepak and NeenaSondhi (2018):Research Methodology -Concepts and Cases. Noida, Vikas Publishing House Pvt Ltd. 2nd Ed.

Gupta, S P (2019).Statistical Methods. New Delhi. S Chand & Sons.45th Ed.

Copper, H.M. (2002).Intergrating Research : A guide for literature reviews. California: Sage, 2nd Edition.

Kerlinger, Foundation of Educational Research Ingle P.O. Scientific Report Writing. Nagpur, Sarla P. Ingle.

REFERENCE BOOKS

Ranjit Kumar (2011). Research Methodology: a step-by-step guide for beginners, SAGE Publications.3rd edition.

Kulkarni, A.P. (2020). *Biostatistics*, New Delhi: CBS publishers and distributors pvt ltd.

Anderson, David R and et.al.(2013) : Statistics for Business and Economics. Delhi, Cengage Learning India Pvt Ltd. 11th Ed.

Bandarkar, P.L. and Wilkinson T.S. (2000): Methodology and Techniques of Social Research. Himalaya Publishing House, Mumbai.

Bell, Judith (2005): Doing your Research Project – A guide for first time researchers in education, health and social science. England, Open University Press. 4th Ed.

Thomas, G.C. (2016). Research Methodology and Scientific Writing, New Delhi: Ane booksPvt(Ltd).

Danial, Wayne W and Chad L Cross (2017): Biostatistics – Basic Concepts and Methodology For the Health Sciences – International Student Version. New Delhi, ArEmmInternatonal, 10th Ed.

Course Code	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
24PHSC22	**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
Head of the Department

Mrs.A.Jeevarathinam
Course Designer

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

M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS

(for those who join in 2024-2025)

Semester: II	**ADVANCED DIETETICS PRACTICAL**	Hours/Week : 6	
Core Course -6 Practical - 2		Credits : 4	
Course Code **24PHSC21P**		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, the students 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

4.Planning and preparing diet for Pneumonia

5.Planning and preparing diet for Rheumatic arthritis

6.Planning and preparation of diet for Glomerulonephritis

7. Planning and preparation of diet for cancer according to the condition.

8. Planning and Preparing diet for pre and post Bariatric surgery patients.

9. Assessment and planning diet for post burn condition.

TEXT BOOKS

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.

Course Code	**PO1**		**PO2**	**PO3**		**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
24PHSC21P	**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

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

M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS

(for those who join in 2024-2025)

Semester: II	**NUTRITIONAL BIOCHEMISTRY**	Hours/Week:4	
Elective Course – 3 (DSEC)		Credits: 3	
Course Code - **24PHSE21**		Internal 25	External 75

COURSE OUTCOMES

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

CO1: discuss the basic concept, structure and classification of bio molecules present in the human body.[K2]

CO2: find out the biological importance of buffer system, free radicals, enzymes and bio molecules in human body.[K3]

CO3: identify the various biochemical mechanisms and factors affecting enzyme activity in human body.[K3]

CO4: illustrate the metabolic pathway in human body. [K4]

CO5: analyze the functions and regulations of bio molecules in human body and assess the recombinant DNA technology. [K4]

UNIT I

Biological oxidation and enzymes

Biological oxidation, Electron transport chain and Oxidative Phosphorylation.

Enzymes – Definition, Types, mechanism of action, factors affecting enzyme activity, coenzyme, role of B Vitamin as coenzyme.

Free radicals – definition, formation in biological systems. Antioxidants – definition, Role of antioxidants in prevention of degenerative disorders (12 hours)

UNIT II

Metabolism of Carbohydrates

Review of Classification, Glycolysis, Citric Acid Cycle, Glycogenesis, Glycogenolysis, Gluconeogenesis,
Hexose Monophosphate Shunt and Bioenergetics.
Hormonal regulations of blood glucose homeostasis.
Metabolic disorders- glycosuria, galactosemia, lactose intolerance and glycogen storage diseases. (12 hours)

UNIT III

Protein and amino acid metabolism

Review of Classification of amino acids, Oxidative Deamination, decarboxylation, transamination and
transmethylation of amino acids, Urea Cycle, biosynthesis of non-essential amino acids, catabolism of
essential amino acids. Protein biosynthesis.
Metabolic disorders-alkaptonuria, Phenyl ketonuria, tyrosinemia and albinism.
(12 hours)

UNIT IV

Metabolism of Lipids

Review of Classification of fatty acid, Biosynthesis of fatty acids, beta oxidation of fatty acids and ketone bodies.
Essential fatty acids – types and functions.Metabolism of phospholipids, and cholesterol.
Lipo proteins – classification and function.
Metabolic disorders- Ketosis, Gaucher's disease, Tay-Sach's disease and Niemann Pick disease. (12 hours)

UNIT V

Overview of intermediary metabolism of carbohydrates, protein and lipid. Hormonal regulation of carbohydrate, protein and fat metabolism.

Structural components and functions of nucleic acid, Structure of DNA, DNA Replication, RNA synthesis – types and functions and metabolism, translation.

Recombinant DNA technology, Metabolism of Xenobiotics, Nutrigenomics.

Metabolic disorders- Gout and Lesch-Nyhan syndrome. (12 hours)

REFERENCE BOOKS

1. Allan Gaw. (2008). Clinical Biochemistry, 7 th Edition, United Kingdom: Elsevier 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, 2 nd Edition, Chennai: Scitech Publications.
5. Sharma, D.C. (2017). Nutritional Biochemistry, New Delhi: CBS Publishers
6. Singh,S.P. (2006). Principles of Biochemistry, New Delhi: CBS Publishers.
7. Thomas, M. Devlin (2010). Text book of Biochemistry with Clinical Correlations, 7 th Edition, New York: A John Wiley & Sons, INC Publications.

E-LEARNINGRESOURCES:

https://www.udemy.com/share/1027yA/https://www.classcentral.com/course/swayam-biochemistry-5229

https://www.classcentral.com/course/edx-biochemistry-biomolecules-methods-and-mechanisms-12585

https://www.classcentral.com/course/swayam-experimental-biochemistry-12909

https://youtu.be/y6YGZfcAegw

PEDAGOGY (TEACHING METHODOLOGY):

Group Discussion, Case study, seminar, journal reviewing, Assignments, Power point presentations.

Course Code 24PHSE21	**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	-	-	-	-	2	-	-
CO 2	3	3	3	2	2	2	-	3	-	-
CO 3	3	3	3	2	2	2	2	3	-	-
CO 4	3	3	2	2	2	3	2	3	-	-
CO 5	3	3	2	3	3	3	3	3	-	-

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

Dr.D.Vijayarani
Head of the Department

Mrs.T.Devi
Course Designer

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

M.Sc. HOME SCIENCE - NUTRITION AND DIETETICS

(for those who join in 2024-2025)

Semester II	**PERSPECTIVES OF HOME SCIENCE**	Hours/Week: 4	
Elective Course – 4 (Generic)		Credits: 3	
Course Code **24PHSE22**		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: explain the concepts of Extension Education, Textiles and Clothing, Family Resource Management, Human Development, Guidance and Counselling.[K2]

CO2: identify the role of fibre in fabric manufacturing, resources in home management, maturation and learning, disciplinary techniques, pre-school and teaching aids.[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 preschool education, interior designing, textiles and clothing, extension education and counselling. [K4]

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

UNIT I

Extension Education - Meaning, Definition, objectives, characteristics, principles. Extension teaching methods- types and methods. Qualities of a good Extension Worker. Communication, Innovation and Social change.

(12 hours)

UNIT II

Human Development - Growth, Development, Maturation and Learning. Principles and Developmental stages and Task. Parental Disciplinary Techniques – merits and demerits. Early Childhood Education – Objectives. Types of Nursery Schools. Exceptional children – Deaf, Blindness, Physical Impairment, Mental Retardation and Giftedness. Rehabilitation. (12 hours)

UNIT III

Textiles and Clothing - Classification and General properties textile fibres. Processing and manufacture of Cotton, Silk, Wool and Rayon fibres. Yarn: Classification. Fabric construction - woven, non-woven and knitted fabric. Clothing: selection for the family. (12 hours)

UNIT IV

Family Resource Management - Home Management – Meaning, objectives and process. Resources - Classification and characteristics. Time, Money and Energy management. Decision making - Steps and Methods of resolving conflicts. Work simplification - Importance of work simplification. Mundel's classes of Change. Principles and Elements of Interior design, Various colours and colour schemes. (12 hours)

UNIT V

Guidance and Counselling - Meaning, nature, types and scope of guidance and counselling. Various steps and techniques of Guidance and counselling. Need and importance of educational guidance. (12 hours)

TEXTBOOKS

1. Berk, L. E. (2013). *Child development*, 8th edition, India: Pearson education.
2. Jha, J.K. (2002). Encyclopaedia of Teaching of Home Science, Vol.I,II and III New Delhi: Anmol Publications.
3. Suriakanthi, A. (2005). *Child Development an Introduction*, Gandhigram: Kavitha Publications.
4. Varghese, M.A., Ogale, N. N. and Srinivasan, K. (2000). *Home Management*, New Delhi: New Age International (P) Limited Publishers.
5. Reddy, A. A. (1971). *Extension Education*, Andhra Pradesh: Sri Lakshmi Press.
6. Stella Soundarajan, A textbook of Household Arts, Madras, Orient Longman, 1989.
7. PremalathaMullick, A textbook of Home Science, Ludhiana, Kalyani Publishers, 2004.
8. Dahama,O.P. and Bhatnagar,O.P. (1985). *Education and communication for development*, New Delhi: Oxford and IBH publishing CO PVT Ltd..

REFERENCE BOOKS

1. Serene and Ahlawat Santos Shekhar (2013), Textbook of Home Science Extension Education.
2. Tami James Moore and Sylvia M.Asay (2008), Family Resource Management, Sage Publications.
3. Diane E. Papalia (2004), 9th edition, Human Development, McGraw Hill India.
4. Rani K. Sudha and SrivastavaSushila, Textbook of Human Development: A lifespan development approach, S. Chand & Co Ltd.
5. Rajammal P. Devadas and Jaya N. Muthu (2002). A Textbook of Child Development, New Delhi: Macmillan Publishers.
6. Berk, L. E. (2017). *Child development*, 9th edition, India: Pearson education.
7. Hurlock, B. (2017). *Child development – Indian edition*, 6thedition, New Delhi: McGraw- Hill publishing company Ltd.

Course Code 24PHSE22	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	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
Head of the Department

Dr.D.Vijayarani
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
(for those who join in 2024-2025)

Semester II	**FOOD PRESERVATION**	Hours/Week: 4	
Elective Course - 5 (NME)		Credits: 2	
Course Code **24PHSN21**		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: describe the concept and principles of food preservation. [K1]

CO2: write the processing steps for preserving food by using drying, sugar, salt, low and high temperature. [K2]

CO3: explain the appropriate method to preserve different foods [K2]

CO4: determine the effects of preservation methods on the quality of foods [K3]

CO5: analyse the use of modern technology in food preservation.[K4]

UNIT I

Introduction to Food Preservation

Concept, importance of food preservation, Common terms used in food preservation. Different methods and Principles of preservation. (12 hours)

UNIT II

Preservation by Low Temperature

Use of Refrigerated Storage, principles and methods. Use of Freezing temperatures: Slow and fast freezing of foods and Cryogenic freezing of foods, dehydro freezing, Frozen storage and thawing of foods (12 hours)

UNIT III

Preservation by High Temperature

Preservation of foods by high temperatures.Blanching, Pasteurization and Sterilization of foods. General process of canning of foods (12 hours)

UNIT IV

Preservation by using sugar, principles of gel formation, preparation of jam, jelly, marmalade, preserves, candies, glazed and crystallized fruits, problems encountered in preparation and FPO specification. (12 hours)

UNIT V

Preservation by Drying

Principles and application of drying and dehydration of foods Different types of drying and dryers.

Preservation by using chemicals and salt – chemical preservatives – role of preservation – permitted preservatives and levels – preparation and preservation of fruit juices, pickling – types of pickles (12 hours)

TEXT BOOK

1. Vennila, P. (2003). Principles on preservation of fruits and vegetables, Tamilnadu: Ratna publications.

REFERENCES BOOKS

1. Prakash Triveni. (2010). Food Preservation, New Delhi: Aadi Publication.
2. Shafiur Rahman,M. (2007). Hand Book of Food Preservation, Newyork: Marcel Dekker Inc,
3. Mc.Willims and Paine. (2009). Modern Food Preservation, New Delhi: Surjeet Publications.
4. Karnal, Marcus and Lund, D.B. (2003). Physical Principles of Food Preservation, New Jersey: CRC Press Inc.

5. VanGarde, S.J. and Woodburn, M. (2001). Food Preservation and Safety Principles and Practice, Ahmedabad: Surbhi Publications.
6. Sivasankar, B. (2002). Food Processing & Preservation, New Delhi: Prentice Hall India Learning Private Limited
7. Khetarpaul, Neelam, (2005).Food Processing and Preservation, New Delhi :Daya Publications.
8. Norman N. Potter, Joseph H. Hotchkiss, (2009). Food science, 5 th ed. New York : Springer Science & Business Media.

E-LEARNING RESOURCES

https:// www.embibe .com/food -preservation/

https://agripathshala.com/lessons/principles-of-food-preservation

www.onlinebiologynotes.com/food-preservation-from-microbial-spoilage-principles

https://www.researchgate.net/publication/347909697_FOOD_PRESERVATION

PEDAGOGY

Lecture, journal reviewing, Assignments, Power point presentations, video presentations.

Mapping of Co with PSO:

Course Code 24PHSN21	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	1	1	2	1	3	3	1	2
CO 2	3	3	1	3	3	2	3	3	1	3
CO 3	3	3	2	3	3	2	3	3	1	3
CO 4	3	3	1	3	3	2	3	3	3	3
CO 5	3	3	1	3	3	2	3	3	3	3

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

Dr.D.Vijayarani
Head of the Department

Mrs.T.Devi
Course Designer