



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

OUTCOME BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM

REGULATIONS AND SYLLABUS (with effect from Academic Year 2020 - 2021)

V.V.Vanniaperumal College for Women, Virudhunagar, established in 1962, offers 20 UG Programmes, 14 PG Programmes, 6 M.Phil. Programmes and 6 Ph.D. Programmes. The curriculums for all these Programmes, except Ph.D. Programmes, have been framed as per the guidelines given by the University Grants Commission (UGC) 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 and Computer Applications.
Commerce & Management	:	Commerce, Commerce (Computer Applications), Commerce (Professional Accounting), Business Administration.

PG PROGRAMMES

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

PRE-DOCTORAL PROGRAMMES (M.Phil.)

Arts & Humanities	:	History, English, Tamil
Physical & Life Sciences	:	Mathematics, Biochemistry
Commerce & Management	:	Commerce

OUTLINE OF CHOICE BASED CREDIT SYSTEM - PG

1. Core Courses
2. Project
3. Elective Courses
 - 3.1 Discipline Specific Elective Courses (DSEC)
 - 3.2 Non Major Elective Course (NMEC)
4. Online Course – Practice for SET/NET – General Paper
5. Extra Credit Courses (Optional)

List of Non Major Elective Courses (NMEC) Offered

PG PROGRAMMES

Name of the Course	Semester	Department
History of Freedom Movement in India (A.D. 1885 - 1947)	III	History
English for Job Aspirants	III	English
தமிழும் பிற்துறைகளும்	III	Tamil
Taxation Concepts and Assessment	III	Commerce
Entrepreneurship	III	Business Administration
Mathematics for Competitive Examinations	III	Mathematics
Digital Electronics	III	Physics
Chemistry for Competitive Examinations	III	Chemistry
Apiculture	III	Zoology
Nutrition and Health	III	Home Science - Nutrition and Dietetics
Clinical Biochemistry	III	Biochemistry
Web Programming	III	Computer Science
Fundamentals of Information Technology	III	Information Technology
Web Technology	III	Computer Applications

B. OUTCOME BASED EDUCATION (OBE) FRAMEWORK

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

Vision of the Institution

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

Mission of the Institution

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

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

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

Vision of the Department of Home Science

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 Home Science

To empower the students by providing quality education through scientific aspects of food science, nutrition and dietetics, and ensure health for the family, community and nation.

B.1.1 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. Programme

The students will be able to

- become health professionals in hospitals, fitness 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.1.2 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 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, synthesise the findings and provide valid conclusion by critical evaluation of theories, policies and practices for the betterment of society. (*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.1.3 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 mandatory 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

PO1: *Disciplinary Knowledge*

PSO1.a: apply professional knowledge and entrepreneurial skills involved in the various branches of Home Science for empowering themselves and the community.

PSO1.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, government and non government organizations.

PO2: *Communication Skills*

PSO2: 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*

PSO3.a: 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.

PSO3.b: 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*

PSO4: analyse critically the prevailing issues in global nutrition and find out valid solutions through experimentation and research for the welfare of the people.

PO5: *Research related skills*

PSO5: adopt appropriate statistical tools to analyze the data that enhances interdisciplinary research activities and find appropriate remedies for the existing health related problems in the society.

PO6: Digital Literacy, Self - directed and Lifelong learning

PSO6: develop higher order thinking skills and professionalism using the ICT to nurture the capability for lifelong self-learning.

PO7: Cooperation/Team Work and Multi-Cultural Competence

PSO7: 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 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

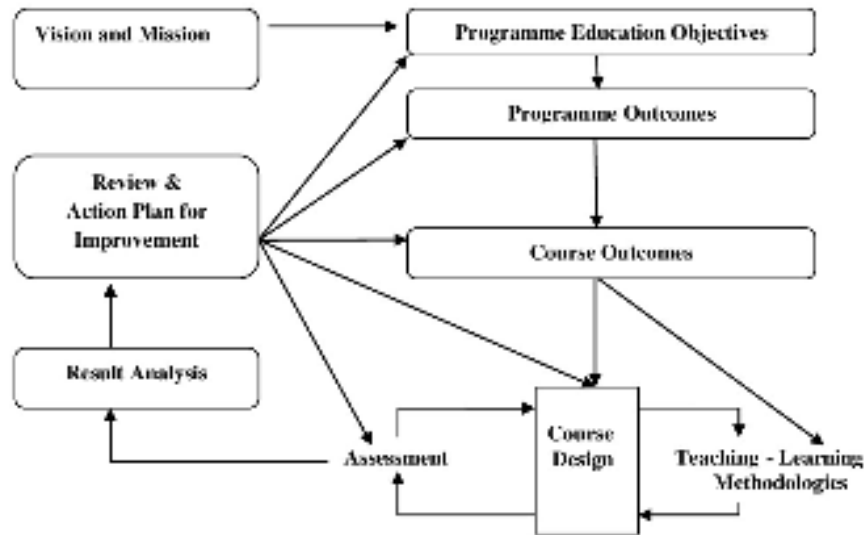
Attainment of PEOs can be measured by a PO-PEO matrix. PEOs should evolve through constant feedback from alumnae, students, industry, management, etc. It is mandatory that each PEO should be mapped to at least one of the POs.

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

B.1.4 Course Outcomes (COs)

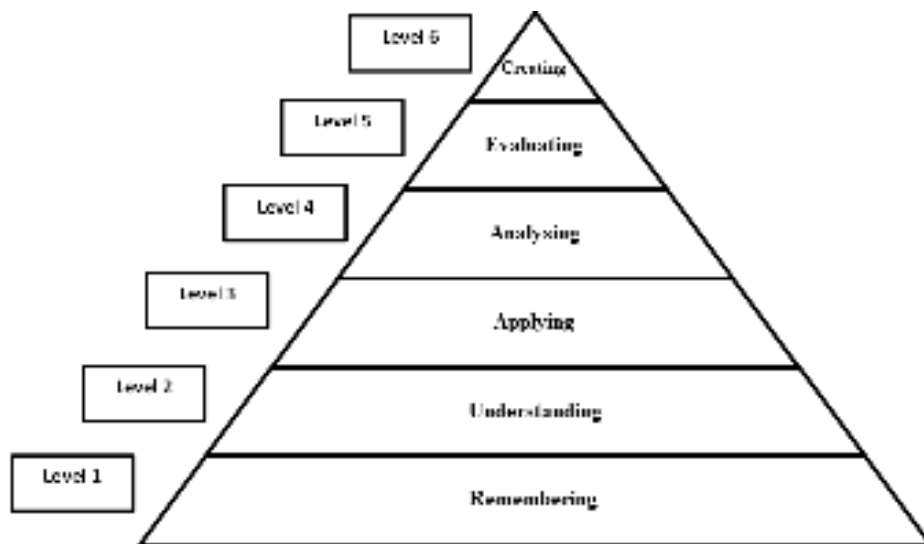
Course Outcomes are narrow statements restricted to the course contents given in five units. Course Outcomes describe what students would be capable of, after learning the contents of the Course. They reflect the level of knowledge gained, skills acquired and attributes developed by the students after learning of Course contents. COs are measurable, attainable and

manageable in number. COs contribute to attain POs in such a way that each CO addresses at least one of the POs and also each PO is reasonably addressed by adequate number of COs.



It is important to determine the methods of assessment. A 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 weighted percentage 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	PO1/ PSO1	PO2/ PSO2	PO3/ PSO3	PO4/ PSO4	PO5/ PSO5	PO6/ PSO6	PO7/ PSO7	PO8/ PSO8
Cos								
CO1								
CO2								
CO3								
CO4								
CO5								

ELIGIBILITY FOR ADMISSION

The candidate should have passed Bachelor of Science 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/Project	40	60	100
Internship	50	50	100

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

INTERNAL ASSESSMENT**Distribution of Marks****Theory**

Mode of Evaluation		Marks
Periodic Test	:	25
Assignment	:	5
Seminar	:	10
Total	:	40

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
Continuous Assessment	:	15
Model Examination		15
Performance	:	10
Total	:	40

Model Examination - Average of the best two will be considered

Performance - Attendance and Record

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

Section	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Max. Marks
A Q.No.(1 - 5)	Fill in / Sentence Form	5	5	1	5
B Q.No.(6-10)	Internal Choice - Either Or Type	5	5	5	25
C Q.No.(11-13)	Open Choice	3	2	10	20
Total					50*

*The total marks obtained in the Periodic Test will be calculated for 25 marks

EXTERNAL EXAMINATION**Question Pattern****Duration: 3 Hours**

Section	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A Q.No.(1 - 5)	Fill in / Sentence Form	5	5	1	5
B Q.No.(6-10)	Internal Choice- Either Or Type	5	5	5	25
C Q.No.(11-15)	Open Choice	5	3	10	30
Total					60

B.2.2 Project

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

Internship

- One month internship training is mandatory in reputed hospitals.
- Internal evaluation will be carried out by a Dietitian of the reputed hospital.

B.2.3 Online Course

Practice for SET/NET - General Paper

Internal Examination only

- Online Test 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	:	40
Model Examination	:	60
Total	:	100

Two Periodic Tests - Better of the two will be considered

B.2.4 Extra Credit Courses

- Extra credits are allotted for the completion of Open Online Courses offered by MOOC to the maximum of 15 credits.
 - The Courses shall be completed within the first III Semesters of the Programme.
 - The allotment of credits is as follows
 - 4 weeks 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 prescribed Courses of study and a minimum of 50% Pass marks in all the Courses.
 - No Pass minimum for Internal Assessment for other Courses.
 - Pass minimum for External Examination is 27 marks out of 60 marks for Core Courses, Discipline Specific Elective Courses and Non Major Elective Course.
 - Pass minimum for Practice for SET/NET - General Paper is 50 Marks.
- Attendance
 - The students who have attended the classes for 76 days (85%) and above are permitted to appear for the Summative Examinations without any condition.
 - The students who have only 60-75 days (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 the respective 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.

Attainment Levels of COs

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

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 average mark 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

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

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 attainment of 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 against 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	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 and
Extra curricular Activities)]**

Expected Level of Attainment for each of the Programme Outcomes

POs	Level of Attainment
Value \geq 70%	Excellent
Value \geq 60 % and Value $<$ 70%	Very Good
Value \geq 50 % and Value $<$ 60%	Good
Value \geq 40% and Value $<$ 50%	Satisfactory
Value $<$ 40%	Not Satisfactory

Level of PO Attainment

Graduation Batch	Overall PO Attainment (in percentage)	Whether Expected Level of PO 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	25 % of the class strength	30 % of the class strength
Progression to Higher Education	40 % 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
Value \geq 70%	Excellent
Value \geq 60 % and Value $<$ 70%	Very Good
Value \geq 50 % and Value $<$ 60%	Good
Value \geq 40% and Value $<$ 50%	Satisfactory
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 PROGRAMME EDUCATIONAL OBJECTIVES

The college has always been involving the key stake holders 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

Re-accredited with 'A' Grade (3rd Cycle) by NAAC

VIRUDHUNAGAR - 626 001

**MASTER OF HOME SCIENCE –NUTRITION AND DIETETICS (7022)**

Programme Structure - Allotment of Hours and Credits

For those who join in the Academic Year 2020-2021

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)	6 (5)	6 (4)	24 (19)
Core Course	-	-	-	6 (4)	6 (4)
Core Course Practical	6(3)	6(3)	6 (3)	-	18 (9)
Project	-	-	-	6(5)	6(5)
Discipline Specific Elective Course	6 (4)	6 (4)	-	-	12 (8)
Non Major Elective Course	-	-	5 (4)	-	5 (4)
Online Course	-	-	1(1)	-	1(1)
Total	30 (22)	30 (22)	30 (23)	30 (23)	120 (90)
Extra Credit Course(Optional) - MOOC	-	-	-	-	Limited to a maximum of 15 credits

M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS
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	Principles of Food Science	20PHSC11	6	5		40	60	100
2	Core Course-2	Advanced Food Microbiology and Food Safety	20PHSC12	6	5	3	40	60	100
3	Core Course-3	Applied Physiology	20PHSC13	6	5	3	40	60	100
4	Core Practical-1	Food Analysis Lab	20PHSC11P	6	3	3	40	60	100
5	DSEC-1	Elective: Research Methodology / Instrumentation in Food Analysis / Food Biotechnology	20PHSE11/ 20PHSE12/ 20PHSE13	6	4	3	40	60	100
TOTAL				30	22				500

DSEC - Discipline Specific Elective Course

M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS**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 Nutrition and Dietetics	20PHSC21	6	5		40	60	100
2	Core Course-5	Clinical Biochemistry	20PHSC22	6	5	3	40	60	100
3	Core Course-6	Composite Home Science	20PHSC23	6	5	3	40	60	100
4	Core Practical-2	Clinical Nutrition and Dietetics Lab	20PHSC21P	6	3	3	40	60	100
5	DSEC-2	Elective: Statistics and Computer Applications / Food Packaging Technology/ Nutrition in Emergencies and Disasters	20PHSE21/ 20PHSE22/ 20PHSE23	6	4	3	40	60	100
TOTAL				30	22				500

DSEC- Discipline Specific Elective Course

M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS**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	Clinical and Therapeutic Nutrition	20PHSC31	6	5	3	40	60	100
2	Core Course -8	Public Nutrition	20PHSC32	6	5	3	40	60	100
3	Core Course -9	Entrepreneurship and Food Service Management	20PHSC33	6	5	3	40	60	100
4	Core Practical -3	Therapeutic Diet Lab	20PHSC31P	6	3	3	40	60	100
5	NMEC	Non-major Elective: Nutrition and Health	20PHSN31	5	4	3	40	60	100
6	Online Course	Practice for SET/NET - General Paper	20PGOL31	1	1	-	100	-	100
TOTAL				30	23		600		

M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS
SEMESTER IV

S.No.	Components	Title of the Course	Course Code	Hours per Week	Credits	Exam Hours	Marks		
							Int.	Ext.	Total
1	Core Course-10	Dietetics Techniques and Counseling	20PHSC41	6	5	3	40	60	100
2	Core Course-11	Nutrition for Health and Fitness	20PHSC42	6	5	3	40	60	100
3	Core Course-12	Bakery and Confectionery	20PHSC43	6	4	3	40	60	100
4	Core Course-13	Project	20PHSC41PR	6	5	-	40	60	100
5	Core Course-14	Internship -Dietetics	20PHSC42I	6	4	-	40	60	100
Total				30	23				500



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VIRUDHUNAGAR - 626 001

M.Sc. HOME SCIENCE- NUTRITION AND DIETETICS (SEMESTER) (2020 - 2021 onwards)

Semester: I	PRINCIPLES OF FOOD SCIENCE	Hours/Week:6	
Core Course-1		Credits: 5	
Course Code 20PHSC11		Internal 40	External 60

COURSE OUTCOMES

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

- CO1: explain the concept of food science, food components, process of new food product development and sensory attributes of food. [K2]
- CO2: identify the role of food constituents in food and food industries, methods of sensory evaluation to standardize the new food products. [K3]
- CO3: determine the effect of processing on food components and sensory attributes of food and new food products. [K3]
- CO4: analyse the structure, classification and properties of food components and factors affecting properties of food and food product development. [K4]
- CO5: assess the rheology of food, role of water, artificial sweeteners, transfat and fat replacers in food industries and interpret the formation of foam, emulsion and dough in new food products. [K5]

UNIT I

Food Science – Introduction to food science - physical properties of food- colloids and gels - classification and its properties- sols, emulsions and foams - formation, stabilization and properties.

Carbohydrates- dietary classification of carbohydrates, sugars - chemistry, functionality and their role in food industry, sweeteners, characteristics and functional properties of native and

modified starches. Non-Starch Polysaccharides - cellulose, hemicellulose, pectin and fructo-oligosaccharides. (18 Hours)

UNIT II

Lipids - classification of lipids, physical characteristics of fats, reaction of fats- rancidity and polymerization, factors affecting the process of deep fat frying, deteriorative changes in fats and oils, role of lipids in food. Fat replacers and transfat.

Proteins - classification and composition- functional properties of protein- hydration, viscosity, gelation and texturization, dough formation, emulsifying and surface properties of protein.

Enzymes- classification, enzyme utilization in food industry. (18 Hours)

UNIT III

Vitamins - classification, applications of vitamins in food industries, general causes of variation/losses of vitamins in food during processing.

Minerals – classification, functional role of minerals in food industries, effect of processing on mineral content in foods.

Water – structure and properties of water, role of water in food systems- water balance.

(18 Hours)

UNIT IV

Quality Attributes of Food - chemicals responsible for the four basic tastes i.e. sweet, salt, sour and bitter - factors affecting taste quality. Texture in Foods - objective measurement and evaluation of food texture. Rheology of foods - colour - functions of colour in foods, measurement of colour in foods.

Sensory evaluation- acceptance tests, sensory evaluation during product life cycle.

(19 Hours)

UNIT V

Food Product Development- need for product development, factors influencing product development, standardization of new food product- statistical experimental methods, modeling for process and recipe. (17 Hours)

REFERENCE BOOKS

1. Fennema,O.R. (1996). *Food Chemistry*, New York: Marcel Dekker Inc.
2. Khader,V. (2001). *Text Book of Food Science and Technology*, New Delhi: ICAR.
3. Manay,S.N.(2008). *Foods Facts and Principles*, New Delhi: New Age International (p) Ltd.
4. Owusu,R.(2005). *Introduction to Food Chemistry*, Washington: CRC Press.
5. Potter, N.(1995). *Food Science*, 5th Edition, NewDelhi: CBS Publishers and Distributors.
6. Sivasankar,B.(2005). *Food Processing and Preservation*, New Delhi: Prentice Hall of India Private Ltd.
7. Srilakshmi, B. (2016). *Food Science*,New Delhi: New age (P) Ltd.
8. Swaminathan,M. (1995). *Food Science and Experimental Foods*, Madras: Ganesh and Co.

Course Code 20PHSC11	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	H	H	M	L	L	L	L	H	-	-
CO2	H	H	H	M	M	M	M	H	-	-
CO3	H	H	H	M	M	H	H	H	-	-
CO4	H	H	H	H	M	H	H	H	-	-
CO5	H	H	H	H	M	H	H	H	-	L

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VIRUDHUNAGAR - 626 001

M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS (SEMESTER) (2020-2021 onwards)

Semester: I	ADVANCED FOOD MICROBIOLOGY AND FOOD SAFETY	Hours/Week:6	
Core Course-2		Credits: 5	
Course Code		Internal	External
20PHSC12		40	60

COURSE OUTCOMES

On completion of the course, students will be able to

- CO1: explain the development in microbiology and concept of food spoilage, food borne diseases, food fermentation, food safety and regulation. [K2]
- CO2: find out the functional food ingredients, food poisoning, food contamination, indicators organisms and legislations regarding food safety. [K3]
- CO3: apply the standard procedures to isolate, preserve, examine, investigate, and monitor the microbiological safety of foods. [K3]
- CO4: analyze the role of microbes in food spoilage, food infection, and fermented foods, acceptability criteria of foods and food regulations and standards. [K4]
- CO5: recommend the suitable microbes to produce fermented foods, hygienic practices to control the microbes and food safety system to keep the food safe. [K5]

UNIT I

Microbiology - definition and scope, history-spontaneous generation and golden age of microbiology. Microbiological methods – isolation, sterilization - heat, filtration, radiation and chemicals. Maintenance and preservation of cultures. Food spoilage - sources of food contamination, factors affecting the growth of microorganisms in food, causes of food spoilage. Spoilage of different foods- cereals and cereal products, vegetables and fruits, milk and milk products, fish and sea foods, meat and meat products , poultry and poultry products, canned foods, control of food spoilage. (18 Hours)

UNIT II

Food borne diseases – bacterial food borne diseases - staphylococcal poisoning, *Bacillus cereus* poisoning, Botulism, Salmonellosis, Shigellosis. Non-bacterial food borne diseases - Aflatoxicosis, Ergotism .Investigation of food borne disease out breaks and preventive measures. Hygiene , sanitation and safety in food service establishments. Microbiological analysis of foods – direct examination, enumeration method, alternative methods and rapid methods. Common antimicrobial food agents –benzoate, citric acid, ethylene, ethanol, antibiotics.

(19 Hours)

UNIT III

Fermentation – definition, advantages, factors affecting fermentation, role of microbes in fermented products - wine, beer, vinegar, cheese and traditional fermented products. Probiotics, probiotics, prebiotics and symbiotics – meaning, characteristics and beneficial role in human health.

(17 Hours)

UNIT IV

Food safety - definition, importance of safe food and factors affecting food safety.Indicators of food microbial quality and safety - Coliforms, Enterococci, Bifidobacteria, Coliphages/Enteroviruses. Risk assessment and management during food preparation - Food Safety Objective (FSO), Microbiological criteria, definitions, sampling plans. Microbiological criteria for various food products - Sea foods, Milk products, Spices, Fruits and vegetables.

(18 Hours)

UNIT V

Food regulation and standards in India - National – BIS, AGMARK and PFA, Essential Commodities Act-FPO, MPO, Milk and Milk Products Order, Standard of Weights and Measures Act, Export Inspection Council and Consumer Protection Act. International Organizations and Agreement – FAO and Codex Alimentarius, HALAL.Food Safety and Standard Authority of India (FSSAI) and HACCP.

Risk analysis - risk assessment, risk management and risk communication. (18 Hours)

REFERENCE BOOKS

1. Adams, M.R. and Moss, M.G.(2018). *Food Microbiology*, New Delhi: New Age International Private Ltd.

2. Ananthanarayanan,R. and Panicker,C.K.(2009). *Text book of Microbiology*, Hyderabad: Universities Press (India) Pvt ltd.
3. Askar, A. and Treptow, H. (1993). *Quality Assurance in Tropical Fruit Processing*, Berlin: Springer-Verlag.
4. Atlas,M. and Ronald,(1995). *Principles of Microbiology*,1st Ed, Missouri, USA: Mosby – year book Inc.
5. Frazier,W.C. and Westhoff,D.C. (2013). *Food Microbiology*, 5th Edition, New Delhi: McGraw Hill.
6. James ,M. (2000). *Modern Food Microbiology*, Maryland: Aspen Publishers.
7. Khetarpaul,N. and Jood,S. (2003). *Food Microbiology*, Udaipur : Agrotech Publishing Academy.
8. Parmar, M. (2014). *Food Safety and Preservation*, New Delhi: Black Prints.
9. Prescott and Dunn, (2004). *Industrial Microbiology*, New Delhi: CBS Publishers.
10. Roday, S.(1999). *Food Hygiene and Sanitation*, New Delhi: Tata McGraw Hill.
11. Sharma ,P.D.(2001). *Microbiology*, New Delhi: Rastogi Publication.
12. Sugandharbabu (2008). *Food Microbiology*, New Delhi: Adhyayan Publishers.

Course Code 20PHSC12	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	H	H	M	M	M	M	-	H	-	-
CO2	H	H	M	M	M	M	M	H	-	L
CO3	H	H	M	H	H	H	H	H	-	L
CO4	H	H	H	H	H	H	H	H	-	L
CO5	H	H	H	H	H	H	H	H	-	M

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VIRUDHUNAGAR - 626 001

M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS (SEMESTER) (2020 - 2021 onwards)

Semester I	APPLIED PHYSIOLOGY	Hours/Week:6	
Core Course - 3		Credits: 5	
Course Code		Internal	External
20PHSC13		40	60

COURSE OUTCOMES

On completion of the course, the students 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 organs and systems. [K3]
- CO4: classify the types of various physiological system in human body. [K4]
- CO5: predict the abnormalities found in various organs and systems in the human body by assessing the composition and secretions of various glands. [K5]

UNIT I

Cell Structure and Functions – Level of cellular organization, organelles, tissues, organs and systems.

Cell membrane, transport across cell membrane and inter cellular communication.

Regulation of cell multiplication

Immune System – cell mediated and humoral immunity, activation of WBC and production of antibodies, role in inflammation and defence mechanism. (15 Hours)

UNIT II

Digestive System – structure and functions of gastro intestinal tract, gastro intestinal motility, salivary gland function, nature and control of stomach and pancreatic secretions, biliary system, digestion and absorption in small and large intestines, regulation of food intake –hunger, appetite and satiety.

Respiratory System – structure of lungs and mechanism of breathing, ventilation, regulation of respiration, artificial ventilation, non-respiratory functions of the lungs and gaseous exchange (transport of oxygen and carbon-di-oxide). (20 Hours)

UNIT III

Cardio vascular system – Blood composition and functions, structure and functions of heart and blood vessels, regulation of cardiac output and blood pressure, heart failure and hypertension.

Excretory System – structure and functions of excretory system, structure of nephron, physiology of urine formation, micturition; structure and functions of skin. (17 Hours)

UNIT IV

Nervous System – Structure and functions of brain and spinal cord, structure and functions of neuron; conduction of nerve impulse, role of neuro transmitters; blood brain barriers, CSF, hypothalamus and its role in various body functions.

Musculo Skeletal System – structure and functions of bone and physiology of muscle contraction. (18 Hours)

UNIT –V

Reproductive System – structure and functions of male and female reproductive organs, menstrual cycle, fertilization, physiological changes in pregnancy, parturition, lactation and menopause.

Endocrine System – structure, function, role of hormones, regulation of hormone secretion and disorders - pituitary, thyroid, adrenal, pancreas and parathyroid glands. (20 Hours)

REFERENCE BOOKS

1. Arumugam, N. (2016), *Human Physiology*, India : Saras Publication.
2. Ganong,W.F. (1985). *Review of Medical Physiology*,12th Edition, Lange Medical Publication.

3. Guyton,A.C.(1985). *Function of the Human Body*, 4th Edition, Philadelphia: W.B.Sanders Company. *Human Physiology*, New Delhi : S.Chand Company.
4. Jain,A.K. (1998). *Textbook of Physiology*, Vol. I and II, New Delhi: Avichal Publishing Co.
5. Ratan, V.S. (1993). *Hand Book of Physiology*, New Delhi : Medical Publishers (p) Ltd.
6. Saladin, K.S. (1998). *Anatomy Physiology*, New York : MC Grow-hill.
- 7.Sherwood, L. (2011). *Fundamentals of Human Physiology*, 4th Edition, United States: Cengage Learning.
- 8.Singh, H. D. (2010). *A Textbook of Human Physiology*, New Delhi: S.Chand Company.
- 9.Subramanyam,S., MadhavanKutty, K. and Singh, H.D. (1996). *A Textbook of Human Physiology*, New Delhi: S.Chand Company.

Course Code 20PHSC13	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	H	H	H	-	-	L	M	L	-	-
CO2	H	H	M	M	M	M	H	H	-	-
CO3	H	H	M	M	M	M	H	H	-	-
CO4	H	H	M	H	H	M	H	H	-	-
CO5	H	H	M	H	H	H	H	H	-	H

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VIRUDHUNAGAR - 626 001

M.Sc. HOME SCIENCE- NUTRITION AND DIETETICS (SEMESTER) (2020 - 2021 onwards)

Semester: I	FOOD ANALYSIS LAB	Hours/Week:6	
Core Practical-1		Credits: 3	
Course Code 20PHSC11P		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: write the procedure of food analytical techniques. [K3]

CO2: prepare the reagents and media for analyzing the food samples. [K3]

CO3: determine the amount of nutrients and microbial load in the food samples and document it in the record. [K3]

CO4: comment on the reagents, reactions and techniques involved in food analysis. [K4]

CO5: defend the results obtained from the food analysis. [K5]

A. Nutrient Analysis

1. Determination of moisture content in foods by different methods.
2. Estimation of reducing sugar in food sample.
3. Estimation of fiber content in food sample.
4. Estimation of protein.
5. Determination of
 - a. Specific gravity of oil.
 - b. Refractive index of oil.
6. Estimation of acid value of fats and oils.
7. Estimation of saponification value of fats and oils.
8. Estimation of ascorbic acid

9. Estimation of ash content in foods
10. Estimation of sodium
11. Estimation of phosphorus
12. Estimation of iron
13. Detection of common adulterants in food

B. Microbial Analysis

1. Personal protection and conduct in microbiology laboratory.
2. Functioning and usage of various microbial equipment.
3. Principle and methods of sterilization techniques.
4. Preparation of selective and differential media.
5. Isolation of pure cultures
 - a) Pour plate technique
 - b) Spread plate technique
 - c) Streak plate technique.
6. Enumeration of bacteria by Plate count method and Haemocytometer.
7. Isolation and identification of microbes from fruits and vegetables
8. Microbial analysis of food sample - soft drinks, ice creams, pickles, bread and meat samples.
9. Standard quality analysis of water sample.
 - a) Presumptive test
 - b) Confirmative test
 - c) Completed test
10. Antibiotic activity of the given food samples
 - a) Disk diffusion method
 - b) Well diffusion method.
11. Analysis of microbial load in food processing equipments.
12. Determination of the quality of milk sample by methylene blue reductase test.

C Demonstration

1. Determination of energy content in foods by using bomb calorimeter.
2. Estimation of protein by Kjeldhal method
3. Estimation of crude fat by Soxhlet method.

REFERENCE BOOKS

1. Ajay Paul,(2012). *Basic and Applied Biochemistry-A practical Manual*, Haryana : CCS Hariyana University.
2. Arora,B. and Arora, D.R. (2007). *Practical Microbiology*, New Delhi: CBS Publishers.
3. Gunasekaran, P. (2005). *Laboratory Manual in Microbiology*, New Delhi: New Age International (P) Limited Publishers.
4. Kalaiselvan,P.T.(2006). *Microbiology and Biotechnology - a Laboratory manual*, Tamilnadu: MJP Publishers.
5. Rajan,S. and Selvichristy,R. (2011). *Experimental Procedures in Life Sciences*, Chennai: Anjanaa Book House.
6. Sadasivam ,S. and Manickam, B. (2004). *Biochemical Methods*, New Delhi: New Age International Publishers.
7. Sathe ,A.Y. (1999). *A First Course in Food Analysis*, New Delhi: New Age International (P) Ltd.

Course Code 20PHSC11P	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	H	H	H	H	M	H	H	H	L	M
CO2	H	H	L	H	H	H	H	H	H	M
CO3	H	H	M	H	H	H	H	H	H	M
CO4	H	H	M	H	H	H	H	H	H	M
CO5	H	H	H	H	H	H	H	H	H	M

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M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS (SEMESTER) (2020 - 2021 onwards)

Semester: I	RESEARCH METHODOLOGY	Hours/Week:6	
Elective Course-1		Credits: 4	
Course Code 20PHSE11		Internal 40	External 60

COURSE OUTCOMES

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

- CO1: explain the concept of good research, sampling, collection of data, reliability, validity and report writing. [K2]
- CO2: apply the correct procedure to construct research design, select sampling methods, collect data, frame hypothesis and measure the quality of research to provide good report. [K3]
- CO3: manipulate the data of the research process and present the results in a scientific manner to solve the research problems. [K3]
- CO4: categorize research, hypothesis, variables, and collection of data, reliability, validity and report to pursue the research. [K4]
- CO5: formulate research report of a contemporary problem and conclude the data by adopting software and research ethics. [K5]

UNIT I

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

Research design – meaning, need, features of good design – Experimental design - basic principles, informal experimental design and formal experimental designs. (20 Hours)

UNIT II

Variables – definition and types.

Hypothesis - definition, characteristics and types

Theory of probability – Sampling - definition, advantages and disadvantages, types- probability sampling - simple random sampling, restricted random sampling, systematic random sampling, stratified random sampling and multistage sampling, Non probability sampling-judgment, convenience and quota sampling. (20 Hours)

UNIT III

Collection of data-definition, sources of data, methods of collection – questionnaire, interview, observation, case study. Participatory Rural Appraisal (PRA) and Rapid Rural Appraisal (RRA). (17 Hours)

UNIT IV

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

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

UNIT V

Report writing - definition, characteristics of good report, types of report, format of a good report and chapterisation, references, figures, formatting and typing of research report.

Citation Software – Mendeley, Ethics in research, Plagiarism – meaning and importance.

(15 Hours)

REFERENCE BOOKS

1. Chawla, D. and Sondhi, N. (2018). *Research Methodology*, 2nd Edition, Noida: VIKAS Publications Pvt(Ltd).
2. Gurumani, N.(2006). *Research Methodology*, Chennai: MJP Publishers.
3. Kothari, G.R. (1990). *Research Methodology Methods and Techniques*, New Delhi: Wiley Eastern Limited.
4. Prem, S.M.(2007). *Introductory Statistics*, 6th edition, Singapore: John wiley.
5. Sharma, B.A.V., Prasad, R.D. and Satyanarayana, P. (1985). *Research Methods in Social Sciences*, New Delhi: Sterling Publishers pvt.Ltd.
6. Thomas, G.C. (2016). *Research Methodology and Scientific Writing*, New Delhi: Ane books Pvt(Ltd).
7. Veer Bala, R. (2011). *Fundamentals of Statistics*, New Delhi: Ane books Pvt(Ltd).
8. Wilkinson, T.S. and Bhandarkar, P.L.(1984).*Methodology and Techniques of Social Research*, Bombay: Himalaya Publishing House.

Course Code 20PHSE11	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	H	H	M	M	M	M	H	L	-	-
CO2	H	H	M	H	H	H	H	L	-	M
CO3	H	H	H	H	H	H	H	M	-	M
CO4	H	H	H	H	H	H	H	M	-	M
CO5	H	H	H	H	H	H	H	M	-	H

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M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS (SEMESTER) (2020 - 2021 onwards)

Semester: I	INSTRUMENTATION IN FOOD ANALYSIS	Hours/Week:6	
Elective Course –1		Credits: 4	
Course Code 20PHSE12		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

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

[K2]

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

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

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

CO5: choose the appropriate analytical instrument to measure, identify, separate and purify the unknown minor and major components in foods.[K5]

UNIT I

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

UNIT II

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

UNIT III

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

UNIT IV

Microscopy - basic principles and applications, types - Light, Compound, Phase contrast , Dark Field, Fluorescence Microscopy Scanning Electron Microscopy (SEM)-Transmission Electron Microscopy(TEM). (19 Hours)

UNIT V

Electrophoretic Techniques: General principles. Paper and Gel Electrophoresis. Polyacrylamide Gel Electrophoresis, SDS. (17 Hours)

REFERENCE BOOKS

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

9. Wilkinson, T.S. and Bhandarkar P.L, (1984).*Methodology and Techniques of Social Research*, Bombay: Himalaya Publishing House.

Course Code 20PHSE12	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	H	H	M	L	L	M	H	H	-	-
CO2	H	H	L	M	M	M	H	H	-	L
CO3	H	H	M	H	H	H	H	H	-	L
CO4	H	H	M	H	H	H	H	H	-	M
CO5	H	H	M	H	H	H	H	H	-	M

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M.Sc. HOME SCIENCE- NUTRITION AND DIETETICS (SEMESTER) (2020 - 2021 onwards)

Semester: I	FOOD BIOTECHNOLOGY	Hours/Week:6	
Elective Course-1		Credits: 4	
Course Code 20PHSE13		Internal 40	External 60

COURSE OUTCOMES

On completion of the course students will be able to

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

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

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

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

CO5: evaluate the pros and cons of food biotechnology on public health and food safety. [K5]

UNIT I

Biotechnology - definition, scope, potential benefits and risks of modern food biotechnology. Role of biotechnology in food processing. (15 Hours)

UNIT II

Single Cell Protein (SCP) – definition, properties, nutritional value and advantages. Production process of spirulina, baker's yeast and mushroom- paddy straw mushroom, button

mushroom and oyster mushroom. Preservation of mushrooms, identification of poisonous mushroom, safety and nutritional evaluation of SCP, economic importance of SCP.

(21 Hours)

UNIT III

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

Downstream Processing- stages in downstream processing-solid liquid separation, release of intracellular products, concentration, purification and formulation. (17 Hours)

UNIT IV

Processing of fermented products – organic acids- citric acid, lactic acid and acetic acid. Vitamins- vitamin B₁₂, vitamin B₂ and beta carotene. Amino acids - lysine and glutamic acid. Polysaccharides - xanthan, dextran and alginate.

Enzyme Technology – enzyme production - amylase, protease, pectinase, phosphatase and lipase. Applications of enzymes in food industry. (19 Hours)

UNIT V

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

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

Intellectual Property Rights (IPR). (18 Hours)

REFERENCE BOOKS

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

Course Code 20PHSE13	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	H	H	M	L	L	M	L	L	-	-
CO2	H	H	M	H	H	M	M	M	-	L
CO3	H	H	M	H	H	H	M	M	-	L
CO4	H	H	M	H	H	H	H	M	-	H
CO5	H	H	H	H	H	H	H	M	-	H

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VIRUDHUNAGAR - 626 001

M.Sc. HOME SCIENCE - NUTRITION AND DIETETICS

(2020 - 2021 onwards)

Semester II	ADVANCED NUTRITION AND DIETETICS	Hours/Week: 6	
Core Course – 4		Credits: 5	
Course Code 20PHSC21		Internal 40	External 60

COURSE OUTCOMES

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

- CO1: review the basic concepts of nutrition science, RDA, BMR, definition, food sources, classification, digestion and absorption of nutrients and overview of normal and special diet. [K2]
- CO2: identify the functions and deficiency diseases of energy, water, macro and micro nutrients in human nutrition. [K3]
- CO3: find out the factors affecting energy expenditure, BMR and absorption of various micro and macro nutrients, physical changes occur during different stages of human life cycle and in special conditions. [K3]
- CO4: analyse the requirements of energy, water, macro and micro – nutrients needed during different stages of lifecycle and in special conditions. [K4]
- CO5: recommend the suitable menu and dietary modifications required for normal, special conditions persons and for sports persons. [K5]

UNIT I

Nutrition Science - Basic concepts - nutritional requirements - definition of concepts in relation to human nutritional requirements- basic terminology in relation to nutritional requirements - methods for studying the nutrient requirements. National and International

recommendations on nutrient requirements - goals of National and International requirement estimates and RDA's dietary guidelines.

Energy – definition and unit of energy, determination of energy, factors affecting energy expenditure and requirement, total energy requirements and dietary energy recommendations, energy imbalance, BMR - factors affecting BMR.

Water - functions of water in the body, water distribution and compartments of body water, water balance, requirements for water and disturbances in fluid balance. (18 Hours)

UNIT II

Carbohydrates – classification, functions, digestion and absorption, food sources. Metabolic utilization and regulation of blood glucose concentration. Fibre - types and role of fibre in human health. Modification of carbohydrate intake for specific disorders.

Proteins – classification, functions, digestion, absorption and transport, quality of protein in the diet, nutritional requirements, recommended allowances for proteins and amino acids, protein deficiency and food sources.

Fat – classification, digestion, absorption, transport and storage of fats in the body, functions of fat, nutritional requirements and food sources. (18 Hours)

UNIT III

Fat Soluble Vitamins - Vitamin A, D, E and K – functions, nutritional requirements, food sources and deficiency.

Water soluble Vitamins: Thiamin (Vitamin B1, or Aneurin), riboflavin, niacin, pyridoxine (Vitamin B6), folate, cyanocobalamin (Vitamin B12), ascorbic acid (Vitamin C) - functions, nutritional requirements, food sources and deficiency. Interaction with other nutrients.

Macro Minerals: Calcium, phosphorus, magnesium, sodium, potassium, chloride - functions, nutritional requirements, food sources and deficiency.

Micro Minerals: Iron, zinc, copper, selenium, chromium, manganese, iodine and fluorine - functions, nutritional requirements, food sources and deficiency. (18 Hours)

UNIT IV

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

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

Infants and Preschool Children - growth and development, nutrient needs and recommended dietary allowances, diet and feeding patterns, nutritional problems of infants and preschoolers. (18 Hours)

UNIT V

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

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

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

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

REFERENCE BOOKS

1. Abraham, S. (2016). *Nutrition Through Life Cycle*, New Delhi: New Age International Ltd.
2. Gopalan, C. (2007). *Nutritive Value of Indian Foods*, Hyderabad: NIN/ICMR.
3. Gopalan, C. and Vijayaragavan, K. (1971). *Nutrition*, Hyderabad: Atlas of India NIN/ICMR.
4. Kravse, M.V. and Mohan, (1984). *Food, Nutrition and Diet Therapy*, Philadelphia: Pa. W.B. Saunders.

5. Mary kay Mitchell. (2015). *Nutrition Across the Life Span*, 2nd Edition, New Delhi: Scientific International PVT,LTD.
6. Rajalakshmi, R. (2013). *Applied Nutrition*, 4th Edition, New Delhi: Oxford & IBH Publishing Co. Pvt. Ltd.
7. Robinson, H.C.(1978). *Fundamentals of Normal Nutrition*, 3rd Edition, Macmillan: Collier Macmillan International Edition.
8. Sharma, R.(1999). *Diet Management*. 2nd Edition, London: Churchill Livingstone.
9. Srilakshmi, B. (2015). *Human Nutrition*, 1stEdition, New Delhi: New Age International Ltd.
10. Srilakshmi, B. (2018). *Nutrition Science*, 6th Edition, New Delhi: New Age International Ltd.
11. Srilakshmi, B.(2019). *Dietetics*. 8th Edition, New Delhi: New Age International Publishers.
12. Swaminathan, M. (2018). *Essentials of Food and Nutrition*, Vol I & II, Bangalore: The Bangalore printing and Publishing Co Ltd.
13. Williams and Sue Rodewell, (1985). *Nutrition and Diet Therapy*, 5th edition, St. Louis: Times Mirror/Mosby College Publications.

Course Code 20PHSC21	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	H	M	H	M	L	M	M	H	-	L
CO2	H	M	H	M	M	H	H	H	-	L
CO3	H	M	H	H	M	H	H	H	-	L
CO4	H	M	H	H	H	H	H	H	-	L
CO5	H	H	H	H	H	H	H	H	-	H

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VIRUDHUNAGAR - 626 001

M.Sc. HOME SCIENCE - NUTRITION AND DIETETICS (SEMESTER) (2020 - 2021 onwards)

Semester II	CLINICAL BIOCHEMISTRY	Hours/Week: 6	
Core Course -5		Credits: 5	
Course Code 20PHSC22		Internal 40	External 60

COURSE OUTCOMES

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

- CO1: outline the basic concept of biomolecules, functions of liver and kidney in human body. [K2]
- CO2: write the metabolic pathway and estimation of bio-components in human body. [K3]
- CO3: identify the enzyme defect, clinical manifestations and treatment of various metabolic disorders associated with carbohydrate, protein, fat and nucleic acid metabolism. [K3]
- CO4: analyze the role of macronutrients, enzymes and major organs in metabolism and clinical diagnosis. [K4]
- CO5: interpret the diagnostic methods of various disorders. [K5]

UNIT I

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

Metabolic disorders- glycosuria, galactosemia, lactose intolerance and glycogen storage diseases.

(18 Hours)

UNIT II

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

Metabolic disorders-alkaptonuria, Phenyl ketonuria, tyrosinemia and albinism.

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

UNIT III

Lipid Metabolism - lipogenesis- synthesis of fatty acids, oxidation of fatty acids, ketogenesis, biosynthesis of cholesterol, catabolism of cholesterol.

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

UNIT IV

Nucleotide Metabolism- purine nucleotide synthesis- De Novo synthesis and Salvage pathway.primidine synthesis- deoxyribonucleotide synthesis.

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

UNIT V

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

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

REFERENCE BOOKS

1. Allan Gaw. (2008). *Clinical Biochemistry*, 7th Edition, United Kingdom: 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*, 2nd Edition, Chennai: Scitech Publications.
5. Sharma, D.C. (2017). *Nutritional Biochemistry*, New Delhi: CBS Publishers & Distributors.
6. Singh, S.P. (2006). *Principles of Biochemistry*, New Delhi: CBS Publishers.

7. Thomas, M. Devlin (2010). *Text book of Biochemistry with Clinical Correlations*, 7th Edition, New York: A John Wiley & Sons, INC Publications.

Course Code 20PHSC22	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	H	H	H	-	-	-	-	M	-	-
CO2	H	H	H	M	M	M	-	H	-	-
CO3	H	H	H	M	M	M	M	H	-	-
CO4	H	H	M	M	M	H	M	H	-	-
CO5	H	H	M	H	H	H	H	H	-	-

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M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS (SEMESTER) (2020 - 2021 onwards)

Semester: II	COMPOSITE HOME SCIENCE	Hours/Week:6	
Core Course -6		Credits: 5	
Course Code - 20PHSC23		Internal 40	External 60

COURSE OUTCOMES

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

- CO1: explain the concepts of Food Science, Nutrition, Dietetics and Institutional management, Textiles and Clothing, Family Resource Management, Human development and Extension Education. [K2]
- CO2: identify the role of nutrition in health, microorganism in food spoilage, fibre in fabric manufacturing, resources in home management, peers, family, school, community and culture on child development and teaching aids in community development. [K3]
- CO3: apply the scientific principles of various aspects in branches of Home Science in their day today life. [K3]
- CO4: focus the scientific skills in the management of resources and develop basic skills for career options in the fields of dietetics, preschool education, interior designing, textiles and clothing and extension education. [K4]
- CO5: assess the various aspects in the branches of Home Science for healthy human upliftment and community. [K5]

UNIT I

Food, Nutrition, Dietetics and Institutional Management

Food - food groups, balanced diet and food pyramid.

Quality evaluation of foods – Its objectives and subjective perspectives. Effects of cooking and processing techniques on nutritional components. Nutrients: The role of nutrients, nutrient

deficiencies and requirements of nutrients for Indians. Nutrition through life span-physiological changes, development from conception to adolescence, nutritional needs and dietary guidelines for adequate nutrition. Nutritional assessment methods and techniques. Nutritional intervention: Therapeutic nutrition. Diet counselling. Role of microorganisms in food spoilage and its prevention. Perspectives of food service - menu planning and food cost analysis. Food service management of institutional level-hospital, educational, social and special institutions.

(18 Hours)

UNIT II

Textiles and Clothing

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

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

(18 Hours)

UNIT III

Family Resource Management

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

Design Fundamentals: Elements and principles of design. Colour - Dimensions of colour, psychological effects of colour, colour schemes and factors affecting the use of colour. Space planning and design-housing - Need, principles of planning spaces, types of house planning for different income groups.

(18 Hours)

UNIT IV

Human Development

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

Theories of human development. Early childhood care and education: Activities to promote holistic development. role of peers, family, school, community and culture and personality development on children. . Children with special needs – classification, care, education, and prevention and rehabilitation. child labour, child abuse and trafficking. Adolescence - Challenges and Programs to promote optimal development of the child. Adulthood - Characteristics, changing roles, responsibilities in early and middle adulthood. Developmental Task of various stages of life span. Aging - physical and psychological changes. (18 Hours)

UNIT V

Extension Education

Extension Education – meaning, history, objectives, principles and Philosophy. Communication - definition, elements, models, types and barriers of communication. Different approaches of extension education. Audio-visual aids- classification, preparation and selection criteria. Extension programme Planning – meaning, need, developmental process. Community development programme and Threetyre systems of panchayat raj. Objectives and planning of Formal / Non-formal Curriculum. National programmes related to Home Science. (18 Hours)

REFERENCE BOOKS

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

5. Durga,D.(1991). *Household Textiles and Laundry Work*, New Delhi: Alma Ram and Sons.
6. Frazier, W.C. and Westhoff, D.C. (2015). *Food microbiology*, 4thEdition, New York: John Wiley & sons, inc.
7. Gajalakshmi, R. (2014), *Nutrition Science*, New Delhi: CBS Publishers and Distributors Pvt Ltd.
8. Goldstein,H. and Goldstein,V.(1958). *Art in Everyday Life*, U.S.A: Macmillan Company.
9. Hurlock, B. (1980). *Developmental Psychology*, New Delhi: McGraw- Hill Publishing Company Ltd.
10. Lutz and Przytulski, (2004). *Nutrition and Diet Therapy*, Philadelphia: F.A. Davis Company.
11. Manay,S.N. and Shadaksharaswamy, M. (2008). *Foods Facts and Principles*, New Delhi: New Age International Ltd.
12. Mohini,S. and Surjeet,M.(1993). *Catering Management and Integrated Approach*, New Delhi: Wiley Eastern Ltd.
13. Nickell, P. and Dorsey, J.M. (1978). *Management in Family Living*, New Delhi: John Wiley and sons.
14. Paul,S. (2005). *Textbook of Bio-Nutrition, Curing Diseases through Diet*, 1st Edition, India: CBS Publications.
15. Potter,N.N. and Hotchkiss,J.H. (2006). *Food Science*, New Delhi: CBS Publishers.
16. Premlata.M, (2012).*Textbook of Home Science*, New Delhi: Kalyani Publications.
17. Reddy, A. A. (1971). *Extension Education*, Andhra Pradesh: Sri Lakshmi Press.
18. Robinson,C.H. (1986). *Normal and Therapeutic Nutrition*, 17th Edition, U.S.A: Macmillan Publishing Co.
19. Shuchi, R. (2018). *UGC NET/SET (JRF& LS) Home Science Paper II and III*, New Delhi: Arihant Publications (India) Limited.
20. Srilakshmi, B. (2018). *Dietetics*, 7th Edition, New Delhi: New Age International Ltd.
21. Suganthi,M. and kumari, P.(2017). *Food Service Management*, Chennai: Dipti press PVT Ltd.
22. Suriakanthi, A. (2005). *Child Development an Introduction*, Tamilnadu: Kavitha Publications.

23. Swaminathan, M. (2018). *Essentials of Food and Nutrition*, Vol I & II. Bangalore: The Bangalore printing and Publishing Co Ltd.
24. Varghese, M.A., Ogale, N. N. and Srinivasan, K. (2000). *Home Management*, New Delhi: New Age International (P) Limited Publishers.

Course Code 20PHSC23	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	H	H	M	L	L	L	M	H	-	-
CO2	H	H	M	H	H	H	M	H	-	-
CO3	H	H	H	H	H	H	H	H	-	M
CO4	H	H	H	H	H	H	H	H	-	H
CO5	H	H	H	H	H	H	H	H	-	H

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VIRUDHUNAGAR - 626 001

M.Sc. HOME SCIENCE - NUTRITION AND DIETETICS (SEMESTER) (2020 - 2021 onwards)

Semester II	CLINICAL NUTRITION AND DIETETICS LAB	Hours/Week: 6	
Core Practical -2		Credits: 3	
Course Code 20PHSC21P		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

- CO1: write the procedure for qualitative and quantitative analysis of biochemical constituents in urine and blood. [K3]
- CO2: apply the principles of diet in planning a suitable balanced diet for the persons of different age groups. [K3]
- CO3: estimate the amount of biochemical constituents present in blood, prepare the meal and calculate the nutrients present in it and the record completion. [K3]
- CO4: analyze the results and its interpretations. [K4]
- CO5: recommend the menu suitable for various clinical conditions in different stages of life. [K5]

Biochemical Analysis in Urine and Blood

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

Dietetics Practical

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

Data Analysis using Excel and SPSS package.

REFERENCE BOOKS

1. Anusha, B.(2014). *Biochemical Methods - A Practical Approach*, New Delhi: Narosa Publishing House.
2. Biswajit,M. and Sharbaribas, (2006). *Fundamentals of Practical Clinical Biochemistry*, New Delhi: B.I.Publications Pvt Ltd.
3. Gopalan, C. (2007). *Nutritive Value of Indian Foods*, Hyderabad: NIN/ICMR.
4. Sharma, R. (1999). *Diet Management*. 2nd Edition, London: Churchill Livingstone.
5. Singh,S.P.(2013). *Practical Manual of Biochemistry*, New Delhi: CBS Publishers and Distributors.
6. Srilakshmi,B.(2019). *Dietetics*. 8th Edition, New Delhi: New Age International Publishers.

Course Code 20PHSC21P	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	H	H	L	L	L	L	H	H	H	H
CO2	H	H	M	H	H	H	H	H	H	H
CO3	H	H	M	H	H	H	H	H	H	H
CO4	H	H	H	H	H	H	H	H	H	H
CO5	H	H	H	H	H	H	H	H	H	H

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M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS (SEMESTER)
(2020 - 2021 onwards)

Semester II	STATISTICS AND COMPUTER APPLICATIONS	Hours/Week:6	
Elective Course-2		Credits: 4	
Course Code 20PHSE21		Internal 40	External 60

COURSE OUTCOMES

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

- CO1: explain the concepts of frequency distribution, classification and tabulation of data, statistical analysis and statistical tool packages. [K2]
- CO2 : write the formulae and steps involved in the calculation of various statistical analysis by using various methods. [K3]
- CO3: compute the statistical data using measures of central tendency, dispersion, parametric and non parametric methods. [K3]
- CO4: analyse the properties, applications, merits and demerits of various statistical methods. [K4]
- CO5: interpret the statistical skills in MS office and SPSS package for analyzing the data. [K5]

UNIT I

Classification and tabulation of data, frequency distribution, measures of central tendency and dispersion: Arithmetic mean – median – mode, measures of dispersion – range, quartile deviation, mean deviation, standard deviation. Co-efficient of variation. Binomial distribution and normal distribution. (21 Hours)

UNIT II

Parametric test – t-test, ‘f’- test and ANOVA - Advantages and limitations.

Non-parametric test –chi-square, mann-whitney U test, kruskal-wallis or H- test – advantages and limitations. Response Surface Methodology (RSM)

Testing of hypothesis. (21 Hours)

UNIT III

Correlation analysis – definition, properties, significance, causation, types, methods - Karlpearson’s and Spearman’s rank correlation - merits and limitations.

Regression analysis– definition, uses, regression lines, regression equations, limitations- correlation and regression differences.

Trend analysis and factor analysis. (21 Hours)

UNIT IV

MS word – introduction-menubar, toolbar, formatting, tables, mail merge, short cut keys

MS Excel- introduction, editing, formatting, functions and chart

MS Power point-menu, toolbar, working with power point. (12 Hours)

UNIT V

SPSS - introduction, menu commands and sub-commands, basic steps in data analysis - defining, editing and entering data, data file management functions, running a preliminary analysis-six characteristics of a data set, data transformation, graphical presentation of data.

(15 Hours)

REFERENCE BOOKS

1. Agarwal, B.L. (2018). *Basic Statistics*, New Delhi: New Age International Publishers.
2. Gupta, S.P. (2005). *Statistical Methods*, New Delhi: Sultan Chand and Sons.
3. Gurumani, N. (2005). *An Introduction to Biostatistics*, Chennai: MJP Publishers.
4. Khan, (2004). *Fundamentals of Biostatistics*, Hyderabad: Ukaaz Publications.
5. NellaiKannan, C. (2012). *MS-Office*, Thirunelveli: Nels Publications.

6. Pillai, R.S.N. (2005). *Statistics*, New Delhi: Chand and Company Ltd.
7. Rajathi, A. and Chandran, P. (2010). *SPSS for You*, Chennai: MJP Publishers.
8. Subathra, R. (2006). *Probability and Statistics*, Pune :Tech Max Publications.

Course Code 20PHSE21	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	H	H	M	M	M	M	M	L	-	-
CO2	H	H	M	H	H	H	H	L	-	-
CO3	H	H	M	H	H	H	H	L	-	-
CO4	H	H	H	H	H	H	H	L	-	-
CO5	H	H	H	H	H	H	H	L	-	-

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VIRUDHUNAGAR - 626 001

M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS (SEMESTER) (2020 - 2021 onwards)

Semester II	FOOD PACKAGING TECHNOLOGY	Hours/Week:6	
Elective Course –2		Credits: 4	
Course Code 20PHSE22		Internal 40	External 60

COURSE OUTCOMES

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

CO1: describe the concept and functions of packaging, methods of packaging, packaging laws, types of packaging materials and its requirements for food items. [K2]

CO2: plan the packaging environment and laws needed for packing various food items safely. [K3]

CO3: apply the principles involved in food packaging, packaging materials, methods of packaging and packaging of various food items. [K3]

CO4: categories the levels of packaging, packaging methods, food regulations and packaging requirements for various food items. [K4]

CO5: evaluate the pros and cons of various packaging materials and methods of packaging by following the food standards. [K5]

UNIT I

Introduction to Food Packaging – definition, levels of packaging, functions of packaging, need of food packaging, packaging environment. (15 Hours)

UNIT II

Flexible Packaging Materials – paper, edible films, aluminium foils and laminations.

Semi rigid packaging materials – aluminium containers, paper board cartons, folding paper board cartons, molded pulp and plastic containers.

Rigid packaging materials – glass containers, composite containers, cans, aerosol containers, solid and corrugated fibre board containers – wooden boxes and crates, shipping containers.

Caps, closures, wads, adhesives, inks, lacquers, cushioning materials and reinforcements.

Labeling – evaluations of packaging materials, labeling requirements for trade. (21 Hours)

UNIT III

Packaging material and requirements - food grains and food grain products, fruits and vegetables, meat, fish and poultry products, milk and milk products, fats and oils, bakery and confectionary products, stimulant foods, spices and condiments. (19 Hours)

UNIT IV

Methods of packaging -Controlled Atmosphere Packaging (CAP), Modified Atmosphere Packaging (MAP), vacuum packaging, aseptic packaging, retort packaging, bag – in- box packaging. (17 Hours)

UNIT V

Packaging laws and regulations – CODEX Alimentarius - SWMA rules – PFA rules – FPO rules –MFPO rules – Edible oil packaging order - AGMARK rules. (18 Hours)

REFERENCE BOOKS

1. EIRI board of consultants and engineers, (2006). *Handbook of Food Packaging Technology*, New Delhi: Engineers India Research Institute.
2. Han, J.H. (2005). *Innovation in Food Packaging*, California: Elsevier Academic Press.
3. Jacob John, P. (2010). *Handbook on Food Packaging*, New Delhi: Daya Publishing House.
4. NIIR. (2010). *Handbook on Modern Packaging Industries*, 2nd Edition, New Delhi: Asia Pacific Business Press.
5. Robertson, G.L. (1992). *Food Packaging Principles and Practices*, New York: Marcel Dekker, Inc.

Course Code 20PHSE22	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	H	H	H	L	L	M	L	L	-	M
CO2	H	H	H	H	H	H	M	L	-	M
CO3	H	H	H	H	H	H	H	L	-	M
CO4	H	H	H	H	H	H	H	L	-	H
CO5	H	H	H	H	H	H	H	M	-	H

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M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS (SEMESTER) (2020 - 2021 onwards)

Semester II	NUTRITION IN EMERGENCIES AND DISASTERS	Hours/Week:6	
Elective Course -2		Credits: 4	
Course Code 20PHSE23		Internal 40	External 60

COURSE OUTCOMES

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

- CO1: explain the concept of various natural and manmade emergencies, nutritional relief, rehabilitation and health care and methods of assessing the nutritional status of the victims. [K2]
- CO2: identify the method of assessing the nutritional and health status of emergency and disaster affected population. [K3]
- CO3: apply the nutritional relief and rehabilitation of the victims of emergencies and disasters and principles of health care to tackle the nutritional and health problems. [K3]
- CO4: analyse the causes for nutritional and communicable diseases, clinical sign for screening acute malnutrition, survey of diseases and approach it to tackle nutritional and health problems in emergencies. [K4]
- CO5: assess the process involved in disease investigation, reporting and control measures during various emergencies and disasters conditions. [K5]

UNIT I

Emergencies and Disaster Management – concept, disaster cycle – Natural and Manmade disasters resulting in emergency situations - famine, drought, flood, earthquake, cyclone, war,

civil and political emergencies. Factors contributing to the rise and development of emergency situations.

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

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

UNIT II

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

UNIT III

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

UNIT IV

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

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

UNIT V

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

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

(18 Hours)

REFERENCE BOOKS:

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

Course Code 20PHSE23	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	H	H	H	L	L	L	L	M	-	-
CO2	H	H	H	M	M	H	M	H	-	-
CO3	H	H	H	H	H	H	H	H	-	L
CO4	H	H	H	H	H	H	H	H	-	L
CO5	H	H	H	H	H	H	H	H	-	M

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M.Sc. HOME SCIENCE - NUTRITION AND DIETETICS (SEMESTER) (2020 - 2021 onwards)

Semester III	CLINICAL AND THERAPEUTIC NUTRITION	Hours/Week: 6	
Core Course -7		Credits: 5	
Course Code 20PHSC31		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

- CO1: explain the purpose, importance, principles of diet therapy, and elaborate the concept of nutrition and drug interaction, different diseases and disorders. [K2]
- CO2: write the different types of hospital diet, stages of different diseased conditions, effect of nutrient drug interactions, causes and consequences of various diseases and disorders. [K3]
- CO3: focus the special feeding methods, guidelines for the use of drug, clinical significance of drug and nutrient interactions, and also analyze the signs and symptoms of different diseases and disorders. [K4]
- CO4: assess the risk factors for nutrients and drug interaction, and recommend the suitable diet for various diseases, disorders and critically ill patients based on the principles, nutrient and dietary management guidelines. [K5]
- CO5: recommend the dietary guidelines for various diseases and disorders. [K5]

UNIT I

Adaptation of Therapeutic Diets - Routine hospital diets, mode of feeding – oral feeding, tube or enteral feeding, peripheral vein feeding, total parenteral nutrition and nutritional management of the critically ill. (16 Hours)

UNIT II

Nutrition and Drug Interaction - basic concept, effect of nutrition on drugs, drug effects on nutritional status, drug and drug interaction, clinical significance and risk factors for drug - nutrient interactions, guidelines to lower risk and wise use of drugs. (16 Hours)

UNIT III

A Review on etiology, signs and symptoms, consequences, nutritional and dietary management of renal disorders - Renal Nephritis, Glomerulitis, Renal failure, Kidney stone, Nephrolithiasis.

A Review on etiology, signs and symptoms, consequences, nutritional and dietary management during Fevers, Asthma and Tuberculosis.

A Review on etiology, signs and symptoms, consequences, nutritional and dietary management of Liver and Pancreas – Hepatitis, Cirrhosis, Cholecystitis, Cholelithiasis and Pancreatitis. (20 Hours)

UNIT IV

Nutritional Management of Eating Disorder -Anorexia Nervosa, Bulimia Nervosa and Binge eating.

Nutritional Management of Inborn Errors of Metabolism - Phenylketonuria, Galactosemia, Glycogen storage disease and Maple syrup urine disease – epidemiology, causes and dietary management.

Nutritional Management of Neurological Disorders – causes, clinical features and dietary management of Dysphagia, Alzheimer's disease, Parkinson's disease and Epilepsy. (19 Hours)

UNIT V

Nutritional Management of Lifestyle Diseases - causes, consequences and dietary management of Obesity, Diabetes mellitus, Atherosclerosis, Peptic Ulcer, Cancer and AIDS.

Nutrition During Stress - Stress Response - Ebb phase, Flow phase and Recovery /Anabolic phase. Dietary Management during Surgery, Burns, Trauma and Sepsis. (19 Hours)

REFERENCE BOOKS

1. Antia, F.P. and Philip, A. (2002). *Clinical Dietetics and Nutrition*. 4th Edition, England: Oxford University Press.
2. Bamji, M.S., Rao, P.N. and Reddy,V. (1996). *Textbook of Human Nutrition*, England: Oxford and IBH Publishing House.

3. Gopalan, C. (2007). *Nutritive Value of Indian Foods*, Hyderabad: NIN/ICMR.
4. Sharma, R.(1999). *Diet Management*, 2nd Edition, New Delhi: Churchill Livingstone.
5. Srilakshmi, B. (2019). *Dietetics*, 8th Edition, New Delhi: New Age International Publishers.

Course Code 20PHSC31	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	H	M	M	H	H	H	L	H	-	-
CO2	H	M	M	H	H	H	H	H	-	-
CO3	H	M	M	H	H	H	H	H	-	-
CO4	H	H	H	H	H	H	H	H	-	H
CO5	H	H	H	H	H	H	H	H	-	H

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M.Sc. HOME SCIENCE - NUTRITION AND DIETETICS (SEMESTER)

(2020 - 2021 onwards)

Semester III	PUBLIC NUTRITION	Hours/Week: 6	
Core Course -8		Credits: 5	
Course Code 20PHSC32		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

- CO1: outline the definition, need, scope, objectives and importance of public nutrition, malnutrition, nutritional assessment, nutrition education, intervention programmes and national and international organizations. [K2]
- CO2: identify the factors influencing community nutrition and macro and micro nutrients problems, nutritional assessment, theory of nutrition education and functions of national and international organizations. [K3]
- CO3: categorize the types of PEM, health and methods of assessing nutritional status, nutrition education, intervention programmes, preventive measures of PEM and role of national and international organizations. [K4]
- CO4: assess the consequences of macro and micro nutrient problems, strategies to combat public nutrition, activities of national and international programmes and the process of nutrition education and communication. [K5]
- CO5: recommend the suitable strategies to overcome the nutritional problems in the community. [K5]

UNIT I

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

Malnutrition- PEM – causes, consequences and preventive measures. (18 Hours)

UNIT II

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

(21 Hours)

UNIT III

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

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

(18 Hours)

UNIT IV

National Organizations - ICMR, NIN, CFTRI, NIPCCD

International Organizations - FAO, WHO, UNICEF, UNESCO, World Bank. (19 Hours)

UNIT V

Nutrition Education – definition, need, scope , importance, theory and methods of Nutrition education, Process of Nutrition education and Communication. (14 Hours)

REFERENCE BOOKS

1. Bamji,S.(2019). *Text Book of Human Nutrition*, 4th Edition, New Delhi:Oxford Publishing Pvt .Ltd.
2. Darshan,S. (2011). *Nutrition*, India: Vikas and Company.
3. Park,K.(2011). *Textbook of Preventive and Social Medicine*, 21st Edition. India: Banarasi das Bhanot Publishers.
4. Roday. S, (2011). *Food Hygiene and Sanitation*, 2nd Edition, New Delhi: TATA McGraw - Hill Publishing Company Limited.

5. Shanthi,G. (1992). *The Feeding and Care of Infants and Young Children*, New Delhi: Voluntary Health Association of India.
6. Srilakshmi,B. (2016). *Nutrition Science*, New Delhi : New Age International (p) Ltd.

Course Code 20PHSC32	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	M	M	M	-	-	-	H	M	-	-
CO2	M	M	M	H	H	H	H	H	-	-
CO3	H	H	H	H	H	H	H	H	-	-
CO4	H	H	M	M	M	M	H	H	-	-
CO5	M	M	H	H	H	H	M	M	-	-

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M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS (SEMESTER) (2020 - 2021 onwards)

Semester: III	ENTREPRENEURSHIP AND FOOD SERVICE MANAGEMENT	Hours/Week:6	
Core Course-9		Credits: 5	
Course Code 20PHSC33		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

- CO1: write the definition and concept of entrepreneurship, food service establishment, styles of service, food laws, food, personnel and financial management. [K2]
- CO2: identify the types of entrepreneur, food service establishment, menu, styles of service, equipment, budget and accounts. [K3]
- CO3: focus the importance and functions of entrepreneurship and feasibility, food service establishment, food safety and hygiene, food, personnel and financial management. [K4]
- CO4: assess the process of management, innovation, project proposal, personnel and financial management and analyze the purchasing, receiving, selection, care and maintenance of food and equipment. [K5]
- CO5: predict the required skills for entrepreneurship and food service establishment. [K5]

UNIT I

Entrepreneurship – definition, characteristics, creative process, Process of Innovation, Merchandising skills specially for entrepreneurs.

Planning the set up - Identifying resources - Facility available and equipment needed, Menu and precosting, Manpower required, Utilities. Developing Project plan and determining investments. Feasibility assessment. Project Proposal. (20 Hours)

UNIT II

Food Service Establishments: History and Development, Types of Food Service Establishment - Commercial and Non-commercial Establishments, Recent Trends.

Management - Principles, Process and Functions. (15 Hours)

UNIT III

Food Management - Importance of Menu and Menu Planning in Food Service Organization - Types of Menu and its Applications - Steps in Menu Planning and its Evaluation. Purchasing, receiving, storing and issuing of foods. (15 Hours)

UNIT IV

Styles of Service - Food Service Establishments, Restaurant and Specialized Forms of Service. Equipment- classification, selection, care and maintenance.

Sanitation and Hygiene – food hygiene, personnel hygiene and environmental hygiene.

Safety - accidents - prevention and training.

Laws Governing Food Service Establishments - labour laws, working conditions, welfare, health and safety, harmonious working relations, payments, food laws and food standards. (20 Hours)

UNIT V

Personnel Management: Staff Planning and Management,

Pricing – definition, factors affecting pricing, pricing policy and method of pricing.

Costing - cost control, cost calculation, Break - Even analysis and standard dish costing.

Budget - advantages, steps in budget planning, preparation and types.

Accounting - types, Books of Account: Journal, Sales Return Book, Purchases Return Book, Sales Book, Purchase Book, Cash Book and Ledger, Trial balance, balance sheet, profit and loss account. (20 Hours)

TEXT BOOKS

1. Mohini,S. and Surjeet,M.(2018). *Catering Management and Integrated Approach*. 3rd Edition, New Delhi: Wiley Eastern Ltd.
2. Suganthi and Premakumari, (2017). *Food Service Management*. Chennai: Dipti Press Pvt Ltd.

REFERENCE BOOKS

1. Bobby,G. and Sandeep ,C. (2008). *Food and Beverage Service Management*, Chennai: Jaico Publishing House.
2. Malhotra, R.K. (2005). *Food Service Management*. New Delhi: Anmol Publishers.
3. Varghese,B. (2015). *Professional Food and Beverage Service Management*, Chennai: Rajiv Beri for Macmillan India Ltd.

Course Code 20PHSC33	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	H	L	M	-	-	-	L	L	-	L
CO2	H	L	M	M	L	M	L	M	-	L
CO3	H	M	M	M	H	M	L	M	-	L
CO4	H	M	H	M	M	H	L	M	-	-
CO5	H	H	H	H	H	H	M	H	-	H

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M.Sc. HOME SCIENCE - NUTRITION AND DIETETICS

(2020 - 2021 onwards)

Semester III	THERAPEUTIC DIET LAB	Hours/Week: 6	
Core Practical – 3		Credits: 3	
Course Code 20PHSC31P		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: write the aim, principles of diet and foods to be included and excluded for various diseases and disorders. [K3]

CO2: plan the menu for various types of diseases and disorders. [K3]

CO3: prepare and evaluate the planned menu for various diseases and disorders and completion of the record. [K3]

CO4: analyze the result and conclude the interpretation. [K4]

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

A. Therapeutic Diet Practical

1) Planning and preparation of Routine hospital diets: Pre and post-operative diets - Clear fluid diet, Full fluid diet and Soft diet

2) Diet in upper and lower gastrointestinal disorders

- a) GERD with cholelithiasis
- b) Gastro intestinal resection
- c) Pancreatitis
- d) Irritable bowel disorder
- e) Constipation with hyperthyroidism and diabetes
- f) Peptic Ulcer

- 3) Dietary management for metabolic diseases
 - a) Diabetes Mellitus with insulin therapy
 - b) Diabetes with CVD and hypertension
 - c) Obesity with gout
 - d) CVD with COPD
- 4) Dietary management in liver disorders:
 - a) Hepatitis
 - b) Liver cirrhosis
 - c) Diet in liver transplantation
 - d) Cholelithiasis
- 5) Dietary management in Renal diseases:
 - a) Diabetic Nephropathy
 - b) Acute renal failure with hyperkalemia
 - c) Renal calculi (urates, oxalates, carbonates and phosphates)
 - d) Renal transplantation
- 6) Dietary management for Inborn errors of metabolic disorders
 - a) Phenyl Ketonuria
 - b) Galactosemia
 - c) Glycogen storage disease and
 - d) Maple syrup urine disease
- 7) Dietary management for
 - a) Burns
 - b) AIDS
 - c) Trauma and
 - d) Cancer

REFERENCE BOOKS

1. Anusha,B. (2014). *Biochemical Methods - A Practical Approach*. New Delhi: Narosa Publishing House.
2. Biswajitmohanty and Sharbaribas (2006). *Fundamentals of Practical Clinical Biochemistry*, New Delhi: B.I.Publications Pvt Ltd.
3. Gopalan, C. (2007). *Nutritive Value of Indian Foods*, Hyderabad: NIN/ICMR.
4. Rajathi, A. and Chandran, P. (2010). *SPSS for You*, Chennai: MJP Publishers.
5. Sharma, R.(1999). *Diet Management*, 2nd Edition, London: Churchill Livingstone.
6. Singh,S.P. (2013). *Practical Manual of Biochemistry*, New Delhi: CBS Publishers and Distributors.
7. Srilakshmi, B. (2009). *Nutrition Science*, New Delhi: New Age International Ltd.
8. Srilakshmi, B. (2019). *Dietetics*, 8th Edition, New Delhi: New Age International Publications.

Course Code 20PHSC31P	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	H	H	M	H	L	H	H	H	L	L
CO2	H	H	M	H	M	H	H	H	M	H
CO3	H	H	M	H	M	H	H	H	M	H
CO4	H	H	M	H	M	H	H	H	H	H
CO5	H	H	M	H	M	H	H	H	H	H

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(2020 -21 onwards)

Semester III	PRACTICE FOR SET/NET – GENERAL PAPER	Hours/Week: 1
Course Code		Credit: 1
20PGOL31		Internal 100

COURSE OUTCOMES

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

- CO1: discuss various concepts related to higher education system, teaching, communication, research, ICT and environmental studies. [K2]
- CO2: apply the skills of communication, mathematical, internet and research aptitude in competitive examinations. [K3]
- CO3: analyze the circumstances, instances, contents and arrive at / choose the best option. [K4]
- CO4: interpret the data using ICT tools and logical reasoning. [K5]
- CO5: build self-learning activities to face challenges in their life. [K6]

UNIT I Teaching & Research Aptitude

Teaching: concept, objectives, levels of teaching, factors affecting teaching, Methods of teaching of Higher learning, Evaluation systems.

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

UNIT II Communication and Higher Education System

Communication, Meaning, types, characteristics of communication, Verbal and non – verbal, Barriers to communication.

Higher Education System : Professional, Technical, skilled Based education, Value education, Policies, Governance and Administration.

UNIT III Comprehension

A passage of text will be given. Answers should be given according to the questions from the passage.

UNIT IV Mathematical, Logical Reasoning and Data Interpretation

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

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

UNIT V ICT and Environmental Studies

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

Environmental Studies: Pollution, Impacts of Pollutants, Natural and energy sources, Natural disasters and environmental protection Act.

BOOKS FOR STUDY:

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

REFERENCE BOOKS

- 1.RashmiSingh and Asim Khan (2019), UGC-NET Paper- I, Disha Publication, New Delhi.
- 2.Dr.Usha Rani Jain (2018), UGC-NETMital Books India Ltd., New Delhi.

Course code 20PGOL31	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H	H	-	-	M	L	-	L
CO2	H	H	L	M	H	M	-	M
CO3	H	M	M	H	H	M	-	M
CO4	H	M	H	H	H	H	-	L
CO5	H	L	M	L	L	H	-	L

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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

(2020 -2021 onwards)

Semester IV	DIETETICS TECHNIQUES AND COUNSELING	Hours/Week: 6	
Core Course – 10		Credits: 5	
Course Code 20PHSC41		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

- CO1: state the definition, concept, objectives, need, importance, advantages and disadvantages of medical nutritional therapies, diet counseling, nutritional care, counseling strategies, clinical information, communication and AV aids and record maintenance. [K2]
- CO2: find out the types of dietician, counseling, theories and approaches to counseling, AV aids, counseling of various sectors, correlating relevant information and identifying areas of need and factors affecting and individual food choices. [K3]
- CO3: analyze the qualities and role of dieticians, techniques of obtaining clinical information, effective diet counseling, practical considerations in giving dietary advice and counselling and also need for collecting clinical information and focus the materials needed for counseling. [K4]
- CO4: assess the food and nutritional intake, diet counseling steps, impact of counseling, communication and nutritional care process, reporting, findings of counseling and dietary diagnosis. [K5]
- CO5: recommend the suitable method of diet counseling and communication process to prevent various disease conditions. [K5]

UNIT I

Medical nutrition therapy and dietetics - Definition. The science and art of human nutrition care, Dietitian-definition, types, qualities and role of dietitian. Dietitian as a part of medical team and research team.

The Nutrition Care Process - nutrition assessment, nutrition diagnosis, nutrition intervention, nutrition monitoring and evaluation. Importance of coordinated nutritional care and rehabilitation services. (18 Hours)

UNIT II

Counselling - definition, importance, types, principle, process, advantages and disadvantages of counselling. Qualities of an effective counselling.

Diet Counselling - meaning, significance, process, types and goals of counselling. Theories and different approaches to counselling. Counselling strategies - Individual and Group counselling. Diet counselling steps - assessment, planning, implementation and evaluation components.

(18 Hours)

UNIT III

Clinical information - medical history and patient profile, techniques of obtaining relevant information and retrospective information, dietary diagnosis. Assessing food and nutrient intakes - lifestyles, physical activity, stress, nutritional status. Correlating relevant information and identifying areas of need. (18 Hours)

UNIT IV

Practical consideration in giving dietary advice and counselling - factors affecting and individual food choice, communication of dietary advice ,consideration of behaviour modification and motivation.

Role of counselling in hospital, role of counselling in community, organizing health

Providing counselling and organizing health camp- hospital and community level. Impact of counselling on patients. (19 Hours)

UNIT V

Materials needed for counselling –models, charts, posters, AV aids and Handouts. Communication process in counselling and linguistics in clinical dietary practices and problems in communication. Record maintains, reporting and applying findings for counselling.

(17 Hours)

REFERENCE BOOKS

1. Anita, F.P. (2002). *Clinical Dietetics and Nutrition*, 4th Edition, Bangalore: Oxford University Press.
2. Davidson, S. (1986). *Human Nutrition and Dietetics*, 8th Edition, London: Churchill Livingstone.
3. Eclames, (1972). *Biology of Nutrition*, New Delhi: Palaniuma Press, Lowrie, AVI Publication. Co.
4. Goodhearh, R. S. (2020). *Modern Nutrition in Health and Disease*, 11th Edition, Philadelphia: Lea &Febiger Publishing.
5. Krause, (2007). *Foods & Nutrition Therapy*, 12th Edition, Philadelphia: W.B. Saunders Company.
6. Pyke and Maonus. (1970). *Food Science and Technology*, 5th Edition, London : J. Murray Publication.
7. Winick, (1973). *Nutrition and Development*, New York: Columbia University.

Course Code 20PHSC41	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	H	L	M	L	H	L	L	H	-	L
CO2	H	L	M	M	H	M	L	H	-	L
CO3	H	M	M	M	H	M	L	H	-	L
CO4	H	H	M	H	M	M	M	H	-	L
CO5	H	H	M	H	H	H	H	H	-	L

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M.Sc. HOME SCIENCE - NUTRITION AND DIETETICS (SEMESTER) (2020 -2021 onwards)

Semester: IV	NUTRITION FOR HEALTH AND FITNESS	Hours/Week:6	
Core Course 11		Credits: 5	
Course Code: 20PHSC42		Internal 40	External 60

COURSE OUTCOMES

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

- CO1: describe the concepts of fitness, physical fitness, body composition, assessment, body system, nutrients, health and diet. [K2]
- CO2: write the changes that occur in body composition, body system, nutrients and modification of diet during physical activity and also find the inter relationship between the health and physical fitness. [K3]
- CO3: analyse the role of physical activity in fitness, body composition, body system, nutrients and diet in the maintenance of weight and prevention of various diseased conditions and also the diet for sports persons. [K4]
- CO4: recommend the suitable physical activity for various body systems, nutrients for better work performance, weight management, and dietary guidelines for normal, diseased conditions and sports persons. [K5]
- CO5: assess the appropriate measures to maintain the nutritional status and fitness of the people. [K5]

UNIT I

Fitness – Definition, objectives, concept of physical fitness and health, Principles of nutrition for health and contributing factors to health. Motivation for a physically active life, motivational strategies, assessment of fitness and approaches for keeping fit. Physical fitness and health inter-relationship and benefits of fitness. (18 Hours)

UNIT II

Body system involved in fitness – role and functions of body system and effect of exercise on it –musculo skeletal system – muscle mass, muscle strength and flexibility and range of motion. Circulatory system–carbondioxide expulsion, oxygen intake.Respiratory system - heart rate, oxygen transport and respiratory rate.Cardiovascular system- heart and blood vessels. Endocrine system –hypothalamus, pituitary gland, adrenal glands, growth hormone and endorphins. Nervous system – sympathetic and para sympathetic, nervous system. (18 Hours)

UNIT III

Fitness Performance and Nutrients

Role of nutrition in fitness, nutritional guidelines for fitness and nutritional supplements.Effect of specific nutrients on work performance and physical fitness, nutrition and exercise.Energy expenditure during physical activity. Carbohydrates,fat, protein,vitamins and minerals performance. Fluid and electrolyte loss and replacement in exercise. (18 Hours)

UNIT IV

Dietary Management and Health: Sports specific requirements. Diet manipulation.Pre-game and post-game meals.Assessment of different nutritional Ergogenic aids and commercial supplements – types, potential and concerns.Diets for persons with high energy requirements, stress, fracture and injury. (17 Hours)

UNIT V

Body Composition and Weight Management.

Body build, size and body composition, levels of body composition, methods to measure body composition- Direct and indirect, Significance of body composition measures for athletes. Body composition and performance safe, effective weight loss and Weight gain. Significance of physical fitness and nutrition in the prevention and management of weight control, obesity, diabetes mellitus, cardio vascular disorders, bone health and cancer. Nutritional and exercise regimes for management of obesity. Critical review of various dietary regimes for weight and fat reduction.Prevention of weight cycling. (19 Hours)

TEXT BOOKS

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

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

REFERENCE BOOKS

- William, D.(1996). *Exercise Nutrition: Energy Nutrition and Human Performance*, USA: William and Wilkin Publishing.
- linsky, I. (1998). *Nutrition in Exercise and Sports*, 3rd Edition, Francis: CRC Press.
- Mahan, L.K. and Ecott-Stump, S. (2000). *Food and Nutrition and Diet Therapy*, USA: W.B Saunders Company.
- Melvin,H.W. (2002). *Nutrition for Health, Fitness and Sports*, 6th Edition, New York:McGraw –Hill Companies.
- Rath, S.S. (2018). *Physical Fitness and Wellness*, New Delhi: Sports Publication
- Singh, N.P. (2019). *Anatomy and Physiology in Physical Education*, New Delhi: KhelSahitya Kendra Publication.
- Sizer,F. and Whitney, E. (2000). *Nutrition-Concepts and Controversies*, 8th Edition, Wadsworth: An International Thomson Publishing Co.
- Whitney, E.N. and Rolfes, S.R. (1999). *Understanding Nutrition*, 6th Edition, Wadsworth: An International Thomson Publishing Co.

Course Code 20PHSC42	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	H	H	H	L	L	M	L	H	-	-
CO2	H	H	M	H	H	H	L	H	-	-
CO3	H	H	M	H	H	H	L	H	-	-
CO4	H	H	M	H	H	H	L	H	-	-
CO5	H	H	M	H	H	H	L	H	-	L

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**M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS (SEMESTER)
(2020 -2021 onwards)**

Semester IV	BAKERY AND CONFECTIONERY	Hours/Week:6	
Core Course -12		Credits: 4	
Course Code 20PHSC43		Internal 40	External 60

COURSE OUTCOMES

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

- CO1: write the definition and concepts of baking, bakery products and confectionery items. [K2]
- CO2: find the types of bakery equipment, ingredients, bakery and confectionery products and its composition. [K3]
- CO3: analyze the role and functions of bakery ingredients and confectionery items. [K4]
- CO4: assess the processing methods and the quality of bakery and confectionery items and also infer the effect of fermentation on bakery products. [K5]
- CO5: predict the novel bakery and confectionery items and also propose suitable packaging materials. [K5]

UNIT I**Baking** –definition and principles

Role of Ingredients: Flour –types, composition, role of constituents, functions and quality assessment.

Leavening agents, methods of leavening, Yeast – types, functions and its effects on fermentation and other leavening agents.

Eggs – composition, functions in bakery and confectionery.

Sugar – types and uses.

Fats – composition, classification and functions.

Moistening agents - milk and water

Emulsifiers, dried fruits and enzymes. (20 Hours)

UNIT II

Major and minor equipments used in bakery.

Baking process - mixing, fermentation, proofing and baking.

Formula construction and computation of yeast raised products

Bread-Methods of making bread, characteristics of bread, bread faults and their causes, rope and mold, staling of bread, procedure for testing gluten and yeast. (17 Hours)

UNIT III

Methods of preparation of cakes, biscuits, cookies-faults and their causes. (18 Hours)

UNIT IV

Icing-types of icing

Preparation of pizza and burger

Pastries-types, ingredients, methods of preparing pastries, faults and their causes in each pastry. (15 Hours)

UNIT V

Confectionery – Ingredients used – sugar boiled confectionery – chocolate confectionery – traditional Indian confectionaries and other products – quality evaluation – packaging. (20 Hours)

REFERENCE BOOKS

1. Beenion and Bambord (1973). *The Technology of Cake making*, UK: Leonard Hill Book Bucks.
2. Hanneman, L.J.(1991). *Bakery - Flour Confectionery*, England: William Heinemann Ltd.
3. Herissse, E. and Herman Senn, C. (1973). *Pastry Making and Confectionery*, London: Warlock and Co.
4. Malik R.K. and Dhingara K.C. (1981). *Technology of Bakery Products, Modern Bakery Industries*. New Delhi: Small Industry Research Institute.

5. Pomeranz, Y. (1988). *Wheat Chemistry and Technology*, Vol I &II American Assn of Cereal chemists, 3rd Edition, USA. : St.Paul Minnesota,
6. Smith,W.H. (1972). *Biscuit, Crackers and Cookies* vol. 1, *Technology, Production and Management*, England: Applied Science Publishers Ltd.
7. Yogambal, A. (2018). *Textbook of Bakery and Confectionary*, 2nd Edition, TamilNadu : PHI Learning Pvt. Ltd.,

Course Code 20PHSC43	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	H	H	H	L	L	-	-	H	-	-
CO2	H	H	H	M	M	L	H	H	-	-
CO3	H	H	H	H	H	H	H	H	-	-
CO4	H	H	H	H	H	H	H	H	-	L
CO5	H	H	H	H	H	H	H	H	-	L

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M.Sc. HOME SCIENCE – NUTRITION AND DIETETICS (SEMESTER) (2020 -2021 onwards)

Semester IV	PROJECT	Hours/Week : 6	
Core Course - 13		Credits : 5	
Course Code 20PHSC41PR		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

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

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

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

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

CO5: defend the research findings. [K5]

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

Course Code 20PHSC41PR	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	H	H	H	H	H	H	H	H	-	L
CO2	H	H	H	H	H	H	H	H	-	H
CO3	H	H	H	H	H	H	H	H	-	H
CO4	H	H	H	H	H	H	H	H	-	H
CO5	H	H	H	H	H	H	H	H	-	H

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**M.Sc. HOME SCIENCE - NUTRITION AND DIETETICS (SEMESTER)
(2020 -2021 onwards)**

Semester IV	INTERNSHIP -DIETETICS	Hours/Week: 6	
Core Course - 14		Credits: 4	
Course Code 20PHSC42I		Internal 40	External 60

COURSE OUTCOME

On completion of the course, students will be able to

- CO1: identify the procedure followed in the dietary department of the hospital, make use of the nutritional assessment techniques and find out the clinical manifestations of the patients. [K3]
- CO2: plan and prepare the routine hospital and special feeding diet for the diseased persons based on the diet principles and RDA recommended by ICMR. [K3]
- CO3: make use of ICMR recommended RDA value and compute the nutritional value for the planned menu of the diseased persons and prepare the record. [K3]
- CO4: analyze the nutritive values for the planned menu and infer the result. [K4]
- CO5: recommend the suitable therapeutic diet to overcome the health issues of the patients. [K5]

CONTENT

1. Observation and study of organization and management of the dietary department.
2. Understanding the medical history of the patients, study of case sheets and diagnostic tests used.
3. Planning therapeutic diets and computation of nutritive value.
4. Observation and study of

- a. Purchase storage and issue
 - b. Production
 - c. Service
 - d. Evaluation and follow up
5. Participation in diet counselling units, experience in imparting diet counselling and understanding the records maintained in diet counseling units.
 6. develop practical experience in the management of the dietary department and patient counseling for a period of one month

Course Code 20PHSC42I	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	H	H	H	H	H	H	H	H	H	H
CO2	H	H	M	H	H	H	H	H	H	H
CO3	H	H	H	H	H	H	H	H	M	H
CO4	H	H	H	H	H	H	H	H	H	H
CO5	H	H	H	H	H	H	H	H	H	H

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