ST. TERESA'S COLLEGE (AUTONOMOUS)

ERNAKULAM

CURRICULUM AND SYLLABI FOR

MASTER'S PROGRAMME IN CLINICAL NUTRITION AND DIETETICS

Under Credit and Semester System

(Effective from 2020 admission onwards)

ST. TERESA'S COLLEGE (AUTONOMOUS), ERNAKULAM

DEPARTMENT OF HOME SCIENCE

BOARD OF STUDIES

Sl. No	Category	Name	Designation	Official Address	Remarks
1	Chairperson (HOD)	**Dr. Thara Sebastian**	Assistant Professor	Dept. of Home Science, St. Teresa's College, Ernakulam	Child Development
2	Faculty with Doctorate	**1.Dr. Betty Rani Isaac**	Associate Professor	Dept. of Home Science, St. Teresa's College, Ernakulam	Food and Nutrition
		2. Dr. Susan Cherian	Associate Professor	Dept. of Home Science St. Teresa's College Ernakulam	Resource Management and Interior Designing
		3.Dr.Anu Joseph	Associate Professor	Dept. of Home Science, St. Teresa's College, Ernakulam	Food Service Management
		4.Dr.Shilpa Jose	Assistant Professor	Dept. of Home Science, St. Teresa's College, Ernakulam	Food Science and Nutrition
		5.Dr.Dhanya N	Assistant Professor	Dept. of Home Science, St. Teresa's College, Ernakulam	Child Development
		6.Dr.Leena Leon	Assistant Professor	Dept. of Home Science, St. Teresa's College, Ernakulam	Resource Management and Interior Designing
		7. Dr. Nisha Vikraman	Assistant Professor	Dept. of Home Science, St. Teresa's College, Ernakulam	Extension Education
		8. Dr. Rashmi H. Poojara	Assistant Professor	Dept. of Home Science, St. Teresa's College, Ernakulam	Food Science and Nutrition

3	Names of 2 Subject Experts- **outside MG University**	**1. (Mrs.) K. Manimozhi**	Controller of Examinations and Associate Professor	Department of Resource Management, Avinashilingam Deemed to be University, Coimbatore - 43	Family Resource Management
		2. Dr. A. Thirumani Devi	Associate Professor & Head	Dept. of Food Science and Nutrition, Avinashilingam Deemed to be University, Coimbatore – 43	Food Science and Nutrition
4	University Representative	**Dr. M. S. Rajalakshmi**	Professor	Department of Human Development Smt. V.H.D Central Institute of Home Science Bangalore – 560 001	Child Development
5	Industry representative	**Dr. Dharani Krishnan**	Clinical Nutritionist and Consultant Dietician	Sree Lakshmi Poly Clinic , Teynampet, Chennai	Clinical Nutrition and Dietetics
6	Alumni representative	**Dr. Lizmitha Godwin**	Head and Assistant Professor	Morning Star Home Science College Angamaly	Family Resource Management
7	Experts from Outside	**1. Mrs Ambili Arun**	Nursing Manager	Lakshmi Hospital, Diwan's Road, Ernakulam	Nursing/Health Care Assistance

	college **- if special courses of studies are to be formulated**	**2. Mrs. N. P. Jaya Kumari**	Nursing Superintendent	Krishna Hospital, MG Road, Ernakulam	Nursing/Health Care Assistance
8	Other members of the Faculty*	**Smt. Teresa Kuncheria**	Associate Professor	Dept. of Home Science St. Teresa's College Ernakulam	Textiles and Clothing
		Smt. Rose Mary Francis	Assistant Professor	Dept. of Home Science St. Teresa's College Ernakulam	Resource Management and Interior Designing
		Smt. Nimmi Jacob	Assistant Professor	Dept. of Home Science St. Teresa's College Ernakulam	Food Science and Nutrition
		Ms. Surya M Kottaram	Head and Assistant Professor on contract	Dept. of Clinical Nutrition and Dietetics Women's Study Centre St. Teresa's College, Ernakulam	Clinical Nutrition and Dietetics
		Ms. Ani Thomas Thottan	Assistant Professor on contract	Dept. of Clinical Nutrition and Dietetics Women's Study Centre St. Teresa's College, Ernakulam	Clinical Nutrition and Dietetics

FACULTY WHO HAVE CONTRIBUTED TOWARDS STRUCTURING OF CURRICULUM AND SYLLABI FOR MASTER'S PROGRAMME IN CLINICAL NUTRITION AND DIETETICS

Ms. Surya M Kottaram

Head of the Department

Department of Clinical Nutrition and Dietetics

Women's Study Centre

St. Teresa's College, Ernakulam

Ms. Ani Thomas Thottan

Assistant Professor

Dept. of Clinical Nutrition and Dietetics

St. Teresa's College, Ernakulam

Ms. L. R Rajani

Assistant Professor

Dept. of Clinical Nutrition and Dietetics

St. Teresa's College, Ernakulam

Dr. Priya Pillai,

Assistant Professor

Dept. of Clinical Nutrition and Dietetics

St. Teresa's College, Ernakulam

MINUTES OF THE BOS MEETING OF THE PG BOARD OF DEPARTMENT OF HOME SCIENCE, ST. TERESA'S COLLEGE (AUTONOMOUS), ERNAKULAM

The members of the Board of Studies of the Department of Home Science, St. Teresa's College (Autonomous), Ernakulam met on 19.3.2020 at 10.00 a. m. in the Staff Room of the Department of Home Science, St. Teresa's College, Ernakulam.

The agenda of the meeting was as follows:

- Approval of the minutes of the previous Board of Studies meeting
- Approval of the Panel of External Examiners for the End Semester Examinations (Odd and Even) for the academic year 2020-21
- Approval of restructured syllabus for M. Sc Home Science (Branch A) Child Development; (Branch B) Family Resource Management and Interior Design, (Branch C) Food Science and Nutrition, Masters Programme in Clinical Nutrition and Dietetics and PG Diploma in Clinical Nutrition and Dietetics.
- Implementation of OBE in teaching learning for all UG/PG programmes for 2020 admission onwards
- To approve the modified syllabus of the new UG programme: B. Sc. Nutrition and Dietetics as per the suggestions given by the BOS of the MG University.
- To approve the faculty strength and student strength for the new programme to be commenced from next academic year.
- Any other matter with the permission of the Chair.

Item No.1: Approval of the minutes of the previous Board of Studies meeting

Board of Studies approved the minutes of the previous Board of Studies meeting held on 05.12.2019.

Item No. 2: Approval of the Panel of External Examiners for the End Semester Examinations (Odd and Even) for the academic year 2020-21.

Board of studies approved the panel of external examiners for B. Sc. Home Science, M. Sc. Home Science (Branch A) Child Development; (Branch B) Family Resource Management and Interior Design, (Branch C) Food Science and Nutrition, Master's Programme in Clinical Nutrition and Dietetics, PG Diploma in Clinical Nutrition and Dietetics, B. Sc. Nutrition and Dietetics and B. Voc. Food Processing Technology.

- **Item No. 3: Approval of restructured syllabus for M. Sc Home Science (Branch A) Child Development; (Branch B) Family Resource Management and Interior Design, (Branch C) Food Science and Nutrition, Masters Programme in Clinical Nutrition and Dietetics and PG Diploma in Clinical Nutrition and Dietetics.**

  For the PG Diploma in Clinical Nutrition and Dietetics and Masters Programme in Clinical Nutrition and Dietetics, the new eligibility was approved by the BOS.

  BOS approved the conversion of ISA of Core course Community Programme of both Masters Programme in Clinical Nutrition and Dietetics and PG Diploma in Clinical Nutrition and Dietetics to ISA and ESA weightage as per University format.

  The core course Communication skills in PG Diploma in Clinical Nutrition and Dietetics was a theory course and has been changed and approved to Practical Course because the assessment is through mock interview, resume and related types of assessment.

- **Item No. 4: Implementation of OBE in teaching/learning for all UG/PG programmes for 2020 admission onwards**

  It was decided to follow OBE in teaching/learning and question paper setting for all UG and PG Programmes from 2020 admission onwards.

- **Item No. 5: To approve the modified syllabus of the new UG programme: B. Sc. Nutrition and Dietetics per the suggestions given by the BOS of the MG University.**

  The complementary courses of B. Sc. Nutrition and Dietetics were converted to the University format. The corrections suggested by the BOS in Home Science of MG University were incorporated and was approved and the details are as follows:

  (i) The first modification was made in Course ND1BP01B20 – Food Science Practical (Basis of food production such as soup preparation, salad making and sauce preparation were added in Module 5).

  (ii) The second modification done was Clinical lab techniques have been included under ND2CP02B20 (Human Physiology Practical I) and ND4CP04B20 (Human Physiology Practical II).

  (iii) The third modification was in the paper ND4B09B20 (Dietetics) wherein Biochemical changes in diseases were included. The fourth modification was that Medical Nutrition therapy for Cancer was also included.

  (iv) Modification five was that the course Human Physiology has been split and incorporated under four semesters and the blueprint has also been modified accordingly.

  (v) All the question papers of the first semester have been corrected and are in line with Blooms Taxonomy (OBE pattern).

  (vi) The sixth modification was that in Course ND1BP01B20 – Food Science Practical, omelette has been replaced with egg white.

- **Item No. 6: To approve the faculty strength and student strength for the new programme to be commenced from next academic year.**

  For the smooth conduct of the programme, BOS suggested a maximum of 20 students per batch for practicals as per University regulations. Taking into consideration the space constraints, BOS also recommended an optimum number of two batches for the commencement of B. Sc. Programme in Nutrition and Dietetics.

  The meeting came to an end at 2.30 p.m.

The following members were present

1. Dr. Thara Sebastian (Chairperson)
2. Dr. Lizmitha Godwin (BOS Member – Alumna)
3. Dr. Betty Rani Isaac (BOS Member)
4. Smt. Teresa Kuncheria
5. Dr. Susan Cherian (BOS Member)
6. Dr. Anu Joseph (BOS Member)
7. Smt. Rosemary Francis
8. Dr. Dhanya. N (BOS Member)
9. Dr. Leena Leon (BOS Member)
10. Dr. Rashmi H. Poojara (BOS Member)
11. Dr. Nisha Vikraman (BOS Member)
12. Smt. Nimmy Jacob
13. Smt. Surya M. Kottaram
14. Smt. Bhavya. E. P
15. Smt. Dinu Simon
16. Smt. Ani Thomas Thottan
17. Smt. Leena George
18. Smt. Jumana Haseen. A

ACKNOWLEDGEMENT

I would like to extend my sincere thanks to Rev. Dr. Sr. Vinitha for her support, also acknowledge with gratitude, the guidance extended by Principal, Dr. Sajimol Augustine. M, during the restructuring of the syllabus of Master's Programme in Clinical Nutrition and Dietetics.

I thank all the esteemed experts of the BOS for their valuable and expert suggestions. I wish to individually thank all the members of the BOS who have provided valuable inputs on course structure and content. I gratefully acknowledge the unstinted support and guidance extended by the faculty members of the Clinical Nutrition and Dietetics Department and subject experts from other universities during the course of structuring of the syllabus. I am also grateful to all the members of the Curriculum Committee of the college for their guidelines and generous support. I extend my immense sense of gratitude and respect to all those who extended help and guidance. Above all, I bow my head before God Almighty for all the help given to us in all our endeavours.

Dr. Thara Sebastian

Head, Department of Home Science & Centre for Research

Chairman, Board of Studies in Home Science

PREFACE

As an autonomous college under Mahatma Gandhi University, St. Teresa's College has taken conscientious efforts to strengthen the curriculum by retaining all the fundamental stipulations of the University/Higher Education Council, to ensure a well-balanced Curriculum. Within the constraints of prescribed syllabi, we have resolved to make a collective effort to create an inspiring academic culture in the institution, essential for teachers and students to access deeper knowledge and participate in its expansion and transmission. It is also to re-articulate the almost lost or forgotten fact that production and transmission of Quality Knowledge, essential for the development of students in particular and society in general, are the primary functions of any Educational Institution.

The syllabi of the programmes aim to provide students many opportunities to engage with authentic, real world learning which will foster their reasoning, imagination, intelligence and problem solving skills, thereby enabling them to acquire true knowledge of universal validity and relevance which will lead to individual development, civil efficiency, economic competency and welfare of the whole of humanity.

I acknowledge the efforts taken by the teachers in restructuring the syllabi and course outcomes of the programmes that focus on the cognitive and intellectual skills of the learners, confidence to carry out independent and scholarly research in the area of professional interest to them and to position themselves as globally effective cross- cultural educators.

I congratulate the efforts taken by the Principal Dr. Sajimol Augustine M. and Convenor, PG syllabus restructuring 2020, Smt. Shanty B.P who coordinated the syllabus structuring of all the programmes in an effective manner. Transformation is what makes St. Teresa's distinctive; transforming lives in order to make a real impact on the local and international stage through the creation, sharing and application of knowledge. We look forward to sharing with you the outcomes of our curriculum restructuring and I hope that these resources will enable you to reflect on the learning gain in our institution.

Dr. Sr. Vinitha (Celine E)

Director, St. Teresa's College, Ernakulam

FOREWORD

Autonomy in the field of higher education implies responsibility and accountability and this in turn leads to excellence in academics and proactive governance. St Teresa's College was given autonomous status in the year 2014 and we have made a concerted attempt to maintain a high level of quality in the standard of education that we impart. In 2019 the college has been re-accredited with A++ grade (CGPA 3.57)

Academic autonomy has granted us the freedom to fine tune the syllabus keeping in mind the changing needs of the new generation of students. Education in the current scenario throws up a multitude of challenges and the curricula and syllabi ought to reflect the paradigm shift that has occurred in the various disciplines. Structured feedback was taken from the Students, Alumni and the experts from the industry and the changes suggested by them were duly incorporated in the restructured syllabi.

The Board of Studies constituted for each department meets regularly in the stipulated time frame and in depth discussions are conducted about the different dimensions of the curricula and syllabi. The IQAC team has felicitated the conduct of a number of workshops and conferences to equip the faculty with the necessary skill set to restructure the syllabi, set question papers for internal tests that evaluate whether the learning outcomes enlisted in the syllabus have been achieved and to ensure the fair and transparent conduct of examinations.

The responsibility that autonomy has placed on us is indeed onerous but we have strived together to meet all the challenges that were placed in our way. We have worked towards moulding young women as responsible citizens who will carry forward the task of nation building in an exemplary manner. All effort has been made to nurture their academic ambitions as well as their skills in co-curricular activities. To keep in pace with the need of the new generation students, we have decided to structure graduate programmes in the next academic year.

With sincere gratitude I acknowledge the instinct support and constant guidance extended by Rev. Sr. Dr. Vinitha, the Director of the College.

I specially thank the team headed by Smt. Shanty B. P. for coordinating the syllabus structuring and restructuring of the programmes, the Heads of the Departments and all the faculty members for their diligence, commitment and exceptional contribution towards this endeavour.

DR. SAJIMOL AUGUSTINE M.

PRINCIPAL

CONTENTS

PREAMBLE

Master's Programme in Clinical Nutrition and Dietetics is a four semester full time program with six months hospital internshi. An ultimate aim of the programme is to produce competent professionals who deeply understand the essence of nutrition which allows them to personalize information rather than follow every guideline issued for an entire population. The overall content, organization, and features remain, but, within this framework, key topics and issues are updated with the newest information available. Learning nutrition can be exciting and engaging. Clinical Nutrition takes students on a fascinating journey beginning with curiosity and ending with a solid knowledge base and a healthy dose of skepticism. Our goal is to develop sophisticated consumers who have information about both nutrients and nutrition. The programme also focuses on the current trends in nutrition to match with the pace of the fast changing subject. This programme emphasizes the key areas of knowledge that must be understood and also the key points of critical thought that must accompany the acquisition of this knowledge. It covers nutritional support, ethics and other aspects on scientific bases. The course emphasizes the role of nutrition as a major modifiable factor in community health and the preventive, promotive and curative role of diet in health.

Electives provide add on knowledge which assist in their professional endeavour. The program is designed with theory papers, practicals, project and internship that provide first-hand experience empowering students to be successful professionals.

PROGRAMME OUTCOME

PO1. Disciplinary knowledge

- Demonstrate a mastery of the fundamental knowledge and skills required in the discipline to function effectively as an entry-level professional in the field.

PO2. Scientific Temper

- Experiment with new approaches, challenge existing knowledge boundaries and take informed action to solve problems related to society.
- Identify, define, and deal with problems through logical, analytical and critical thinking acquired from different domains of knowledge

PO3. Research and Digital Competence

- Develop a research culture for lifelong learning and demonstrate competency in creating new knowledge.
- Analyze and choose from available data and information sources to communicate, collaborate and network through a range of digital media.

PO4. Communication Skills

- Develop language proficiency through interactions embedded in meaningful contexts.
- Demonstrate communicative competence particularly using technology in social and global environments.

PO5. Leadership, Teamwork and Interpersonal Skills

- Function effectively both as leader and/or member of a team.
- Collaborate and interact effectively with others.

PO6. Moral & Ethical Awareness and Social Responsibility

- Demonstrate social and national responsibility.
- Engage in activities that contribute to the betterment of society, with a preferential option for the economically challenged and the marginalized.

PROGRAMME SPECIFIC OUTCOME

The Department of Clinical Nutrition and Dietetics is committed to provide an enriched educational experience to develop the knowledge, skills and attributes of students to equip them for life in a complex and rapidly changing world.

On completion of **Master's Programme in Clinical Nutrition and Dietetics** our students should be able to demonstrate the programme outcome listed below:

- **PSO1** – Recognize the importance of good nutrition in combating the ill effects of metabolic alterations and prepare themselves to become sophisticated nutrition professionals
- **PSO2** – Develop into competitive and socially committed nutritional educators and consultants in various fields like space nutrition, sports nutrition and also in various institutions.
- **PSO3 -** Interpret the role of nutrition in critical conditions and palliative care
- **PSO4** – Explain newer developments in food technology and design innovative recipes
- **PSO5** – Develop skills to access, analyze and plan nutrition management for different therapeutic conditions.
- **PSO6**: Describe interrelationship between nutrition and pharmacology

PROGRAMME OBJECTIVES

On completing the first semester the students will develop thorough knowledge on physiology of the human body and the nutritional demands during the various stages of life cycle. They are also taught structure, composition and functions of both macro and micronutrients. Attain knowledge on the basics of planning and preparing a menu for the various life cycles. Basics in research methodology also instill a spark for research in the students.

At the end of the second semester the students are trained in detailed modifications in therapeutic conditions there by understanding the requirement of diet modifications during times of disease or illness. Equipped with the appropriate skill and attitudes for nutritional diagnostic therapy and counselling services for the purpose of disease management. They also attain knowledge on food science and technology. The courses in the semester also cover conditions requiring critical care.

On completing the third semester the students are equipped with skills in hospital management and also trained in statistical analysis. The knowledge gained during the earlier semesters help in

applying the same for conditions requiring nutritional modifications. Basic knowledge in pharmacology also helps the students understand the interrelations between drugs and diet.

On culmination of the program the students are equipped with skill in conducting community programs. The students are made aware of the various public health issues, national and international nutrition intervention schemes. Knowledge in various electives that assist in their job nature is also provided. The hospital internship also opens the practical knowledge for being successful professionals. The project done in the final semester also evokes the research in the beneficiaries to give innovative advancements in the field of dietetics molding them to be effective dietetic professionals.

JOB OPPORTUNITIES

- Dieticians work in hospitals, nursing care facilities and other healthcare facilities and in the community.
- The students can opt as researches mainly in universities, public or private sector research institutes, food product manufacturing companies and hospitals.
- The Clinical Nutrition Course gives the best opportunity to develop advanced skills in the design and implementation in the field of Research and Development
- Teaching Professionals in related streams
- Dieticians and nutritionists in nutraceutical companies and food industries.

ELIGIBILITY FOR ADMISSION

Graduation in Clinical Nutrition and Dietetics, Food Science and Quality Control, Home Science, Family and Community Science, Food Service Management and Dietetics, Sports Nutrition and Physiotherapy, Nutrition and Dietetics and Applied Nutrition. Graduation in Double or Triple main candidates or candidates who passed degree examination in vocational or specialised programme with any of the above subjects are also eligible for the above programme.

The candidates should have completed the undergraduate programme with not less than 50% marks.

Duration of the Programme: 4 Semesters with six mmonths hospital internship.

Examination: Credit and Semester system (CSS). Direct Grading system with 7 point scale

Medium of Instruction and Assessment: English

Faculty under which the Degree is awarded: Science

STRUCTURE OF MASTER'S PROGRAMME IN CLINICAL NUTRITION AND DIETETICS

The Master's Programme in Clinical Nutrition and Dietetics shall include two types of courses, core courses and elective courses. There shall also be a dissertation and comprehensive viva-voce as core courses. The students should undergo six months Hospital Internship in a multispeciality hospital. The programme also includes assignment/seminar/practical etc. Students must submit at least one assignment as an internal component for each course. Students must also deliver one seminar lecture as an internal component for each course. The seminar lecture is expected to train the student in self-study, collection of relevant matters from various resources, editing and presentation.

THEORY COURSES

There are fifteen theory courses spread in all the four semesters of the Master's Programme. Distribution of theory courses is as follows. There are fourteen core courses common to all students. Semester I, II and Semester III will have **four** core theory courses each and Semester IV will have **two** core courses. **One** elective course is in semester IV. One out of three electives offered in this syllabus. One elective course can be chosen as per the interest of the students, availability of faculty and academic infrastructure.

PRACTICAL

All four semesters will have a practical course. In Semester I and Semester II the practical examinations will be conducted at the respective examination centres by one external and one internal examiner appointed by the controller of examinations at the end of each semester.

In Semester III there will be a practical course on Yoga and Basic Life support. In this course hands-on training on Yoga will be conducted to provide a holistic approach to increase the confidence and productivity of the students and Basic Life Support to handle an emergency situation which will be evaluated by experts.

Community Programme: During the IVth semester community programs have to be done among the rural population. It includes surveys to assess the prevalence rate of disease and nutrition education programs which includes awareness of public health issues and the need of the hour in health aspects as well as information on basic nutrition. Medical camps have to be arranged according to the need. Visual aids will have to be prepared and a project report will have to be submitted.

PROJECT

The project of the PG programme should be relevant and innovative in nature. The type of project can be decided by the student and the guide (a faculty of the department or other department/college/university/institution). The project work should be taken up seriously by the student and the guide. The project should be aimed to motivate the inquisitive and research aptitude of the students. The students may be encouraged to present the results of the project in seminars/symposia. The conduct of the project may be started at the beginning of Semester III, with its evaluation scheduled at the end of Semester IV. The project is evaluated by one external and one internal examiner.

COMPREHENSIVE VIVA VOCE

A viva voce examination will be conducted by one external examiner at the time of evaluation of the project. The components of viva voce consist of subjects of special interest, topics covering all semesters and awareness of current and advanced topics.

HOSPITAL INTERNSHIP

The students should undergo a six months hospital internship in a multispeciality hospital. There are internal and external evaluations which will be conducted at the end of hospital internship.

COURSE CODE

The courses in the programme are coded according to the following criteria. The first two letters of the code indicates the name of programme, ie. ND Clinical Nutrition and Dietetics. Next digit is to indicate the semester. i.e., ND1 (Clinical Nutrition and Dietetics, 1st semester) followed by the letter C or E indicating whether the course is a core course or elective course as the case may be. Next digits indicate course number. The letter/letters T/P/PR/V/I follow it and are used to indicate theory/practical/project/viva/internship. The last letter will be M which indicates whether the programme is for masters and it is followed by the number 20 which indicates the year of restructuring the syllabus.

DISTRIBUTION OF COURSES AND CREDITS

Semester	Course Type	Course Code	Course Title	Teaching Hours/ Week	Credits	Total Credits
I	Core Theory	ND1C01TM20	Nutrition through life cycle	5	4	18
	Core Theory	ND1C02TM20	Human Physiology	5	4	
	Core Theory	ND1C03TM20	Nutritional Biochemistry	5	4	
	Core Theory	ND1C04TM20	Research Methodology and Biostatistics	5	4	
	Core Practical	ND1C01PM20	Biochemical Analysis	5	2	
II	Core Theory	ND2C05TM20	Advanced Dietetics	5	4	18
	Core Theory	ND2C06TM20	Advanced Nutrition	5	4	
	Core Theory	ND2C07TM20	Food Science and Technology	5	4	
	Core Theory	ND2C08TM20	Nutrition in Critical Care	5	4	
	Core Practical	ND2C02PM20	Advanced Dietetics and Critical Care	5	2	
III	Core Theory	ND3C09TM20	Applied Nutrition	5	4	
	Core Theory	ND3C10TM20	Hospital Management	5	4	
	Core Theory	ND3C11TM20	Clinical Biochemistry	5	4	
	Core Theory	ND3C12TM20	Nutritional Pharmacology	4	4	

	Core Practical	ND3C03PM20	Yoga and Basic Life Support	6	4	20
IV	Core Theory	ND4C13TM20	Food Microbiology and Quality control	5	4	24
	Core Theory	ND4C14TM20	Public Health Nutrition	5	4	
	Elective	ND4E01TM20	Sports Nutrition and Fitness	5	3	
	Elective	ND4E02TM20	Paediatric Nutrition			
	Elective	ND4E03TM20	Geriatric Nutrition			
	Core Practical	ND4C04PM20	Community Programme	6	4	
	Project	ND4PRM20	Project	4	3	
	Viva Voce	ND4VM20	Comprehensive viva	-	3	
	Core Practical	ND4IM20	Hospital Internship	6 Months	3	
TOTAL						**80**

ELECTIVE CORE COURSES

Course Code	Course Title	Teaching Hours/ Week	Credit
ND4E01TM20	Sports Nutrition and Fitness	5	3
ND4E02TM20	Paediatric Nutrition	5	3
ND4E03TM20	Geriatric Nutrition	5	3

DISTRIBUTION OF CREDITS

The total credit for the programme is fixed at 80. The distribution of credit points in each semester and allocation of the number of credits for theory courses, practical, internship, project and comprehensive viva-voce is as follows. The credit of sixteen core courses including two core practicals is 4 and other two core practicals have a credit of 2 and elective course credit is 3. The credit for dissertation, comprehensive viva voce and hospital internship is 3.

Semester	Courses	Credit	Total Credit
I	4Theory Core Courses	4	4 X 4 = 16
	1 Practical Core Course	2	1 X 2 = 2
II	4 Theory Core Courses	4	4X 4 = 16
	1 Practical Core Course	2	1 X 2 = 2
III	4 Theory Core Courses	4	4 X 4 = 16
	1 Practical Core Course	4	1 X 4 = 4
IV	2 Theory Core Courses	4	2 X 4 = 8
	1 Practical Core Course	4	1 X 4 = 4
	Electives	3	1 X3 = 3
	Dissertation	3	1 X 3 = 3
	1 Comprehensive viva	3	1X 3 = 3
	Hospital Internship	3	1 X 3 = 3
GRAND TOTAL			**80**

EVALUATION AND GRADING

The evaluation for each course shall contain two parts such as In-Semester Assessment (ISA)and End Semester Assessment (ESA). The ratio between ISA and ESA shall be 1:3 and 25% weightage shall be given to ISA and 75% to ESA. Both ISA and ESA shall be carried out using a direct grading system.

Evaluation (Both ISA and ESA) to be done by the teacher is based on a six point scale shown in the table below:

GRADE	GRADE POINT	RANGE
A^+	5	4.50 to 5.00
A	4	4.00 to 4.49
B	3	3.00 to 3.99
C	2	2.00 to 2.99
D	1	0.01 to 1.99
E	0	0.00

Direct Grading System based on a 7 – point scale is used to evaluate the performance of students in both ISA and ESA.

For all courses (theory & practical)/semester/overall programme, the letter grades for GPA/SGPA/CGPA and its indicators are given in the following table:

GRADE	RANGE	INDICATOR
A^+	4.50 to 5.00	Outstanding
A	4.00 to 4.49	Excellent
B^+	3.50 to 3.99	Very good
B	3.00 to 3.49	Good (Average)
C^+	2.50 to 2.99	Fair
C	2.00 to 2.49	Marginal
D	0.00 - 1.99	Deficient (Fail)

IN-SEMESTER ASSESSMENT (ISA)

Pass minimum for ISA for each course is C grade. The In-Semester assessment is to be done by continuous assessments of the components given below.

- The components of the In-Semester assessment for theory and practical and their weights are as in the following table:

THEORY		PRACTICAL	
COMPONENTS	**WEIGHTAGE**	**COMPONENTS**	**WEIGHTAGE**
Assignment	1	Written / Lab test	3
Seminar	2	Lab involvement and record	1
Test Papers (Average of 2)	2	Viva	1
Total	**5**	**Total**	**5**

Laboratory involvement

Laboratory involvement
Handling Equipments
Personal and cooking hygiene
Skill in preparation

The two test papers should be in the same model as the End- Semester examination question paper. For test papers questions shall be set in such a way that the answers can be awarded A^+, A, B, C, D, E grade.

The performance of students in the seminar and assignment should also be documented in terms of grades.

- The components for assignments and seminars are as in the following table:

COMPONENTS	
ASSIGNMENTS	**SEMINAR**
Punctuality	Content
Content	Presentation

Yoga and Basic Life Support (Practical)

The break up for In-Semester assessment of Yoga and Basic Life Support is as follows:

COMPONENTS	WEIGHTAGE
Performance	3
Written test/Viva voce	1
Report	1
Total	**5**

Community Programme

The break up for In-Semester assessment of Community Programme is as follows:

COMPONENTS	WEIGHTAGE
Presentation	1
Innovation in education methods	1
Team work	2
Report	1
Total	**5**

Hospital Internship (6 months)

The break up for In-Semester assessment of hospital internship is as follows**:**

COMPONENTS	WEIGHTAGE
Presentation	1
Case study	2
Report	2
Total	**5**

Project

The components of the In-Semester assessment for Project and their weightages are as in the following table:

COMPONENTS	WEIGHTAGE
Relevance of the topic and analysis	2
Project content and presentation	2
Project viva	1
Total	**5**

The In-Semester assessment of the project is done by the supervising guide of the department or the member of the faculty decided by the head of the department. The project work may be started at the beginning of the Semester III. The supervising guide should keenly and sincerely observe the performance of the student during the course of project work. The supervising guide is expected to inculcate in student(s), the research aptitude and aspiration to learn and aim high in the realm of research and development. A maximum of two students may be allowed to perform one project work if the volume of the work demands it. project evaluation begins with (i) the selection of problem, (ii) literature survey, (iii) work plan, (iv) experimental / theoretical setup/data collection, (v) characterization techniques/computation/analysis (vi) use of modern software for data analysis and (vi) preparation of dissertation. The project internal grades are to be submitted at the end of semester IV.

The components of the In- Semester Assessment for comprehensive viva- voce and their weights are as in the following table:

COMPONENTS	WEIGHTAGE
Fundamentals concepts	3
Awareness of current or advanced topics.	2
Total	**5**

GENERAL INSTRUCTIONS FOR ISA

- The In-Semester Assessment should be fair and transparent. The responsibility of evaluating the sessional assessment is vested on the teacher(s) who teach the course. The evaluation of the components should be published and acknowledged by students. All documents of internal assessments are to be kept in the institution for 2 years.
- The assignments/ seminars / test papers are to be conducted at regular intervals. These should be marked and promptly returned to the students.

- One teacher appointed by the Head of the Department will act as a coordinator for consolidating grade sheet for In-Semester assessment in the department in the format supplied by the Controller of the examinations. The consolidated grade sheets are to be published in the department notice board, one week before the closing of the classes for End Semester Assessment. The grade sheet should be signed by the coordinator and counter signed by the Head of the Department and the college Principal.
- The consolidated grades in specific format (Form A) are to be kept in the college for future references. The consolidated grades in each course should be uploaded to the Institution Portal at the end of each semester as directed by the Controller of Examinations.
- There shall not be any chance for the improvement of ISA grade point.
- **Grievance Redressal Mechanism** for ISA
- There will be provision for grievance redressal at three levels, viz,
    1. at the level of teacher concerned,
    2. at the level of departmental committee consisting of Head of the Department, Coordinator and teacher concerned,
    3. at the level of college committee consisting of the Principal, Controller of Examinations and Head of the Department,
- College level complaints should be filed within one week of the publication of results and decisions taken within the next two weeks.

END SEMESTER ASSESSMENT (ESA)

The End Semester Assessment of all semesters shall be conducted by the institution on the close of each semester. The End Semester Assessment will be of 3 hours duration for each lecture based and practical courses except Yoga and Basic Life Support and community programme as the assessment of these two practical courses is in the form of demonstration and presentation. A minimum C grade is required for a pass in both ISA and ESA. Also a minimum C grade is required for a pass in a course.

Students with less than 75% aggregate attendance during a semester are not eligible to attend ESA of any course.

If a student represents her Institution/ University / State/ Nation in Sports /NCC/NSS or Cultural or any other officially sponsored activities such as college union/university union etc she shall be eligible to claim the attendance for the actual number of days participated subject to a maximum of

15 days in a semester based on the specific recommendations of the Head of the Department or teacher concerned.

For reappearance/ improvement, students may appear along with the next batch.

QUESTION PAPER PATTERN FOR THEORY COURSES.

All the theory question papers are of three hour duration. All question papers will have three parts. The question shall be prepared in such a way that the answers can be awarded A+, A, B, C, D, E.

Part A: Questions from this part are very short answer type. Eight questions have to be answered from ten questions. Each question will have weightage one and the Part A will have a total weightage of eight.

Part B: Part B consists of short essay type questions from the course concerned. Six questions out of eight given have to be answered. Each question has a weightage two making the Part B total weightage twelve.

Part C: Part C will have four questions. Two questions have to be answered out of four questions. Each question will have a weightage five making the total weightage ten in Part C.

Maximum weightage for ESA is 30. Therefore, Maximum Weighted Grade Point (WGP) is 150.

DIRECTIONS FOR QUESTION SETTERS

1) Questions shall be set to assess knowledge acquired, standard and application of knowledge in new situations, critical evaluation of knowledge and the ability to synthesize knowledge.
2) Due weightage shall be given to each module on content/teaching hours allotted to each module.
3) The question setter shall ensure that questions are set as per the course outcomes.
4) A question paper shall be a judicious mix of short answer type, short essay type and long essay type questions.
5) The questions shall be set in such a way that the answers can be awarded $A^{+,}$ A, B, C, D, E grade.
6) Different types of questions shall be given different weightage to quantify their range as shown below:

Part	Type of Questions	Weightage	Number of questions to be answered
Part A	Short Answer type questions	1	8 out of 10
Part B	Short essay/ problem solving type questions	2	6 out of 8
Part C	Long Essay type questions	5	2 out of 4

PRACTICAL, PROJECT AND VIVA VOCE EXAMINATIONS

Practical Examination:

Practical examinations are conducted at the end of each semester. All practical examinations will be of three hours duration except Yoga and Basic Life Support and community programme as the assessment of these two practical courses is in the form of demonstration and presentation. All End Semester Assessment of practical courses will have external and internal examiners.

There will be an external and internal examiner selected by the department.

Evaluation of Practical Examinations:

COMPONENTS	WEIGHTAGE
Written/Lab test	10
Record	3
Viva	2
Total	**15**

The scheme of Evaluation of the practical examination will be decided by the Board of Examiners. The different weightage for assessment of different components is shown in the following table.

Yoga and Basic Life Support (Practical)

The break up for End Semester Assessment of this course is as follows:

COMPONENTS	WEIGHTAGE
Performance	10
Written test/Viva voce	3
Report	2
Total	**15**

Community Programme

The break up for End Semester Assessment of Community Programme is as follows:

COMPONENTS	WEIGHTAGE
Presentation	5
Innovation in education methods	5
Report	5
Total	**15**

HOSPITAL INTERNSHIP (6 MONTHS)

The break up for End Semester Assessment of hospital internship is as follows**:**

COMPONENTS	WEIGHTAGE
Punctuality	3
Initiative	2
Performance	3
Assignment and Seminar	2
Report	5
Total	**15**

PROJECT

The project is evaluated by the external examiner deputed from the board of practical examination. The project is examined along with the oral presentation of the project by the candidate. The examiner should ascertain that the project and report are genuine. Innovative projects or the results/findings of the project presented in national seminars may be given maximum advantage. The supervising guide or the faculty appointed by the head of the department may be allowed to be present at the time of project evaluation. This is only to facilitate proper evaluation of the project. The different weights for assessment of different components are shown in the following table.

COMPONENTS	WEIGHTAGE
Relevance of the topic and analysis	2
Project content and presentation	10
Project viva	3
Total	**15**

COMPREHENSIVE VIVA- VOCE EXAMINATION:

Viva voce examination is conducted only by the external examiner deputed from the board of practical examination. The components of the End Semester Assessment for comprehensive viva- voce and their weights are as in the following table.

COMPONENTS	WEIGHTAGE
Course of special interest, fundamentals of Nutrition and Dietetics, topics covering all semesters and awareness of current and advanced topics.	15
Total	**15**

REAPPEARANCE / IMPROVEMENT

- A student who fails to secure a minimum grade (Grade C) for a pass in a course will be permitted to write the examination along with the next batch.
- The candidates who wish to improve the grade/grade point of the End-Semester Assessment of a course / courses she has passed can do the same by appearing in the End-Semester Assessment of the semester concerned along with the immediate junior batch. This facility is restricted to first and second semesters of the programme.

- There shall be supplementary examinations (no improvement) for third semester.
- **One Time Betterment Programme:** A candidate will be permitted to improve the CGPA of the programme within a continuous period of four semesters immediately following the completion of the programme allowing only once for a particular semester. The CGPA for the betterment appearance will be computed based on the SGPA secured in the original or betterment appearance of each semester whichever is higher.

  If a candidate opts for the betterment of CGPA of a programme, she has to appear for the external examination of the entire semesters excluding practicals/project/comprehensive viva voce. One time betterment programme is restricted to students who have passed in all courses of the programme at the regular (first) appearance.

PROMOTION

- A student who registers for a particular semester examination shall be promoted to the next semester.
- A student having 75% attendance and fails to register for examination of a particular semester will be allowed to register notionally and is promoted to the next semester, provided application for notional registration shall be submitted within 15 days of the commencement of the next semester.

COMPUTATION OF GPA/SGPA/CGPA

Grade Point Average (GPA): ISA and ESA are separately graded using a six point scale and the combined grade point with weightage 1 for ISA and 3 for ESA shall be applied to calculate the grade point average (GPA) of each course.

The Semester Grade Point Average (SGPA): After the successful completion of a semester SGPA of a student in that semester is calculated using the formula given below

Semester Grade Point Average (SGPA) = $\frac{\sum(C_i \ X \ GPA_i)}{\sum C_i}$ where C_i and GPA_i are the credit point and GPA of each course respectively.

Cumulative Grade Point Average (CGPA) for the programme is calculated as follows:

CGPA = $\frac{\sum(C_i \ X \ SGPA_i)}{\sum C_i}$ where C_i and $SGPA_i$ are the total credit point and SGPA of each semester respectively.

Note: GPA/SGPA/CGPA is graded on a 7 – point scale. A separate minimum of **C** Grade each for ISA and ESA (for both theory and practical) is required for pass for a course. For a pass in a programme, a separate minimum of Grade **C** is required for all the individual courses.

If a candidate secures **D** Grade for any one of the courses offered in a Semester/Programme, only **D** grade will be awarded for that Semester/Programme until she improves this to **C** grade or above within the permitted period.

Note on compliance with the UGC minimum standards for the conduct and award of postgraduate degrees:

Credit and semester system is followed in this program. The program has 4 semesters with eighteen weeks in each semester. In each week there are 15 lecture hours and 10 laboratory hours (may change). In each semester there are 270 lecture hours and 180 practical hours; thus a total of 450 calendar hours in each semester which is in compliance with the minimum 390 hours stipulated by the UGC.

All rules and regulations are subject to change as and when modified by MG University to which St. Teresa's College [Autonomous] is affiliated.

Syllabi for

Core Courses

SEMESTER I

ND1C01TM20 NUTRITION THROUGH LIFE CYCLE

Total Credits: 4

Total Lecture Hours: 90

Course Outcome

CO1: Articulate the changes in growth and development of infancy and care required for preterm and LBW

CO2: Administer the RDA to the diets of different age groups

CO3: Identify the changes in different life cycles

CO4: Generalize on complications in various life stages, theories supporting the changes

CO5: Identify lactogogues, milk banking, national immunization schedule, complications of pregnancy and adolescences

Syllabus Content

Module I:Infancy (14 Hours)

Growth and development, nutritional requirements. Feeding pattern, breast feeding and artificial feeding. Compositional differences between human milk and cow's milk. Composition of pre-term milk, Milk substitutes and their suitability for infant feeding. Complementary feeding, need for complementary feeding and types of supplementary foods, problems associated with complementary feeding. Nutritional assessment. Nutrition, feeding techniques and care for Premature/ preterm Infants. National immunization schedule and immunization chart.

Module II: Preschool and School going (12 Hours)

Growth and development, rate of growth, assessment of growth, importance of height to age chart. RDA, Nutritional requirements and dietary guidelines, packed lunch, nutritional problems specific to this age: Food Hypersensitivities, Growth Failure, Childhood Obesity and its related stunting and Eating Disorders. Role of nutrition on physical and mental development.

Module III: Adolescence (16 Hours)

Physiological modifications and stages of adolescence. Eating disorders in adolescence: Bulemia nervosa, anorexia nervosa, binge eating and obesity. Preventive nutrition in adolescent girls, against cardiovascular disease, osteoporosis, diabetes, cancer.

Module IV: Pregnancy (14 Hours)

Menstrual cycle and sex steroid hormones, nutritional concerns in pre and post menopausal phase, physiological adjustments. Nutritional requirements: RDA, Nutritional status of Indian pregnant women. Effect of malnutrition on outcome of pregnancy. Growth of foetus from conception till term, Maternal weight gain, complications of pregnancy- oligohydramnios, IUGR, PIH, eclampsia, toxaemia, gestational diabetes. HIV/AIDS during pregnancy, role of Exercise and Fitness and adolescent pregnancy

Module V: Lactation (14 Hours)

Factors affecting lactation, role of hormones in lactation. Development of breast, physiology of lactation. Nutritional composition of colostrum, breast milk and efficiency of lactation. Advantages of breast feeding. Nutritional requirements: RDA and dietary modifications during lactation, lactogogues. Milk banking.

Module VI : Young adults (8 Hours)

Nutritional requirements RDA based on activity Nutritional status of Indian adult population, Reference Man and Woman.

Module VII : Elderly (12 Hours)

Changes: psychological, physiological and social. Theories of ageing. Nutritional requirements. Nutritional problems. Nutritional care, lifestyle modifications and dietary modifications in elderly.

Learning Resources

References

1) Ronald Ross Watson, George Grimble, Victor R. Preedy, ShermaZibadi,(2012) "Nutrition in Infancy", Volume 1, Springer Science & Business Media Publishers.
2) Victor R. Preedy, (2011), " Diet and Nutrition in Palliative Care", CRC Press.
3) Judith Brown, Janet Isaacs, Bea Krinke, Ellen Lechtenberg, Maureen Murtaugh,(2010) "Nutrition Through the Life Cycle", Cengage Learning Publishers.
4) Gopalan.C, Rama Sastri, B.V, and Balasubramian, S.C, (2010), "Nutritive Value of Indian Foods", National Institute of Nutrition, ICMR,
5) Kathleen C. Niedert, Becky Dorner, (2004), "Nutrition Care of the Older Adult", American Dietetic Association.
6) Prakash S. Shetty, (2002), "Nutrition through the Life Cycle", Royal Society of Chemistry Publishers.
7) Indian Council of Medical Research, Recommended Dietary Intake for Indians (2010)

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ND1C01TM20 NUTRITION THROUGH LIFE CYCLE

Module	**Weightage-1 8/10**	**Weightage-2 6/8**	**Weightage-10 2/4**
I	1	2	1
II	1	1	
III	2	1	
IV	2	1	1
V	1	2	1
VI	1	-	1
VII	2	1	

MODEL QUESTION PAPER
MASTER'S PROGRAMME DEGREE (C.S.S) EXAMINATION,

CLINICAL NUTRITION AND DIETETICS

FIRST SEMESTER

FACULTY OF SCIENCE

ND1C01TM20 NUTRITION THROUGH LIFE CYCLE

Time: Three Hours **Max.Weightage:30**

Section -A

(Answer any eight questions. Each question carries a weight of 1.)

1. Write on reference man and woman in Indian context
2. Discuss 8 big allergens.
3. List factors considered before planning menu for old age?
4. State on anorexia nervosa.
5. Write the RDA of energy, protein, fat, Calcium, Vitamin A for a lactating woman
6. Identify components of weight gain in pregnancy.
7. Describe on "Theories of ageing"
8. Distinguish between human milk and cow's milk based on nutrient composition.
9. Write on physiological changes during adolescence.
10. Write on menstrual cycle**.** **(8x1=16)**

Section B

(Answer any six questions. Each question carries a weight of 2)

11. Write a note on dietary modifications in old age with reasons.
12. Discuss advantages of breast feeding.
13. Discuss the term weaning and types of supplementary feeds.
14. Write on nutritional problems in preschoolers.
15. Discuss role of hormones in lactation and factors affecting the same
16. Explain on effect of HIV on pregnancy
17. Discuss points to remember while preparing packed lunch
18. Elaborate on pre term babies feeding techniques and care pattern

(6X2=12)

Section C

(Answer any two questions. Each question carries a weight of 5.)

19. Discuss complications and nutritional requirements for pregnant woman.
20. Elaborate on factors affecting, role of hormones and physiology of lactation.
21. Write the RDA for school going, infancy and adolescence. Justify the difference in nutrient requirement.
22. Discuss the RDA for young adult based on physical activity. Write on dietary modifications in elderly.

(2 x 10 = 10)

SEMESTER I

ND1C02TM20 HUMAN PHYSIOLOGY

Total Credits: 4

Total Lecture Hours: 90

Course Outcome

CO1: Discuss on the span of life from molecular, cellular to the organ and organ system level

CO2: Interpret the structure and functions of various organ system

CO3: Summarize the body functioning and basis of many common dysfunction

CO4: Identify the basic organ system mechanisms of the body

Syllabus Content

Module 1 : Cell and Tissue Protein (6 Hours)

Structure of cell, cell injuries- Etiology and pathogenesis, Reversible and irreversible cell injury: Types, Sequential changes, Cellular swellings, Hyaline changes, Mucoid changes. Types of Necrosis and Gangrene, Autolysis. Tissue protein- Collagen- synthesis, functions and degradation, Muscle proteins- Actin and myosin, Functions of Elastin and Lens protein.

Module II: Body Fluids (10 Hours)

Blood-Composition and functions, plasma proteins, erythrocytes, structure of haemoglobin, leucocytes/WBC- functions and Platelets, blood groups, blood coagulation and clotting factors, blood transfusion and blood banks. Lymphatic system, Buffers- buffer capacity, buffers in body fluids- Bicarbonates, Phosphates, and Proteins, Other body fluids – Cerebrospinal fluid, Aqueous humor, Amniotic fluid.

Module III: Endocrine System (10 Hours)

Classification, Mechanisms of hormone regulation, Alteration of hormonal regulation, functions, actions and abnormalities of- Thyroid, Parathyroid, Pituitary, Pancreas, Adrenal cortex and medulla.

Module IV: Circulatory system (12 Hours)

Heart structure and functions, CV system, anatomy, cardiac cycle, heart sounds, heart rate and regulation, blood pressure- measurements and mechanism of maintenance of B.P, hemorrhage- compensatory changes, cardiovascular modifications during exercise, oedema, causes and types.

Module V: Respiratory system (10 Hours)

Anatomy of the respiratory system, process of respiration, transport and exchange of oxygen and carbon dioxide in the body and different pulmonary volumes.

Module VI: Digestive system (12 Hours)

Anatomy of digestive tract and process of digestion, absorption and assimilation of food, composition and functions and mechanism of secretion of digestive juices and accessory organs and glands-salivary, gastric, liver, gall bladder, intestine and pancreas, functions of bile salts, movements of stomach, small intestine, villi and defecation.

Module VII : Excretory system (10 Hours)

Structure and function of kidney, structure of nephron, GFR, stages of urine formation, selective reabsorption of different constituents and factors affecting urine volume, composition of urine and micturition, Renin- Angiotensin system

Module VIII : Reproductive system (10 Hours)

Anatomy of male reproductive system, anatomy of female reproductive system, menstrual cycle-conception, contraception and parturition. Brief anatomy of mammary gland

Module IX : Nervous system (10 Hours)

Anatomy and physiology, structure of neurons, nerve cell as a conducting tissue, transmission of nerve impulses, mechanism of impulse transmission, synaptic transmission and its affecting factors, various types of receptors and reflex action and arc.

Learning Resources

References

1) Lauralee Sherwood, (2015), "Human Physiology: From Cells to Systems", Cengage Learning.
2) Sembulingam. K, PremaSembulingam, (2012), "Essentials of Medical Physiology", JP Medical Ltd.
3) Chandra Sekar C.N,(2007), "Manipal Manuel of Physiology", 1st Edition, CBS Publishers and Distributors, New Delhi.
4) ChatterjeeC.C(2005), "Human Physiology", 11th Edition(Reprint),Vol 1& II Medical Allied Agency, Kolkata.
5) Khurana, Indu, (2005), "Textbook Of Medical Physiology", Elsevier India.
6) RatanVidya, (2004), "Handbook of Human Physiology", 7th Edition (Reprint), Jaypee Bros Medical Publishers (P) Ltd, New Delhi

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ND1C02TM20 HUMAN PHYSIOLOGY

Module	Weightage- 1 8/10	Weightage- 2 6/8	Weightage- 5 2/4
I	2	1	1
II	2	1	
III	1	1	1
IV	1	1	
V	1	-	
VI	1	1	1
VII	1	1	
VIII	-	1	1
IX	1	1	

MODEL QUESTION PAPER
MASTER'S PROGRAMME DEGREE (C.S.S) EXAMINATION,

CLINICAL NUTRITION AND DIETETICS

FIRST SEMESTER

FACULTY OF SCIENCE

ND1C02TM20 HUMAN PHYSIOLOGY

Time: Three Hours **Max.Weightage:30**

Section -A

(Answer any eight questions. Each question carries a weight of 1.)

1. Discuss the structure of muscle proteins
2. Explain GFR
3. Describe the transportation of carbon dioxide
4. State about reflex arc.
5. Write the role of pancreas in digestion
6. Define buffer. Write the functioning of one buffer in the body
7. Write a brief note on heart sounds.
8. Enlist the functions of elastin and lens protein?
9. Detail on the structure and function of haemoglobin
10. Write on the abnormalities of pancreas **(8X1=8)**

Section B

(Answer any six questions. Each question carries a weight of 2)

11. Write a note on synthesis, functions and degradation of collagen.
12. Discuss the functions of different glands for digestion.
13. Write a note on the structure of nephron.
14. Explain the abnormalities of thyroid hormone.
15. Define blood grouping. How does blood coagulation occur?
16. Write on various receptors and their characteristics.
17. Discuss role of sexual hormones in female body.
18. Write on cardiac changes during exercise. **(6X2=12)**

Section C

(Answer any two questions. Each question carries a weight of 5.)

19. Discuss on the following
    a) Tissue proteins
    b) Muscle proteins
    c) Buffers
20. Explain cardiac cycle and how exchange of gasses takes place and abnormality of pituitary gland.
21. Detail on the structure of digestive system and how urine is synthesised in the body
22. Enumerate on the various types of receptors and reflex arch. Write on the process of parturition

(2X5=10)

SEMESTER I

ND1C03TM20 NUTRITIONAL BIOCHEMISTRY

Total Credits: 4

Total Lecture Hours: 90

Course Outcome

CO1: Differentiate between the metabolism of macronutrients

CO2: Analyse the role of micronutrients on macronutrients metabolism

CO3: Describe the enigmas of detoxification in the human body

CO4: State the production pathways of energy and various nucleic acids.

Syllabus Content

Module I : Enzymology (12 Hours)

Nomenclature and classification of enzymes and co – enzymes, Specificity of enzymes. Mechanism of enzyme action, Activation energy, Factors affecting enzyme activity, Enzyme inhibition, Role of different co – enzymes in metabolism, Isozymes, Enzymes in clinical diagnosis.

Module II : Carbohydrate Metabolism (18 Hours)

Chemistry of Carbohydrates: Structure and classification, Isomerism and properties of Monosaccharides, Oligosaccharides and Polysaccharides

Metabolism of Carbohydrates: Intestinal transport of carbohydrates, Transport of glucose across various cells, Utilization of absorbed carbohydrate, Catabolic pathways of glucose and their regulation and significances- Glycolysis, oxidation of pyruvate, TCA cycle, HMP shunt, Glycogenesis, Anabolic pathways of glucose- Glycogenolysis, gluconeogenesis and major substrates involved, Uronic acid pathway, Metabolism of Galactose and Fructose, Metabolism of alcohol, interrelationship between macronutrients.

Module III : Lipid Metabolism (14 Hours)

Chemistry of Lipids- Structure, classification and properties

Metabolism of Lipids: Oxidation of fatty acids-β,α, ω and peroxisomal oxidation of fatty acids, oxidation of MUFA and PUFA, De Novo synthesis of fatty acids, synthesis of triglycerides, role of liver in fat metabolism, Biosynthesis of cholesterol and bile acid formation.

Module IV : Protein Metabolism (18 Hours)

Chemistry of Protein: Structure, classification and properties. Metabolism of Protein: trasamination, oxidative deamination, transdeamination, transmethylaion, decarboxyltion, Urea cycle, biosynthesis of nonessential aminoacids- Glycine, Serine, Methionine, Cysteine, Glutamic acid, Tyrosine. Production of specialized compounds from amino acids – catecholamines, melanin, serotonin

Module V: Nucleic acid metabolism (12 Hours)

DNA- structure, synthesis, replication and degradation. RNA- structure of rRNA, mRNA, tRNA.Protein synthesis- Initiation, elongation and termination, Genetic code. Nucleotide metabolism – biosynthesis and regulation of purines, metabolism of pyramidine.

Module VI : Bioenergetics (10 Hours)

The concept of free energy, exergonic and endergonic reactions, High energy compounds and key position of ATP, substrate level and oxidative phosphorylation, Electron transport chain.

Module VII :Xenobiotics (6 Hours)

Phase 1- oxidation, reduction and hydrolysis

Phase II- Conjugating agents-Glucuronic acid, Sulfate, Cysteine, Glutathione, Acetylation, Glycine

Learning Resources

References

1) John Baynes, Marek H Dominiczak (2014), "Medical Biochemistry", Elsevier Health Sciences.
2) Richard A Harvey, Denise R Ferrier, (2011), "Biochemistry", Lippincott Williams & Wilkins.
3) Todd A. Swanson, Sandra I. Kim, Marc J. Glucksman, (2008), "Biochemistry", Lippincott Williams & Wilkins.
4) Deb A.C. (2006), Fundamentals of Biohemistry, New Central Book Agency (p) Ltd, Kolkata.
5) Vasudevan. D. M, Sreekumari S,(2005), Text Book of Biochemistry, Jaypee Brothers Medical Publishers(P),Ltd, New Delhi.
6) David A. Bender, (2003), "Nutritional Biochemistry of the Vitamins", Cambridge University Press.
7) Murray R.K, Garnner, D.K, Mayers, P.A, and Rodwell, V.W(2000), Harpers Biochemistry 25th Edition , Appleton and Lange, Connecticut

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ND1C03TM20 NUTRITIONAL BIOCHEMISTRY

Module	Weightage- 1 8/10	Weightage- 2 6/8	Weightage-5 2/4
I	2	1	1
II	2	2	
III	2	1	1
IV	1	1	1
V	1	1	
VI	1	1	1
VII	1	1	

MODEL QUESTION PAPER
MASTER'S PROGRAMME DEGREE (C.S.S) EXAMINATION,

CLINICAL NUTRITION AND DIETETICS

FIRST SEMESTER

FACULTY OF SCIENCE

ND1C03TM20 NUTRITIONAL BIOCHEMISTRY

Time: Three Hours **Max.Weightage:30**

Section -A

(Answer any eight questions. Each question carries a weight of 1.)

1. Explain the coenzymatic role of niacin in carbohydrate metabolism.
2. Briefly explain the term xenobiotics.
3. State transamination with a suitable example
4. Explain degradation of MUFA?
5. Describe the major salient features of DNA
6. Illustrate glycogenesis
7. Write exergonic reaction write an example
8. Define isoenzyme.
9. Discuss fructose metabolism.
10. Describe α oxidation. **(8X1=8)**

Section B

(Answer any six questions. Each question carries a weight of 2)

11. Explain HMP shunt with its significances.
12. Describe the role of mRNA in protein synthesis.
13. Explain the production and excretion of ammonia.
14. Explain the phases of detoxification?
15. Explain the process of digestion, absorption and transportation of fat.
16. Discuss glycolysis with energetics.
17. Differentiate exergonic and endergonic reactions
18. Explain the mechanism of enzyme action and the factors affecting the same.

(6X2=12)

Section C

(Answer any two questions. Each question carries a weight of 5.)

19. Elaborate on gluconeogenesis. Explain the mechanism of enzyme action and the factors affecting the same.
20. Explain Denovo synthesis of fat. Describe its regulation and write the energy transaction during the process
21. Elaborate the replication process of DNA. Describe catabolic reactions of amino acids.
22. Define detoxification. Discuss the energy production through respiratory chain.

(2X5=10)

SEMESTER I

ND1C04TM20 RESEARCH METHODOLOGY AND BIOSTATISTICS

Total Credits: 4

Total Lecture Hours: 90

Course Outcome

CO1:Critically analyse and apply knowledge about opportunities for research at advance level in the various fields of research nutrition

CO2:Explain various research designs and their characteristics

CO3: Explain the art of interpretation and the art of writing research reports.

CO4:Describe comprehensive knowledge for development of research

CO5: Explain the art of interpretation and the art of writing research reports.

Syllabus Content

Module I: Foundation and Design Strategies of Scientific Research (12 Hours)

Research Definition - Significance of Research - Objectives and characteristics of research - Types of Research - Qualities of researcher – Need for research in field of Nutrition. Descriptive studies - Correlation studies, Case studies, Cross sectional/Survey. Analytical studies - Observational studies, Cohort studies, Cross sectional studies/Survey.

Module II: Research Process (8 Hours)

Criteria for the selection of a research problem - selection and formulation of research problem - Literature survey, Formulating hypothesis - Importance and types of Hypothesis, Variables- definition, Characteristics, Types; Specifying objectives. Preparing Research Design – Importance and types of research design, Characteristics of a good Research design

Module III: Methods of Sampling, Data Collection and Representation (15 Hours)

Sampling- Definition, Characteristics of good sample, Sampling techniques, Merits and Limitations of sampling, Sampling and Non sampling errors. Sampling and survey methods and their application to public health research.

Concept and Types of Data, Methods for collecting data, Research tools for data collection – Questionnaire, Schedule, Rating scale, Attitude scale, Reliability and validity. Pilot study. Organization of data, Classification and Tabulation of data- parts of table, Significance and types of data presentation- graphs, bar diagram, histogram, pie chart, pictogram, cartogram.

Module IV: Scientific Writing (12 Hours)

Meaning, definition, Characteristics and Principles, Types of scientific writing, Format of report, National and international standards, Layout of thesis / dissertation. Writing process: Parts of dissertation/ Thesis: Title, Certificate, Declaration, Acknowledgement, Introduction, Review of

literature, Statement of the problem, Scope, Relevance, Objectives and Hypothesis of the study, Methodology, Results and discussion, Summary and Conclusion, Limitations and Recommendations, Abstract, Bibliography, Appendix.

Module V: Research in Nutrition and Dietetics (5 Hours)

Research possibilities in the field of nutrition and dietetics, Institutions providing Research facilities, Scholarships, Funds, Fellowships, Minor and Major project requisites. Article publication opportunities and Journals within the field of Nutrition and Dietetics. , Writing for Grants.

BIOSTATISTICS

Module VI: Foundation of Biostatistics (7 Hours)

Meaning, definition, characteristics of statistics. Importance of the study of statistics, Branches of statistics, Statistics and health science. Variables and their types, Measurement scales. Measurements of central tendency, Partition values, Measures of dispersion.

Module VII: Correlation and Regression analysis (9 Hours)

Concept of Correlation, correlation coefficient, Karl Pearson and Rank Correlation Coefficients. Concept of Regression and significance of regression, Linear regression & regression equation.

Module VIII: Probability and Standard Distributions (8 Hours)

Definition of probability, conditional probability, addition and multiplication rules of probability. Binomial distribution, Poisson distribution, Normal distribution, Divergence from normality – skewness, kurtosis.

Module IX: Testing of Hypothesis (14 Hours)

Parameters and statistics, Statistical inference, Statistical tests, Statistical hypothesis – Simple and Composite Hypotheses, parametric and non parametric Hypotheses, Null and alternative Hypotheses. Test statistics – Sampling distribution, Standard error, Level of significance, Type 1 and Type II, Degree of freedom, Two tailed and one tailed tests, Large and small sample tests - Test for mean, Test for proportion, Testing independence of attributes - χ 2 test.

QUESTION PAPER BLUE PRINT

ND1C04TM20 RESEARCH METHODOLOGY AND BIOSTATISTICS

Module	Weightage-1 8/10	Weightage-2 6/8	Weightage-5 2/4
I	1	1	
II	2	1	1
III	1	1	
IV	1	1	1
V	1	1	
VI	1	1	1
VII	1	1	
VIII	1	1	1
IX	1	-	

MODEL QUESTION PAPER
MASTER'S PROGRAMME DEGREE (C.S.S) EXAMINATION,

CLINICAL NUTRITION AND DIETETICS

FIRST SEMESTER

FACULTY OF SCIENCE

ND1C04TM20 RESEARCH METHODOLOGY AND BIOSTATISTICS

Time: Three Hours **Max.Weightage:30**

Section -A

(Answer any eight questions. Each question carries a weight of 1.)

1. Distinguish between a parameter and statistic.
2. Define binomial distribution and state the condition under which it holds.
3. Explain the term judgement sampling
4. Enlist the minor and major project requisites?
5. Enumerate the different types of scientific writing?
6. Define 'Dependent' and 'Independent' variable and specify its characteristics.
7. Define regression analysis and enlist the types.
8. Distinguish between case studies and cross sectional studies.

9. Enumerate the significance of variables
10. Enlist the characteristics of a good research design

(8X1=8)

Section B

(Answer any six questions. Each question carries a weight of 2)

11. Explain the significance of Chi – square test in statistical analysis.
12. Define research process. What are the criteria in selection of a research problem?
13. Calculate the correlation coefficient from the following data sheet:

    N X = 444 N Y = 443 N X2 = 19806 N Y2 = 20065 N XY = 19711 n = 10

14. Write a note on partition values.
15. Discuss on research tools. Define the terms 'Reliability' and 'Validity'.
16. Explain a scatter diagram with illustration.
17. Explain on descriptive studies and analytical studies in research.
18. Discuss on 'Writing for Grants'? Enlist the steps to be followed.

(6X2=12)

Section C

(Answer any two questions. Each question carries a weight of 5.)

19. Define hypothesis. Enlist the characteristics of research
20. Explain in detail on parts of dissertation. Discuss on merits and limitations of sampling.
21. Illustrate the research possibilities in the field of nutrition. Discuss the significance of statistics.
22. Define probability and explain the following;
    a. Condition probability.
    b. Addition and Multiplication rules of probability
    c. Two tailed test.
    d. One tailed test

(2X5=10)

SEMESTER I

ND1C01PM20 BIOCHEMICAL ANALYSIS

Total Credits: 2

Total Lecture Hours: 90

Course Outcome

CO1:Identify macro nutrients present in the given sample

CO2:Measure the amount of constituents present in various body fluids

CO3: Identify the types of abnormal constituents in various diseases

CO4: Analyse the amount of micronutrients present in body fluids

Syllabus Content:

Module 1: Carbohydrate (16 Hours)

a. Identification of Monosaccharides
b. Identification of Disaccharides
c. Identification of Polysaccharides
d. Identification of unknown carbohydrate
e. Estimation of Glucose in blood

Module II : Proteins (14 Hours)

a. Estimation of Proteins
b. Qualitative analysis of Amino Acids – Tryptophan, Tyrosine, Cysteine, Cystine

Module III : Fat (12 Hours)

a. Estimation of Cholesterol content
b. Estimation of Triglycerides

Module IV: Micro Nutrients (16 Hours)

a. Estimation of Vitamin C
b. Estimation of Iron
c. Estimation of Phosphorus
d. Estimation of Calcium

Module V : Blood constituents (20 Hours)

a. Estimation of Haemoglobin
b. Estimation of SGOT
c. Estimation of SGPT
d. Estimation of Acid/ Alkaline Phosphate
e. Checking of Blood pressure and pulse

Module VI: Urine constituents **(12 Hours)**

a. Estimation of Urea

b. Estimation of Creatinine

Learning Resources:

1) Satyanarayana. U(2005), Biochemistry, Uppala Author- Publisher Interlinks, Vijayavada

2) Jain J. L, Jain S, Jain N (2005),Fundamentals of Biochemistry, S. Chand& Company LTD, New Delhi

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ND1C05PM BIOCHEMICAL ANALYSIS

BLUE PRINT

Module	**Weightage-10**	**Weightage- 3**	**Weightage – 2**
I	1	Record	Viva Voce
II			
III			
IV			
V			
VI			

SEMESTER II

ND2C05TM20 ADVANCED DIETETICS

Total Credits: 4

Total Lecture Hours: 90

Course Outcome

CO1: Analyse the concept of medical nutrition therapy

CO2: Describe the significance of unique and individualised nutritional therapy

CO3: Describe different therapeutic diets, nutritional support and mode of feeding available

CO4: State the importance of team approach in therapeutic nutrition

Syllabus Content

Module 1: Introduction to Medical Nutrition Therapy (8 Hours)

Role of dietician, job specialization,

NCP- Nutritional assessment, nutritional diagnosis, nutritional intervention, nutritional monitoring and evaluation, documentation- SOAP/ Z score/ MUST/ POMR/ SGA. Routine Hospital Diet- Clear fluid, full fluid, soft and normal diet.

Module II: Medical Nutrition therapy for Gastrointestinal Tract Disorders (12Hours)

Upper Gastrointestinal tract Diseases /Disorders: Pathophysiology and Nutritional care and diet therapy in:

Diseases of oesophagus- Oesophagitis, Hiatus hernia

Disorders of stomach: Dietary management for Dyspepsia, Gastritis, Gastro esophageal reflux disease, Peptic ulcers, Dumping syndrome.

Lower gastrointestinal tract Diseases/Disorders

Flatulence, constipation, haemorhoids, diarrhoea,

Diseases of the large intestine: Diverticular disease, Irritable bowel syndrome, inflammatory bowel disease- Ulcerative colitis, Crohn's disease and short bowel syndrome

Malabsorption Syndrome/Diseases of Small intestine - Celiac (Gluten –induced) disease, Tropical sprue, Lactose intolerance, steatorrhoea,

Principles of dietary Care: Modified fibre diets/ high residue, low residue.

Module III: Medical Nutrition therapy for Diabetes Mellitus (10 Hours)

Aetiology, classification, pathophysiology symptoms and diagnosis, Glucose monitoring techniques – GTT, FBS, PPBS, RBS, Glycosylated haemoglobin, Urine testing

Management of DM- Nutritional management for Type1, Type2 and Gestational Diabetes

Medication - Hypoglycemic drugs, Insulin therapy, Exercise

Acute complications - Hypoglycemia, Hyperglycemia, Ketoacidosis.

Chronic complication –Macrovascular complications - Atherosclerosis, cerebro vascular diseases, peripheral vascular diseases, and infections

Microvascular complication - Nephropathy, Neuropathy and Retinopathy

Somogyi effect and Dawn phenomenon

Module IV: Medical Nutrition therapy for Liver and Gall Bladder disease (12 Hours)

Dietary care and management in jaundice, viral hepatitis (different types), fulminant hepatitis cirrhosis of liver, hepatic encephalopathy, Wilson's disease.

Dietary care and management in diseases of the gall bladder - cholelithiasis, cholecystitis, cholecystectomy

Dietary care and management in diseases of the Pancreas- acute, chronic pancreatitis

Module V: Medical Nutrition therapy for Cardiovascular Diseases (10 Hours)

Hypertension – classification (secondary and essential) Risk Factors for hypertension, Dietary management-DASH approach.

Hyperlipidemia and Hyperlipoproteinemia- Classifications, dietary management Atherosclerosis - Etiology and understanding the pathogenesis. Coronary Heart Disease - Angina Pectoris and Myocardial Infarction - Clinical manifestation and importance of cardiac enzymes to aid in the detection of CHD - Dietary management

Congestive Heart Failure - Pathogenesis - Risk factors

Cerebrovascular Disease and Peripheral Vascular Disease - Etiology and dietary care. Rheumatic and Congenital Heart Disease - Clinical manifestation, pathogenesis and nutritional care

Module VI: Medical Nutrition therapy for Renal Diseases (12 Hours)

Glomerulonephritis: Etiology, characteristics, Principles of dietary treatment and management.

Nephrotic Syndrome: Etiology, Principles of dietary treatment and management

Acute Renal Disease - Causes and Dietary management, Chronic Renal Disease and End stage renal diseases - Causes and Dietary management with complications.

Types of dialysis and their nutritional care – Haemodialysis, Peritoneal dialysis

Nephrolithiases- Etiology, types of stones and nutritional care (acid and alkaline ash diet)

Module VII :Medical Nutrition therapy for Respiratory diseases (10 Hours)

Signs and symptoms of pulmonary disease, respiratory distress syndrome in adults and newborn, Chronic Obstructive Pulmonary Disease - Etiology and Pathogenesis, Nutritional Management.

Module VIII:Medical Nutrition therapy for Fever and Infectious Diseases (8Hours)

Pathophysiology of fever and infection effect of fever and infection on nutritional status and management for febrile diseases- acute-typhoid, malaria, Dengue fever, Chikun Gunya, and chronic fever- tuberculosis, AIDS.

Module IX: Medical Nutrition therapy for Nutritional Anaemia (8 Hours)

Erythropoiesis and haemoglobin synthesis, Nutrients involved in Erythropoiesis Classifications, symptoms of Anemia and Nutritional Care.

Normocytic anaemia – aplastic anemia , Megaloblastic anaemia, Microcytic anemia Sickle cell anemia and Thalassemia, Hemolyticanemia

Learning Resources

References

1) Anne Payne, Helen M. Barker, (2011) "Advancing Dietetics and Clinical Nutrition", Elsevier Health Sciences.
2) Joan Webster-Gandy, Angela Madden, Michelle Holdsworth, "Oxford Handbook of Nutrition and Dietetics", OUP Oxford.
3) Begum R M, (2008), "A Textbook of Foods, Nutrition & Dietetics", Sterling Publishers Pvt. Ltd.
4) Garrow, J.S., James, W.P.T. and Ralph, A. (2000), "Human Nutrition and Dietetics", 10th Edition, Churchill Livingstone.
5) Gopalan.C, Rama Sastri, B.V, and Balasubramian, S.C., (2012), "Nutritive Value of Indian Foods", NIN, ICMR.
6) Mahan, L.K. and Escott-Stump, S. (2000), "Krause's Food Nutrition and Diet Therapy", 10th Edition, W.B. Saunders Ltd.

QUESTION PAPER BLUE PRINT

ND02C05TM20 ADVANCED DIETETICS

Module	**Weightage 1** **8/10**	**Weightage 2** **6/8**	**Weightage 5** **2/4**
I	1	1	
II	2	1	1
III	1	1	
IV	1	-	1
V	1	1	
VI	1	1	
VII	1	1	1
VIII	1	1	
IX	1	1	1

SEMESTER II

ND2C06TM20 - ADVANCED NUTRITION

Total Credits: 4

Total Lecture Hours: 90

Course Outcome

CO1: Differentiate between functions of various nutrients

CO2: Analyse the role and importance of all nutrients present in foods

CO3: Describe the recent advancement in field of nutrition.

CO4: State the various types of nutrients and their functions in the body.

Syllabus Content

Module I-Human Nutrient Requirements (7 Hours)

Macronutrients, methods of assessment of nutrient needs – a critical review, Critical evaluation of sensitive methods and derivations of requirements and recommended dietary allowances of macronutrients for all age groups: - Energy - Carbohydrates and dietary fibre - Proteins and amino acids - Lipids – Water, critical evaluation of National and International nutrient allowances; factors affecting the requirements.

Module II- Body Composition (9 Hours)

Different levels of body composition- atomic, molecular, cellular, tissue and whole body levels, body compartments, Estimation of body composition (direct and indirect methods), Body composition changes during childhood, adolescence and elderly, Status/Length, Weight, Circumference measurements, Body Mass Index, skinfold measurements, leg length.

Module III-Energy (12 Hours)

Components of energy requirements: BMR, RMR, thermic effect of food, physical activity. Factors affecting energy requirements, methods of measuring energy expenditure. Estimating energy requirements of individuals and groups. Regulation of energy metabolism and body weight: Control of food intake – role of leptin and other hormones.

Module IV- Carbohydrates (8 Hours)

Classification, occurrence and physiological functions, digestion, absorption and transport, factors influencing metabolism. Dental caries. Role of dietary fibre in health and disease. RDA, major sources.

Module V- Lipids (8 Hours)

Digestion, absorption and transport, classification - visible and invisible fats. MUFA, PUFA, EFA, SFA, trans fatty acid- sources and physiological functions. Role of lipoproteins, cholesterol and triglycerides in health and disease. RDA, major sources.

Module VI- Proteins (8 Hours)

Classification - essential and non-essential amino acids- their role in growth and development. Physiological functions of proteins. Requirements, nitrogen balance. Methods for evaluating protein quality. RDA, major sources.

Module VII- Minerals (13 Hours)

Macro minerals: Digestion, absorption, factors affecting absorption, transport and utilization

Calcium - Skeleton and other tissue measurement, bone mineral density, effect of diet and immobilization, calcium absorption and utilization, calcium balance, requirement, sources, deficiency and excess (toxicity).

Phosphorous - Concentration in the body, calcium -phosphorous ratio, absorption and utilization, deficiency and toxicity, interrelationship of calcium, phosphorus, vitamin D and protein.

Sodium, potassium, magnesium and sulphur - distribution, absorption, utilization, role in human nutrition, deficiency and toxicity. Electrolyte balance and acid base balance, Acidosis, Alkalosis, Anion gap

Micro Minerals: Iron - Intake, utilization, storage, iron balance, functions, deficiency and toxicity. Role of Iron in prevention of anaemia, sources and RDA.

Iodine and Zinc - Physiology, functions, and sources recommended intake, deficiency and toxicity.

Fluorine -Physiology, use in the prevention of dental carries and toxic effects, sources, RDA.

Copper, molybdenum, cobalt, nickel, manganese, selenium, chromium and cadmium Physiology, sources, recommended intake, deficiency and toxicity, sources and RDA

Module VIII- Fat Soluble Vitamins (12 Hours)

Factors influencing the utilization of vitamins.

Fat soluble vitamins: A,D,E,K - History, chemistry, physiological role, digestion, absorption transport, utilization and storage, methods of assay, dietary sources, dietary losses in preparation and handling, conversion of carotene in to vitamin A in human beings, RDA, deficiency and toxicity.

Module IX- Water Soluble Vitamins (13 Hours)

Water soluble Vitamins: B complex Thiamine, riboflavin, niacin, vitamin B_{12}, pyridoxine, pantothenic acid, Choline, carnitine, inositol, taurine, biotin and ascorbic acid – history, chemistry, sources, physiological action, biochemical utilization, storage, transport, biosynthesis of vitamins, losses in preparation and handling, recommended intake, deficiency diagnosis and toxicity, methods of assay.

Learning Resources

References

1) James L Groff and Sareen S Gropper, (2009) "Advanced Nutrition and Human Metabolism", Fourth Edition, Wadsworth Publishing Company.

2) Hui,Y H, (2007), " Handbook of Food Products Manufacturing" Vol. I , Wiley- Interscience, New Jersey Publishers.

3) Maurice B Shils, Moshe Shike A, Catherine Ross, Benjamin Cabellero, Robert J Cousins, (2006), "Modern Nutrition in Health and Disease", Lippincott Williams al Wilkins.

4) Michael J Gibney, Ian A Macdonald and Helen M Roche (2003) "Nutrition and Metabolism", The Nutrition Society Textbook Series, Blackwell Publishing, First Edition.

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ND2C06TM20 - ADVANCED NUTRITION

Module	**Weightage 1** **8/10**	**Weightage 2** **6/8**	**Weightage 5** **2/4**
I	1	1	1
II	2	1	
III	1	1	1
IV	1	-	
V	1	1	
VI	1	1	1
VII	1	1	
VIII	1	1	1
IX	1	1	

SEMESTER II

ND2C07TM20 FOOD SCIENCE AND TECHNOLOGY

Total Credits: 4

Total Lecture Hours: 90

Course Outcome

CO 1: Enable the students to gain knowledge on nutritive value and properties of different foods

CO2: Enumerate the changes in property during cooking and handling of food

CO3: Articulate on recent trends and novel foods.

CO4: Distinguish between various functional foods

CO5: Identify toxins in food

CO6: Apply principles of New Product Development

CO7: Develop innovative food products

Syllabus Content

Module I: Cereals and millets (10 Hours)

Structure, properties, nutritive value. Gelatinization, Gelation, syneresis, retrogradation, dextrinization. Factors affecting gelatinization and gelation. Modified starch, resistant starch Flour mixtures – batters and dough - Leavening agents – physical, chemical and biological. Gluten formation, Gums – Functions, sources, applications. Pectic substances, pectin gels

Module II: Vegetables and Fruits (10 Hours)

Nutritive value, pigments, ripening and senescence. Enzymatic and non enzymatic browning reaction.

Pulses and legumes - Composition, processing

Module III:Milk and Milk Products (15 Hours)

Composition of milk, properties of milk, effect of heat on milk, milk products and milk substitutes

Meat, fish and poultry – Composition. Post-mortem changes of meat, tenderisation, cuts and grades of meat. Selection of fishes.

Eggs -Composition, use in cooking, egg products.

Protein concentrates and isolates hydrolysates and textured vegetable proteins, modified meat products, soy proteins, non-conventional sources of protein.

Module IV: Fats, oils and sugars (8 Hours)

Properties of fats, Role of fats and oils in cooking, Fat substitutes, Fat deterioration and antioxidants, chemical degradation, oxidative and hydrolytic rancidity, effect of heat, chemical modifications of

fats - Hydrogenation, trans fats. Colloidal systems, Types of food dispersions – sol, gel, emulsion and foam and applications in foods.

Sugars -Properties of sugars, chemical reactions –Hydrolysis, caramelization, maillard reaction. Food Applications : crystalline candies, crystallization, syrup, sauces, jams and jellies, Stages of sugar cookery, Crystallisation

Module V: Food processing techniques (15 Hours)

Traditional Processing Methods – Drying, Salting, Sugaring, Pickling, Smoking, Fermentation, Concentration – Advantages and Disadvantages. Modern Processing techniques – Application of High temperature, Low temperature, Hydrostatic Pressure Treatment, High Voltage Pulse Technique, irradiation. Canning – Advantages and Disadvantages.

Food Packaging. Novel Methods in Food Preservation, Use of Biopreservatives: Antibiotics, Bacteriocins, Natural antimicrobials from plants.

Module VI: Food additives (8 Hours)

Definition, Types and action of food additives – Preservatives, Antioxidants, Sequesterants, Stabilizers, Bleaching agents, Maturing agents, Aerating agents, Antistaling agents, Bodying agents, Clouding agents, Curing agents, Clarifiers, Food colours, Nutritive and Non –Nutritive Sweeteners, Surfactants , Fat replacers. Numbering system of Food additives, Acceptable Daily Intake, Health concerns.

Module VII: Novel Foods (10 Hours)

Definition, Types and acceptability of Novel foods - SCP, leaf isolates, oil seed cakes, hydrocolloids, novel source of food colourants.

Functional foods – Fibre- Resistant starch, phytochemicals, essential oils, Natural antimicrobial compounds in foods.

Introduction, Definition, history, classification – Prebiotics, probiotics and synbiotics

Probiotics: Taxonomy and important features of probiotic micro- organisms, Health effects of probiotics including mechanism of action, Probiotics in various foods: fermented milk products, non-milk products. Quality Assurance of probiotics and safety.

Prebiotics-Definition, chemistry, sources, metabolism and bioavailability, effect of processing, physiological effects, effects on human health and potential applications in risk reduction of diseases, perspective for food applications of - Non-digestible carbohydrates/oligosaccharides: Dietary fibre, Resistant starch, Gums.

Module VIII: Toxins in food (8 Hours)

Definition, Types and health hazards of Natural Toxins in foods: Pulses, cereals, nuts–Biogenic amines, Ciguatoxin Shellfish toxins, Scombrotoxin, Tetrodotoxin, Mushroom toxins, Aflatoxins,

BOAA Gempylotoxin, Pyrrolizidine alkaloids, Venomous fish, Grayanotoxins, Phytohaemagglutinin, protease inhibitors, phytates.

Definition and health hazards of chemical contaminants – Heavy Metals, Pesticide residues, inferior packaging materials and adulterants.

Module IX: New product development (6 Hours)

Definition, classification, characterization, factors shaping product development. Social concerns, health concerns and market place concerns. Process of development: ingredient characteristics, idea generation, feasibility, technique standardization, variations, product standardisation, product development, sensory evaluation, product modification, final product, label design and packing

Learning Resources

References

1) Vickie Vaclavik, Elizabeth W. Christian, (2013), "Essentials of Food Science", Springer Science & Business Media.
2) George Stewart, (2012), "Introduction to Food Science and Technology", Elsevier.
3) Geoffrey Campbell-Platt, (2011), "Food Science and Technology", John Wiley & Sons.
4) International Food Information Service, (2009), "IFIS Dictionary of Food Science and Technology", John Wiley &Sons.
5) Sumati Rajagopal Mudambi, Shalini M. Rao, M. V. Rajagopal, (2006), "Food Science", New Age International.

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ND2C07TM20 FOOD SCIENCE AND TECHNOLOGY

Module	Weightage-1 8/10	Weightage-2 6/8	Weightage-5 2/4
I	1	1	1
II	1	1	
III	1	1	
IV	1	1	1
V	2	1	
VI	1	1	1
VII	1	1	
VIII	1	1	1
IX	1	-	

SEMESTER II

D2C08TM20 NUTRITION IN CRITICAL CARE

Total Credits: 4

Total Lecture Hours: 9

Course Outcome

CO1: Discuss on the process of nutrition care in hospitals

CO2: Analyse and modify the feeding techniques for specific conditions

CO3: Explain the skills in specialising with therapeutic dietary management

CO4: Discuss the nutritive requirements of various critically ill conditions.

Syllabus Content

Module I: Pre and Post-Operative Diet: (10 Hours)

Type of surgery, physiological response to surgery, assessment of nutritional status, nutritional requirements for various surgical conditions.

Module II: Enteral nutrition (12 Hours)

Introduction, access route, catheter insertion procedure, physical characteristics, advantages and disadvantages, nutrient composition, types of formula, formula calculation, drug administration, monitoring and complications- gastro intestinal, insertion site and metabolic complications.

Module III: Parentral Nutrition (12 Hours)

Total parentral nutrition- short term, long term, peripheral parentral nutrition. Nutrient composition, PN solutions, osmolarity and osmolality of solutions, administration techniques, monitoring and complications- vein, gastro intestinal, insertion site and metabolic complications

Module IV: Hospice Nutrition (8 Hours)

Definition, Social and psychological support to terminally ill. Role of palliative care in different conditions- Elderly, cancer patients, paralyzed patients.

Module V: Nutrition in Stress (12 Hours)

Burns- classification, complications, dietary management. Trauma- Physiological metabolic and hormone response to injury, dietary management. Sepsis- systemic metabolic response. Multiple organ dysfunction syndrome- Nutritional assessment and dietary management. Gastric and Intestinal surgery: Short bowel syndrome, Ileostomy, Colostomy, Rectal surgery

Module VI: Cardiovascular complications, surgery and transplant (7 Hours)

Clinical and metabolic aspects and special nutritional requirements

Module VII: End stage Renal Disease and Kidney Transplantation (7 Hours)

ESRD: In diabetic patients and in children Nutritional requirement, fluid and electrolyte management

Module VIII: Decompensated Liver diseases and transplant (7 Hours)

Complications, nutritional management of liver disease. Nutritional therapy in liver resection and transplantation.

Module IX: Nutrition and Cancer (15 Hours)

History of cancer, development of cancer, characteristics and identification of cancers. Carcinogens in foods, Etiology and Pathogenesis of carcinogenesis. Metabolic and Nutritional Alterations in Malignancy. Types of therapy and their side effects. Nutritional impacts of cancer therapy. Bone Marrow Transplant and its nutritional care. Nutritional requirement of the Cancer patient

Learning Resources

References

1) Rajkumar Rajendram, Victor R. Preedy, Vinood B. Patel, (2015), "Diet and Nutrition in Critical Care", Springer New York.
2) Peter Faber, Mario Siervo, (2014), "Nutrition in Critical Care", Cambridge University.
3) Miranda Kelly, (2014), "Nutrition in Critical Illness, An Issue of Critical Nursing Clinics", Elsevier Health Sciences.
4) Gopalan.C, Rama Sastri, B.V, and Balasubramian, S.C. (2012), "Nutritive Value of Indian Foods", NIN, ICMR.
5) Preiser, (2005), "Nutrition in Critical Care", Remedica Publishers.

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ND2C08TM20 NUTRITION IN CRITICAL CARE

Modules	**Weightage-1 8/10**	**Weightage-2 6/8**	**Weightage-5 2/4**
I	1	-	1
II	1	1	
III	1	-	1
IV	1	1	
V	2	3	1
VI	1	1	
VII	1	1	
VIII	1	-	
IX	1	1	1

SEMESTER II

ND2C02PM20 ADVANCED DIETETICS AND CRITICAL CARE

Total Credits: 2

Total Lecture Hours: 90 Hours

Course Outcome

CO1: Analyse and modify the menu to therapeutic demands

CO2: Explain the skill in the selection of foods for modification of diet

CO3: Plan menu for specific therapeutic conditions

CO4: Prepare and calculate the nutritive value of planned menu

Syllabus Content

Module 1: Market Survey (5 Hours)

Market survey for commercial oral supplements – any ten macro and micro nutrients supplements produced by nutraceutical companies

Module II: Standardisation (3 Hours)

Standardization of common raw and cooked foods for weight and volume measurement.

Module III: Enteral Feeding (5 Hours)

Plan and prepare a kitchen formula any critically ill patient.

Module IV: Routine Hospital Diet (8 Hours)

1) Plan therapeutic diet – clear full diet, full fluid diet, soft diet and normal diet.
2) Plan the therapeutic diet progression of a severely burnt patient.

Module V: **Planning and preparation of diets for Cardiac diseases (8 Hours)**

1) Modified diet for Hypertension,
2) Modified diet for Atherosclerosis

Module VI: **Planning and preparation of diets for Renal diseases (12 Hours)**

1) Nephrotic syndrome (paediatric)- Modified diet with protein, sodium and potassium
2) Glomerulonephritis - Modified diet with protein, sodium and potassium
3) Chronic renal failure - Modified diet with protein, sodium and potassium

Module VII: **Planning and preparation of diets for High calorie diet (12 Hours)**

1) Modified diet for underweight
2) Modified diet for cancer
3) Modified diet for anaemia
4) Modified diet for fevers – tuberculosis, typhoid.

Module VIII: **Planning and preparation of diets for Gastro intestinal diseases (15Hours)**

1) Modified diet for Peptic ulcer

2) Modified diet for Ulcerative colitis
3) Modified diet for Diverticulosis
4) Modified diet for Diarrhoea
5) Modified diet for Constipation

Module IX: **Planning and preparation of diets for Diabetes mellitus (5 Hours)**

1) Modified diet for with/without insulin therapy.

Module X: **Planning and preparation of diets for Low calorie diet conditions (7 Hours)**

1) Modified diet for obesity
2) Modified diet for gout

Module X1: **Planning and preparation of diets for Liver diseases (10 Hours)**

1) Modified diet for Hepatitis
2) Modified diet for Cirrhosis

Learning Resources

References

1) Rajkumar Rajendram, Victor R. Preedy, Vinood B. Patel, (2015), "Diet and Nutrition in Critical Care", Springer New York.
2) Peter Faber, Mario Siervo, (2014), "Nutrition in Critical Care", Cambridge University Press.
3) Miranda Kelly, (2014), "Nutrition in Critical Illness, An Issue of Critical Nursing Clinics", Elsevier Health Sciences.
4) Gopalan. C, Rama Sastri, B.V, and Balasubramian, S.C. (2012), "Nutritive Value of Indian Foods", NIN, ICMR.

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ND2C02PM20 ADVANCED DIETETICS AND CRITICAL CARE

Module	Weightage 10	Weightage 3	Weightage 2
I	1	Record	Viva voce
II			
III			
IV			
V			
VI			
VII			
VIII			
IX			
X			
XI			

SEMESTER III

ND3C09TM20 APPLIED NUTRITION

Total Credits: 4

Total Lecture Hours: 90

Course Outcome

CO1: Assemble the basic principles of nutrition and design diet regimens for overall health and exercise performance.

CO2: Administer the nutritional alterations in special conditions

CO3: Simulate changes through nutrition counselling

CO4: Identify the factors influencing the development of eating disorders and eating disorder sequel.

CO5: Deduce the development in the field of nutrition.

CO6: Familiarise concepts of immune nutrition, nutrigenetics and nutrigenomics

Syllabus Content

Module I: Nutrition and weight management (16 Hours)

Regulation of body weight, Genetics and body weight, body weight assessment Obesity: Etiology, Assessment, Classification, Management of Obesity - Medical, Nutritional, Lifestyle management, Role of exercise, Surgical complications, Childhood Obesity. Underweight: Etiology Metabolic consequences of starvation and Management.

Module II : Eating Disorders (12 Hours)

Nutritional Aspects of Eating Disorders and Nutritional management of eating disorders - Anorexia Nervosa, Bulimia Nervosa, Binge eating disorders, Anorexia athletic, Body dysmorphic disorder, Muscle dysmorphic disorder (bigorexia), Orthorexia nervosa, Pregorexia**,** Drunkorexia, Infection-triggered, auto immune subtype of anorexia nervosa in young children, Night-eating syndrome, Rumination syndrome, Gourmand syndrome, Prader-Willi syndrome, Pica, Cyclic vomiting syndrome, Chewing and spitting.

Module III: Food Allergy (13 Hours)

Definition, Symptoms and mechanism of food allergy, Diagnosis – Biochemical, RAST, history and food record, food challenge, Elimination diets, Food Selection and Medication.

Module IV: Special conditions (14 Hours)

Space nutrition – Foods developed for different space flights. International space station, Food system engineering facilities, Types of space foods, Microgravity, Baseline space shuttle food and beverages, International space station daily menu and standard menu, Space shuttle standard menu.

High altitude nutrition – Acclimatization, Hydration, Micronutrient ratio and calories, altitude sickness, Effect of altitude on energy balance, Fluid requirements, Hypoxia, weight loss, gastrointestinal complaints.

Polar – Key developments in nutrition, Fundamentals of polar diet, Formulation of a polar diet, Hunger and starvation, Nutrition in inter war period.

Module V: Nutrition counselling (**12 Hours)**

Diet counselling skill: Tactics and techniques of counselling – evaluating and understanding clients attitude, how to identify and express feelings towards the client, utilizing proper counseling techniques – verbal behavior, non – verbal behavior, covert behavior. Concepts and principles in communication and their application in developing skills in counseling, use of communication aids, communication and interviewing skills.

Counseling process, Community counseling – Community education, crisis intervention, assessment, client records, orientation of services for clients, client care plan, referral, follow up. Ethics and the counselor.

Module VI : Immuno Nutrition **(13 Hours)**

Nutrients affecting the immune system at the physiological, cellular and genetic level. Nutrients involved in the Inflammatory response. Role of specific nutrients in immune suppression. Role of nutrients in Immune promotion acute inflammation: features, causes, vascular and cellular events, inflammatory cells and mediators, chronic inflammation: Causes, Types, Classification nonspecific and granulomatous with examples, repair, Wound healing by primary and secondary union, factors promoting and delaying the process. Healing in specific site including bone healing.

Module VII: Nutrigenetics and Nutrigenomics (**10 Hours)**

Nutritional genomics- Nutrigenetics and Nutrigenomics- Introduction, Definition, Gene Expression, Single – nucleotide polymorphism (SNP) nutrition- gene interaction, Human, Nutrigenetic diseases, Epigenetics.

Learning Resources

Reference:

1) Bharat B. Aggarwal, David Heber, (2014), "Immunonutrition: Interactions of Diet, Genetics, and Inflammation", CRC Press.
2) Sareen Gropper, Jack Smith, (2012), "Advanced Nutrition and Human Metabolism", Cengage Learning.
3) Anne Payne, Helen M. Barker, (2011), "Advancing Dietetics and Clinical Nutrition", Elsevier Health Sciences.

4) Krause's Food and Nutrition Therapy, (2010), 12th Edition.
5) Paul Insel, R. Elaine Turner, Don Ross, (2009), "Discovering Nutrition", Jones & Bartlett Publishers.
6) Lynnette R. Ferguson, (2013), "Nutrigenomics and Nutrigenetics in Functional Foods and Personalized Nutrition", CRC Press

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ND3C09TM20 APPLIED NUTRITION

Module	**Weightage-1 8/10**	**Weightage-2 6/8**	**Weightage-5 2/4**
I	1	1	1
II	1	1	1
III	2	1	
IV	2	1	1
V	1	2	
VI	1	1	1
VII	2	1	

SEMESTER III

ND3C10TM20 HOSPITAL MANAGEMENT

Total Credits: 4

Total Lecture Hours: 90

Course Outcome

CO1:Identify the skills necessary in every aspect of catering management, where a dietician is directly involved

CO2:Measure the amount of knowledge on software programming

CO3: Identify administrative aspects of hospital management

CO4: Analyse knowledge of efficient management of hospital; being a part of medical team

Syllabus Content

Module I: Food Service Establishments (10 Hours)

Structure, History and Development, Types of Food Service Establishments - Commercial Establishments, Non-Commercial Establishments.

Module II: Institutional Food Management (10 Hours)

Organisational hierarchy, Approaches to Management, Principles of management, functions of management- planning, organizing, directing, coordinating, controlling and evaluating, Management Process- Tools of Management, Management of resources- money, space, materials, equipment's, staff, time, energy and procedures.

Module III: Food Management (10 Hours)

Food purchasing, Receiving and Storage of foods, Menu planning. Food Service: Style of Service & Types of Service. Environmental hygiene and sanitation, Waste disposal, Food handling practices, Personal hygiene Safety and security, Legal responsibilities of a food service institution, Food Standards.

Module IV : Financial Management (10 Hours)

Definition & Scope of application of Management accounting, Cost concept, Components of costs, Cost control, Pricing, Book keeping & accounting

Module V: Personnel Management (15 Hours)

Recruitment, Selection, induction, employee facilities & benefits, Types of employee welfare Schemes, training and development of employees.

Module VI: Presentations using Power Point (15 Hours)

Creating Presentations - Slides. New Slid, Slide Layout, Applying a Slide Layout, Slide Design, Design Templates, Colour Schemes, Slide Background, Changing Slide background,

Deleting Slides, Slide Show, Show Type, Show options, Animation schemes, Slide Transition, Setting up Shows, Custom Shows, Printing Slides.

Module VII: SPSS and its Applications **(20 Hours)**

Defining variables - Numeric and String Variables - Assigning Names and Labels to variables and values - Entering Data - Summary Statistics - Frequencies - Descriptive Statistics Means - Crosstab - Graphs - Histograms and Bar charts- Scatter diagram, Pie Diagram - Bivariate Correlation - Linear regression - Test of mean - One Sample t-test, Independent sample t-test- Paired samples t-test - One way ANOVA- Chisquare test.

Learning Resources

References

1) Wallace J. Hopp, William S. Lovejoy, (2012), "Hospital Operations: Principles of High Efficiency Health Care", FT Press.
2) A.K. Malhotra (2009), "Hospital Management: An Evaluation", Global India Publications.
3) BM Sakharkar ,(2008), "Principles of Hospital Administration and Planning", Jaypee Brothers, Medical Publishers Pvt. Limited.
4) Frank J. Fabozzi, Pamela P. Peterson, (2003), "Financial Management and Analysis", John Wiley & Sons.
5) Cole Davis, (2013), "SPSS for Applied Sciences: Basic Statistical Testing", Csiro Publishing.
6) Dr.S. M Jha (2018) "Hospital Management" Himalaya Publishing House.

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ND3C10TM20 HOSPITAL MANAGEMENT

Module	**Weightage 1 8/10**	**Weightage 2 6/8**	**Weightage 5 2/4**
I	1	1	
II	2	1	1
III	1	1	1
IV	1	1	
V	1	1	1
VI	2	2	
VII	2	1	1

SEMESTER III

ND3C11TM20 CLINICAL BIOCHEMISTRY

Total Credits: 4

Total Lecture Hours: 90

Course Outcome

CO1: Analyse the pathophysiological changes in different organs in different disease conditions

CO2: Articulate the metabolic changes occurring in different disease conditions

CO3: Interpret various diagnostic tests and parameters

CO4: Differentiate between various inborn errors of macronutrient metabolisms

Syllabus Content

Module 1: Nutrition and Metabolic Syndrome (10 Hours)

Overview, Prevalence, Etiology, Risk factors, Complications and Management. Special emphasis to preventive role of nutrition and lifestyle, Metabolic changes of Brain, Muscles and adipose tissue- during fasting, starvation, well fed conditions and changes during exercise

Module II: Metabolic alterations in Diabetes Mellitus (12 Hours)

Insulin- Biosynthesis, degradation, structure, mechanism of action and physiological action, metabolic derangements in diabetes mellitus- carbohydrate, protein and fat metabolism

Module III: Metabolic alterations in Liver diseases (10 Hours)

Fatty infilteration, fatty liver – definition, causes and action of lipotrophic factors, Catabolism and anabolism of ketonebodies, regulation of ketogenesis, ketosis and its consequences. Biochemical parameters.

Module IV: Metabolic alterations in cardiovascular diseases (12 Hours)

Progressive stages of plaque formation, Lipoprotein metabolism- VLDL, LDL and HDL, alterations in structure and function of lipoproteins, Types, synthesis, biological and clinical actions of prostaglandins. Synthesis of steroid hormones

Module V: Action of free radicals and antioxidants (12 Hours)

Overview, Types, action, mechanism of antioxidants, role of oxygen free radicals and production, physiological mechanisms to limit free radical damage, free radical in the pathophysiology of diseases, enzymatic regulation of damage

Module VI: Biochemical aspects of haematology (10 Hours)

Disorders of erythrocyte metabolism, hemoglobinopathies, thalessemias thrombosis and anemias. Laboratory tests to measure coagulation and thrombolysis

Module VII: Inborn Errors of Metabolism (14 Hours)

Carbohydrate- Introduction, Glycogen storage diseases, Fructosuria, Galactosemia,

Protein metabolism: Phenylalanemia, homocystinuria, tyrosinemia, Maple Syrup Urine Disease, phenylketonuria, alkaptonuria, albinism and animoacidurias

Fat metabolism: Hyperlipoproteinemia, Gaucher's disease, Tay-Sach's and Niemann-Pick disease, Abetalipoproteinemia

Module VIII: Diagnostic tests **(10 Hours)**

Organ Function Tests- Thyroid, Renal, Cardiac and Liver, Enzymology -LDH, CPK, ALP, ACP, GGT, Amylase,5'nucleotidase.Haematological test- Haematocrit, PCV, RBC indices.

Learning Resources

References

1) Allan Gaw, (2008), "Clinical Biochemistry: An Illustrated Colour Text", Elsevier Health Sciences.
2) Nessar Ahmed, (2010), "Clinical Biochemistry", OUP Oxford.
3) VasudevanD.M,Sreekumari S,(2005), "Text Book of Biochemistry", Jaypee Brothers Medical Publishers(P),Ltd, New Delhi.
4) William J. Marshall, MártaLapsley, Andrew Day, Ruth Ayling, (2014), "Clinical Biochemistry: Metabolic and Clinical Aspects", Elsevier Health Sciences.
5) Nanda Maheshwari, (2008), "Clinical Biochemistry", Jaypee Brothers Publishers.

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ND3C11TM20 CLINICAL BIOCHEMISTRY

Module	**Weightage-1 8/10**	**Weightage-2 6/8**	**Weightage-5 2/4**
I	1	1	1
II	1	1	
III	1	1	1
IV	2	1	
V	1	1	1
VI	1	1	
VII	2	1	1
VIII	1	1	

SEMESTER III

ND3C12TM20 NUTRITIONAL PHARMACOLOGY

Total Credits: 4

Total lecturer hours: 72

Course Outcome

CO1: Discuss on the process of nutrition care in hospitals

CO2: Analyse and modify the feeding techniques for specific conditions

CO3: Explain the skills in specialising with therapeutic dietary management

CO4: Differentiate how specific patient characteristics and genetics can affect the response to a particular class of drugs.

CO5: Analyse the scientific basis underlying how two different drugs can interact within the body and can have undesirable effects either on drug concentrations or drug clinical Effects

Syllabus Content

Module 1: General principles of Nutritional Pharmacology (13 Hours)

Definitions, classification of drugs, sources of drugs, routes of drug administration, principles of pharmacokinetics and pharmacodynamics, principles of toxicology and treatment of poisoning, pharmacogenomics, essential drug concepts, drug toxicity, drug allergy, drug resistance, drug potency, efficacy and drug antagonism, drug addiction and drug abuse, toxicity studies in animals.

Module II: Effects of Food on Drug therapy (10 Hours)

Digestion**,** absorption**,** distribution and excretion of drugs, Medication and enteral nutrition reaction, effect of nutrients and nutritional status on absorption and metabolism of drugs. Physiological consequences.

Module III: Effect of Drug on Food and Nutrition (13 Hours)

Nutrient digestion, absorption, distribution, excretion. Modification of drug action by food. Drug and nutrient interaction: Effect of drugs on nutrient intake, absorption and metabolism, requirement, summary of action of some common drugs. Major mechanisms that can lead to drug-drug interactions, Role of enzyme induction and inhibition of metabolic enzymes play in drug metabolism.

Module IV: Effects of drug on Nutritional status (10 Hours)

Effect on chemical senses**,** gastrointestinal effects**,** and appetite changes organ system toxicity, Effect on glucose levels, Excipients and food drug interactions.

Module V: Systemic Pharmacology (14 Hours)

Cardiovascular system, Renal function, Gastro intestinal system, Central nervous system, Blood, Autocoids, Respiratory system. Drugs affecting uterine motility, Heavy metals and chelating agents, Drugs used for imunomudulation: Immunostimulants, Immunosuppressant's, Chemotherapy of Neoplastic diseases, NSAID's

Module VI: Drug Regulations (12 Hours)

Drugs and Cosmetics Act, Drug Price Control order, Application for Investigational New Drug (IND), Application for New Drug Discovery (NDD) according to Indian Control Authority & USFDA guidelines. Ethical considerations in utilizing human subjects for drug discovery process. ICH-GCP Guidelines. Ethical guidelines in utilizing animals for experimental purposes.

Learning Resources

References

1) Satoskar R S, Nirmala Rege, SD Bhandarkar, (2015), "Pharmacology and Parmacotherapeutics", Elsevier Health Sciences.
2) Stanley Zaslau (2013), "Lippincott's Illustrated Q&A Review of Pharmacology", Lippincott Williams & Wilkins.
3) Joseph I. Boullata, Vincent T. Armenti, (2010), "Handbook of Drug-Nutrient Interactions", Springer Science & Business Media.
4) Richard Finkel (PharmD.), Michelle Alexia Clark, Luigi X. Cubeddu, (2009) "Pharmacology", Lippincott Williams & Wilkins.
5) Mitchell Bebel Stargrove, Jonathan Treasure, Dwight L. McKee, (2008) "Herb, Nutrient, and Drug Interactions: Clinical Implications and Therapeutic Strategies".

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ND3C12TM20 NUTRITIONAL PHARMACOLOGY

Module	**Weightage-1 8/10**	**Weightage-2 6/8**	**Weightage-10 2/4**
I	2	1	1
II	1	-	1
III	2	2	1
IV	1	2	
V	2	1	
VI	2	2	1

SEMESTER III

ND3C03PM20 YOGA AND BASIC LIFE SUPPORT

Total Credits: 4

Total Lecture Hours: 108

Course Outcome

CO1: Administer yoga for all-round personality development

CO2: Practice stress management techniques

CO3: Interpret the significance of emergency medicine

CO4: Identify the need for basic first aid

CO5: Create presence of mind in times of accidents

Syllabus Contents

Module I **(12 Hours)**

Introduction to Yoga: definition, objectives, need and importance. Different streams of yoga, five points of yoga**.** 8 limbs of yoga, general instructions for the practitioner. Do's and Don'ts

Module II **(15 Hours)**

Kriyas, pranayama and meditation

Module III **(15 Hours)**

Basic asanas and benefits

Module V **(14 Hours)**

Surya namaskara: introduction steps of suryanamaskara

Module VI **(8 Hours)**

- Introduction to basic life support
- Recognition of sudden cardiac arrest (SCA) and activation of the emergency response system
- Learn to look for arterial pulse
- Learn to look for breathing patterns

Module VII **(12 Hours)**

- CPR: Adults, Infants
- Chest compressions : Hands on training
- Rescue Breaths
- Early Defibrillation With an AED(optional)
- Recovery position

Module VIII **(16 Hours)**

- BLS during choking
- Relief of Foreign-Body Airway Obstruction

- Basics of heart attack, stroke, hypoglycemia ,hypothermia

Module IX **(18 Hours)**

- Snake Bite : Primary care
- Other bites and stings: Primary care
- BLS during road accidents: Log roll, helmet removal, spine fractures
- Basic trauma victim management
- Basic wound management
- Burns, scalds, electric shock

Learning Resources

References

1) K.S. Iyengar, "Light on Yoga" Schocken Publisher, 1995
2) Mary Nurriestearns, "Yoga for Emotional Trauma medications and practices for healing pain and suffering", Harbinger Publications
3) Dr. R Nagaratna and Dr. H.R Nagendra, " Yoga for Hypertension and Heart Diseases, Vivekananda Yoga Research Foundation
4) Rajeev Roy, "Yoga for Health and Happiness", Tiny Tot Publications
5) Yogacharya Govindan Nair, Yogapadavali, D.C Books, Kottayam
6) Dr.Gireesh Kumar, Advanced emergency life support protocols, Paras books, 2015

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ND3C03PM20 YOGA AND BASIC LIFE SUPPORT

Module	Performance (10Weightage)	Written Test/ Viva (3 Weightage)	Report (2 Weightage)
I	1	1	1
II			
III			
IV			
V			
VI			
VII			
VIII			
IX			

SEMESTER IV

ND4C13TM20 FOOD MICROBIOLOGY AND QUALITY CONTROL

Total Credits: 4

Total Lecture Hours: 90

Course Outcome

CO1: Identify the basic principles of food microbiology.

CO2: Measure the quality control aspects in food industries.

CO3: Identify the use of microorganisms in food product development

CO4: Analyse the role of microorganisms in food spoilage

Syllabus Content

Module 1: Introduction Food and Microorganisms (9 Hours)

Classification of microorganism, Microorganisms important in food microbiology, food as a substrate for microorganisms, Factors affecting the survival and growth of micro-organisms in food – Intrinsic and extrinsic factor - Hydrogen ion concentration, Moisture requirement, concept of water activity, temperature, oxidation reduction potential, inhibitory substances and biological structure.

Module II: Contamination of Foods (9 Hours)

Contamination from green plants and fruits, animals, sewage, soil, water, air, contamination during handling and processing of foods. Food spoilage – Definition, types of spoilage- physical, enzymatic, chemical and biological spoilage.

Module III : Principles of Food Preservation (11 Hours)

General principles of food preservation, Asepsis, removal of microorganism, maintenance of anaerobic conditions, use of acids, fermentation, use of high temperature, use of low temperature, mechanical destruction, chemical preservation, carbonation**,** irradiation.

Module IV: Spoilage of Different Types of Food (15 Hours)

Source type and effect of microorganisms on the following: Fruits and vegetables, Milk and milk products, Meat and meat products, Fish and other sea foods, Egg and poultry, cereals and canned foods.

Module V: Culture Techniques in Food Microbiology (12 Hours)

General principle of culture maintenance and preparation, bacterial cultures, yeast cultures, mold cultures, instruments and equipment's. Methods of isolation and detection of microorganisms or toxic compounds produced in foods. Physical, chemical and molecular methods, Bioassays

Module VI: Food in relation to disease (12 Hours)

Food borne infections and intoxications: Bacterial and non bacterial. Foodborne illness, food borne disease outbreaks and preventive measures.

Module VII: Microbiology in Food Plant Sanitation (8 Hours)

Bacteriology of water, sewage and waste treatment, microbiology of food product, good manufacturing practices, Hazard Analysis Critical Control Point (HACCP), health of employees.

Module VIII: Food Laws and Regulations (6 Hours)

Enforcement and Control agencies, Quality assurance: Microbiological quality standards of food. Government regulatory practices and policies. FDA, EPA, ISI.

Module IX: Applications of Food Microbiology (8 Hours)

Microorganisms in Human Welfare, Beneficial Uses of Microorganisms in Food, Intestinal Beneficial Bacteria-Concept of Prebiotics and Probiotics, Economic importance of microorganisms. Biosensors in food. Importance of microbes in food biotechnology: genetically engineered organisms, probiotics and single cell proteins. Dairy products (cheese and yoghurt) and traditional Indian fermented foods and their health benefits.

Learning Resources

References

1) Bibek Ray, Arun Bhunia, (2013), "Fundamental Food Microbiology", CRC Press.
2) James M. Jay (2012), "Modern food microbiology", Springer Science & Business Media Publishers.
3) Gould, G. W. (2012), "New Methods of food preservation", Springer Science &Business Media
4) Manay, N.S. Shadaksharaswamy, M. (2010), "Foods- Facts and Principles", New age international publishers, New Delhi.
5) Ahmed E. Yousef, Carolyn Carlstrom, (2016) "Food Microbiology: A Laboratory Manual", John Wiley & Sons.
6) Srilakshmi, B, (2003), "Food Science", New Age International Publishers, New Delhi.
7) Subalakshmi, G and Udipi, S.A. (2012), "Food processing and preservation". New Age International Publishers, New Delhi

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ND4C13TM20 FOOD MICROBIOLOGY AND QUALITY CONTROL

Module	**Weightage 1 8/10**	**Weightage 2 6/8**	**Weightage 5 2/4**
I	1	1	
II	2	1	1
III	1	1	
IV	1	-	1
V	1	1	
VI	1	1	
VII	1	1	1
VIII	1	1	
IX	1	1	1

SEMESTER IV

ND4C14TM20-PUBLIC HEALTH NUTRITION

Total Credits: 4

Total Lecture Hours: 90

Course Outcome

CO1: Discuss on the national nutrition problems and the efforts taken to overcome them

CO2: Explain the importance of nutrition education and integration of nutrition education with some aspect of diet counselling

CO3: Interpret the impact of technological advancement on general health due to altered food habits/pattern

CO4:Explain on various methods of nutritional assessment to be untaken in a Community.

Syllabus Content

Module I: Demographic Profile and Vital Statistics (10 Hours)

Population trends in India, Density of population, Age structure, Sex ratio, Family size, Literacy and Education, Life expectancy. Vital Statistics : Infant Mortality (IMR), Birth rate (CBR), Fertility rate, Material mortality rate (MMR), Under 5 mortality rate (U5MR)

Module II: Food Production and Sufficiency (12 Hours)

Food production, post- harvest technology, food grain storage, food losses. Food sufficiency, Food requirements verses food availability. Food & Nutritional Security. Food Security Programmes: Public Distribution System (PDS), Antyodaya Anna Yojana (AAY), Annapurna Scheme, Food for Work Programme.

Module III: Prevalent Nutrition Problems in India (15 Hours)

Protein energy malnutrition, obesity, underweight, Anaemia, vitamin A deficiency, Iodine deficiency disorders, Rickets, Osteomalacia and osteoporosis, Fluorosis.

Module IV: Strategies to combat Nutritional Deficiencies (18 Hours)

Food fortification, Food enrichment, Nutrition and health education, National nutrition Policy & Programmes: (Aims and objectives Short and long term policies and implementation). Vitamin A prophylaxis programme, prophylaxis against nutritional anaemias, control of Iodine deficiency disorders.

Module V: Supplementary Feeding Programmes (15 Hours)

Role of ICDS, national& international agencies in combating malnutrition (WHO, FAO, UNICEF, NIN, NFI, FNB, NNMB, CFTRI) Role of food technology in combating malnutrition (development of food mixtures, food fortification, food preservation & new

foods).Nutrition Policy and Programme: National Nutrition Policy –Anganwadi - its management, its role in implementation of nutrition policy programme. Functions of Primary Health Centre.

Module VI: Assessment of Nutritional Status (10 Hours)

Methods of Nutritional assessment, nutritional anthropometry, growth standards, dietary and clinical assessment, biochemical and radiological assessment. Nutrition monitoring objectives, agencies engaged in nutrition monitoring. Nutritional surveillance: need for nutritional surveillance, key indicators of nutritional surveillance programme.

Module VII: Nutrition Education (10 Hours)

Scope of nutrition education, steps in planning, conducting & evaluating nutrition and health education programme. Methods of imparting nutrition education– design messages, mass media and traditional methods. Monitoring and evaluation of effectiveness of nutrition and health education programmes.

Learning Resources

References

1) Michael J. Gibney, Barrie M. Margetts, John M. Kearney, Lenore Arab, (2013), "Public Health Nutrition", John Wiley & Sons.
2) Sari Edelstein, (2010), "Nutrition in Public Health", Jones & Bartlett Learning.
3) Arlene Spark, Lauren M. Dinour, Janel Obenchain, (2015), "Nutrition in Public Health: Principles, Policies, and Practice, Second Edition", CRC Press.
4) Proceedings of Nutrition Society of India, NIN, Hyderabad.
5) Technical Reports of WHO.
6) Technical Reports of ICMR, New Delhi.

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ND4C14TM20 PUBLIC HEALTH NUTRITION

Module	Weightage-1 8/10	Weightage-2 6/8	Weightage-5 2/4
I	1	1	
II	1	1	1
III	2	1	
IV	2	1	1
V	2	2	
VI	1	1	1
VII	1	1	1

SEMESTER IV

ND4C04PM20 COMMUNITY PROGRAMME

Total Credits: 4

Total Lecture Hours: 108

Course Outcome

C01 - Prepare to take public awareness classes

C02 – Generalise on importance of public health

C03 - Analyse the prevalence of diseases among rural people

C04 - Identify the effectiveness of various communication aids in mass counselling

C06 – Manage coordination skills

Syllabus Content

Module 1: Survey (16 Hours)

Conduct a survey in a nearby rural area to detect the prevalence rate of different disease conditions

Module II: Nutrition awareness class (30 Hours)

Each student should take a class on nutrition/ dietetics in a rural area in collaboration with government/ non- governmental organization

Module III: Health check-up camp (22 Hours)

Measure and record the weight, height and BMI of the people who come to attend the class.

Record the random glucose level, blood group checking and blood pressure.

Arrange medical check –up camp along with primary health centres.

Module IV: Anthropometric measurement of children (15 Hours)

Measure and record the weight, height, head circumference of the pre- school children in an institution.

Module V: Awareness class on Basic Life Support (25 Hours)

Each student should take a class on basic life support in an area/ institution in collaboration with government/ non- governmental organization

Syllabi for Electives

SEMESTER IV

ND4E01TM20 HEALTH AND FITNESS

Total Credits: 3

Course Outcome

CO1: Interpret the components of health and fitness and the role of nutrition in these.

CO2: Recognise the effect of exercise on different systems.

CO3: Identify the changes in organ systems during excercise

CO4: Develop nutritional, dietary and physical activity recommendations to achieve fitness and well-being.

Total Lecture Hours: 90

Syllabus Content

Module 1: Introduction to Fitness and Training Benefits of Exercise (10 Hours)

Parameters of fitness, fitness tests, Holistic approach to management of health and fitness including diet and exercise (Aerobic and anaerobic)., energy production, Alternative systems for Health and fitness.

Module II: Musculo-skeletal Systems (12 Hours)

Types of Skeletal muscles fibre, Effect of anaerobic exercise on musculoskeletal system, Endurance, strength/ Power, Speed, Coordination, agility, balance.

Module III: Cardio--respiratory System (14 Hours)

Effect of aerobic exercise on heart rate, blood pressure and lung function, Assessment of Cardio-respiratory fitness using Maximum aerobic capacity (VO2max), Assessment of coronary risk profile- RISKO factor , Recognizing symptoms to stop any exercise. Emergency procedures.

Module IV: Substrate for exercise (8 Hours)

Utilization of lipid and carbohydrate in relation to exercise type, intensity and duration.

Module V: Sports Nutrition (14 Hours)

Overview, Nutritional requirements and recommendations, pre event and post event meal, water and electrolyte balance**,** Regime of hydration and dehydration. Symptoms and effect of dehydration. Sports Drink.

Module VI: Effect of Specific Nutrients on Work Performance (12 Hours)

Nutritional requirements during exercise, Effect of specific nutrients during exercise-carbohydrate, protein, fat, iron, calcium, vitamins, consumption pattern -Merits and demerits of nutragenic aids and supplements**.** Ergogenic Aids-physical, chemical and mechanical, Use and Abuse of Dietary Supplements.

Module VII: Exercise prescription in Special Conditions (10 Hours)

Exercise regime for pre and post-natal fitness, Obesity and weight control – Prevention of weight cycling, Diabetes, Hypertension and Coronary Heart Disease, Osteoarthritis and Osteoporosis, Spondylitis Back aches.

Module VIII: Formulating dietary guidelines (10 Hours)

Fitness and health Obesity management and Critically analyzing different established weight reduction diet plans. Management of diabetes mellitus and Management of CVD

Learning Resources

References

1) Mahan, L.K. & Ecott-Stump, S. (2000): Krause's Food, Nutrition and Diet Therapy, 10th Edition, W.B. Saunders Ltd.
2) Sizer, F. & Whitney, E. (2000): Nutrition – Concepts & Controversies, 8th Edition, Wadsworth Thomson Learning.

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ND4E01TM20 HEALTH AND FITNESS

Module	**Weightage-1 8/10**	**Weightage 2 6/8**	**Weightage-5 2/4**
I	1	2	1
II	1	1	
III	1	1	
IV	1	-	1
V	1	1	
VI	2	1	1
VII	2	1	
VIII	1	1	1

SEMESTER IV

ND4E02TM20 PAEDIATRIC NUTRITION

Total Credits: 3

Total Lecture Hours: 90

Course Outcome

CO1: Recognise the importance of nutritional care and nourishment of children with various ailments

CO2: Identify the specific needs of children and the effects of various diseases on nutritional status and nutritional requirements at these stages of the life cycle

CO3: Devise recommendations / provide appropriate nutritional care based on pathophysiology, prevention/ and treatment of the various diet-related disorders/ diseases

CO4: Employ principles of diet therapy for paediatric

Syllabus Content

Module 1: Paediatric Nutritional Assessment (12 Hours)

Paediatric assessment triangle. Anthropometric measurements, biochemical parameters, clinical and dietary data. Measuring, recording and plotting growth chart

Module II: Nutritional considerations for LBW and preterm children (12 Hours)

Overview, Nutritional management and feeding options for pre mature children and children with developmental disabilities, paediatric problems- congenital heart disease, lactose intolerance, celiac disease

Module III: **Nutrition concerns in childhood (14 Hours)**

Childhood Obesity; Underweight and Under nutrition- short term and long term consequences , Failure to thrive; Growth faltering and detection Mineral and vitamin deficiencies, Dental caries, Allergies, Attention-deficit hyperactivity disorder

Module IV: Inborn Errors of Metabolism (14 Hours)

Disorders of amino acid metabolism- PKU, Maple syrup urine disease, Homocystinemia Disorders of CHO metabolism- Galactosemia, Glycogen storage disorder , other disorders- Wilson's disease. Nutritional Care Management of these conditions.

Module V:Gastrointestinal Diseases and Disorder (14 Hours)

Diarrhoea, gluten enteropathy, inflammatory bowel disease, constipation and fat absorption test diet, calculation of fluids & electrolytes- both deficit and maintenance and management of caloric intake.

Module VI: Neurological and Pulmonary Diseases in Children (10 Hours)

Epilepsy (ketogenic diets) , cystic fibrosis

Module VII: Renal Disease and Disorder in Children (14 Hours)

Nephrotic syndrome, chronic renal failure and different types of dialysis- calculation of fluids& electrolytes- both deficit and maintenance and management of caloric intake.

Learning Resources

References

1) Peter Faber, Mario Siervo, (2014), "Nutrition in Critical Care", Cambridge University Press.
2) NargisRabiya, A. N. Assessment of Nutritional Status and Anaemia in Children with Congenital Heart Disease. Diss. SreeMookambika Institute of Medical Sciences, Kulasekharam, 2019.
3) Mahan, L.K. and Escott-Stump, S. (2000): Krause's Food Nutrition and Diet Therapy, 10th Edition, W.B. Saunders Ltd.
4) Chaudhary, A. (Ed) (2001): Active Aging in the New Millennium, Pub. Anugraha, Delhi

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ND4E02TM20PAEDIATRIC NUTRITION

Module	**Weightage-1 8/10**	**Weightage-2 6/8**	**Weightage-5 2/4**
I	1	2	
II	1	1	1
III	2	2	
IV	2	2	1
V	2	-	1
VI	1	1	
VII	1	-	1

SEMESTER IV

ND4E03TM20 GERIATRIC NUTRITION

Total Credits: 3

Total Lecture Hours: 90

Course Outcome

CO1: Determine the components of ageing

CO2: Articulate the policies and programs with emphasis on geriatric

CO3: Review the physiological changes in geriatric in chronic disease conditions

CO4: Administer holistic wellbeing measures among old age

Syllabus Content

Module 1: The ageing process (20 Hours)

Physical, Physiological, metabolic body composition changes and impact on health and nutritional status, Socio-psychological aspects of ageing-special problems of elderly women.

Module II: Nutritional and health status of elderly (20 Hours)

Nutritional assessment methods and tools, Nutritional changes and requirement, Factors influencing food and nutrient intake, health status including lifestyle pattern, medication, psychosocial aspects.

Module III: Chronic diseases (20 Hours)

Chronic degenerative diseases and nutritional problems of the elderly-their pathogenesis, management, prevention and control, Nutritional support- parenteral, enteral and oral feedings, health and feeding problems.

Module IV: Policies and programmes (16 Hours)

Policies and programmes of the government and NGO sector pertaining to the elderly.

Module V: Promoting fitness and well-being (14 Hours)

Use of various modern and traditional approaches to promote fitness and well being

Learning Resources

References

1) Sharma, O.P. (Ed.) (1999): Geriatric Care in India – Geriatrics and Gerontology: A Textbook, M/s. ANB Publishers.
2) Care of the Elderly: A family approach, New York, Pergamon Press. 26. Watson, R. R. (2000) Handbook of Nutrition in the Aged. 3rd edition. CRC Press. Boca Raton
3) Bock, G.R.; and Whelen, J. (eds) The Childhood Environment and Adult Disease. Chichester, U.K. Wiley

4) Berg, R.L. and Casells, J.S. (1990) The Second Fifty Years: Promoting Health and Preventing Disability. Washington E.C. National Academy Press.

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ND4E03TM20 GERIATRIC NUTRITION

Module	**Weightage-1 8/10**	**Weightage-2 6/8**	**Weightage-5 2/4**
I	2	1	1
II	2	2	1
III	2	3	1
IV	2	1	1
V	2	1	

SYLLABUS FOR HOSPITAL INTERNSHIP

ND4IM20 HOSPITAL INTERNSHIP

Total Credits: 3

Duration: 6 months

Course Outcomes

C01 - Analyse the working atmosphere in a hospital

C04 - Priotatize on improving counselling skills of students

C05 - Assess nutrition status

C07 - Critically evaluate the modification of diet

C09 - Plan sample menu on discharge and follow up for compliance and response to effective diet counselling

Guidelines for Hospital Internship

This should be continuous internship for 6 months in the Multi-specialty hospital.

KNOWLEDGE BASE & SKILL SETS TO BE ACQUIRED DURING THIS TRAINING PERIOD

A. Gathering work experience as a Hospital Dietician for indoor patients of various hospital departments. (To learn actual job profile of Hospital Dietician)

B. Gathering work experience and developing expertise in Nutritional Management (Nutrition Care Process, Screening, Diagnosis, Intervention and Follow-up) and Counselling Techniques of Outpatients.

C. Developing skills in independent Nutritional Management of cases as well as its documentation.

D. Developing skills in record keeping, organizing material, presentation of case study and effective communication.

E. Acquiring skills in food procurement, production, quality maintenance, patient food service and cafeteria management

F. Involvement in community nutrition programme

G. Research Project: The student has to submit a research project at the conclusion of the internship

H. Acquisition of skills in enteral tube feeding and therapeutic diet management

I. To update knowledge to practice evidence based dietetics.