ALAGAPPA UNIVERSITY

(A State University Established in 1985)

Karaikudi - 630003. Tamil Nadu, India

2017 Accredited with A+ Grade by NAAC (CGPA : 3.64)

2018 MHRD Govt. of India UGC Graded as Category - I Granted Autonomy

2018 MHRD Swachh Campus Rank : 4

2021 nirf National Institutional Ranking Framework Rank : 33

2021 QS University Rankings Asia Rank : 199

FACULTY OF SCIENCE

DEPARTMENT OF NUTRITION AND DIETETICS

M.Sc., NUTRITION AND DIETETICS

REGULATIONS AND SYLLABUS

(For the candidates admitted from the Academic Year 2023 - 2024)

DEPARTMENT OF NUTRITION AND DIETETICS
M.Sc., Nutrition and Dietetics

REGULATIONS AND SYLLABUS
[For the candidates admitted from the Academic Year 2023– 2024 onwards]

ALAGAPPA UNIVERSITY
(A State University Accredited with "A+" grade by NAAC (CGPA: 3.64) in the Third Cycle and Graded as Category-I University by MHRD-UGC)
Karaikudi -630003, Tamil Nadu.

ALAGAPPA UNIVERSITY
DEPARTMENT OF NUTRITION AND DIETETICS
Karaikudi -630003, Tamil Nadu.

REGULATIONS AND SYLLABUS-(CBCS-University Department)
[For the candidates admitted from the Academic Year 2023 – 2024 onwards]

Name of the Department **:** Nutrition and Dietetics

Name of the Programme **:** M.Sc., Nutrition and Dietetics

Duration of the Programme: Full Time (Two Years)

Choice-Based Credit System

A choice-Based Credit System is a flexible system of learning. This system allows students to gain knowledge at their own tempo. Students shall decide on electives from a wide range of elective courses offered by the University Departments in consultation with the Department committee. Students undergo additional courses and acquire more than the required number of credits. They can also adopt an inter-disciplinary and intra-disciplinary approach to learning, and make the best use of the expertise of available faculty.

Programme

"Programme" means a course of study leading to the award of a degree in a discipline.

Courses

'Course' is a component (a paper) of a programme. Each course offered by the Department is identified by a unique course code. A course contains lectures/ tutorials/laboratory work/seminars/project work / practical training/report writing /Viva-voce, etc or a combination of these, to meet effectively the teaching and learning needs.

Credits

The Term "Credit" refers to the weightage given to a course, usually in relation to the instructional hours assigned to it. Normally in each of the courses credit will be assigned on the basis of the number of lectures/tutorials/laboratory and other forms of learning required to complete the course contents in a 15-week schedule. One credit is equal to one hour of lecture per week. For laboratory/field work one credit is equal to two hours.

Semesters

An Academic year is divided into two **Semesters.** In each semester, courses are offered in 15 teaching weeks and the remaining 5 weeks are to be utilized for conduct of examination and evaluation purposes. Each week has 30 working hours spread over 5 days a week.

Medium of instruction

The Medium of instruction for M.Sc., Nutrition and Dietetics program is English.

Departmental committee

The Departmental Committee consists of the faculty of the Department. The Departmental Committee shall be responsible for admission to all the programmes offered by the Department including the conduct of entrance tests, verification of records, admission, and evaluation. The Departmental Committee determine the deliberation of courses and specifies the allocation of credits semester-wise and course-wise. For each course, it will also identify the number of credits for lectures, tutorials, practicals, seminars etc. The courses (Core/Discipline Specific Elective/Non-Major Elective) are designed by teachers and approved by the Departmental Committees. Courses approved by the Departmental Committees shall be approved by the Board of Studies. A teacher offering a course will also be responsible for maintaining attendance and performance sheets (CIA - I, CIA-II, assignments and seminar) of all the students registered for the course. The Non-major elective programme and MOOCs coordinator are responsible for submitting the performance sheet to the Head of the department. The Head of the Department consolidates all such performance sheets of courses pertaining to the programmes offered by the department. Then forward the same to be Controller of Examinations.

Programme Educational Objectives- (PEO)

PEO-1	To develop students to become health care professionals for services in various fields of nutrition and nutrition management.
PEO-2	To develop entrepreneurs and entrepreneurship skill in Food Processing sectors.
PEO-3	To understand the composition, properties, and functionality of foods, as well as their impact on human health and the environment.
PEO-4	To understand the role of nutrients in human health and disease, and translating the knowledge into practical applications for promoting optimal nutrition and well-being.
PEO-5	Identify the physical, chemical, and/or microbiological changes in food caused by heat, enzymes, changes in pH, freezing, incorporation of air, and mechanical manipulation.
PEO-6	To improve the quality of life through evidence-based dietary interventions and nutrition support strategies tailored to the specific needs of individuals across the lifespan and across various health conditions.
PEO-7	To build competent professional Nutrition & Dieticians in hospitals and specialty clinics. Thereby, the professionals can find job prospects in the field as Nutrition and Diet consultants in Food service organizations like Hotels, Hospitals, Geriatric homes and also as administrators of Industrial canteens and other specialties.

PEO-8	To prepare competent entry-level registered dietitian nutritionists for careers in a variety of health care settings, including sports nutrition, clinical, community, research, business, and food service, who will work towards improving the health of society through optimal nutrition practices.
PEO-9	To develop capacities and abilities and enable them to pursue higher education and research in Nutrition and Dietetics.
PEO-10	To revolve around improving health, preventing disease, enhancing performance, and providing convenient nutritional solutions for consumers by functional foods and nutraceuticals

Programme Specific Objectives-(PSO)

PSO-1	To gain knowledge on human physiology and nutrition in health and well-being.
PSO-2	Learn the metabolic role of biomolecules and obtain insight on the national nutritional problems.
PSO-3	Understand the special nutritional requirements for physical activities related to sports and exercise.
PSO-4	Understand the symptoms and role of various diseases and its associated diets.
PSO-5	Gain knowledge on the role of Functional foods and nutraceuticals in health.

Programme Outcome-(PO)

PO-1	Students Utilize knowledge from the physical and biological sciences as a basis for understanding the role of food and nutrients in health and disease processes.
PO-2	Learners Implement strategies for food access, procurement, preparation, and safety for individuals, families, and communities.
PO-3	Students practice nutrition counselling and education as individuals, groups, and communities throughout the lifespan using a variety of communication strategies.
PO-4	Students evaluate nutrition information based on scientific reasoning for clinical, community, and food service application and implement self-learning in future endeavors.
PO-5	Learners acquired knowledge about professional Ethics and ethical regulations, responsibilities and norms of professional nutrition and dietetics practice.
PO-6	Students able to analyze, identify, formulate research literature and solve nutritional deficiencies using fundamentals of clinical nutrition and dietetics,

	physiology, food science and biochemistry and relevant domain disciplines
PO-7	Students aware of modern tool usage, appropriate techniques, resources and modern devices to compute nutritional needs with a thoughtfulness of the limitations.
PO-8	Learners recognize the need and the ability to engage in independent learning for continual development as a homescience educational and communication professional.
PO-9	Students able to think critically, apply the knowledge of nutrition and dietetics to the sports and space field to prevent the diseases.
PO-10	Learners develop innovative food products to create value and wealth for the betterment of the individual and society at large.

Programme specific outcome

PSO-1	Students able to develop knowledge and skilled professionals to perform food and nutrition analysis using various analytical tools at multi-centric facilities in India and abroad.
PSO-2	Learners inculcate problem-solving mind-sets through healthcare and industrial exposure of real-world problems.
PSO-3	Students able to develop as a Diet Counsellor, Nutrition/ Health communicator for creating awareness in the society through various Communication Strategies in Nutrition Education emphasizing Information Technology.
PSO-4	Learners apply the knowledge of food processing techniques in designing and enhancing the shelf life of new and existing products.
PSO-5	Students familiarise as a successful entrepreneurs and energized professionals to take up careers in academics, health care centres and food processing industries.

Eligibility for admission

A candidate who has passed Bachelor's Degree under 10+2+3 pattern of education in Science (Home Science, Nutrition and Dietetics, Botany, Zoology, Biochemistry, Chemistry, Biotechnology, Microbiology, Biomedical Science, Food Science and Quality Control, Food Science & Nutrition Food service management, Food technology and Yoga/ M.B.B.S. / B.H.M.S. / B.A.M.S. / Naturopathy / Nursing /B. Pharmacy and any other relevant programs in Biological Science) with at least 55% of marks eligible for applying this programme.

Minimum Duration of programme

The programme is for a period of two years. Each year shall consist of two semesters viz. Odd and Even semesters. Odd semesters shall be from June / July to October / November and even semesters shall be from November / December to April / May. Each semester there shall be 90 working days consisting of 6 teaching hours per working day (5 days/week).

Components

A PG programme consists of a number of courses. The term "course" is applied to indicate a logical part of the subject matter of the programme and is invariably equivalent to the subject matter of a "paper" in the conventional sense. The following are the various categories of the courses suggested for the PG programmes:

A. Core courses (CC)- "Core Papers" means "the core courses" related to the programme concerned including practicals and project work offered under the programme and shall cover Core competency, critical thinking, analytical reasoning, and research skill.
B. Discipline-specific electives (DSE) means the courses offered under the programme related to the major but are to be selected by the students, and shall cover additional academic knowledge, critical thinking, and analytical reasoning.
C. Non-Major Electives (NME)- Exposure beyond the discipline
    - Students have to undergo a total of Non-Major Elective courses with 2 credits offered by other departments (one in II Semester and another in III Semester)
    - A uniform time frame of 3 hours on a common day (Tuesday) shall be allocated for the Non-Major Electives
    - Non-Major Elective courses offered by the departments pertaining to a semester should be announced before the end of the previous semester.
    - Registration process: Students have to register for the Non-Major Elective course within 15 days from the commencement of the semester either in the department or NME portal (University website)

D. Self Learning Courses from MOOCs platforms.
    - MOOCs shall be voluntary for the students.
    - Students have to undergo a total of 2 Self Learning Courses (MOOCs) one in II semester and another in III semesters.
    - The actual credits earned through MOOCs shall be transferred to the credit plan of programmes as extra credits. Otherwise 2 credits/course be given if the self Learning Course (MOOCs) is without credit.
    - While selecting the MOOCs, preference shall be given to the course related to employability skills.
    -
E. Projects / Dissertation /Internships (Maximum Marks: 200)

The student shall undertake the Project/Dissertation/internship during the fourth semester.

- **Plan of work**

<u>Project/Dissertation</u>

The candidate shall undergo Project/Dissertation Work during the final semester. The candidate should prepare a scheme of work for the dissertation/project and should get approval from the guide. The candidate, after completing the dissertation /project work, shall be allowed to submit it to the university departments at the end of the final semester. If the candidate is

desirous of availing the facility from other departments/universities/laboratories/organizations they will be permitted only after getting approval from the guide and HOD. In such a case, the candidate shall acknowledge the same in their dissertation/project work.

- **Format to be followed for dissertation/project report**

The format /certificate for thesis to be followed by the student are given below

- Title page
- Certificate
- Acknowledgment
- Content as follows:

Chapter No.	TITLE	Page No.
1.	Introduction	
2	Review of Literature	
3.	Materials and Methods	
4.	Results	
5.	Discussion	
6.	Summary	
7.	References	

Format of the Title Page:

TITLE OF THE PROJECT

A Dissertation Submitted to the Alagappa University, Karaikudi -630 003 in Partial Fulfilment ofthe Requirement for the Award of Degree of

MASTER OF SCIENCE IN NUTRITION AND DIETETICS

By

Students Name:
Register Number:
Supervisor:

ALAGAPPA UNIVERSITY
DEPARTMENT OF NUTRITION AND DIETETICS
KARAIKUDI – 630 003
Month and Year

Format of Declaration of the Candidate:

Name and class of the student

DECLARATION

I hereby declare that the Project entitled_____ submitted to Alagappa University for the award of the degree of Master of Science in NUTRITION AND DIETETICS is my original work and that it has not been previously formed the basis for the award of any degree, diploma/associate ship or any other similar title of any other University or Institution.

Signature of the Student

Format of the Certificate:

CERTIFICATE

This is to certify that the project entitled ..... ------submitted in partial fulfilment of the requirement of the degree of Master of Science in NUTRITION AND DIETETICS to the Alagappa University, Karaikudi is a record of bonafide research work carried out by under my supervision and guidance and that no part of the project has been submitted for the award of any degree or diploma.

Place:
Date: Signature of Guide

Signature of HOD

Teaching methods

The Masters degree uses many approaches to attain effective learning, but when it comes to key teaching methods, seven have become universal. 1.Discussions, 2. Laboratory and practical learning, 3. Field trips, 4. Problem-based/Enquiry-based learning (PBL/EBL), 5. Projects, 6. E-learning and 7. Co-curricular activities.

Attendance

Students must have earned 75% of attendance in each course for appearing for the examination. Students who have earned 74% to 70% of attendance need to apply for condonation in the prescribed form with the prescribed fee. Students who have earned 69% to 60% of attendance need to apply for condonation in the prescribed form with the prescribed fee along with the Medical Certificate. Students who have below 60% of attendance are not eligible to appear for the End Semester Examination (ESE). They shall re-do the semester(s) after completion of the programme

Examination

The examinations shall be conducted separately for theory and practical's to assess (remembering, understanding, applying, analysing, evaluating, and creating) the knowledge required during the study. There shall be two systems of examinations viz., internal and external examinations. The internal examinations shall be conducted as Continuous Internal Assessment tests I and II (CIA Test I & II).

A. Internal Assessment

The internal assessment shall comprise a maximum of 25 marks for each subject. The following procedure shall be followed for awarding internal marks.

Theory -25 marks

Sr.No	Content	Marks
1	Average marks of two CIA test	15
2	Seminar/group discussion/quiz	5
3	Assignment/field trip report/case study report	5
	Total	25

Practical -25 Marks

Sr.No	Content	Marks
1	Average marks of two CIA test	15 marks
2	Observation note book	10 marks
	Total	25 Marks

Internship- 25 Marks (assess by Guide/incharge/HOD/Supervisor)

Sr.No	Content	Marks
1	Presentations	15 Marks
2	Progress report	10 Marks
	Total	25 Marks

Project/Dissertation -50 Marks (assess by Guide /incharge /HOD/ Supervisor)

Sr.No	Content	Marks
1	Two presentations (mid-term)	30 Marks
2	Progress report	20 Marks
	Total	50 Marks

B. External Examination

- There shall be examinations at the end of each semester, for odd semesters in the month of October / November; for even semesters in April / May.
- A candidate who does not pass the examination in any course(s) may be permitted to appear in such failed course(s) in the subsequent examinations to be held in October / November or April / May. However, candidates who have arrears in Practical shall be permitted to take their arrear Practical examination only along with Regular Practical examination in the respective semester.
- A candidate should get registered for the first-semester examination. If registration is not possible owing to a shortage of attendance beyond condonation limit/regulation prescribed OR belated joining OR on medical grounds, the candidates are permitted to move to the next semester. Such candidates shall re-do the missed semester after completion of the programme.
- For the Project Report/ Dissertation Work the maximum marks will be 100 marks for project report evaluation and for the Viva-Voce it is 50 marks
- For the Internship the maximum marks will be 50 marks for project report evaluation and for the Viva –Voce it is 25 marks.
- Viva-Voce: Each candidate shall be required to appear for the Viva-Voce Examination (in defense of the Dissertation Work / Internship).

C. Scheme of External Examination (Question Paper Pattern)

Theory - Maximum 75 Marks

Section A	10 questions. All questions carry equal marks. (Objective-type questions)	10 x 1 = 10 Marks	10 questions – 2 each from every unit
Section B	5 questions Either / or type like 1.a (or) b. All questions carry equal marks	5 x 5 = 25	5 questions – 1 each from every unit
Section C	5 questions Either / or type like 1.a (or) b. All questions carry equal marks	5 x8 = 40	5 questions – 1 each from every unit

Practical –Maximum 75 Marks

Section A	Major experiment	15 Marks
Section B	Minor experiment	10 Marks
Section C	Experimental setup	5 Marks
Section D	Spotters (5 spotters x5 marks)	25 Marks
Section E	Record note	10 Marks
Section F	Vivo voce	10 Marks

Dissertation /Project Report Maximum 150 Marks

Dissertation /Project report	100 Marks
Vivo voce	50 Marks

Internship report Maximum 75 Marks

Internship report	50 Marks
Vivo voce	25 Marks

Results

The results of all the examinations will be published through the Department where the student underwent the course as well as through University Website

Passing minimum

- A candidate shall be declared to have passed in each course if he/she secures not less than 40% marks in the End Semester Examinations and 40% marks in the Internal Assessment and not less than 50% in the aggregate, taking Continuous assessment and End Semester Examinations marks together.
- The candidates not obtained 50% in the Internal Assessment are permitted to improve their Internal Assessment marks in the subsequent semesters (2 chances will be given) by writing the CIA tests and by submitting assignments.
- Candidates, who have secured the pass marks in the End-Semester Examination and in the CIA but failed to secure the aggregate minimum pass mark (E.S.E + C I.A), are permitted to improve their Internal Assessment mark in the following semester and/or in university examinations.
- A candidate shall be declared to have passed in the Project / Dissertation / Internship if he /she gets not less than 40% in each of the Project / Dissertation / Internship and Viva-Voce and not less than 50% in the aggregate of both the marks for Project / Dissertation / Internship Report and Viva-Voce.
- A candidate who gets less than 50% in the Project Report must resubmit the Project Report. Such candidates need to take again the Viva-Voce on the resubmitted Project.

Grading of the Courses

The following table gives the marks, Grade points, Letter Grades and classifications meant to indicate the overall academic performance of the candidate.

Conversion of Marks to Grade Points and Letter Grade (Performance in Paper / Course)

RANGE OF MARKS	GRADE POINTS	LETTER GRADE	DESCRIPTION
90 - 100	**9.0 – 10.0**	**O**	**Outstanding**
80 - 89	**8.0 – 8.9**	**D+**	**Excellent**
75 - 79	**7.5 – 7.9**	**D**	**Distinction**
70 - 74	**7.0 – 7.4**	**A+**	**Very Good**
60 - 69	**6.0 – 6.9**	**A**	**Good**
50 - 59	**5.0 – 5.9**	**B**	**Average**
00 - 49	**0.0**	**U**	**Re-appear**
ABSENT	**0.0**	**AAA**	**ABSENT**

a) Successful candidates passing the examinations and earning GPA between 9.0 and 10.0 and marks from 90 – 100 shall be declared to have Outstanding (O).
b) Successful candidates passing the examinations and earning GPA between 8.0 and 8.9 and marks from 80 - 89 shall be declared to have Excellent (D+).
c) Successful candidates passing the examinations and earning GPA between 7.5 – 7.9 and marks from 75 - 79 shall be declared to have Distinction (D).
d) Successful candidates passing the examinations and earning GPA between 7.0 – 7.4 and marks from 70 - 74 shall be declared to have Very Good (A+).
e) Successful candidates passing the examinations and earning GPA between 6.0 – 6.9 and marks from 60 - 69 shall be declared to have Good (A).
f) Successful candidates passing the examinations and earning GPA between 5.0 – 5.9 and marks from 50 - 59 shall be declared to have Average (B).
g) Candidates earning GPA between 0.0 and marks from 00 - 49 shall be declared to have Re-appear (U).
h) Absence from an examination shall not be taken as an attempt.

From the second semester onwards the total performance within a semester and continuous performance starting from the first semester are indicated respectively **by**

Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA). These two are calculated by the following formulate

GRADE POINT AVERAGE (GPA) = $\Sigma_i C_i \; G_i / \Sigma_i C_i$

GPA = Sum of the multiplication of Grade Points by the credits of the courses
Sum of the credits of the courses in a Semester

Classification of the final result

CGPA	Grade	Classification of Final Result
9.5 – 10.0	**O+**	First Class – Exemplary*
9.0 and above but below 9.5	**O**	
8.5 and above but below 9.0	**D++**	First Class with Distinction*
8.0 and above but below 8.5	**D+**	
7.5 and above but below 8.0	**D**	
7.0 and above but below 7.5	**A++**	First Class
6.5 and above but below 7.0	**A+**	
6.0 and above but below 6.5	**A**	
5.5 and above but below 6.0	**B+**	Second Class
5.0 and above but below 5.5	**B**	
0.0 and above but below 5.0	**U**	Re-appear

The final result of the candidate shall be based only on the CGPA earned by the candidate.

a) Successful candidates passing the examinations and earning CGPA between 9.5 and 10.0 shall be given Letter Grade (O+), those who earned CGPA between 9.0 and 9.4 shall be given Letter Grade (O) and declared to have First Class –Exemplary*.
b) Successful candidates passing the examinations and earning CGPA between 7.5 and 7.9 shall be given Letter Grade (D), those who earned CGPA between 8.0 and 8.4 shall be given Letter Grade (D+), those who earned CGPA between 8.5 and 8.9 shall be given Letter Grade (D++) and declared to have First Class with Distinction*.
c) Successful candidates passing the examinations and earning CGPA between 6.0 and 6.4 shall be given Letter Grade (A), those who earned CGPA between 6.5 and 6.9 shall be given Letter Grade (A+), those who earned CGPA between 7.0 and 7.4 shall be given Letter Grade (A++) and declared to have First Class.
d) Successful candidates passing the examinations and earning CGPA between 5.0 and 5.4 shall be given Letter Grade (B), those who earned CGPA between 5.5 and 5.9 shall be given Letter Grade (B+) and declared to have passed in Second Class.
i) Candidates those who earned CGPA between 0.0 and 4.9 shall be given Letter Grade (U) and declared to have Re-appear.
e) Absence from an examination shall not be taken as an attempt.

CUMULATIVE GRADE POINT AVERAGE (CGPA) = $\Sigma_n \Sigma_i C_{ni} G_{ni} / \Sigma_n \Sigma_i C_{ni}$

CGPA = Sum of the multiplication of Grade Points by the credits of the entireProgramme
Sum of the credits of the courses for the entire Programme

Where '**Ci**' is the Credit earned for Course i in any semester; '**Gi**' is the Grade Point obtained by the student for Course i and 'n' refers to the semester in which such courses were credited.

CGPA (Cumulative Grade Point Average) = Average Grade Point of all the Courses passed starting from the first semester to the current semester.

Note: * The candidates who have passed in the first appearance and within the prescribed Semesters of the PG Programme are alone eligible for this classification.

Maximum duration of the completion of the programme

The maximum period for completion of **M.Sc., degree** in Nutrition and Dietetics shall not exceed eight semesters continuing from the first semester.

Conferment of the Master's Degree

A candidate shall be eligible for the conferment of the Degree only after he/ she has earned the minimum required credits for the Programme prescribed therefor (i.e. 90 credits) Programme.

Village Extension Programme

The Sivaganga and Ramnad districts are very backward districts where a majority of people lives in poverty. The rural mass is economically and educationally backward. Thus the aim of the introduction of this Village Extension Programme is to extend out to reach environmental awareness, social activities, hygiene, and health to the rural people of this region. The students in their third semester have to visit any one of the adopted villages within the jurisdiction of Alagappa University and can arrange various programs to educate the rural mass in the following areas for three days based on the theme.

1. Environmental awareness
2. Hygiene and Health.

A minimum of two faculty members can accompany the students and guide them.

What to do after M.Sc., degree in Nutrition and Dietetics

Nutrition and Dietetics is one of the multi-disciplinary fields with great demand in various applications in the field of research and development. Pursuing this programme the students may opt for various higher studies like M.Phil, and PhD which will improve the chances for better jobs. An individual with a degree in Nutrition and Dietetic can work as a Nutritionist, Management Dietician, Consultant Dietician and Dietician in hospitals and clinics/Health care centers/schools/corporate organizations/NGOs technical marketing in Pharmaceuticals and Nutraceuticals Industry for nutritional support products/ nutraceuticals.

The students also have opportunity in the Research and Development, Education, Independent practice, Nutritionist in Food Industry and Freelance Clinical writing. They earn hefty amounts of salaries working as a professional in this field.

JOB AND CAREER OPTION FOR M.SC., NUTRITION AND DIETETICS:

M.Sc., Nutrition and Dietetics students will yield in a brighter future and gradually hold pace towards overall development of the society. Nutrition and Dietetics students can be employed as a Registered Dieticians, Nutrition Specialist, Clinical Dietician, Dietetic Technicians, Health Coach, Health Educators and Community Health Workers, Holistic Nutritionist, Rehabilitation Counselors, Sports Nutritionist. A post graduate in M.Sc., Nutrition and Dietetics may decide to become an academician or a researcher or an entrepreneur, as per their desire. After completing their studies, they also have the option of becoming an independent researcher in National/International Institutes/Universities. Overall, there are a wide range of career opportunities for the students and if the right career is explored and chosen by the students, it will provide them a life changing experience.

EMPLOYMENT AREAS:

Nutrition and Dietetics can work as a **dietician in hospitals and Nutritionists in health clinics, health centers, and MNCs**. Opportunity to be a registered dietician (RD). Graudates can work as a project assistant, project associate, chief nutritionist in NGO's and private organizations.

M.Sc., Nutrition and Dietetics- Programme Structure

S.No	Course Code	Courses	TITLE OF THE COURSE	T/P	No. of Credits	Hours/ week	Marks		Total
							Int.	Ext.	
I Semester									
1.	558101	Core 1	Human Physiology	T	5	6	25	75	100
2.	558102	Core 2	Nutrition and Health	T	5	6	25	75	100
3.	558103	Core 3	Advanced Food Science	T	5	6	25	75	100
4.	558104	Core 4	Lab-I:Human Physiology, Nutrition And Health & Advanced Food Science	P	4	6	25	75	100
5.	558501 558502	DSE	Home Science Education And Communication / Food Service Management	T	4	4	25	75	100
	-		Library, Yoga And Career Guidance		-	2	-	-	
			Total		**23**	**30**			**500**
II Semester									
6.	558201	Core 5	Nutritional Biochemistry	T	5	5	25	75	100
7.	558202	Core 6	Community Nutrition	T	5	5	25	75	100
8.	558203	Core 7	Sports Nutrition	T	5	5	25	75	100
9.	558204	Core 8	Lab. II: Nutritional Biochemistry, Community Nutrition & Sports Nutrition	P	4	6	25	75	100
10.	558503 558504	DSE	Food Microbiology And Sanitation/ Geriatric Nutrition	T	4	4	25	75	100
11.	-	NME	NME- I (Course to be chosen from other department)	T	2	3	25	75	100
12.	-		Self-learning course (SLC) – MOOCs**	T	Extra Credit	-----			
	-		Library / Yoga/ Counselling/Field Trip		-	2			
	-	Skill based Course	Skill Based Industrial Courses/Internship –Hospitals / Food & Nutraceutical Industries / Academic / Research Institutions of National Repute		-	1 month	-	-	-
			Total		**25+ Extra Credits**	**30**			**600**

III Semester									
13.	558301	Core9	Clinical And Therapeutic Nutrition	T	5	5	25	75	100
14.	558302	Core 10	Dietetics In Life Style Diseases	T	5	5	25	75	100
15.	558303	Core 11	Research Methodology & Biostatistics	T	5	5	25	75	100
16.	558304	Core 12	Lab. III: Clinical And Therapeutic Nutrition, Dietetics In Life Style Diseases & Research Methodology	P	4	6	25	75	100
17.	558505 558506	DSE	Paediatric Nutrition/ Biotechnology In Functional Foods And Nutraceuticals	T	4	4	25	75	100
18.	-	NME	NME- II (Course to be chosen from other department)	T	2	3	25	75	100
19.	-		Self-learning course (SLC) – MOOCs**	T	Extra Credit	----			
	-		Library / Yoga/ Counselling/Field Trip			2			
			Total		**25+ Extra Credits**	**30**			**600**
IV Semester									
20.	558401	Core	***Dissertation Work or Internship programme		17	30	50	150	200
			Total		**17**	**30**			**200**
			Grand Total		**90+ Extra credit**	**-**	**-**	**-**	**1900**

CC – Core Course

*DSE – Student Choice and it may be conducted by parallel sections

NME- Non-Major Elective
**SLC- Self Learning Course (MOOCs) - Voluntary basis
*** Dissertation / internship report –Marks -Vivo-voce (50) + thesis (100) + internal (50) = 200
T-Theory,
P-Practical

I - MAJOR ELECTIVE COURSES FOR THE STUDENTS
DSE – I – 558501 - Home Science Education and Communication
DSE – II – 558502 - Food Service Management
DSE – III- 558503 - Food Microbiology and Sanitation
DSE – IV – 558504 - Geriatric Nutrition
DSE – V – 558505 - Paediatric Nutrition
DSE – VI – 558506 - Biotechnology in Functional Foods and Nutraceuticals
II - NON- MAJOR ELECTIVE COURSES
NME – I – 558701 - Basics of Human Nutrition
NME – II –558702 - Food Preservation

SEMESTER I					
Core	**Course code: 558101**	**HUMAN PHYSIOLOGY**	**T**	**Credits:5**	**Hours:6**
Unit - I					
Objective 1	**To familiarize about the structure and function of cell organelles, muscles and nervous tissues.**				
CELL, CELL ORGANELLES AND TISSUES **Cell-** Structure and organization of prokaryotic and eukaryotic cells. Cell and nuclear membrane, cell wall and cell envelope. Physiology of cytoplasm. **Cell organelles** - Structural organization and functions of intracellular organelles: nucleus, nucleolus, endoplasmic reticulum, golgi complex, mitochondria, chloroplast, lysosomes, peroxisomes and vacuoles. **Tissues** - Classification, structure and functions of epithelial, muscular, connective and nervous tissues.					
Outcome 1	**Learners understand about the physiological functions of cell organelles, muscles and nervous tissues.**				**K2**
Unit - II					
Objective 2	**To provide knowledge about the components of musculo skeletal system, cardiovascular system and blood.**				
MUSCLES, BLOOD AND CARDIOVASCULAR SYSTEM **Musculo skeletal system** –structure and functions of bone, cartilage, muscle, joints, ligaments and tendons. Blood **-**Introduction to hematology, functions of blood, plasma proteins, erythrocytes, Hb, important indices of RBC & WBC, Functions of blood groups, ESR, blood viscosity, blood coagulation, Erythroblastosis fetalis and blood transfusion. **Cardiovascular system -** Basic properties of the heart, cardiac cycle.					
Outcome 2	**Students able to illustrate about the structure and functions of muscles, blood and cardiovascular system.**				**K2**
Unit - III					
Objective 3	**To educate about the physiological mechanisms of respiratory and digestive systems.**				
RESPIRATORY AND DIGESTIVE SYSTEM **Respiratory system -** Anatomy and physiology of respiratory organs, mechanism of respiration, gaseous exchange in lungs and tissues. Resuscitation and its methods. **Digestive system -** Anatomy, composition & functions of salivary, gastric, intestinal & pancreatic secretions. Functions of bile salts, Mechanism of secretion of digestive juices and its regulation, movements of stomach, small intestine, villi, defecation. Importance of liver in digestive system and anatomy and physiology of liver.					
Outcome 3	**Learners able to analyze the importance of respiratory and digestive system.**				**K4**
Unit - IV					
Objective 4	**To learn about the functions of sense organs, excretory and reproductive systems**				
EXCRETORY AND REPRODUCTIVE SYSTEM, SENSE ORGANS **Excretory system** – Structure and function of kidney, composition of urine. Mechanism of urine formation and the role of the kidneys in water and electrolyte balance. Renal function tests. **Reproductive system** - Male and female reproductive organs: structure and functions. Menstruation,					

menstrual cycle, puberty, menarche, menopause, fertilization, conception, implantation. **Sense organs** - Physiology of vision, hearing, taste, smell and cutaneous sensations.

Outcome 4	**Students able to explain the organs of different glands in the human body.**	**K5**

Unit - V

Objective 5	**To educate about the changes occurring in organs due to abnormalities of hormone secretion by endocrine glands**.

ENDOCRINE, EXOCRINE AND NERVOUS SYSTEM

Endocrine glands - pituitary, thyroid gland, parathyroid gland, pancreas, adrenal cortex and adrenal medulla. Mechanism of action of hormones. **Exocrine glands–** Structure and functions of sweat, salivary, mammary, ceruminous, lacrimal, sebaceous, and mucous glands. **Nervous system** - General anatomy of nervous system, functions of the different parts, reflexes, autonomic nervous system.

Outcome 5	**Learners able to elaborate about the secretion and release of hormone into blood stream and target tissues**.	**K6**

Suggested Readings:

Murugesh, N. (2021). *Human Anatomy and Physiology*, Sathya Publishers.

Tortora, G.J., & Grabowski, S.R. (2020). *Principles of Anatomy and Physiology*. John Wiley; 16th edition.

Chatterjee, C.C. (2020). *Human Physiology*, Vol.1&2, 13th Edition, CBS Publishers and Distributors Pvt Ltd.

Guyton & Hall. (2020). *Textbook of Medical Physiology*, Third South Asia Edition, Elsevier Health Science Pvt Ltd.

Jain, A.K. (2020). *Human Physiology in Nutshell*. 5th Edition, Arya Publications.

Rastogi, S., Sharma, D.K., Deshwal, C.S. (2018). *Text Book of Human Anatomy and Physiology*, Mackingee Publishers.

Boron & Walter. (2016). *Medical Physiology*. International Edition, 3 rd Edition, Elsevier Publishers Pvt Ltd.

Venkatesh & Sudhakar. (2015). *Text Book of Medical Physiology*, Wolters Kluwer India Pvt. Ltd.

Best & Taylor's. (2011). *Physiological Basis of Medical Practice*. Wolters Kluwer India Pvt. Ltd. 13th Edition.

Web Resources

https://ncert.nic.in/textbook/pdf/kebt102.pdf

https://samples.jbpub.com/9781449652609/99069_ch05_6101.pdf

https://www.uc.edu/content/dam/uc/ce/docs/OLLI/Page%20Content/OLLI%20-%20The%20Digestive%20System.pdf

https://www.nios.ac.in/media/documents/OBE_indian_knowledge_tradition/Level_B/Vijnana-B_English_OBE/Science-B_eng_Ch-8.pdf

http://www.uop.edu.pk/ocontents/Lec%20no%203(3).pdf

https://www.powershow.com/view/3b26a6-MDc4M/Human_Physiology_powerpoint_ppt_presentation

K1-Remember	K2–Understand	K3-Apply	K4- Analyze	K5- Evaluate	K6– Create

Course designed by: Dr.P.Rameshthangam

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S (3)	L (1)	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)
CO2	S (3)	L (1)	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)
CO3	S (3)	L (1)	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)
CO4	S (3)	L (1)	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)
CO5	S (3)	L (1)	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)
W.AV	**3**	**1**	**1**	**1**	**1**	**2**	**1**	1	1	**1**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L (1)	M (2)	M (2)	L (1)	L (1)
CO2	L (1)	M (2)	M (2)	L (1)	L (1)
CO3	L (1)	M (2)	M (2)	L (1)	L (1)
CO4	L (1)	M (2)	M (2)	L (1)	L (1)
CO5	L (1)	M (2)	M (2)	L (1)	L (1)
W.AV	**1**	**2**	**2**	**1**	**1**

S –Strong (3), M-Medium (2), L- Low (1)

SEMESTER I					
Core	**Course code: 558102**	**NUTRITION AND HEALTH**	**T**	**Credits:5**	**Hours :6**
Unit - I					
Objective 1	**To familiarize with the importance of nutrition in health and well-being.**				
Nutrition and diet in health - concept of adequate nutrition and malnutrition. Difference between hunger, appetite and satiety. Different food groups – major nutrients present in each group, guide in menu planning. Recommended dietary allowances **-** Basis for requirements. ICMR Recommended Dietary Allowances (RDA) for Indians, FDA Recommendations, Basal metabolic rate (BMR) and active metabolic rate (AMR).					
Outcome 1	**Learners understand the basic concepts of nutrition and diet planning.**				**K2**
Unit - II					
Objective 2	**To provide knowledge of nutritional status and dietary requirement for pregnancy and lactating women.**				
Nutrition in pregnancy and Lactation -Physiological changes in pregnancy. Nutritional status and general health. Importance of preconceptual nutrition. Weight gain during pregnancy and the nature of weight gain. Factors affecting maternal nutritional status. Nutrient requirements, storage of nutrients in normal pregnancy, complications of pregnancy and nutritional problems, dietary guidelines – causes and complications. Avoiding pregnancy associated health risk through nutrition – gestational diabetes, anemia and hypertension disorders. **Nutrition in lactation** - Physiological adjustments during lactation, lactation in relation to growth and health of infants, efficiency of milk production, diet during lactation.					
Outcome 2	**Students discuss about the nutritional requirements and menu planning for pregnant and lactating women.**				**K4**
Unit - III					
Objective 3	**To educate on dietary requirement during infancy and preschool stages**				
Nutrition in infancy-Nutritional status of the infants, rate of growth as the indicator. Nutritional allowances for the infants, breast feeding Vs formula feeding, food square, weaning foods suitable for infants. Feeding the premature infants and Low Birth Weight (LBW) infants, reasons for under 5 Mortality Rate (MR). **Nutrition in preschool age** - Growth and development of preschool children, food habits and nutrient intake of preschool children. Dietary allowances for preschool age – supplementary foods.					
Outcome 3	**Students analyze about dietary requirements for infancy and preschool children.**				**K4**
Unit - IV					
Objective 4	**To learn the competency in planning diets for school, adolescent and adult age groups.**				
Nutrition during school age - Physical development, nutritional status of school going children, food habits, nutritional requirements, nutrition and academic performance. **Nutrition during adolescence** - Changes of growth, assessment of growth – sexual maturity rating, physical, physiological and psychological changes in adolescents. Nutritional needs of the adolescent anemia, eating disorders.					

Nutrition for the adults - Nutritional requirements according to the mode of activity. Nutrition and health of women. General nutritional problems of women, anemia, osteoporosis, pre and post-menopausal syndrome, PCOD, hormonal changes during menopause. Infertility – risk factors, methods of detection and prevention.

Outcome 4	**Learners assess the growth of the children and planning about nutritional requirements of school, adolescent and adult age groups.**	**K5**

Unit - V

Objective 5	**To familiarize with nutrition for sports, space travel and old age.**

Nutrition in adult and old age- Ageing process- physiological, metabolic, body composition changes. Nutritional & health status, dietary modifications of elderly. **Nutrition in special events** - Sports nutrition - quantity of fluids and food taken by an athlete. **Space nutrition** - food product created and processed for consumption by astronauts in outer space.

Outcome 5	**Students able to develop food products for sports nutrition, space travel and old age groups.**	**K6**

Suggested Readings

Srilakshmi. B (2021), *Nutrition Science*, New Age International Pvt Ltd, New Delhi.

Carolyn D Berdanier, 2021. *Advanced Nutrition, Macronutrients, Micronutrients and Metabolism*, III rd Edition, CRC Press Publishers.

Srilakshmi. B (2019), *Dietetics,* New Age International Pvt Ltd, New Delhi.

Sumati, R. Mudambi, 2020. *Fundamentals of Foods, Nutrition and Diet Therapy*, New Age International Pvt Ltd.

Bamji M.S, 2017. *Textbook of Human Nutrition,* 4th Edition, Oxford and IBH Publishing Co. Pvt. Ltd, New Delhi.

Krause M.V and Mahan L.K (2016) *Food, Nutrition and Diet therapy*, 14th edition, W.B. Saunders Co, Philadelphia.

Robinson C.H. (2015) *Normal and Therapeutic nutrition*, 12th edition, Macmillan Publishing Co. Inc, Newyork

Park.K, (2015). Park's *Textbook of Preventive and Social Medicine*, 23rd ed. M/s BanarsidaBhanot, Jabalpur.

Anjana A and Shobana A Udipi, (2013). Text Book of Human Nutrition, Jaypee Brothers Medical Publishers, 1st Edition.

Laxmiah.(2011). *Dietary Guidelines of Indians- A Manual*, National Institute of Nutrition, 2nd Edition.

Web Resources:

https://ncert.nic.in/textbook/pdf/kehe103.pdf
http://www.snggdcg.ac.in/pdf/stdy-material/food-and-nutrition/food-and-nutrition-Unit-2.pdf
http://www.diva-portal.org/smash/get/diva2:902175/FULLTEXT01.pdf
https://files.eric.ed.gov/fulltext/ED277922.pdf
https://www.youtube.com/watc?v=CpMeB0TObHA

K1-Remember	**K2–Understand**	**K3-Apply**	**K4- Analyze**	**K5- Evaluate**	**K6 – Create**

Course designed by: Dr.P.Rameshthangam

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M (2)	L (1)	M (2)	L (1)	M (2)	S(3)	M (2)	S(3)	M (2)	L (1)
CO2	S(3)	M (2)	M (2)	S(3)	M (2)	L (1)	M (2)	M (2)	S(3)	M (2)
CO3	L(1)	M (2)	L(1)	S(3)	L (1)	L (1)	M (2)	M (2)	L (1)	M (2)
CO4	M (2)	L (1)	M (2)	L (1)	L (1)	S(3)	M (2)	S(3)	M (2)	L (1)
CO5	M (2)	M (2)	M (2)	S(3)	M (2)	L (1)	M (2)	M (2)	S(3)	M (2)
W.AV	**2**	**1.6**	**1.8**	**2.2**	**1.6**	**1.8**	**2**	**2.4**	**2.2**	**1.6**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M (2)	L (1)	M (2)	L (1)	M (2)
CO2	M (2)	S(3)	S(3)	M (2)	S(3)
CO3	L (1)	M (2)	L (1)	L (1)	S(3)
CO4	M (2)	L (1)	M (2)	L (1)	M (2)
CO5	M (2)	M (2)	S(3)	L (1)	M (2)
W.AV	**1.8**	**1.8**	**2.2**	**1.2**	**2.4**

S –Strong (3), M-Medium (2), L- Low (1)

Semester I					
Core	**Course Code: 558103**	**ADVANCED FOOD SCIENCE**	**T**	**Credits:5**	**Hours: 6**

Unit - I

Objective 1	**To impart knowledge on food preparation and food quality assessment**

FOOD PREPARATION, PROPERTIES OF FOOD AND FOOD QUALITY

Food in relation to health - Introduction to food science as a discipline and modern developments, different methods of cooking, functions of cooking food. Functional properties of foods - Definition, structure and properties of food hydrocolloids. Hydrocolloids as gelling, emulsifying, thickening, stabilizing and coating agents. Important roles of proteins (denaturation and browning), carbohydrates (caramelization and crystallization) and fats (emulsification) in altering the functional properties of food. Evaluation of food quality - Quality attributes of food – appearance factors, textural factors, and flavor factors sense of taste, texture and colour: sensory evaluation and objective evaluation. Types of sensory test. Procedures for determination and monitoring of shelf life.

Outcome 1	**Students able to understand the skill on the preparation of healthy diet**	**K2**

Unit – II

Objective 2	**To provide knowledge about the nutritive values of cereals, millets, vegetables and fruits**

CEREALS, MILLETS, PULSES, VEGETABLES AND FRUITS GROUP

Cereals & Millets – Nutrient composition, parboiling, Cereal cookery – gluten formation-factors affecting gluten formation. Structure of Starch granules and characteristics – effect of moist and dry heat, non-starch polysaccharides- fibres, cellulose, hemicellulose, pectic substances, gums and carboxy methyl cellulose (CMC). Nutrient composition of breakfast cereals and fermented products. Pulses- Nutrient composition, processing, anti-nutritional factors, protein foods for infants and children, soy products, protein concentrates and isolates, textured vegetable proteins. Vegetables and fruits - Nutritional importance, pigments and acids, effect of cooking on pigments and nutrients. Post-harvest changes of fruits, browning reactions- enzymatic and non-enzymatic.

Outcome 2	**Learners able to compile the benefits of different food components**	**K3**

Unit – III

Objective 3	**To educate the nutritional value of milk, marine food and flesh food**

MILK AND MEAT PRODUCTS

Milk and milk products– Nutrient composition of milk powders, ghee, khoa, butter, paneer, cheese and ice creams - Composition, physical and functional properties. Flesh foods - Composition, post-mortem changes in meat, tenderization, changes produced during cooking, spoilage. Effect of heat on egg proteins, egg foams, factors influencing foaming and egg products. Nutrient composition of marine foods: Fish, shrimp and sea weeds.

Outcome 3	**Students able to analyze the skills of evaluating the current food habits**	**K4**

Unit – IV

Objective 4	**To learn the importance of sugars and fats in the food**

NUTS, FATS, SUGAR, AND BEVERAGES

Nuts and oilseeds – Classifications and Nutrient composition. Fats and oils - role of fat in cookery, rancidity, changes of fat on heating, salad dressing. Sugar - Properties, sugar related products, crystallization, crystalline & non- crystalline candies, stages of sugar cookery, artificial

sweeteners. Beverages– Classification, manufacture and nutritional significance and energy value.

Outcome 4	**Learners able to evaluate the role of sugars, fats and nuts in today's diet**	**K5**

Unit – V

Objective 5	**To educate about the recent development in food science and food processing industry**

FOOD ADDITIVES, FOOD TECHNOLOGY AND RECENT DEVELOPMENT IN THE FIELD OF FOOD SCIENCE

Food additives - Definition and needs for food additives, types of food additives and food safety, unintentional additives. Genetically Modified (GM) foods, Production and nutritive value of GM foods. Recent developments in the field of Food Science and Food Technology. Current research in the field of Food Science and Food Technology.

Outcome 5	**Students able to discuss the various modern technology and developments related to foods science**	**K6**

Suggested Readings:

Potter, N.N., & Hotchkiss, J.H. (2021). *Food Science*, 5th Edition, CBS Publishers and Distributors. Kindle Edition.

Bhanu, P. (2021). *Research and Technological Advances in Food Science*, 1st Edition, Elsevier.

Shakuntala, M.N., & Shadaksharaswamy, M. (2020). *Foods Facts and Principles*, New Age International Private Limited; 4th Edition.

Sharma, A. (2019). *Textbook of Food Science and Technology*, 3rd Edition, CBS Publishers.

Srilakshmi, B. (2018). *Food Science*, New Age International Private Limited; 7th Edition.

Amy, B. (2018). *Understanding Food: Principles and Preparation*, Wadsworth Publishing Co Inc; 6th Edition.

John, M.D., John,W.F., Jeffrey, H.W., Chang, Y.L. (2018). *Principles of Food Chemistry*, Springer Pvt Ltd.

Ghonkrokta, S.S. (2017). *Science and Strategies for Safe Food*, CRC Press; 1st Edition.

Judith, L.B., Ailsa, A.W., John, M.K., Susan, A.L. (2017). *New Public Health Nutrition (The Nutrition Society Textbook)*, Wiley-Blackwell; 2nd Edition.

Sari, E. (2013). *Food Science an Ecological Approach*, Jones and Bartlett Publishers.

Web Resources:

https://ncert.nic.in/textbook/pdf/lehe106.pdf
https://www.fao.org/3/a1392e/a1392e.pdf
https://www.fao.org/3/i3396e/i3396e.pdf
https://www.doc.wa.gov/docs/publications/700-CA016.pdf
https://aissmschmct.in/wp-content/uploads/2020/08/BSC-HS-Sem-V-Advanced-Food-Prod.-System-HS-301-Chapter-8.pdf
https://www.youtube.com/watch?v=77esF_U3L-8

K1-Remember	**K2–Understand**	**K3-Apply**	**K4- Analyze**	**K5- Evaluate**	**K6–Create**

Course designed by: Dr.P.Rameshthangam

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M (2)	M (2)	S (3)	M (2)	M (2)	S (3)	S (3)	M (2)	L (1)	S (3)
CO2	L (1)	S (3)	S (3)	M (2)	M (2)	L (1)	S (3)	M (2)	M (2)	L (1)
CO3	S (3)	S (3)	M (2)	M (2)	M (2)	L (1)	S (3)	M (2)	M (2)	M (2)
CO4	S (3)	S (3)	S (3)	M (2)	M (2)	M (2)	L (1)	L (1)	M (2)	S (3)
CO5	M (2)	M (2)	M (2)	L (1)	L (1)	S (3)	M (2)	S (3)	S (3)	L (1)
W.AV	**2.2**	**2.6**	**2.6**	**1.8**	**1.8**	**2.0**	**2.4**	**2.0**	**2.0**	**2.0**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L (1)	M (2)	S (3)	M (2)	M (2)
CO2	M (2)	M (2)	L (1)	L (1)	M (2)
CO3	M (2)	S (3)	L (1)	S (3)	L (1)
CO4	L (1)	L (1)	M (2)	S (3)	L (1)
CO5	S (3)	L (1)	L (1)	M (2)	S (3)
W.AV	**1.8**	**1.8**	**1.6**	**2.2**	**1.8**

S –Strong (3), M-Medium (2), L- Low (1)

SEMESTER I					
Core	**Course code: 558104**	**Lab. I: HUMAN PHYSIOLOGY, NUTRITION AND HEALTH & ADVANCED FOOD SCIENCE**	**T**	**Credits:4**	**Hours :6**
Unit - I					
Objective 1	**To familiarize with the impact of fundamental skills in biochemical estimation**				
HUMAN PHYSIOLOGY 1) Estimation of Glucose from blood. 2) Analysis of blood Haemoglobin. 3) Determination of Cholesterol from blood.					
Outcome 1	**Learners practice the skills of biochemical analysis**				**K3**
Unit - II					
Objective 2	**To provide knowledge about the blood typing and Histology**				
HUMAN PHYSIOLOGY 4) Blood typing 5) Blood cell counts, Haematocrit, Blood Histology/ Blood Smears 6) Histology: cells and tissues 7) Diffusion and osmosis					
Outcome 2	**Students acquired practical knowledge of blood cells**				**K4**
Unit - III					
Objective 3	**To educate about the vital test**				
HUMAN PHYSIOLOGY 8) Urine analysis - Creatinine, Total nitrogen and Urea 9) Pregnancy test 10) Measurement of blood pressure, pulse rate, respiratory rate and body temperature					
Outcome 3	**Learners are able to perform urine analysis, pregnancy test and measurement of vitals.**				**K4**
Unit - IV					
Objective 4	**To learn about planning and preparing a balanced diet for various stages in the lifecycle**				
HEALTH AND NUTRITION 11) Preparation of weaning foods and recipes for preschoolers. 12) Preparation of low-cost recipes for adolescents, pregnant and lactating mothers					
Outcome 4	**Students are able to evaluate the low-cost recipes for different stages**				**K5**
Unit - V					
Objective 5	**To educate about the practical applications of advanced food science**				
ADVANCED FOOD SCIENCE 13) Weights and measures of all food ingredients according to food groups (Raw and after cooking). 14) Sensory evaluation of food. 15) Effects of cooking on the texture, flavor and taste of cereals, pulses, vegetables, fruits, milk products and meat products. 16) Stages of sugar cookery.					
Outcome 5	**Learners are able to elaborate on various food groups**				**K6**

Suggested Readings:

Harshad, K. K. & Sanjeev, K. S. (2021). *Objective Food Science*, 11th Edition, Jain Brothers.

Gupta, G.D. Shailesh, S. Rahul Kumar, S. (2021). *Practical Manual of Human Anatomy and Physiology*, Nirali Prakashan Publisher Pvt Ltd.

Mamta, V. (2021). *Practical Book, Physiological, Biochemical & Hematology Lab*,Krishna Prakashan Publisher.

Mohini, S. & Eram, S. R. (2019). *Food Science – Experiments and Applications*, 2nd Edition CBS Publishers, New Delhi.

Shilpa, A. D. & Niraj, S. V. (2018). *A Practical Book of Human Anatomy and Physiology*, 1st Edition, Nirali Prakashan Publisher.

Judith, L.B., Ailsa, A. W., John. M. K., Susan, A. L. (2017). *New. Public Health Nutrition*, 2nd Edition.

Suzanne Nielsen, S. (2017). *Food Analysis Laboratory Manual*, Springer; 3rd Edition.

Fellows, P.J. (2016). *Food Processing Technology: Principles and Practice*, CRC Wood head Publishing Ltd., Cambridge, 4th Edition.

Srilakshmi, B. (2015). *Food Science – Laboratory Manual*, Scitech Pub Pvt Ltd, Chennai, 6th Edition.

Brown, A. (2014). *Understanding Food Principles and Preparation*, 363 Wordsworth Publisher, London, 5th Edition.

Web Resources:

https://laney.edu/rebecca_bailey/wp-content/uploads/sites/10/2017/07/Human-Physiology-Lab-Exercises-update-2017.pdf
https://www.mcconline.org.in/download/lab_manual/12.pdf
https://pdf.usaid.gov/pdf_docs/PA00Z4ZT.pdf
https://www.egyankosh.ac.in/handle/123456789/32961
https://lib.rudn.ru/file/Food_Science_Nutrition_Catalogue_ebook.pdf

K1-Remember	K2–Understand	K3-Apply	K4- Analyze	K5- Evaluate	K6–Create

Course designed by: Dr.P.Rameshthangam

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M (2)	L (1)	L (1	M (2)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)
CO2	M (2)	L (1)	L (1)	M (2)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)
CO3	M (2)	L (1)	L (1)	M (2)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)
CO4	M (2)	L (1)	M (2)	M (2)	M (2)	M (2)	L (1)	L (1)	L (1)	L (1)
CO5	L (1)	L (1)	L (1)	L (1)	M (2)	M (2)	L (1)	L (1)	L (1)	L (1)
W.AV	**1.8**	**1**	**1.2**	**1.8**	**1.4**	**2**	**1**	**1**	**1**	**1**

S–Strong (3), M-Medium(2), L-Low(1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M (2)	L (1)	L (1)	L (1)	M (2)
CO2	M (2)	L (1)	L (1)	L (1)	M (2)
CO3	L (1)	L (1)	L (1)	L (1)	L (1)
CO4	S (3)	M (2)	M (2)	L (1)	M (2)
CO5	M (2)	L (1)	M (2)	L (1)	M (2)
W.AV	**2**	**1.2**	**1.4**	**1**	**1.8**

S–Strong(3), M-Medium(2),L-Low(1)

SEMESTER I					
DSE	**Course code : 558501**	**HOME SCIENCE EDUCATION AND COMMUNICATION**	**T**	**Credits: 4**	**Hours:4**

Unit - I

Objective 1	**To familiarize about the types and properties of the fibres, yarns and fabrics**

Fibre

a) Types

Natural – Cotton, Flax/Linen, Jute, Ramie, Hemp

Manmade – Cellulosic, Manmade Synthesized Fibre, Mineral and Elastomeric

b) Properties –Physical and Chemical

Yarn

a) Definition, Classification – Simple and Complex

b) Yarn twist

c) Testing and Identification of yarn

Fabric construction

a) Definition, Types – Woven, Non-Woven, Knitted

b) Merits and Demerits

Outcome1	**Learners understand about the classification and properties of the fibres, yarns and fabric construction.**	**K2**

Unit - II

Objective 2	**To provide knowledge about the laundering agents and the environmental impacts of textile Industries.**

Laundering and Laundering Agents

a) Laundering – Types, Principles, Methods and Process

b) Laundering agents -Stiffening agents, Bleaching agents, Fabric Softeners

c) Dry cleaning –Procedure, Advantages and Disadvantages

Environment Protection

a) Environment Protection –Importance Environmental impacts of textile industries - Effluent treatment of water- Importance of Eco-friendly Processing.

Outcome 2	**Students able to illustrate the laundering procedures for various fabrics and its impact on environment.**	**K2**

Unit - III

Objective 3	**To educate about the concepts of home management, decision making and work simplification**

Concepts of Home Management and Steps

a) Meaning and Importance of Home Management, Basis for Home Management – Values, Goals and Standards

b) Qualities of good home maker, Home management Process- Planning, Controlling, Evaluating

Decision Making

a) Definition, Characteristics and Steps in Decision Making

b) Types of Decision

Work Simplification

a) Definition, Symbols, Techniques

b) Mundels Class of Change

Energy Management – Types of Fatigue, Measures to Relieve Fatigue

Outcome 3	**Learners able to apply the concepts of home management and steps, decision making and work simplification.**	**K3**

Unit - IV		
Objective 4	**To learn about the principles and elements of Interior design and flower arrangement.**	
Interior Design a) Interior Design - Definition and Types b) Colour - Definition, Classification, Prang Colour Chart, Colour Harmonies and Use of Colour in Different Rooms. c) Principles of Design - Harmony, Balance, Proportion, Rhythm and Emphasis d) Elements of Design - Line, Direction, Shape, Colour, Texture and Value **Flower arrangement** a) Principles of Flower Arrangement – Design, Scale, Balance, Harmony, Rhythm, Colour b) Patterns and Styles –Symmetrical and Asymmetrical, Traditional, Oriental, Modern, Dried Flower Arrangement. c) Guidelines , Aids and Accessories and Care of flowers		
Outcome 4	**Students are able to apply the principles and elements of design, flower arrangement in all art forms.**	**K3**
Unit - V		
Objective 5	**To educate about the Developmental and Educational Communication**	
Developmental and Educational Communication a) Communication- Definition, Objectives, Process, Skills b) Types – Interpersonal, Focused and Unfocused, Group, Mass, Verbal Models c) Barriers- Physical, Psychological, Linguistic, Cultural and Mechanical. d) Purpose/ Functions of Communication Essentials of good communication, Seven C's of Communication. e) Class room Communication in Home Science Studies		
Outcome 5	**Students are able to analyze the essential of good communication in different spheres.**	**K4**

Suggested Readings:

Branson, J.C., & Lennox, M. (1973). *Hotel, hostel and hospital housekeeping*, Edward Arnold, London.

Dahama, O.P., & Bhatnagar, .O.P. (1988). *Education and Communication for Development*, Oxford and IBH Publishing, New Delhi.

Deepali, R., & Sheetal, C. (2017). *Textile Science*, 2017, Orient Blackswan Private Ltd.

Dubey, V.K., & Bishnoi, I. (2009). *Extension Education and communications*, New Age International Pvt. Ltd. Publishers, New Delhi.

Holtzschue, L. (2011). Understanding Colour - An introduction for Designers, 4th Edition, Wiley.

Premlata, M. (2000). Text book of home science, Kalyani Publisher.

Premony, G. (2003). *Fibre science and Technology*, McGraw Hill Education.

Seema,S. (2016). *Textbook of Fabric science*, 2nd edition, Prentice hall India learning private Ltd.

Seetharaman, P., & Pannu, P. (2009). *Interior Design and Decoration*, CBS Publishers.

Sudhir, A. (2009). Hotel Housekeeping Training Manual, Tata McGraw-Hill Education.

Online readings:

http://textilelearner.blogspot.com/2011/10/textile-ebooks-free-download-html
https://www.textilemates.com
https://nutritionaustralia.org/app/uploads/2020/05/Fibre-2014.pdf
https://hmhub.in/laundry-agents/
https://www.oca.ac.uk/wp-content/uploads/2020/06/Interior-Design-Basics-red.pdf
https://files.eric.ed.gov/fulltext/ED501789.pdf

K1-Remember	K2–Understand	K3-Apply	K4- Analyze	K5- Evaluate	K6–Create

Course designed by: Dr.P.Rameshthangam

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)
CO2	L(1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)
CO3	L(1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)
CO4	L(1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO5	L(1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	S (3)	L (1)	L (1)
W.AV	**1**	**1**	**1.4**	**1**	**1**	**1**	**1**	**2.0**	**1**	**1**

S–Strong(3),M-Medium(2),L-Low(1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L (1)	L (1)	L (1)	L (1)	L (1)
CO2	L (1)	L (1)	L (1)	L (1)	L (1)
CO3	M (2)	M (2)	L (1)	L (1)	L (1)
CO4	L (1)	L (1)	L (1)	L (1)	L (1)
CO5	M (2)	L (1)	S(3)	L (1)	M (2)
W.AV	**1.4**	**1.2**	**1.4**	**1**	**1.2**

S–Strong(3),M-Medium(2),L-Low(1)

SEMESTER I					
DSE	**Course code : 558502**	**FOOD SERVICE MANAGEMENT**	**T**	**Credits:4**	**Hours :4**
Unit - I					
Objective 1	**To familiarize about the basics of food service industry and infrastructure**				
FOOD SERVICE INDUSTRYAND INFRASTRUCTURE Food service industry**:** Scope of food industry and segmentation. Organization & administration of food service industry**:** types, organization structure and management. Physical facilities – Size and type of kitchen, design of kitchen, ventilation, lighting, flooring, carpets, wall covering. Sample layout of receiving, kitchen, storage and service area.					
Outcome1	**Learners understand about the employability in food service industry.**				**K2**
Unit - II					
Objective 2	**To provide knowledge about the food service management in hospitals.**				
FOOD SERVICE MANAGEMENT IN HOSPITALS Hospital food production – Menu planning for patients and process of food production. Different methods of holding foods for service. Hospital food service management - Principles and techniques of effective management. Tools of food management - Organizational chart of the food service team in hospital. Leadership styles, types and managerial abilities needed for food service institution.					
Outcome 2	**Students able to understand the importance of different types of food servicing in Hospital.**				**K2**
Unit - III					
Objective 3	**To educate about the equipment and material management in food industry.**				
FOOD SERVICE INDUSTRY – EQUIPMENT AND MATERIALS MANAGEMENT Food service equipment- Classification, selection, purchasing, care and maintenance. Major and minor equipments - role and maintenance in food service institution. Hand operated, Semi automated and fully automated equipment - role and maintenance in food service institution. Food materials management- Purchasing of food materials, receiving & storing – Importance of receiving raw materials.					
Outcome3	**Learners able to analyze the different equipment used in the food service industry.**				**K4**
Unit - IV					
Objective 4	**To learn about the preparation, service and sanitation of food**				
PREPARATION, SERVICE AND SANITATION OF FOOD Quantity food preparation - Types of menu, menu planning, purchasing, storage, production management, conventional and non-conventional sources of energy. Standardization, equipment involved in standardization and benefits and portion control. Styles of service - Self-service, tray service, waiter-waitress service, vending and mobile food service system. Sanitation and hygiene - Environmental hygiene & sanitation, safe food handling practices, personal hygiene					
Outcome 4	**Students are able to explain environmental hygiene and sanitation in the food service industry.**				**K5**

Unit - V		
Objective 5	**To educate about human resource management and marketing in the food industry**	
HUMAN RESOURCE MANAGEMENT, MARKETING AND DIETARY ACCOUNTING Human resource management - Recruitment & selection, induction, training, performance appraisal. Importance of communication, employee benefits, laws governing food service establishment. Marketing -Definition, marketing as a managerial function, marketing mix and promotion in food service. Dietary accounting - Definition and principles. Journal and ledger. Book of account – cash book, purchase book, sales book, purchase returns & sales returns book.		
Outcome5	**Learners are able to elaborate on the marketing of food and related dietary products.**	**K6**

Suggested Readings:

Neha, P. (2019). *Catering Management*, ABD Publishers.

Prasanta, M. (2018). *Text Book of Food and Beverage Service and Management*, The Hospitality Publisher.

Sethi, M., &Malhan, S. (2018). *Catering Management an integrated approach*, 3rd Edition, New Age International Publishers.

Parvinder, S., & Bali. (2017). *Theory of Cookery*, Oxford University Press, 1st Edition.

Sudhir, A. (2017). *Food and Beverage Management*, McGraw Hill Education Publisher.

Ahuja &Ravindr. (2016). *Service Quality Management in Hospitality and Tourism*, Random Publications, New Delhi.

Singaravelavan. (2016). *Food and Beverage Service*, 2nd Edition, Oxford University Press Publishers.

Raghubalan, G., & Raghubalan, S. (2015). *Hotel House Keeping: Operations and Management*, 3rd Edition, Oxford University Press.

Krishna Kumar, K. (2013). *The DBS Handbook of Hotel management*, DBS Imprints Publisher, 1st Edition.

Web Resources:

https://www.canr.msu.edu/michiganfood/uploads/files/food_system_infrastructure_report.pdf
https://ficci.in/spdocument/20969/foodzania-2017-report.pdf
https://hub.careinspectorate.com/media/2856/food-in-hospitals-national-catering-and-nutrition-specification-for-food-and-fluid-provision-in-hospitals-in-scotland.pdf
https://samples.jblearning.com/9781284164879/9781284186727_CH01_Drummond_Secured.pdf
https://www.motilaloswal.com/site/rreports/637745508932496406.pdf
https://www.sscasc.in/wp-content/uploads/downloads/BBM/Human-Resource-Management.pdf

K1-Remember	K2–Understand	K3-Apply	K4- Analyze	K5- Evaluate	K6–Create

Course designed by: R.Ramya

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L (1	L (1)	L (1	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO2	L (1)	L (1)	L (1)	S(3)	L (1)	L (1)	L (1)	M (2)	M (2)	L (1)
CO3	L(1)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO4	L (1)	M(2)	L (1)	M (2)	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)
CO5	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	S(3)
W.AV	**1**	**1.2**	**1**	**2**	**1**	**1**	**1**	**1.4**	**1.2**	**1.4**

S–Strong(3),M-Medium(2),L-Low(1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	L (1)	L (1)	L (1)	S(3)
CO2	M (2)	M (2)	L (1)	M (2)	L (1)
CO3	L (1)	L (1)	L (1)	M (2)	S(3)
CO4	L (1)	L (1)	M (2)	L (1)	M (2)
CO5	L (1)	L (1)	L (1)	M (2)	S(3)
W.AV	**1.6**	**1.2**	**1.2**	**1.6**	**2.4**

S–Strong(3),M-Medium(2),L-Low(1)

SEMESTER-II					
Core	**CourseCode: 558201**	**NUTRITIONAL BIOCHEMISTRY**	**T**	**Credits:5**	**Hours: 5**

Unit -I

Objective 1	**To familiarize about the nutritional aspects of carbohydrates.**

CARBOHYDRATES

Carbohydrates - Classification, physical and chemical properties. Nutritional aspects of carbohydrate, sources, biological role. **Carbohydrate metabolism** - Glycolytic pathway, Glycogenesis, Glycogenolysis, Gluconeogenesis & TCA Cycle. Deficiency diseases Inborn errors of carbohydrate metabolism.

Outcome1	**Learners understand about the classification, metabolism and nutritional importance of carbohydrates.**	**K2**

Unit II

Objective 2	**To provide knowledge about the components of proteins and lipids.**

PROTEINS AND LIPIDS

Proteins- Classification, physical and chemical properties, sources, biological role and value of protein. Protein metabolism – Protein synthesis, Transamination, deamination Urea Cycle, deficiency diseases and inborn errors of protein metabolism. **Lipids** - Classification, physical and chemical properties, sources, biological role. Lipid metabolism– β-oxidation. Nutritional aspects of lipids, lipid based metabolic diseases, In-born errors of lipid metabolism.

Outcome2	**Students able to understand about biological role and nutritional aspects of proteins and lipids in maintain a healthy biological system.**	**K2**

Unit III

Objective 3	**To educate about the biological importance of vitamins and minerals.**

VITAMINS AND MINERALS

Fat soluble Vitamins - Characteristics, role of vitamins in metabolism, deficiency and excess effects. Water soluble Vitamins - Characteristics, role of vitamins in metabolism, deficiency and excess effects.

Macro Minerals - Absorption & role of minerals in metabolism, minerals deficiency and excess effects. **Micro Minerals** - Absorption & role of minerals in metabolism, minerals deficiency and excess effects.

Outcome3	**Learners able to discuss about the importance of vitamins and minerals.**	**K6**

Unit IV

Objective 4	**To learn about the significance of nucleic acids and enzymes in biological system.**

NUCLEIC ACIDS AND ENZYMES

Nucleic acids - DNA & RNA, structure, function. Nucleic acids metabolism, genetic disorders. **Enzymes** - Classification, nomenclature, mechanism of enzyme action, enzyme specificity, application of enzymes. Enzyme activity - Factors affecting enzyme activity, Co- enzymes and Co-factors.

Outcome4	**Students able to identify the role of nucleic acids and enzymes.**	**K3**

Unit V

Objective 5	**To educate about the role of hormones, buffers and electrolytes in maintaining equilibrium of the body.**

HORMONES, BUFFERS AND ELECTROLYTES

Hormones - Role of hormones. Interrelation between hormones and nutrients. Hormone deficiency diseases. **Acid base balance** - normal health, major sources of acid produced in the body, buffers, physiological role of different buffer systems. **Fluid and electrolyte balance** -

Maintenance in normal health. Diseases of electrolytes imbalance. Role of nutrients in maintenance of fluid and electrolyte balance during disease condition.		
Outcome 5	**Learners able to determine the role of hormones deficiency, physiological role of buffers and electrolytes.**	**K5**

Suggested Readings:

Vasudevan, D.M. Sreekumari, S. Kannan, V. (2022). *Textbook of Biochemistry for Medical Students*, Jaypee Brothers Medical Publishers.

Renu, V. (2022). *Nutritional Biochemistry*, Nitya Publications.

Sathyanarayana, U. & Sakrapani, U. (2021). *Biochemistry*, 6th Edition, Elsevier Publishers.

Victor. W. R. David, B. Kathleen,. M. B. (2018). *Harper's Illustrated Biochemistry*, 31st Edition, McGraw Hill, Medical Publisher.

Singh, B. K. P. (2018). *Nutritional Biochemistry*, Amiga Press Inc Publisher.

Sharma, D. C. & Sharma, D. (2017). *Nutritional Biochemistry*, CBS Publishers & Distributors.

Ramadevi, K. (2016). *Ambika Shanmugam's Fundamentals of Biochemistry for Medical Students*, 8th Edition, Publisher, Wolters Kluwer India Pvt. Ltd.

Berg, J.M. Tymoczko, J.L. Stryer, L. (2015). *Biochemistry*, W.H. Freeman, 8th Edition.

Murray, R.K. Granner, D.K. Mayes, P.A. Rodwell, V.W. (2015). *Harper's Illustrated Biochemistry*, McGraw-Hill (Asia), 30th Edition.

Urvashi, N. (2013). *A Handbook of Foods and Nutritional Biochemistry*, Daya Publishing House.

Web Resources

https://www.slideshare.net/Nugurusaichandan/carbohydrates-in-food-206371991
https://sightandlife.org/wp-content/uploads/2017/03/SAL_MVLex_web.pdf
https://mgumst.org/pdf/naac/Final_Nsg.PPT_PDF/Medical/Biochemistry/Mineral%20metabolism.pdf
https://www.slideshare.net/fatimasaleh94214/enzymes-2-30256325
https://www.slideshare.net/Sanzux/harmones-cology-ppt-finalppt1
https://faculty.ksu.edu.sa/sites/default/files/chapter24_waterelectroliteacidbasebalance.pdf
https://my.clevelandclinic.org/health/symptoms/24019-electrolyte-imbalance

K1- Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Course designed by: Dr.P.Rameshthangam

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S (3)	L (1)	M (2)	M (2)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)
CO2	S (3)	L (1)	L (1)	L (1)	M (2)	S (3)	M (2)	L (1)	M (2)	M (2)
CO3	M (2)	M (2)	M (2)	M (2)	L (1)	M (2)	L (1)	L (1)	M (2)	L (1)
CO4	M (2)	L (1)	M (2)	M (2)	L (1)	M (2)	L (1)	L (1)	M (2)	L (1)
CO5	S (3)	M (2)	M (2)	L (1)	L (1)	M (2)	L (1)	M (2)	M (2)	L (1)
W.AV	**2.6**	**1.4**	**1.8**	**1.6**	**1.4**	**2**	**1.2**	**1.2**	**1.8**	**1.2**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S (3)	S (3)	M (2)	L (1)	L (1)
CO2	S (3)	M (2)	M (2)	L (1)	L (1)
CO3	M (2)	M (2)	L (1)	M (2)	L (1)
CO4	S (3)	M (2)	L (1)	L (1)	M (2)
CO5	L (1)	L (1)	L (1)	L (1)	L (1)
W.AV	**2.6**	2	1.4	1.2	1.2

S –Strong (3), M-Medium (2), L- Low (1)

SEMESTER II					
Core	**Course code: 558202**	**COMMUNITY NUTRITION**	**T**	**Credits:5**	**Hours :5**

Unit - I

Objective 1	**To obtain insight on the national nutritional problems and their implications.**

ASSESSMENT OF NUTRITIONAL STATUS

Assessment of nutritional status - food and nutritional problems in the community. Nutritional status of an individual and community. Direct method of nutritional assessment: nutritional anthropometry, biochemical methods, clinical examination and dietary survey. Indirect method of nutritional assessment: Age Specific Mortality Rates, Cause Specific Mortality Rates, Cause Specific Nutritionally - Relevant Morbidity Rate, Ecological Factors.

Outcome 1	**Students able to identify their own nutritional status and their family status.**	**K3**

Unit - II

Objective 2	**To provide knowledge on the problem of malnutrition in India.**

MALNUTRITION OVERVIEW AND MALNUTRITION IN INDIA

Protein–energy malnutrition (PEM) - Aetiology, prevalence, symptoms and preventive measures. Ecology of malnutrition, nutrition and infection, Nutritional disorders: anemia, vitamin A deficiency, iodine deficiency disorder – Nutrient deficiency control programme. Prevalence of malnutrition in India: Common nutritional problems-prevalence, morbidity and mortality rate. Strategies to overcome malnutrition in India - Need for an integrated approach to solve the problems of malnutrition.

Outcome 2	**Learners able to understand the current status of malnutrition in India.**	**K2**

Unit - III

Objective 3	**To educate knowledge about nutrition intervention programme**.

NUTRITION INTERVENTION PROGRAMMES

Objectives and operation of nutrition intervention programmes. Nutrition intervention programmes - Role of Environmental sanitation and Health status. Other programmes organized by governmental and non-governmental agencies for the vulnerable sections of the population.

Outcome 3	**Students able to assess the role of nutrition intervention programme for eradication of malnutrition.**	**K4**

Unit - IV

Objective 4	**To provide knowledge about the organizations concern with malnutrition and nutrition education.**

ORGANIZATIONS CONCERNED WITH MALNUTRITION AND NUTRITION EDUCATION

International organizations concerned with food and nutrition, FAO, WHO, UNICEF, CARE, AFPRO, CWS and World Bank.National organizations concerned with food and nutrition- ICMR, ICARM, CHEB, CSWB and SSWB. Nutrition education - nature and importance to the community. Training workers in nutrition education and extension work.

Outcome 4	**Students acquire knowledge about nutrition education programme.**	**K3**

Unit - V

Objective 5	**To Learn the principles of planning and executing nutritional education programme.**

NUTRITION EDUCATION PROGRAMMES, FOOD PRODUCTION AND FOOD SPOILAGE

Principles of planning, executing and evaluating nutrition education programmes, problems of nutrition education programmes. A brief review of losses of foods in the post-harvest period. Green, Blue, White and Yellow Revolution. Agriculture planning, role of food technology. Food production -Objectives in agriculture planning in relation to nutrition. Recent advances and research in the field of community nutrition.

Outcome 5	**Students able to discuss the plan and execution of nutritional education programme.**	**K6**

Suggested Readings:

Suryatapa, D.(2020). *Textbook of Community Nutrition*, Academic Publisher.

Manju, P.(2020). *Community Nutrition in India*, Star Publications.

Usha, K.&.Aditya, K.(2020). *Community nutrition, hygiene and public health.*Independently published

Janice, L.R. & Kelly, M. K. (2020).Krause and Mahan's Food & the Nutrition Care Process, 15th Edition, W.B Saunders Company, USA.

Bamji, M.S.(2017). *Textbook of human Nutrition*. Oxford and IBH Publishing Co, New Delhi.

Park, K. (2017). *Park's text book of preventive and social medicine*, 24th Edition, M/S, BanarsidasBhanot publishers, Jabalpur.

Norman, J.T. &Nelia, S.(2016). *Community Nutrition for Developing Countries*, AU Press and UNISA.

Elizabeth, E.(2016). *Public Health and Community Nutrition*, Kindle Edition, Momentum Press Publisher.

Nigam, A. K. (2015). *Statistical Aspects of Community Health and Nutrition*. Woodhead Publishing India in Food Science and Nutrition.

Sheila, M. & Julia, H.(2014). *Nutrition and Healthy Aging in the Community*, Workshop Summary, Kindle Edition, National Academies Press Publisher.

Web Resources:

https://www.slideshare.net/soharashed/assessment-of-nutritional-status
https://slideplayer.com/slide/2356953/
https://www.drishtiias.com/pdf/malnutrition-in-india-1.pdf
ZDE1Z/India_and_Acute_Malnutrition_in_Children_powerpoint_ppt_presentation
https://www.andeal.org/vault/2440/web/files/20140527-NI%20Snapshot.pdf

K1- Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Course designed by: Dr.P.Rameshthangam

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S (3)	L (1)	M (2)	L (1)	M (2)	M (2)	L (1)	L (1)	M (2)	L (1)
CO2	S (3)	M (2)	M (2)	M (2)	M (2)	L (1)	M (2)	M (2)	L (1)	M (2)
CO3	L (1)	M (2)	L (1)	M (2)	L (1)	L (1)	L (1)	M (2)	L (1)	M (2)
CO4	M (2)	L (1)	M (2)	L (1)	L (1)	M (2)	M (2)	M (2)	L (1)	L (1)
CO5	M (2)	M (2)	M (2)	S (3)	M (2)	L (1)	M (2)	M (2)	M (2)	M (2)
W.AV	**2.2**	**1.6**	**1.8**	**1.8**	**1.6**	**1.4**	**1.6**	**1.8**	**1.6**	**1.6**

S (3) - Strong, M (1) - Medium, L (1) -Low

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M (2)	L (1)	M (2)	L (1)	M (2)
CO2	M (2)	L (1)	L (1)	L (1)	M (2)
CO3	M (2)	M (2)	L (1)	L (1)	M (2)
CO4	L (1)	L (1)	M (2)	L (1)	L (1)
CO5	M (2)	M (2)	M (2)	L (1)	M (2)
W.AV	**1.8**	**1.4**	**1.6**	**1**	**1.8**

S (3) - Strong, M (1) - Medium, L (1) -Low

II Semester					
Core	**Course Code: 558203**	**SPORTS NUTRITION**	**T**	**Credits:5**	**Hours: 5**

Unit - I		
Objective 1	**To familiarize the special nutritional requirements for physical activities related to sports and exercise**	
SPORTS PHYSIOLOGY: Introduction to Fitness, Muscular adaptations during endurance exercise, Hormonal adaptations during endurance exercise, Role of nutrition in stress, Fracture and injury.		
Outcome 1	**Students able to identify the components of health and fitness and the role of nutrition.**	**K3**
Unit – II		
Objective 2	**To provide knowledge in body composition and improve the performance of sportspersons**	
BODY COMPOSITION AND WEIGHT MANAGEMENT IN SPORTS: 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, Weight gain		
Outcome 2	**Students acquire Knowledge of human body composition pattern and prescribe ways to regulate body composition level required for various sports performance**	**K2**
Unit – III		
Objective 3	**To develop an evidence-based approach to the application of the science of nutrition to optimize performance**	
EXERCISE PERFORMANCE AND NUTRITION: Energy expenditure during physical activity, Carbohydrates and performance, Fat metabolism and performance, Effect of exercise on protein requirements, Vitamins and Minerals, Fluid and electrolyte loss and replacement in exercise.		
Outcome 3	**To learn the ability to evaluate fitness and well-being**	**K2**
Unit – IV		
Objective 4	**To acquire knowledge and skill in sports nutrition, nutritional and body composition assessment, weight management and prescription of diets for sports persons**	
NUTRITION IN SPORTS: Nutritional requirements in Sports Events-Team, Power and Endurance events, Pre-game and Post game regime. Carbohydrate loading, Water and electrolyte balance.		
Outcome 4	**Students acquire Knowledge of human body composition pattern and prescribe ways to regulate body composition level required for various sports Performa.**	**K2**

Unit – V		
Objective 5	**To learn knowledge and skill in physical fitness and fitness tests for sports persons**	
NUTRITIONAL ERGOGENICS & MEASURES OF PERFORMANCE AND PHYSICAL FITNESS Ergogenic aids and Supplements-Types, Potential and Concerns, Work Capacity, Physical capacity tests, Physical fitness, parameters of fitness, fitness tests.		
Outcome 5	**Learners able to formulate and apply appropriate strategies for the measurement and monitoring of the nutritional status of athletes.**	**K4**

Suggested Readings:

Bamji, S.M., Rao, N.P., Reddy, V. (1998).*Text book of Human Nutrition*, Oxford and IBH Publishing C. New Delhi.

Burke, L., &Deakin, V. (2010). *Clinical Sports Nutrition*,4th Edition, McGraw-Hill.

Bamji, M.S. (2017). *Textbook of Human Nutrition*, Oxford and IBH Publishing Co, New Delhi.

Driskell, J.A. & Wolinsky, I. (2016).*Sports Nutrition - Vitamins and Trace Elements, 2nd Edition,* Volume of Nutrition in Exercise and Sport Series – CRC-Taylor & Francis

Susan, A. L., Samantha, J. S., Susan, M. S., Adam, L.C. (2011). *Sport and Exercise Nutrition*, A John Wiley & Sons, Ltd., Publication.

Fink, H.H.,Mikesky, E.A.,Burgoon, A.L.(2012).*Practical Applications in Sports Nutrition*, 3rd Edition, Publishers -Jones and Barlett Learning, USA.

Gibney, J.M., Macdonald, A.I., Roche, M.H. (2003). *Nutrition and Metabolism*, Blackwell Publishing.

Maurice, B.S.,Moshe,S.A.,Catherine, R., Benjamin, C., Robert, J. C. (2006).*Modern Nutrition in Health and Disesase*. Edited by Lippincott Williams & Wilkins.

Melvin, W. (2007). *Nutrition for Health, Fitness and Sport*, 8th Edition, McGraw-Hill.

Cherie, M. (2004).*Practical Nutrition for a Fit Life*, Kendall-Hunt Publishers

WHO. (1995).*Physical Status: The Use and interpretation of Anthropometry*, Report of a WHO Expert Committee,Geneva.

Web Resources:

https://samples.jbpub.com/9781284034851/Chapter_6.pdf

https://www.pdfdrive.com/exercise-physiology-e87.html

http://downloads.lww.com/wolterskluwer_vitalstream_com/sample-content/9780781797818_McArdle/samples/Chapter28.pdf

https://boxing.nv.gov/uploadedFiles/boxingnvgov/content/HotTopics/Nutrition_for_Athletes.pdf

https://lllnutrition.com/mod_lll/TOPIC37/m373.pdf

https://www.cambridge.org/core/services/aop-cambridge-core/content/view/6199228EEA00AC2F44DDFA365BEE2246/S0954422499000116a.pdf/nutritional-ergogenic-aids-and-exercise-performance.pdf

K1- Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Course designed by: Dr.P.Rameshthangam

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M (2)	M (2)	L (1)	M (2)	M (2)	L (1)	S (3)	M (2)	L (1)	S (3)
CO2	M (2)	L (1)	S (3)	M (2)	M (2)	L (1)	S (3)	M (2)	M (2)	L (1)
CO3	M (2)	M (2)	M (2)	M (2)	M (2)	L (1)	S (3)	M (2)	M (2)	M (2)
CO4	M (2)	M (2)	S (3)	M (2)	M (2)	M (2)	L (1)	L (1)	M (2)	S (3)
CO5	M (2)	M (2)	M (2)	L (1)	L (1)	S (3)	M (2)	S (3)	S (3)	L (1)
W.AV	**2.0**	**1.8**	**2.2**	**1.8**	**1.8**	**1.6**	**2.4**	**2.0**	**2.0**	**2.0**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L (1)	L (1)	M (2)	M (2)	M (2)
CO2	M (2)	M (2)	L (1)	L (1)	M (2)
CO3	M (2)	M (2)	L (1)	M (2)	L (1)
CO4	L (1)	L (1)	M (2)	M (2)	L (1)
CO5	M (2)	L (1)	L (1)	M (2)	S (3)
W.AV	1.6	1.4	1.4	1.8	1.8

S –Strong (3), M-Medium (2), L- Low (1)

II Semester					
Core	**Course Code 558204**	**Lab.II-NUTRITIONAL BIOCHEMISTRY, COMMUNITY NUTRITION&SPORTS NUTRITION**	**P**	**Credits:4**	**Hours: 6**

Unit - I		
Objective 1	To determine the moisture and macronutrients in foods	
NUTRITIONAL BIOCHEMISTRY 1. Determination of Moisture content in Food sample. 2. Determination of Carbohydrates, Proteins and fats in Food sample.		
Outcome 1	Inculcate the skills of analysis macronutrients in foods	**K4**
Unit – II		
Objective 2	To determine the gluten and acidity from wheat flour	
3. Determination of Gluten content in wheat. 4. Estimation of Acidity in wheat flour.		
Outcome 2	Demonstrate basic skills on analytical methods	**K4**
Unit – III		
Objective 3	To estimate the fiber, phosphorous iron and calcium content in foods.	
5. Estimation of Fiber, Phosphorous and Iron content in any one food. 6. Determination of Calcium content in milk.		
Outcome 3	Create knowledge on analytical techniques	**K4**
Unit – IV		
Objective 4	To develop skills in planning and preparing balanced diet for various stages in lifecycle.	
COMMUNITY NUTRITION 7. Diet in Anaemia, protein calorie malnutrition 8. Diet in vitamin A, D, E, K, C and B deficiency.		
Outcome 4	Prepare diet for anaemia, protein malnutrition and vitamins	**K5**
Unit – V		
Objective 5	To understand the nutrition assessment of sports persons	
SPORTS NUTRITION 9. Nutrition Assessment, diet planning and diet counselling for sports person. 10. Visit to sports academy. 11. Assessment of body composition, muscle flexibility, muscular endurance and cardiovascular efficiency.		
Outcome 5	Evaluate the nutritional requirements of sports person	**K5**

Suggested Readings:

Purvi, P. (2022). *Practical Biochemistry*, Kindle Edition, Jaypee Brothers Medical Publishers (P) Ltd Publisher.

Sai, J. (2022). *Nutritional Biochemistry-Lab Practical with Solutions*, SIA Publishers & Distributors Pvt Ltd.

Louise, B., Michelle, M., Vicki, D. (2021). *Clinical Sports Nutrition Product Bundle*, McGraw-Hill Education / Australia; 6th Edition.

Shruti, M. (2013). *Practical Clinical Biochemis*try, Jaypee Brothers Medical Publisher, 1st Edition.

Sheila, M., & Julia, H. (2014). *Nutrition and Healthy Aging in the Community*, Workshop Summary Kindle Edition, National Academies Press.

Web Resources:

https://www.egyankosh.ac.in/handle/123456789/32956

https://asapglobe.com/Download_File.aspx?chap=bWFpbi5wZGY=&bisbn=OTc4ODEyNjE1MTgwNg

http://mycatalog.txstate.edu/courses/nutr/nutr.pdf

https://www.narayananursingcollege.com/pdf/Laboratory-Learning-Resources/NUT.pdf

https://stillmed.olympics.com/media/Document%20Library/OlympicOrg/IOC/Who-We-Are/Commissions/Medical-and-Scientific-Commission/Encyclopaedia/2014_Maughan_002.pdf

http://students.aiu.edu/submissions/profiles/resources/onlineBook/W6q8B9_Practical_Applications_In_Sports_Nutrition4.pdf

K1- Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Course designed by: Dr.P.Rameshthangam

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L (1)	M (2)	L (1)	M (2)	M (2)	L (1)	L (1)	M (2)	L (1)	L (1)
CO2	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)
CO3	L (1)	L (1)	M (2)	L (1)	M (2)	L (1)	L (1)	M (2)	L (1)	M (2)
CO4	L (1)	L (1)	L (1)	M (2)	L (1)	M (2)	L (1)	L (1)	M (2)	L (1)
CO5	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)
W.AV	**1.0**	**1.2**	**1.4**	**1.6**	**1.4**	**1.2**	**1.2**	**1.6**	**1.2**	**1.2**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L (1)	M (2)	L (1)	L (1)	M (2)
CO2	L (1)	M (2)	L (1)	L (1)	L (1)
CO3	L (1)	L (1)	L (1)	L (1)	L (1)
CO4	L (1)	L (1)	M (2)	L (1)	L (1)
CO5	L (1)	L (1)	L (1)	M (2)	L (1)
W.AV	1.0	1.4	1.2	1.2	1.2

S –Strong (3), M-Medium (2), L- Low (1)

II Semester					
DSE	**Course Code: 558503**	**FOOD MICROBIOLOGY AND SANITATION**	**T**	**Credits:4**	**Hours: 4**

Unit - I

Objective 1	**To gain knowledge about the fundamentals of microbiology.**	
FUNDAMENTALS OF MICROBIOLOGY (YEAST, MOULDS AND VIRUSES) Fundamentals of Microbiology – Introduction, development of microbiology. Bacteria-morphology and cultural characteristics and its importance in food Industry. Yeast-Morphology, culture, physiology, classification and industrial importance of yeast. Moulds-morphology, physiology and multiplication, significance of moulds and common household moulds in relation to food science. Viruses and bacteriophages - discovery, morphology, reproduction and its importance.		
Outcome 1	**Students able to identify the relation between microorganisms and food**	**K3**

Unit – II

Objective 2	To Understand the methods of preserving vegetables and fruits to avoid spoilage from microorganisms	
CONTAMINATION, SPOILAGE, PRESERVATION AND MICROBES OF VEGETABLES AND FRUITS Contamination of foods from external sources, General principles underlying spoilage - chemical changes by microorganisms. General principles of food preservation- Asepsis, Removal, Anaerobic conditions, High temperature, Low temperature, Drying, Food additives and Radiation. Vegetables - contamination, spoilage, preservation, and control of microorganisms. Fruits - contamination, spoilage, preservation, and control of microorganisms.		
Outcome 2	Students able to assess with food preservation skills to preserve vegetables and fruits.	**K3**

Unit – III

Objective 3	To Learn the preservation of cereals, pulses and milk products	
MICROBES IN CEREALS, PULSES, MILK PRODUCTS AND NUTS AND OIL SEEDS Cereals and cereal products - contamination, spoilage, preservation, and control of microorganisms. Pulses - contamination, spoilage, preservation, and control of microorganisms. Milk and milk products - contamination, spoilage, preservation, and control of microorganisms. Nuts and Oil seeds - contamination, spoilage, preservation, and control of microorganisms.		
Outcome 3	Learners able to identify the preservation methods of cereals, pulses and milk products	**K3**

Unit – IV

Objective 4	To provide knowledge about the causes of food poisoning and preventive measures.	
MICROBES IN FLESHY FOODS, CANNED FOODS AND FOOD BORNE DISEASES Fleshy foods, poultry and fish - Contamination, Spoilage, Preservation and control. Spoilage of Canned foods- causes of spoilage, appearance of the unopened container. Grouping of canned foods on the basis of acidity, types of biological spoilage of canned foods. Food borne diseases – Food borne illness, Food borne poisoning, infection and intoxication.		
Outcome 4	Students create awareness about food borne diseases and precautionary measures.	**K5**

Unit – V		
Objective 5	To Comprehend the processes for ensuring food safety and hygiene, including microbiological quality control and food-borne illness analysis	

FOOD SAFETY, PACKING AND FOOD STANDARDS

Food Sanitation and safety – Personal hygiene-care of hands, sanitation, equipment plant, plant constructions, personal facilities, water supplies and sewage disposal. Food packaging – Packaging methods. Moisture sorption properties of foods and selection of packaging materials. Interactions between packaging and food toxicity hazards. Packaging laws and regulations. Bar coding - Nutrition labeling and nutrition claims, coding of food products. Food laws and standards –Bureau of Indian standards - PFA, FPO, MMPO, AGMARK, CCFS, CFL, BIS & FSSAI - Consumer protection act, 1986. International standards- Codex Alimentarius, ISO, WHO, FAO, WTO and HACCP.

Outcome 5	Learn about the impact of hygiene and food safety on food production and how it affects the food's microbiological state and quality.	**K2**

Suggested Readings:

Foster, W.M.(2020). *Food Microbiology*, C.B.S Publishers Pvt Ltd.

Ananthanarayanan, R., &Paniker.(2013). *Text Book of Microbiology*, 9th Edition, Orient Blackswan Publishers Pvt Ltd.

Virendra, K.P.(2021). *Text Book of Food Microbiology*, INSC International Publishers.

Martin, R. Adams., Mauric, O, M., Peter, M.(2015). *Food Microbiology*, 4th Edition, Royal Society of Chemistry.

Vasanthakumari.(2016). *Text book of Microbiology*, Wolters Kluwer (India) Pvt Ltd, 3rd Edition.

William, C.F, Dennis, C.,Westhoff, N.M.,Vanitha. (2017). *Food Microbiology*, McGraw Hill Education; 5th Edition.

Mahendra, R.,& Pal, M.(2015). *Sanitation in Food Establishments*. LAP Lambert Academic Publishing.

Sequeira, K.K., Kapoor, K.S., Yadav., Tauro. P.(2019). *An Introduction to Microbiology,* New Age International Publishers, 3rd Edition.

Sharad, V. (2015). *A laboratory Text book of Biochemistry*, Molecular Biology and Microbiology, Grin Publishing.

Connie, R., Mahon, D.C., Lehman. (2018). *Textbook of Diagnostic Microbiology*, Saunders Publishers.

Web Resources:

http://nuristianah.lecture.ub.ac.id/files/2014/09/fundamental-food-microbiology.pdf
https://www.firstnations.org/wp-content/uploads/2018/11/Introduction-to-Food-Microbiology-A.pdf
https://www.ihmnotes.in/assets/Docs/Sem-3&4/FOOD%20SAFETY%20&%20QUALITY/3.pdf
https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/---coop/documents/instructionalmaterial/wcms_628571.pdf
https://www.slideshare.net/HanuPratap/food-contamination-and-microbial-spoilage
https://www.slideshare.net/vasanthanvasu/dairy-microbiology-39885550
https://downloads.hindawi.com/journals/specialissues/685242.pdf
https://www.fao.org/3/t0451e/t0451e.pdf

K1- Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Course designed by: Dr.P.Rameshthangam

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M (2)	M (2)	L (1)	M (2)	M (2)	L (1)	L (1)	M (2)	L (1)	L (1)
CO2	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	M (2)	M (2)	L (1)
CO3	L (1)	L (1)	M (2)	M (2)	M (2)	L (1)	L (1)	M (2)	M (2)	M (2)
CO4	L (1)	L (1)	L (1)	M (2)	M (2)	M (2)	L (1)	L (1)	M (2)	L (1)
CO5	M (2)	M (2)	M (2)	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)
W.AV	**1.4**	**1.4**	**1.4**	**1.8**	**1.6**	**1.2**	**1.2**	**1.6**	**1.6**	**1.2**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L (1)	M (2)	L (1)	M (2)	M (2)
CO2	M (2)	M (2)	L (1)	L (1)	M (2)
CO3	M (2)	L (1)	L (1)	L (1)	L (1)
CO4	L (1)	L (1)	M (2)	L (1)	L (1)
CO5	L (1)	L (1)	L (1)	M (2)	L (1)
W.AV	**1.4**	**1.4**	**1.2**	**1.4**	**1.4**

S –Strong (3), M-Medium (2), L- Low (1)

SEMESTER II					
DSE	**Course Code: 558504**	**GERIATRIC NUTRITION**	**T**	**Credits:4**	**Hours:4**

Unit-I

Objective 1	**To familiarize about the multifaceted aspects of aging**	

The Ageing Society

Global and Indian scenario, Epidemiology, Life Expectancy vs Life Span, Usual vs Successful, Ageing Changes associated with ageing process.

Outcome 1	**Learners understand about the ageing changes associated with ageing process**	**K2**

Unit II

Objective 2	**To provide knowledge about the Cellular aspects of ageing**

Cellular aspects of ageing:

Physiological changes: Body composition gastrointestinal, cardiac, respiratory, renal, muscular, skeletal, neural (including brain and spinal cord), endocrine and metabolic, changes and impact on health and nutritional status.

Functional manifestations of ageing: constipation, impaired fluid and electrolyte balance, altered thermoregulation, sleep disturbances.

Outcome 2	**Students are able to illustrate the cellular and Physiological changes of aging.**	**K2**

Unit III

Objective3	**To educate about the common molecular theories of ageing and nutritional interventions.**

Common molecular theories of ageing and nutritional interventions:

Factors influencing ageing – endogenous and exogenous. Benefits of calorie restriction and exercise. Nutritional requirements – factors influencing and dietary plans for senior citizens. Promoting successful ageing-traditional and modern methods.

Outcome 3	**Students are able to analyze the Nutritional requirements – factors influencing dietary plans for senior citizens**	**K4**

Unit IV

Objective 4	**To learn about the Nutritional and health status of elderly**

Nutritional and health status of elderly:

Factors influencing food consumption and nutritional status of elderly. Under nutrition in the Elderly – risk factors, Common diseases in elderly: Etiopathogenesis, manifestations and interventions - Gastrointestinal disturbances, cardiac, renal, respiratory diseases, mental changes including depression, dementia, Parkinson's, Alzheimer's, bone and muscle related abnormalities, Sarcopenia, frailty. Role of Nutrition in prevention of age related diseases. Nutrient drug interactions..

Outcome 4	**Students are able to explain the risk factors of common diseases and the role of nutrition in the prevention of age-related disease**	**K5**

Unit V

Objective 5	**To educate about the Assessment of nutritional status**

Assessment of nutritional status – mini nutrition index, assessment of frailty. Policies and programmes of the government and NGO sector pertaining to the elderly. Promoting fitness and well being- use of various modern and traditional approaches.

NOTE: Unit V is to be done through field visits and as independent project through the following:

1. Visit to old age homes
2. Assessment of physical fitness, food intake and nutritional status
3. Planning and preparation of diets for the elderly in health and sickness.
4. Developing protocol for promoting fitness and health vis-à-vis health status/disease.

Outcome 5	**Learners are able to apply the knowledge to promote fitness and well-being of the elderly by using various modern and traditional approaches.**	**K3**

Suggested Readings:

Lauri, S. (2023). *Geriatric Nutrition*, A practical guide to healthy eating for seniors, Kindle Edition.

Julie, W., Colleen, C., Mikhail, K. (2021). *Integrative Geriatric Nutrition*, A Practitioner's Guide to Dietary Approaches for Older Adults, Springer; 1st Edition.

Chaudhary, A. (2001). *Active Aging in the New Millennium*, Publishers Anugraha, Delhi.

Watson, R.R. (2000). *Handbook of Nutrition in the Aged*, 3rd Edition. CRC Press, Boca Raton.

Bagchi, K., & Puri, S. (1999). *Diet and Aging – Exploring Some Facets,* Society for Gerontological Research, New Delhi and Help Age India, New Delhi.

Sharma, O.P. (1999). *Geriatric Care in India – Geriatrics and Gerontology*, A Textbook, M/s. ANB Publishers.

Harrison, T.R., Anthony, F. (1997). *Harrison's Principles of Internal Medicine*, 14th Edition, McGraw Hill.

Kumar, V. (1996). *Aging – Indian Perspective and Global Scenario*. Proceedings of International Symposium of Gerontology and Seventh Conference of the Association of Gerontology (India).

Davis, J., & Sherer, K. (1994). Applied Nutrition and Diet Therapy for Nurses, 2nd Edition, W.B. Saunders Co.

Binstock, R.H., & Shanes, E. (1986). *Handbook of Aging and Social Sciences,* V.N. Reinhold Co, New York.

Watson, R.R. (1985). *Handbook of Vitamins in the Aged*, ERC Press, Boca Raton, Florida

Aiken, L.R. (1978). *The Psychology of Later Life*, Philadelphia WB Saunders Company.

Web Resources:

https://www.demogr.mpg.de/books/drm/008/2.pdf

https://www.un.org/en/development/desa/population/publications/pdf/ageing/WorldPopulationAgeing2019-Highlights.pdf

https://www.med.upenn.edu/gec/user_documents/Pignolo-BiologyofAging2012GGRFINAL.pdf

https://he02.tci-thaijo.org/index.php/tmj/article/download/15698/14334/33921

https://www.researchgate.net/publication/318119608_Theories_of_Aging

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1336040/pdf/cmaj00252-0069.pdf

K1- Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Course designed by: Dr.P.Prabakaran

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L(1)	L(1)	L(1)	M(2)	L(1)	L(1)	L(1)	L(1)	L(1)	L(1)
CO2	M(2)	L(1)	L(1)	L(1)	L(1)	M(2)	L(1)	L(1)	L(1)	L(1)
CO3	M(2)	L(1)	L(1)	M(2)	M(2)	M(2)	M(2)	L(1)	S(3)	L(1)
CO4	S(3)	L(1)	M(2)	M(2)	S(3)	S(3)	M(2)	L(1)	S(3)	L(1)
CO5	S(3)	L(1)	M(2)	M(2)	M(2)	M(2)	M(2)	L(1)	S(3)	L(1)
W.AV	**2.2**	**1**	**1.4**	**1.8**	**1.8**	**2**	**1.6**	**1**	**2.2**	**1**

S–Strong(3),M-Medium(2),L-Low(1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M(2)	L(1)	M(2)	L(1)	L(1)
CO2	M(2)	M(2)	M(2)	L(1)	L(1)
CO3	M(2)	M(2)	M(2)	L(1)	L(1)
CO4	M(2)	M(2)	M(2)	L(1)	L(1)
CO5	L(1)	M(2)	M(2)	L(1)	L(1)
W.AV	**1.8**	**1.8**	**2**	**1**	**1**

S–Strong(3),M-Medium(2),L-Low(1)

SEMESTER III					
Core	**Course code: 558301**	**CLINICAL AND THERAPEUTIC NUTRITION**	**T**	**Credits:5**	**Hours :5**

Unit - I		
Objective 1	**To Understand the role of dietitian and nutrition psychopathologist.**	
ROLE OF DIETITIAN AND NUTRITION PSYCHOPATHOLOGY Role of dietitian in the hospital and community- Types of dietitians, Education and personal qualifications, professional ethics and obligations. Educating the patient – methods of nutrition education, diet clinics and follow up. Psychology of feeding the patient, problems of feeding children. Assessment of patient's needs – Types and advantages.		
Outcome 1	**Students able to know the importance of dieting during different health conditions based on patients psychology and needs.**	**K2**
Unit - II		
Objective 2	**To discriminate the variation between normal and hospital diet.**	
HOSPITAL DIETS AND DIET IN FEBRILE CONDITIONS Routine hospital diets-Regular diet, light diet, soft diet, full liquid diet and clear liquid diet. Enteral and parental feeding in hospitals –composition, monitoring and complications. Transitional feeding. Modifications of diet in febrile conditions -Acute, chronic and recurrent fevers, typhoid, rheumatic fever. Diet for Tuberculosis, malaria, H1N1, dengue fever, chikungunya, COVID.		
Outcome 2	**Equipped themselves as professional dietitians.**	**K4**
Unit - III		
Objective 3	**To Understand the symptoms of various diseases and its associated diets.**	
DIET IN GASTROINTESTINAL DISORDERS Diet for Gastrointestinal disorders - Esophagitis, ulcer, indigestion, gastritis and dumping syndrome. Diet for Gastrointestinal disorders - Diarrhea, constipation, flatulence, celiac disease, tropical sprue and steatorrhea. Gastric surgery. Irritable bowel disease (IBD) – crohn's disease, ulcerative colitis, irritable bowel syndrome (IBS), diverticulitis, colitis.		
Outcome 3	**Impart the basic knowledge on different metabolic disorders.**	**K2**
Unit - IV		
Objective 4	**To Know the diets given for different metabolic disorders.**	
DIET IN LIVER, GALL BLADDER, PANCREAS, METABOLIC AND RENAL DISORDERS Diet for Liver, gall bladder and pancreatic disorders and pancreatitis. Ecological factors: Dietary regimen in cirrhosis, hepatitis, hepatic coma, cholecystitis, cholelithiasis, liver transplantation. Diet for Metabolic disorders - Hypothyroidism, hyperthyroidism, gout, phenylketonuria and lactose intolerance. Diet for Renal disorders - Contributory factors and dietary modification- acute and chronic glomerulonephritis, nephrosis, nephrosclerosis and urolithiasis. Diet for dialysis, renal failure, end stage renal diseases.		
Outcome 4	**Develop the need to formulate different diets for different metabolic disorders.**	**K3**

Unit - V		
Objective 5	**To Learn the effects of food allergies and neurological disorders**	
DIET IN FOOD ALLERGY AND NEUROLOGICAL DISORDERS. Food allergy - Definition, types, tests, dietary management and prevention. Diet during neurological disorders - Alzheimer's disease, Parkinson's disease and epilepsy. Diet during metabolic stress - Burns, sepsis and trauma. Diet during Surgical conditions- Cardiovascular -Pre and post operative, stroke and surgery, respiratory failure, hepatic failure, multi organ failure, Gastrointestinal tract and neurosurgery.		
Outcome 5	**Justify the generalized view on necessity of proper diet**	**K5**

Suggested Readings:

Sri Lakshmi, B. (2016). *Dietetics*, New Age International Pvt Ltd, New Delhi.

Vipul, K., Neelam, K., Sudha, K. (2021). *Normal and Therapeutic Nutrition*, Generic Publisher.

Subhadra, M., & Subbulakshmi, G. 2020. *Nutrition in Traditional Therapeutic Foods*, Vol. 2, Daya Publishing House.

Staci, N.M. (2016). *Williams' Basic Nutrition & Diet Therapy*, First South Asia Edition, Elsevier India Publisher.

Sylvia, E.S. (2015). *Nutrition and Diagnosis-Related Care*. 8th Edition, Wolters Kluwer.

Krause, M.V., & Mahan, L.K. (2016). *Food, Nutrition and Diet therapy*, 14th Edition, W.B. Saunders Co, Philadelphia.

Robinson, C.H. (2015). *Normal and Therapeutic nutrition*, 12th Edition, Macmillan Publishing Co. Inc, New York.

Neil, L. (2021). *Diet Therapy in Advanced Practice Nursing*, Medicare Health Science.

Web Resources:

https://www.ijsr.net/archive/v2i5/IJSRON20131026.pdf
https://www.slideshare.net/primary/role-of-dieticians
https://www.slideshare.net/specialclass/fever-id-diet-final
https://www.lybrate.com/topic/diet-in-fever
https://uomustansiriyah.edu.iq/media/lectures/2/2_2019_04_26!12_36_47_PM.pdf
https://www.slideshare.net/NileshJadhav50/diet-in-kidney-disease-patients
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6723806/
https://www.slideshare.net/AmrHasanNeuro/neurometabolic-disorders
https://www.youtube.com/watch?v=2KHUFPAzxQs

K1- Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Course designed by: Dr.P.Rameshthangam

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S (3)	L (1)	M (2)	L (1)	M (2)	M (2)	L (1)	L (1)	M (2)	L (1)
CO2	S (3)	M (2)	M (2)	M (2)	M (2)	L (1)	M (2)	M (2)	L (1)	L (1)
CO3	L (1)	M (2)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	M (2)	M (2)
CO4	M (2)	L (1)	M (2)	L (1)	L (1)	M (2)	M (2)	M (2)	L (1)	L (1)
CO5	L (1)	M (2)	M (2)	M (2)	M (2)	L (1)	M (2)	L (1)	M (2)	M (2)
W.AV	**2.0**	**1.6**	**1.8**	**1.6**	**1.6**	**1.4**	**1.6**	**1.4**	**1.6**	**1.4**

S (3) - Strong, M (1) - Medium, L (1) -Low

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M (2)	L (1)	M (2)	L (1)	L (1)
CO2	M (2)	L (1)	L (1)	L (1)	M (2)
CO3	M (2)	M (2)	L (1)	M (2)	M (2)
CO4	L (1)	L (1)	M (2)	L (1)	L (1)
CO5	M (2)	M (2)	M (2)	L (1)	M (2)
W.AV	**1.8**	**1.4**	**1.6**	**1.2**	**1.6**

S (3) - Strong, M (1) - Medium, L (1) -Low

SEMESTER III					
Core	**Course code: 558302**	**DIETETICS IN LIFE STYLE DISEASES**	**T**	**Credits: 5**	**Hours : 5**

Unit - I

Objective 1	**To understand the principles of diet therapy to stress management.**	
DIET IN STRESS MANAGEMENT Stress – definition, types, psychosomatic disorders due to stress and functional adjustment. Biological effects of stress on various systems - brain, cardiovascular system, Respiratory system, non-vital organs and immune system. Stress enhancing foods, anti-stress foods and nutrients. Dietary guidelines for the management of stress.		
Outcome 1	**Acquired knowledge on application of proper diet to reduce the stress of patients.**	**K2**

Unit - II

Objective 2	**Learn about dietetics in weight management.**	
DIET IN WEIGHT MANAGEMENT Nutrition for weight management -components of body weight, adipose tissue and regulation of body weight. Obesity-assessment, types, causes and complications. Weight reduction techniques-dietary management, surgical management, lifestyle modification. Underweight-causes, complications and dietary management.		
Outcome 2	**Reframe the daily dietary requirements to maintain good health.**	**K3**

Unit - III

Objective 3	**To gain knowledge on the diets used for diabetics.**	
DIET IN DIABETES Diabetes mellitus - Classification, causes, diagnosis, symptoms and complications. Management of diabetes-dietary management, artificial sweeteners, diet and insulin and lifestyle management. Diabetes Insipidus & Gestational diabetes – causes, complications. Prevalence, Dietary and life style management.		
Outcome 3	**Able to Prepare diets for diabetes management.**	**K3**

Unit - IV

Objective 4	**To Understand the role of diet in avoiding cardiovascular diseases.**	
DIET IN CARDIOVASCULAR DISEASES Hypertension: classification, causes, complications and dietary management. Atherosclerosis-disease progression, causes, symptoms and clinical findings. Management-dietary and lifestyle. Dietary management in angina pectoris, myocardial infarction and cardiac failure. Cardiovascular diseases - Risk factors, dyslipidemia and hypercholesterolemia, Nutritional Risk Factors.		
Outcome 4	**Illustrate various modified diets for cardiovascular diseases.**	**K2**

Unit - V

Objective 5	**To Study the dietetics related to cancer and other neuromuscular disorders.**	
DIET IN CANCER AND MUSCULO SKELETAL SYSTEM Cancer - Classification, development of cancer, risk factors-environmental, hereditary & nutritional. Nutritional problems of cancer therapy-dietary management. Role of food in the prevention of cancer. Cachexia, energy metabolism, substrate metabolism. Cancer therapy-		

chemotherapy, radiation therapy, surgery, Immuno therapy and bone marrow transplantation. Musculo skeletal system, Hyperkinetic Behaviour Syndrome, Etiology, dietary treatment in above conditions.

Outcome 5	**Evaluate the role of diets to reducing the risk factors associated with cancer and neuromuscular system.**	**K5**

Suggested Readings:

Chuong, P.H., & Bruno, P.H. (2022). *Food and Life Style in Healthy and Diseases*, CRC Press Publishers.

Veena, S., & Kalyani, S. (2021). *Principles of medical nutrition therapy for positive clinical outcomes*, Elite Publishing House.

Elena, G. (2020). *Immune System, Diet and Life style*, *The best Foods, Drinks, Natural Remedies and Holistic Recipes to stay healthy and preventive diseases*, Your wellness books publishers.

Kaveri, C. (2020). *Text book of nutrition in health and disease*, Springer Publishers, 1st Edition.

Angela, W. (2020). *Case Studies in personalized nutrition*, Singing Dragon Publishers.

Hans, K.B. (2018). *Sustainable Nutrition in a changing world*, Springer Publisher, 1st Edition.

Judith, L. B., Ailsa, A. W., John, M. K., Susan, A. L. (2017). - *Public Health Nutrition*, 2nd Edition.

William's. (2016). *Basic Nutrition and Diet therapy*, First South Asia Edition, Elsevier India Publishers.

James. M.R. (2016). *Nutrition in Life Style Medicine*, 1st Edition, Humana Publisher.

Louise, G., Pamela, D. (2015). *Advanced Nutrition and Dietetics in Diabetes*. Wiley Blackwell.

Web Resources:

https://www.slideshare.net/DrTarunaYadav/stress-management-with-nutrition-and-herbs-1
https://slideplayer.com/slide/7679235/
https://www.slideshare.net/nutritionistrepublic/weight-management-25913535
https://acewebcontent.azureedge.net/continuingeducation/courses/support_items/SPCERT-WM/WMSpecCert_Mod5_Nutrition_NMuth.pdf
https://slideplayer.com/slide/2701866/
https://www.slideshare.net/MohammedOsmanYahyaYahya/nutrition-23
https://www.cancer.org/content/dam/CRC/PDF/Public/6711.00.pdf
https://www.slideshare.net/EmbracingNutrition/cancer-nutrition
https://www.youtube.com/watch?v=jcTTVut78YQ

K1- Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Course designed by: Dr.P.Rameshthangam

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M (2)	L (1)	M (2)	L (1)	M (2)	M (2)	L (1)	L (1)	M (2)	L (1)
CO2	M (2)	L (1)	M (2)	M (2)	L (1)	L (1)	M (2)	M (2)	L (1)	M (2)
CO3	L (1)	M (2)	L (1)	M (2)	M (2)	L (1)	L (1)	M (2)	L (1)	L (1)
CO4	M (2)	L (1)	M (2)	L (1)	L (1)	M (2)	M (2)	L (1)	L (1)	L (1)
CO5	M (2)	M (2)	M (2)	L (1)	M (2)	S (3)	L (1)	M (2)	M (2)	M (2)
W.AV	**1.6**	**1.4**	**1.8**	**1.4**	**1.6**	**1.8**	**1.4**	**1.6**	**1.6**	**1.4**

S (3) - Strong, M (1) - Medium, L (1) -Low

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M (2)	L (1)	M (2)	L (1)	M (2)
CO2	M (2)	L (1)	L (1)	L (1)	L (1)
CO3	M (2)	M (2)	L (1)	L (1)	M (2)
CO4	L (1)	L (1)	M (2)	L (1)	L (1)
CO5	M (2)	M (2)	M (2)	M (2)	M (2)
W.AV	**1.8**	**1.4**	**1.6**	**1.2**	**1.6**

S (3) - Strong, M (1) - Medium, L (1) -Low

III Semester					
Core	**Course Code: 558303**	**RESEARCH METHODOLOGY & BIOSTATISTICS**	**T**	**Credits:5**	**Hours: 5**

Unit - I

Objective 1	To understand some basic concepts of research and its methodologies	

Research Methods

Definition of research, role and objectives of research, applications and types of research, research process and steps in it. Collecting and reviewing the literature, conceptualization and Formulation of a research problem, identifying variables, constructing hypothesis, Synopsis. Research Design and Design of Sample Survey. Measurement of Scaling Concepts, Data Collection & Analysis, Report writing.

Outcome 1	Create skills in qualitative and quantitative data analysis and presentation	**K1**

Unit – II

Objective 2	To Learn about microscopic and spectroscopic techniques

Microscopy Techniques

Light Microscopy: Microscopic optics, components of microscope, Basic principles and methods of Fluorescence, Confocal Microscopy, Transmission Electron Microscopy, Scanning Electron Microscope, Atomic Force Microscopy.

Spectroscopy Techniques

Introduction to Spectroscopic Methods- Infrared Spectrometry, Nuclear Magnetic Resonance Spectroscopy, Molecular Mass Spectroscopy.

Outcome 2	Demonstrate basic skills on analytical methods	**K2**

Unit – III

Objective 3	To understand the basic concepts of chromatography and electrophoresis techniques

Chromatography: Principles and applications of gel filtration, ion exchange and affinity chromatography, thin layer and gas chromatography, high-pressure liquid chromatography (HPLC).

Electrophoresis: PAGE, SDS – PAGE and Agarose gel electrophoresis. Isoelectric focusing (IEF), 2D Electrophoresis.

Outcome 3	Create knowledge on separation techniques	**K6**

Unit – IV

Objective 4	To Gain knowledge on molecular biology techniques

Molecular Biology Techniques: Isolation and amplification of nucleic acid – Plasmid isolation, Quality and quantity checking of DNA by UV Spectrometry. Polymerase Chain Reaction (PCR)-Principles, Types and applications. Blotting Techniques (Southern, Northern and Western blot), Hybridization.

Molecular Tools for Analysis of Genome: Principles and applications of RFLP, RAPD, AFLP and DNA fingerprinting. Principle and applications of DNA sequencing.

Outcome 4	Get clear knowledge about molecular biology tools	**K4**

Unit – V		
Objective 5	To Inculcates statistical methods in biological research	
Quantitative Methods (Biostatistics) Principles and practice of statistical methods in biological research, basic statistics, data collection, significance tests, Students t-test, Analysis of variance-ANNOVA, correlation regression, chi – square test, and Duncan's multiple tests. Identifying Groups- Factor analysis and cluster analysis (eg., SPSS).		
Outcome 5	Emphasize the role of statistical methods in biological research	**K2**

Suggested Readings:

Ranjit, K. (2009). *Research Methodology, A step by step guide for beginners*, Pearson Education, 6th Edition.

Kothari, C.R. (2008). *Research Methodology*, *Methods and Techniques*, 2nd Edition, New Age International Publication.

Krishna Swamy, K.N., Siva Kumar, A.I., Mathirajan, M., (2006). *Management Research Methodology*, Pearson Education, New Delhi.

Susan, R., Mikkelsen & Eduardo Corton. (2004). *Bioanalytical Chemistry*, Wiley Inter science.

Sambrrok, J. & Russell, D.W. (2003). *Molecular Cloning-A laboratory Manual*, 3rd Edition, Vol.1, 2 and 3), Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York.

Cooper, D., Schindler, P. (2003). *Business research methods*, Tata Mc-Graw Hill, New Delhi.

Mark, S., Philip, L., Adrain, T. (2001). *Research Methods for Business Students*, Pearson Education.

Ram, A. (2001). *Research Methods*, Rawat Publications, New Delhi.

Palanivelu, P. (2000). *Laboratory manual for analytical biochemistry and separation techniques*, Publisher -Madural Kamaraj University.

Bhattacharyya, G. K., & R. A. Johnson. (1997). *Statistical Concepts and Methods*, John Wiley and Sons, New York.

Berenson, M.L., & Levine, D.M. (1996). *Basic Business Statistics*, Prentice-Hall, Englewood Cliffs, New Jersey.

Web Resources:

https://www.udc.ac.in/udc_staff/documents/downlaods/RESEARCH_METHODOLOGY.pdf

https://cw.fel.cvut.cz/b172/_media/courses/a6m33zsl/microscopic_techniques.pdf

https://www.su.se/polopoly_fs/1.521101.1602178917!/menu/standard/file/Introduction%20to%20Spectroscopy.pdf

https://www.whitman.edu/chemistry/edusolns_software/GC_LC_CE_MS_2017/CH%201%202017.pdf

https://www.protein.iastate.edu/docs/542E.pdf

http://staff.cs.psu.ac.th/sathit/research/IntroSRM.pdf

K1- Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Course designed by:Dr.P.Rameshthangam

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L (1)	M (2)	L (1)	M (2)	M (2)	L (1)	L (1)	M (2)	L (1)	L (1)
CO2	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)
CO3	L (1)	L (1)	M (2)	L (1)	M (2)	L (1)	L (1)	M (2)	L (1)	M (2)
CO4	L (1)	L (1)	L (1)	M (2)	L (1)	M (2)	L (1)	L (1)	M (2)	L (1)
CO5	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)
W.AV	**1.0**	**1.2**	**1.4**	**1.6**	**1.4**	**1.2**	**1.2**	**1.6**	**1.2**	**1.2**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L (1)	M (2)	L (1)	L (1)	M (2)
CO2	L (1)	M (2)	L (1)	L (1)	L (1)
CO3	L (1)	L (1)	L (1)	L (1)	L (1)
CO4	L (1)	L (1)	M (2)	L (1)	L (1)
CO5	L (1)	L (1)	L (1)	M (2)	L (1)
W.AV	1.0	1.4	1.2	1.2	1.2

S –Strong (3), M-Medium (2), L- Low (1)

SEMESTER III					
Core	**Course code: 558304**	**Lab. III: CLINICAL AND THERAPEUTIC NUTRITION, DIETETICS IN LIFE STYLE DISEASES & RESEARCH METHODOLOGY**	**P**	**Credits:4**	**Hours :6**

Unit - I

Objective 1	**To familiarize with the fundamental of hospital diets.**

CLINICAL AND THERAPEUTIC NUTRITION

17) Preparation of hospital diets - routine hospital diets, regular diet, soft diet, full fluid diet and tube feeding blends.

Outcome 1	**Learners get practical knowledge in the hospital diets.**	**K3**

Unit - II

Objective 2	**To provide knowledge about the menu planning and preparation for febrile condition and gastrointestinal disorders.**

CLINICAL AND THERAPEUTIC NUTRITION

Menu planning and preparation for the following conditions

1. Febrile conditions - Acute & chronic fevers – typhoid, tuberculosis.

18) Peptic ulcer, gastritis, diarrhea

19) Constipation, malabsorption syndrome.

Outcome 2	**Students acquired practical knowledge on the preparation of menu for febrile condition and gastrointestinal disorders.**	**K4**

Unit - III

Objective 3	**To get practice on menu planning and preparation for various disease conditions.**

CLINICAL AND THERAPEUTIC NUTRITION

Menu planning and preparation for the following conditions

1) Cirrhosis, hepatitis, cholelithiasis and pancreatitis.
2) Hypothyroidism, hyperthyroidism, gout, phenyl ketonuria, Lactose intolerance.
3) Atherosclerosis, hypercholesterolemia, hypertension, myocardial infarction, Cancer.

Outcome 3	**Learners are able to perform menu planning and preparation for various disease conditions.**	**K4**

Unit - IV

Objective 4	**To learn about planning and preparing a diet for life style diseases.**

DIETETICS IN LIFE STYLE DISEASES

Menu planning and preparation for the following conditions

1) Diabetes mellitus and Gestational Diabetes.
2) Obesity and underweight
3) Glomerulonephritis, nephrosis, Urolithiasis.

Outcome 4	**Students are able to evaluate the life style disease and planning a diet accordingly.**	**K5**

Unit - V

Objective 5	**To acquire knowledge of the practical applications on research methodology.**

RESEARCH METHODOLOGY

1) Isolation and amplification of nucleic acid – Plasmid isolation.
2) Quality and quantity checking of DNA by UV Spectrometry.
3) Amplication of DNA Polymerase Chain Reaction (Demo)
4) Isolation and Separation of Protein by SDS-PAGE.

Outcome 5	Able to discuss the quality and quantity checking of protein and nucleic acid	K6

Suggested Readings:

Chuong, P.H., & Bruno, P.H. (2022). *Food and Life Style in Healthy and Diseases*, CRC Press Publishers.

Veena, S., & Kalyani, S. (2021). *Principles of medical nutrition therapy for positive clinical outcomes*, Elite Publishing House.

Vipul, K., Neelam, K., Sudha, K. (2021). *Normal and Therapeutic Nutrition*, Generic Publisher.

Judith, L. B., Ailsa, A. W., John, M. K., Susan, A. L. (2017). - *Public Health Nutrition*, 2nd Edition.

William's. (2016). *Basic Nutrition and Diet therapy*, First South Asia Edition, Elsevier India Publishers.

Staci, N.M. (2016). *Williams' Basic Nutrition & Diet Therapy*, First South Asia Edition, Elsevier India Publisher.

Robinson, C.H. (2015). *Normal and Therapeutic nutrition*, 12th Edition, Macmillan Publishing Co. Inc, New York.

Ranjit, K. (2009). *Research Methodology, A step by step guide for beginners*, Pearson Education, 6th Edition.

Sambrrok, J. & Russell, D.W. (2003). *Molecular Cloning-A laboratory Manual*, 3rd Edition, Vol.1, 2 and 3), Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York.

Mark, S., Philip, L., Adrain, T. (2001). *Research Methods for Business Students*, Pearson Education.

Web Resources:

https://egyankosh.ac.in/handle/123456789/72577
https://uou.ac.in/sites/default/files/slm/MAHS-07.pdf
https://www.sierra-view.com/documents/menuDocs/2018CLINICALDIETMANUAL.pdf
https://apps.who.int/iris/bitstream/handle/10665/42665/WHO_TRS_916.pdf?sequence=1
https://ccsuniversity.ac.in/bridge-library/pdf/Research-Methodology-CR-Kothari.pdf
https://uh-ir.tdl.org/handle/10657/8138

K1- Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Course designed by:Dr.P.Rameshthangam

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M (2)	L (1)	L (1	M (2)	L (1)	M (2)	L (1)	L (1)	M (2)	L (1)
CO2	M (2)	M (2)	L (1)	L (1)	L (1)	M (2)	M (2)	L (1)	L (1)	M (2)
CO3	M (2)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)
CO4	M (2)	L (1)	M (2)	M (2)	M (2)	M (2)	M (2)	M (2)	M (2)	M (2)
CO5	L (1)	L (1)	L (1)	L (1)	M (2)	M (2)	L (1)	M (2)	M (2)	L (1)
W.AV	**1.8**	**1.2**	**1.2**	**1.6**	**1.4**	**1.8**	**1.4**	**1.6**	**1.6**	**1.4**

S–Strong(3),M-Medium(2),L-Low(1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M (2)	L (1)	L (1)	L (1)	M (2)
CO2	M (2)	L (1)	L (1)	L (1)	M (2)
CO3	L (1)	L (1)	L (1)	M (2)	L (1)
CO4	S (3)	M (2)	M (2)	L (1)	M (2)
CO5	M (2)	L (1)	M (2)	L (1)	M (2)
W.AV	**2.0**	**1.2**	**1.4**	**1.2**	**1.8**

S–Strong(3),M-Medium(2),L-Low(1)

SEMESTER III					
DSE	**Course code : 558505**	**PAEDIATRIC NUTRITION**	**T**	**Credits: 4**	**Hours:4**
Unit - I					
Objective 1	**To familiarize about thenutrition of infants and the childhood immunization schedule**.				
NUTRITION IN INFANCY AND IMMUNIZATION SCHEDULES Infancy - Physiological development, assessment of nutritional status. Anthropometric measurements, biochemical parameters, clinical & dietary data of infants. Nutritional and food requirements for infants. Immunization schedule during infancy and childhood.					
Outcome1	**Learners Guide the immunization of infants to the parous mothers in the community**..				**K3**
Unit - II					
Objective 2	**To provide knowledge about the nutritional management of infants and ailments of newborn**				
NUTRITIONAL MANAGEMENT OF INFANTS AND NEWBORN SICKNESS Nutritional management of premature baby, low birth weight babies and children with developmental disabilities. Infant lactation- Characteristics, causes and complications, feeding methods, growth and nutritional assessment of infant's lactation. Identification of newborn sickness-Detection of abnormal signs- cyanosis, jaundice, respiratory distress. Bleeding, seizures, refusal and feed, abdominal distention, failure to pass meconium and urine of sick newborn.					
Outcome 2	**Students able to understand the nutritional management for infants and young children.**				**K2**
Unit - III					
Objective 3	**To educate about the importance of nutritional care and nourishment of children**.				
CLINICAL NUTRITION IN INFANTS - MALNUTRITION Nutritional management in malnutrition -Protein–energy malnutrition (PEM). Anaemia, scurvy, rickets, vitamin A deficiency. Childhood Obesity – Causes and Complications. Underweight and overweight nutrition- short term and long-term consequences in infants					
Outcome 3	**Learners able to apply the curing of malnutrition in infants through clinical nutrition.**				**K3**
Unit - IV					
Objective 4	**To learn about clinical nutrition in infants and other clinical conditions.**				
CLINICAL NUTRITION IN INFANTS – OTHER CLINICAL CONDITIONS Nutritional management of GI Disturbances – Constipation, Diarrhoea. Nutritional management of Typhoid, TB and hepatitis of infants. Nutritional management of Renal disorders. Nutritional management of cardiovascular diseases					
Outcome 4	**Students are able to analyze the Nutritional management of communicable diseases through clinical nutrition.**				**K4**

Unit - V		
Objective 5	**To provide knowledge on the nutritional management of children with special conditions**	

NUTRITIONAL MANAGEMENT FOR CHILDREN WITH SPECIAL CONDITIONS

Lactose intolerance, celiac disease, inflammatory bowel disease, fat absorption test diet of children. (Calculation of fluids & electrolytes-both deficit and maintenance and management of calorie intake). Nutritional management for children with special conditions - Autism and ADH (Attention Deficit Hyperactivity disorder), epilepsy and AIDS. Measuring, recording and plotting growth of children. Recent advances and research in the field of pediatric nutrition.

Outcome 5	**Students are able to evaluate the appropriate nutrition management for children with special condition.**	**K5**

Suggested Readings:

Elizabeth, K.E. (2022). *Nutrition and Child Development*, 6th Edition, Paras Medical Publisher.

Maya, B, William, W., Hay, Jr., Myron, J. L. (2022). *Current Diagnosis & Treatment Pediatrics*, 26th Edition, McGraw Hill / Medical Publishers.

Praveen, S., Goday., Cassandra, W. (2022). *Pediatric Nutrition for Dietitians*, CRC Press Publisher.

Gunasekaran, D. (2021). *Growth and Nutrition in Children,* 1st Edition, Paras Medical Books Pvt. Ltd Publisher.

Atul, C. (2018). *Concepts in Pediatrics*, Nutrition, IP Innovative Publication Pvt. Ltd.

Sharma, M. (2017). *Basic Pediatric Nutrition*, Jaypee Brothers Medical Publishers.

Pooja, G. (2017). *Food, Nutrition and Health*, S Chand Publishing, India.

Koletzko, B. (2015). *Pediatric Nutrition in Practice*, World Review of Nutrition and Dietetics Book 113, 2nd revised Edition, S. Karger Publisher.

Sibal, A. (2015). *Textbook of Pediatric Gastroenterology, Hepatology and Nutrition*, Jaypee Brothers Medical Publishers; 1st Edition.

Web Resources:

https://www.chla.org/sites/default/files/migrated/Chapter1_NutritionalNeeds.pdf
https://www.euro.who.int/__data/assets/pdf_file/0004/98302/WS_115_2000FE.pdf
https://www.slideshare.net/wajihahwafa/infant-nutrition-59143887
https://www.lybrate.com/topic/typhoid-diet-chart
https://www.medindia.net/patients/lifestyleandwellness/diet-during-typhoid.htm
https://www.slideshare.net/AlHijab1/typhoid-fever-111800447

K1- Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Course designed by: Dr.P.Rameshthangam

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M (2)	S (3)	S (3)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)
CO2	M (2)	M (2)	M (2)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)
CO3	S (3)	M (2)	M (2)	M (2)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)
CO4	S (3)	M (2)	M (2)	M (2)	M (2)	M (2)	L (1)	L (1)	L (1)	L (1)
CO5	M (2)	M (2)	M (2)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
W.AV	**2.4**	**2.2**	**2.2**	**1.6**	**1.6**	**1.4**	**1**	**1**	**1**	**1**

S–Strong(3),M-Medium(2),L-Low(1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M (2)	M (2)	L (1)	L (1)	L (1)
CO2	L (1)	M (2	M (2	L (1)	L (1)
CO3	L (1)	M (2)	L (1)	L (1)	L (1)
CO4	L (1)	M (2	L (1)	L (1)	L (1)
CO5	L (1)	L (1)	L (1)	L (1)	L (1)
W.AV	**1.6**	**1.8**	**1.2**	**1**	**1**

S–Strong(3),M-Medium(2),L-Low(1)

III Semester					
DSE	**Course Code: 558506**	**BIOTECHNOLOGY IN FUNCTIONAL FOODS AND NUTRACEUTICALS**	**T**	**Credits:4**	**Hours: 4**

Unit - I

Objective 1	To infer knowledge about the recent trends in food processing technology

FOOD PROCESSING TECHNOLOGY

Introduction to food biotechnology; Fermentation Technology – batch and continuous process, fermenter design, bioprocess control. Enzymes in food industry–Soluble enzymes, immobilized enzymes, amylase, invertase, isomerase – Synthesis, process and applications in food industries. Single cell protein (SCP) –Production of microbial protein. SCP – substrates, nutritional value. Culture and process – spirulina, mushroom and yeast biomass production. Regulatory aspects of biotechnology –Downstream processing, biosensors, biochips. Impact of biotechnology on the nutritional quality of foods.

Outcome 1	Imparting knowledge on food processing technology and create employment opportunities	**K1**

Unit – II

Objective 2	To gain knowledge on the role of Functional foods and Nutraceuticals in health.

FUNCTIONAL FOODS, PREBIOTICS AND PROBIOTICS

Definition, history, classification of functional foods: Prebiotics - sources and bioavailability, effect of processing, effects on human health and potential applications in risk reduction of diseases, perspective for food applications for the following: Non-digestible carbohydrates/oligosaccharides: Dietary fibre, Resistant starch, Gums. Probiotics and synbiotic; Nutrient vs. Non-nutrient. Probiotics - Taxonomy and important features of probiotic micro- organisms. Health effects of probiotics including mechanism of action. Probiotic micro- organisms in fermented milk products and non-milk products. Quality assurance of probiotics and safety.

Outcome 2	Appraises the importance of prebiotics and probiotics.	**K2**

Unit – III

Objective 3	To learn about plant metabolites and non-nutrient effect of specific nutrients.

PLANT METABOLITES AND NON- NUTRIENT EFFECT OF SPECIFIC NUTRIENTS

Alkaloids, Glucosinolates, Terpenoides and Phenolics- Chemistry, classes, sources, bioavailability and effects on human health. Antinutrients present in food: Phytate, saponin, haemagglutinins. Inhibitors - protease, amylase and lipase. Spices and Condiments- nutritive value and its uses in cooking. Supplementary effect of specific nutrients: Proteins, Peptides and nucleotides, Conjugated linoleic acid and n-3 fatty acids, Natural antioxidants.

Outcome 3	Relate the plant metabolites and non-nutrient effects of specific nutrients.	**K6**

Unit – IV		
Objective 4	Tounderstand the nutraceuticals sources, mechanism of action and chemical nature.	
PROPERTIES, STRUCTURE AND FUNCTIONS OF NUTRACEUTICALS Introduction to nutraceuticals as science - Historical perspective, classification, scope & future prospects. Applied aspects of the nutraceutical science**:** Sources of Nutraceuticals. Relation of Nutraceutical Science with other Sciences: Medicine, Human physiology, genetics, food technology, chemistry and nutrition. Properties, structure and functions of various nutraceuticals - Glucosamine, Octacosanol, Lycopene, Carnitine, Melatonin and Ornithine alpha ketoglutarate. Use of Proanthocyanidins, grape products, flaxseed oil as Nutraceuticals.		
Outcome 4	Associate the health benefits of nutrient supplements.	**K4**
Unit – V		
Objective 5	To study the nutraceuticals supplements and remedies.	
NUTRACEUTICAL SUPPLEMENTS AND REMEDIES FOR VARIOUS DISEASE CONDITIONS Nutraceutical rich supplements- Bee pollen, Caffeine, wheat grass, Lecithin, Mushroom extract, Chlorophyll, Kelp and Spirulina. Green tea, grape tea, and Blue Tea. *Garcinia cambogia* and *Aloe vera.* Food as remedies: Nutraceuticals bridging the gap between food and drug. Medicinal plant derived nutraceuticals: Anti aging, anti-inflammatory compounds. Nutraceutical remedies for Arthritis and Bone disorders, Bronchitis, circulatory problems, Diabetes, Nephrological disorders, Liver disorders, Neurological disorders, Psoriasis and related skin disease and GI complications.		
Outcome 5	Recommends the different nutraceutical remedies for treating various diseases.	**K2**

Suggested Readings:

Kalidas, S., &Dipayan, S. (2020). *Functional Foods and Biotechnology*: *Biotransformation and Analysis of Functional Foods and Ingredients*, CRC Press Publisher.

Robert, E.C., Wildman, R.S., Bruno.(2019). *Handbook of Nutraceuticals and Functional Foods,* Routledge Publisher, 3rd Edition.

Xingqian, Y.(2017). *Phytochemicals in Citrus: Applications in Functional Foods*, CRC Press Publishers, 1stEdition.

Webb, G.P. (2016). Dietary Supplements and Functional Foods, Blackwell Publishing Ltd, New York.

Debasis, B., &Sreejayan, N.(2016). *Developing New Functional Food and Nutraceutical Products*, Academic Press; 1st Edition.

Dhiraj, A.V.,&Vatsala, M.(2016). *Functional Foods, Nutraceuticals and Natural Products*, *Concepts and Applications*, DEStech Publications, Inc.

John, S.(2015). *Functional Food Ingredients and Nutraceuticals*, Processing

Technologies, 2nd Edition, CRC Press.
Sukhcharm, S., Riar, C.S., Saxena, D.C. (2015). *Functional Foods and Nutraceuticals*: Sources *and Their Developmental Techniques*, New India Publishing Agency.
Joyce, I. B.(2015). *Nutraceutical and Functional Food Processing Technology*, IFST Advances in Food Science, Wiley-Blackwell.
Tamine, A. (2015).*Probiotic Dairy Products*, Blackwell Publishing Ltd, United Kingdom
Debasis, B., Anand, S., &Manashi, B. (2015). *Genomics, Proteomics and Metabolomics in Nutraceuticals and Functional Foods*, Wiley; 2nd Edition.
Ravishankar, R.V. (2015). *Advances in Food Biotechnology*, Wiley-Blackwell.

Web Resources:

https://www.webpal.org/SAFE/aaarecovery/2_food_storage/Food%20Processing%20Technology.pdf
https://www.pdfdrive.com/food-processing-technology-principles-and-practice-2nd-edition-woodhead-publishing-in-food-science-and-technology-e185126859.html
https://juniperpublishers.com/artoaj/pdf/ARTOAJ.MS.ID.555884.pdf
https://www.semanticscholar.org/paper/Functional-foods-%3A-probiotics-and-prebiotics-Gibson/6123048d1dbe88e0f5d28874c915f53d6add6a49
http://www.jnkvv.org/PDF/11042020204520primary%20and%20secondary%20metabolites%20and%20their%20applications%20(3%20files%20merged).pdf
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3550857/

K1- Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Course designed by: Dr.P.Rameshthangam

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M (2)	M (2)	L (1)	M (2)	M (2)	L (1)	L (1)	M (2)	L (1)	L (1)
CO2	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)
CO3	L (1)	L (1)	M (2)	L (1)	M (2)	L (1)	L (1)	M (2)	L (1)	M (2)
CO4	L (1)	L (1)	L (1)	M (2)	L (1)	M (2)	L (1)	L (1)	M (2)	L (1)
CO5	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)
W.AV	**1.0**	**1.2**	**1.4**	**1.6**	**1.4**	**1.2**	**1.2**	**1.6**	**1.2**	**1.2**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L (1)	M (2)	L (1)	L (1)	M (2)
CO2	L (1)	M (2)	L (1)	L (1)	L (1)
CO3	L (1)	L (1)	L (1)	L (1)	L (1)
CO4	L (1)	L (1)	M (2)	L (1)	L (1)
CO5	L (1)	L (1)	L (1)	M (2)	L (1)
W.AV	1.0	1.4	1.2	1.2	1.2

S –Strong (3), M-Medium (2), L- Low (1)

SEMESTER IV				
Core	**Course code : 558401**	**DISSERTATION**	**Credits: 17**	**Hours:30**

Objectives: To provide knowledge about the basics of research theory and techniques and understand how to do a literature review and how to appraise the literature to address questions**.**

Preliminary

1. Title Page- title, Authors Name
2. Certificate of Originality by the Guide
3. Declaration by the Author
4. Table of Contents
5. List of Tables
6. List of Figures
7. Acknowledgement
8. Abstract

- **Format to be followed for dissertation/project report**

  I. Introduction: Statement of the Problem, Significance, Need for the Study, Objectives, and Definitions.
  II. Review of Literature
  III .Methodology: Tools used, Procedures, Hypothesis.
  IV. Results and Discussion: Tables and Figures, Statistical Presentations, Hypothesis Testing.
  V. Summary and Conclusion
  VI. Suggestion for the Future Study
  VII.References

Outcomes: Learners acquire in-depth knowledge about work-based research projects at postgraduate level.

SEMESTER II					
NME	**Course code: 558701**	**Basics of Human Nutrition**	**T**	**Credits: 2**	**Hours : 3**
Unit - I					
Objective 1	**To familiarize about the importance of nutrition in health and well-being.**				
Basic Concept of Health - Health: definition, importance of health, malnutrition: under nutrition, over nutrition, factors associated with malnutrition: prevalence, dietary recommendations, RDA- ICMR. Functions of food: food groups, classification of food groups. Interaction between food and health: Role of food in health promotion.					
Outcome 1	**Students able to understand the basic concepts of health and food**.				**K2**
Unit - II					
Objective 2	**To educate the concept of macro nutrients.**				
Macro Nutrients - Nutrients: definition, classification, macronutrients: Carbohydrates: functions, requirements, food sources, deficiencies and recommended intake. Proteins: functions, requirements, food sources, deficiencies and recommended intake. Fats: functions, requirements, food sources, deficiencies and recommended intake.					
Outcome 2	**Students acquire knowledge on the Concept of macronutrients.**				**K2**
Unit - III					
Objective 3	**To obtain knowledge about Micronutrients**				
Micronutrients: Vitamins and minerals: Fat soluble vitamins: functions, requirements, food sources, deficiencies and recommended intake. **Water soluble vitamins**: functions, requirements, food sources, deficiencies and recommended intake. **Macro minerals:** functions, requirements, food sources, deficiencies and recommended intake. **Micro minerals:** Functions, requirements, food sources, deficiencies and recommended intake.					
Outcome 3	**Learners acquire knowledge on Micronutrients in health.**				**K2**
Unit - IV					
Objective 4	**To provide knowledge on planning dietary management for different age groups.**				
Life Cycle Nutrition - Nutritional needs, nutritional deficiencies, RDA and dietary measures for the following groups: Infancy, Pre-school, School going, Adolescents, Pregnancy, Lactation, Adulthood and old age.					
Outcome 4	**Students able to interpret the nutritional needs in each stage of human life**. .				**K5**
Unit - V					
Objective 5	**To familiarize with nutrition for sports, space travel and old age.**				
Communicable And Non-Communicable Diseases: causes, symptoms, risk factors, consequences, dietary management, Epidemiology, Prevalence Source of infection, Vaccination schedule, Preventive measures, diet therapy. Communicable diseases:					

Typhoid, tuberculosis, cholera, chicken box, hepatitis, SARS, and covid-19. Non-communicable diseases: Hypertension, CVD, cancer, renal disorders, liver disorders.

Outcome 5	Learners acquire knowledge on Communicable and non-communicable disease.	K2

Suggested Readings:

Susan, A. L., Thomas, R.H., Alison, M.G., Hester, H. V.(2019). *Introduction to Human Nutrition*, The Nutrition Society Textbook, 3rd Edition, Wiley-Blackwell.

Srilakshmi, B. (2011). *Dietetics*, 6th Edition, New age Publishing Press, New Delhi.

Stacy, N., & William's. (2005). *Basic Nutrition and Diet Therapy*, 12th Edition, Elsevier publications, UK.

Mahan, L.K., Stump, S.E., Raymond, J.L. (2012). *Krause's Food and Nutrition Care Process*, 13th Edition, Elsevier Saunders, Missouri.

Barasi, M. (2003). *Human nutrition: A health perspective*, CRC Press.

Roday, S. (2007). *Food science and Nutrition*, Oxford University press, New Delhi.

Mahan, L.K., Stump, S.E., Raymond, J.L. (2012). *Krause's Food and Nutrition Care Process*, 13th Edition, Elsevier Saunders, Missouri.

Robinson, C.H. (2010). *Normal and therapeutic nutrition*, Oxford and IBH publishing company, Bombay.

Web Resources:

https://www.gfmer.ch/GFMER_members/pdf/Concept-health-Rai-2016.pdf

https://acewebcontent.azureedge.net/continuingeducation/courses/support_items/OLC-NHP-10/Nutrients.pdf

https://lpi.oregonstate.edu/sites/lpi.oregonstate.edu/files/pdf/mic/micronutrients_for_health.pdf

http://213.55.90.4/admin/home/Dmu%20Academic%20Resource//Health%20Science/Nutrition%20and%20Food%20Science/2nd%20Year/Nutrition%20Throughout%20the%20Life%20Cycle/Nutrition%20Through%20Life%20Cycles%202.pdf

https://www.montcopa.org/DocumentCenter/View/877/Chapter-3-Communicable-and-Noncommunicable-Diseases?bidId

K1- Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Course designed by: Dr.P.Rameshthangam

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO2	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO3	M (2)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO4	M (2)	S (3)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO5	M (2)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
W.AV	**2.0**	**1.6**	**1.4**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**

S (3) - Strong, M (1) - Medium, L (1) -Low

Course Outcome Vs Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L (1)	L (1)	L (1)	L (1)	L (1)
CO2	L (1)	L (1)	L (1)	L (1)	L (1)
CO3	L (1)	L (1)	L (1)	L (1)	L (1)
CO4	M (2)	S (3)	M (2)	L (1)	M (2)
CO5	L (1)	M (1)	L (1)	L (1)	L (1)
W.AV	**1.2**	**1.4**	**1.2**	**1.0**	**1.2**

S (3) – Strong, M (1) – Medium, L (1) -Low

SEMESTER III					
NME	**Course code**	**FOOD PRESERVATION**	**T**	**Credits: 2**	**Hours:3**
Unit - I					
Objective 1	**To familiarize about the Principles of Food Preservation and Quality control**				
FOOD PRESERVATION & QUALITY CONTROL Principles and methods of food preservation, selection and purchase of foods. Food Additive - Definition, their need, importance and safety evaluation, quality control and its importance, regulation of food additives. Food laws and quality control measures.					
Outcome1	**Learners practice food preservation skills to preserve vegetables and fruits**				**K3**
Unit - II					
Objective 2	**To provide knowledge about the fundamentals of food spoilage**				
FUNDAMENTALS OF FOOD SPOILAGE Classification of food based on pH. Definition-shelf life, perishable and semi perishable foods, shelf stable foods. Role of microorganisms in the spoilage of different kinds of food – cereal and cereal products, vegetables and fruits, fish and other sea foods, meat and meat products					
Outcome 2	**Students able to understand the fundamentals of food spoilage in different kinds of food products.**				**K2**
Unit - III					
Objective 3	**To learn knowledge about preservation by low and high temperature**.				
PRESERVATION BY LOW AND HIGH TEMPERATURE Principle of freezing, changes occurring during freezing. Types of freezing - slow freezing, quick freezing. Heat preservation methods: Sterilization, Pasteurization and blanching.					
Outcome 3	**Learners able to understand the preservation methods in low and high temperature.**				**K2**
Unit - IV					
Objective 4	**To educate about preservation by moisture control and osmotic pressure.**				
PRESERVATION BY MOISTURE CONTROL AND OSMOTIC PRESSURE Concept of drying and dehydration, differences between sun drying and dehydration (i.e. mechanical drying). Factors affecting rate of drying, types of driers used in the food industry. Preservation by high concentration of sugar, preservation by high concentration of salt.					
Outcome 4	**Students are able to understand the various preservation methods such as moisture control and osmotic pressure.**				**K2**
Unit - V					
Objective 5	**To learn about the Preservation by Irradiation**				
PRESERVATION BY IRRADIATION Preservation by Irradiation: Units of radiation, kinds of ionizing radiations used in food irradiation. Mechanism of action, concept of cold sterilization. **RELATED EXPERIENCE** 1. Preparation of jam/ jelly/RTS/nectar/squash/syrup/pickles/sauce or ketchup/candy or Toffee/tuity fruity/wine. 2. Preservation by drying. 3. Visit to a food processing industry.					
Outcome 5	**Students are able to make a variety of recipes using various preservation methods**				**K3**

Suggested Readings:

Sanjeev kumar, S., Harshad, K. K. (2022). *Objective Food Science*, 11th Revised & Enlarged Edition, publisher Jain brothers.

Srilakshmi, B. (2018). *Food Science*, 7th Edition, New Age International Publishers

Potter, N., Hotchkiss, H.J. (1996). *Food Science*, 5th Edition, CBS publishers and distributors, New Delhi.

Bawa, A.S., & Chauhan, O.P. (2013). *Food Science*, New India Publishing agency.

Raina, U., Kashyap, S., Narula, V., Thomas, S., Suvira, V. S., Chopra, S. (2010). *Basic Food Preparation: A Complete Manual*, 4th Edition. Orient Black Swan Ltd.

Srilakshmi, B. (2006). *Food Science*, New Age International Pvt. Ltd., Chennai.

Frazier, W.C., & Westhoff, D.C. (2004). *Food Microbiology*, TMH Publication, New Delhi.

Manay, N.S., & Shadaksharaswamy, M. (2002). *Foods-Facts & Principles,* New Age International Pvt. Ltd, New Delhi.

Sumathi, M.R. (1997). *Food Science*, New Age international Pvt Ltd.

Beckhan, C.G., & Graves, H.J. (1979). Foundations of food preparations, Macmillan Publishing Co, New Delhi.

Web Resources:

https://www.fao.org/3/t0451e/t0451e.pdf
https://egyankosh.ac.in/bitstream/123456789/33296/1/Unit-4.pdf
http://www.uop.edu.pk/ocontents/Lecture%20no%205.pdf
https://chesci.com/wp-content/uploads/2020/06/15_CS20510178_p337-341.pdf
https://apps.who.int/iris/bitstream/handle/10665/38544/9241542403_eng.pdf
https://moisturecontrol.weebly.com/uploads/5/3/5/3/53532707/book_ch2-_water_activity_and_food_preservation.pdf

K1- Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Course designed by: Dr. L. Gomathirajashyamala

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L (1)	L (1)	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)	M (2)	M (2)
CO2	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
CO3	M (2)	L (1)	L (1)	M (2)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)
CO4	L (1)	L (1)	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)	M (2)	M (2)
CO5	L (1)	L (1)	L (1)	M (2)	L (1)	L (1)	L (1)	L (1)	L (1)	L (1)
W.AV	**1.2**	**1**	**1.2**	**1.4**	**1.2**	**1.4**	**1**	**1**	**1.4**	**1.4**

S–Strong(3),M-Medium(2),L-Low(1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M (2)	M (2)	L (1)	L (1)	L (1)
CO2	L (1)	L (1)	M (2	L (1)	L (1)
CO3	L (1)	M (2)	L (1)	L (1)	L (1)
CO4	L (1)	L (1)	L (1)	L (1)	L (1)
CO5	L (1)	L (1)	L (1)	L (1)	L (1)
W.AV	**1.2**	**1.4**	**1.2**	**1**	**1**

S–Strong(3), M-Medium(2),L-Low(1)

SCIENCE CAMPUS