





DEPARTMENT OF FOOD TECHNOLOGY

School of Interdisciplinary Sciences and Technology Jamia Hamdard, New Delhi-110062 www.jamiahamdard.edu

Detailed Syllabus and Bye Laws Choice Based Credit System (CBCS)

Programme Name: MSc. Nutrition and Dietetics

Board of Studies (BoS) Approval Date: 09-01-2023 Programme Code: 584

Academic Session of Introduction: 2023-2024 School Name: School of Interdisciplinary Sciences and Technology Department Name: Department of Food Technology

http://jamiahamdard.edu/Department/Department_FacultyList.aspx?nDeptID=mc



- 1. Course Details: M.Sc. Nutrition and Dietetics
- 2. Total Seats:25+5 (General + NRI)
- 3. Eligibility: Graduation in any of the relevant discipline, such as Home Science, Nutrition or Dietetics, Food Science, Biology, Microbiology, Clinical Biochemistry, Life Sciences, BNYS (Naturopathy), BAMS (Ayurveda), BUMS (Unani) and B. Sc Nursing or other Allied Sciences with a minimum aggregate score of 50% at the level of graduation.
- 4. Selection procedure: Merit of qualifying examination
- 5. Total Semesters: 4

DEPARTMENT OF FOOD TECHNOLOGY

1. About the Department

The school is currently offering B.Tech. & M.Tech. in Food Technology, M. Sc Nutrition and Dietetics and PhD in Food & Fermentation Technology and Interdisciplinary Sciences. The Department of Food Technology received a substantial grant of Rs.75 lakhs in 2010 from Ministry of Food Processing Industries to strengthen the laboratories and infrastructure of the Department. The demand of professionals and trained personnel in the food industry as well as in research and development in government and industrial set-up is immense. The department has funding for research projects from UGC, AICTE, SERB, FIST GRANT etc.

OBJECTIVES OF NUTRITION

As the demand of professionals and trained personnel in the food industry as well as in research and development in government and industrial set-up is immense, the Department of Food Technology has the following objectives:

- To produce professionally competent, proficient, and highly skilled personnel in the field of food technology, with a knowledge of various aspects of food science and technology including the quality of raw material, packaging standards and methodology, health and hygiene parameters, processing techniques, storage, and food value.
- To enhance institutional capability to develop linkages with Industries and Community based regular and continuing education programs in the relevant areas.
- To impart technical and techno-managerial skill to the unemployed youth and the agrarian society.
- To promote R&D in the field and assist in the implementation of the food processing, safety and quality management of the food regulating bodies like FSSAI, BIS, ISO, CODEX.

2. Faculties



Prof. Farhan Jalees Ahmad Dean, School of Interdisciplinary Sciences and Technology (SIST) Jamia Hamdard



Dr. Vasudha Sharma Assistant Professor



Er. Jinku Bora Assistant Professor



Dr. Kulsum Jan Assistant Professor



Dr Khalid Bashir Assistant Professor



Prof. Sayeed Ahmad Head, Department of Food Technology Jamia Hamdard



Dr Sweta Joshi Assistant Professor



Er. Suhaib Hasan Guest Faculty



Dr. Aastha Bhardwaj Lecturer



Prof. M. Muthukumarappan Adjunct Faculty



Dr. Sadia Chishty Guest Faculty



Dr. Swati Kimothi Guest Faculty



Ms. Kalpana Yadav Guest Faculty



Dr. Dilip Ghosh Adjunct Faculty

2.1. Areas of Interest

Faculties	Area of Interest
Prof. Farhan J Ahmad	Nanotechnology, Formulation development, Drug
Dean, SIST	delivery, Nanomedicine, Pharmacology
Prof. Sayeed Ahmad	Pharmacognosy, Quality Control of Herbal drugs and
Head, Department of Food Technology	Botanicals: Chromatography, Metabolomics
Dr. Vasudha Sharma	Probiotics, Fermented & Functional Foods, By-
Assistant Professor	product utilization, food safety
Dr. Khalid Bashir	Starch and Protein Modification, Food Rheology,
Assistant Professor	Probiotics, Food fortification
Dr. Sweta Joshi	Food Chemistry, Functional foods, Nutraceutical,
Assistant Professor	phytochemicals, extraction techniques,
Dr. Kulsum Jan	Cereal processing, Edible films, agricultural waste
Assistant Professor	utilization, by-product utilization
Er. Jinku Bora	Food Engineering, Food Biotechnology, Food
Assistant Professor	Chemistry, Starch modification, Nanotechnology
Dr. Aastha Bhardwaj	Biodegradable Food Packaging, Waste Utilization,
Lecturer	Functional Foods, Dairy Technology
Dr Sadia Chishty	Therapeutic nutrition, Community nutrition, Research
Guest Lecturer	and human physiology
Dr Swati Kimothi	Nutrition and Research, Biochemistry, Nutrition and
Guest Lecturer	Dietetics, Advance Nutrition, Food Chemistry
Ms. Kalpana Yadav	Therapeutic Nutrition, Research, Microbiology, Public
Guest Lecturer	Health Nutrition, Human Nutrition Requirement

3. Facilities

The Department is well equipped with processing and analytical equipment's and is in the process of procuring many more equipment's to make the state-of-the-art facilities. Great emphasis is laid on practical for processing of foods and for analyzing their quality. List of some major equipment available with department and University are as follows: Well equipped kitchen, HPLC, Texture Analyser, Rheometer, Hunter Lab Color Spectrophotometer, UV-Vis Spectrophotometer, Motic Inverted Microscope, Deep Freezer, Moisture analyser, Freeze dryer, Rheometer, BOD Incubator, Rotary Vacuum Evaporator, Biohazard Safety Cabinet, Lab. Scale Spray Drier, Tray Drier, Fluidized Bed Drier, Oven, Meat Processing Unit, Bakery lab, Food Juice Processing Equipment, Packaging equipment, Hammer Mill, Ball mill, Laboratory Pasteurizer, Shrink Packaging Machine,

Vacuum Packaging Machine, Viscometer, Infra-red moisture meter, Fruit Crusher, etc.

4. Research Activities

No. of papers published in the year 2015-22: 200+

No. of current Ph.D. scholars: 20.

5. Publications

For the publication details kindly go through the below links, for the individual faculty members.

S.	Faculty	Profile details
No	Name	
•		
1.	Dr Khalid	Google scholar: https://scholar.google.co.in/citations?user=vet13fEAAAAJ&hl=en
	Bashir	JH website: http://iamiahamdard.edu/Department/Department_FacultyProfile.aspx?nID=igm&nDeptID=mc
2.	Dr Sweta	Google scholar:
	Joshi	https://scholar.google.com/citations?hl=en&authuser=2&user=N5PsbCkAAAAJ
		JH website: http://jamiahamdard.edu/Department/Department FacultyProfile.aspx?nID=iqg&nDeptID=mc
3.	Dr	Google scholar: https://scholar.google.co.in/citations?user=fLe_AG4AAAAJ&hl=en
	Vasudha Sharma	JH website: http://iamiahamdard.edu/Department/Department_FacultyProfile.aspx?pID=iqs&pDeptID=mc\
4	Dr Kulsum	Google scholar: https://scholar.google.co.in/citations?user_iGNPXx A A A A A & Malen
т.	Jan	JH website:
		http://jamiahamdard.edu/Department/Department_FacultyProfile.aspx?nID=iqo&nDeptID=mc
5.	Er. Jinku	Google scholar: <u>https://scholar.google.co.in/citations?user=IPqwYRQAAAAJ&hl=en</u>
	Bora	http://jamiahamdard.edu/Department/Department_FacultyProfile.aspx?nID=isa&nDeptID=mc
6.	Dr. Aastha	Google scholar: <u>https://scholar.google.com/citations?user=auhdk0EAAAAJ&hl=en</u>
	Bhardwaj	http://jamiahamdard.edu/Department/Department_FacultyProfile.aspx?nID=isg&nDeptID=mc
7.	Dr Sadia Chishty	Research Gate: <u>https://www.researchgate.net/profile/Sadia-Chishty</u>
8.	Dr. Swati Kimothi	Research Gate: https://www.researchgate.net/profile/Swati-Kimothi-2/research

6. Programme Code: 584

7. VISION AND MISSION STATEMENTS

8. Vision Statement: To create and achieve excellence in quality education, entrepreneurship and research and development in the field of Nutrition and dietetics.

Mission Statements:

- MS1: To mainstream department of food technology into nutrition and dietetics sector.
- **MS2:** To produce competent and highly skilled professionals in the field of nutrition as research scientists, public health nutritionists, dieticians, food quality control officers, teachers, nutrition consultants, and entrepreneurs.
- **MS3:** Creating awareness of nutrition through community nutrition outreach programs for promotion of healthy lifestyle among common masses and vulnerable sections of society.
- **MS4:** To conduct and facilitate internationally acclaimed research in the field of nutrition, food sustainability, tribal nutrition etc.

8. PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

After completion of the Masters in Nutrition and dietetics, the post graduates will be able to:

- **PEO1:** Apply knowledge of fundamentals of nutrition in management of nutritional deficiency problems, role of nutrition in communicable and non-communicable diseases, prevention through various government programmes and policies.
- **PEO2:** Carry out quality research in different aspects including clinical and community nutrition both.
- **PEO3:** Foster abilities to develop new products utilizing nutrient dense low cost foods beneficial for society.
- **PEO4:** Apply skills and principles of medical nutrition therapy and food service management in hospital setups.
- **PEO5:** Inculcate entrepreneurial skills in aspiring food service management professionals.
- **PEO6:** Develop leadership skills to be applied in nutrition counselors, dieticians, R&D, new product developers, researchers and other facets of the profession.
- **PEO7**: Combine practical knowledge, skills with research abilities for better output.

	MS-1	MS-2	MS-3	MS-4
PEO-1	3	3	3	3
PEO-2	3	3	3	3
PEO-3	3	3	3	3
PEO-4	3	3	3	3
PEO-5	3	3	3	3
PEO-6	3	3	3	3
PEO-7	3	3	3	3

Mapping Program Educational Objectives (PEOs) with Mission Statements (MS)

Level of Mapping: '3' is for 'high-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.

CONSOLIDATE SEMESTER WISE PROGRAMME DETAILS.

Tables-I: Schemes for internal assessments and end semester examinations semester wise

Semester I

Course code Inte			ernal	nal End Semester Exams			Total	Credit	
	Name of the course	Continuous	Asses	sment ional Exams	Total	Total Marks Duration		Marks	points
		mode	Marks	Duration	1000	111111115	Durution		
	OrientationProgramme								
MDNCC-101	Human Physiology	10	30	1 hr	40	60	3hr	100	4
MDNCC-102	Principles of Food Science	10	30	1 hr	40	60	3hr	100	4
MDNCC-103	Research Methodology – I	10	30	1 hr	40	60	3hr	100	4
MDNCC-104	Food Microbiology	10	30	1 hr	40	60	3hr	100	4
MDNCC-105	Nutritional Biochemistry –I	10	30	1 hr	40	60	3hr	100	4
MDNCC-106	Principles of Food Science Lab	10	10	1.5 hr	20	30	3hr	50	2
MDNCC-107	Food Microbiology Lab	10	10	1.5 hr	20	30	3hr	50	2
MDNCC-108	Nutritional Biochemistry- I Lab	10	10	1.5 hr	20	30	3hr	50	2
					TOTAL			650	26

Semester II

Course		Internal Assessment			End Semeste	End Semester Exams		Credit	
code	Name of the	Continuous	Sessional	Exams	Total	Marks	Duration	Marks	points
	course	Mode	Marks	Duration					
MDNCC- 201	Therapeutic Diet-I	10	30	1hr	40	60	3hr	100	4
MDNCC- 202	Research Methodology – II	10	30	1 hr	40	60	3hr	100	3
MDNCC- 203	Human Nutritional Requirement	10	30	1 hr	40	60	3hr	100	3
MDNCC- 204	Principles of Dietetics	10	30	1 hr	40	60	3hr	100	4
MDNCC- 205	Therapeutic Diet-I Lab	10	10	1.5 hr	20	30	3hr	50	2
MDNCC- 206	Human Nutritional Requirement-Lab	10	10	1.5 hr	20	30	3hr	50	2
MDNCC- 207	Principles of Dietetics- Lab	10	10	1.5 hr	20	30	3hr	50	2
MDNCC- 208	Seminar	20	-	1 hr	20	30	1 hr	50	2
	Internship	-	-	-	-	-	-	-	-
	Total							600	22

Semester III

Course code		Internal Assessment				End Semeste	End Semester Exams		Credit
	Name of the	Continuo	Sessiona	al Exams	Total	Marks	Duration	Marks	points
	course	us	Marks	Duration					
		Mode							
MDNCC-301	Advance Nutrition – I	10	30	1 hr	40	60	3hr	100	4
MDNCC-302	Nutritional Biochemistry- II	10	30	1 hr	40	60	3hr	100	4
MDNCC-303	Community Nutrition	10	30	1 hr	40	60	3hr	100	4
MDNCC-304	Advance Nutrition-I Lab	10	10	1.5 hr	20	30	3hr	50	2
MDNCC-305	Nutritional Biochemistry- II Lab	10	10	1.5 hr	20	30	3hr	50	2
MDNCC-306	Community Nutrition Lab	10	10	1.5 hr	20	30	3hr	50	2
MDNCC-307	Educational Tour	20	-	-	20	30	3hr	50	2
MDNCC-308	Internship, report writing &submission	40	-	-	40	60	1hr	100	3
	Elective Theory-1	10	30	1 hr	40	60	3hr	100	4
	Elective Theory -2	10	30	1 hr	40	60	3hr	100	4
	Elective Lab-1	10	10	1.5 hr	20	30	3hr	50	2
	Elective Lab-2	10	10	1.5 hr	20	30	3hr	50	2
	Total							900	35

Name of Theory Course Elective:

Group A: MDNEC-301: Institutional Food Administration, MDNEC-302-Food Processing and Technology

Group B: MDNEC-303-Public Health Nutrition; MDNEC-304-Nutritional Epidemiology

Group C: MDNEC-305-Therapeutic Nutrition II; MDNEC-306-Nutrigenomics

Name of Lab Course Elective:

Group A:MDNEC-307-Institutional Food Administration Lab; MDNEC-308-Food Processing and Technology Lab

Group B:MDNEC-309-Public Health Nutrition Lab; MDNEC-310-Nutritional Epidemiology Lab

Group C:MDNEC-311-Therapeutic Nutrition II Lab; MDNEC-312-Nutrigenomics Lab

Semester IV

Course code	Name of the course	Internal Assessment				End Semester Presentation		Total Marks	Credit points
couc		Continuous	Presentati	on/report	Total	Marks	Duration	1.	points
		Mode -	Marks	Duration	-				
MDNC C-401	ProjectDissertation	100	100	1 hr	200	300	1 hr	500	15
	Elective course -1	10	30	1 hr	40	60	3hr	100	4
	Elective course -1	10	30	1 hr	40	60	3hr	100	4
	Total							700	23

Elective Course forGroup A and B:

MDNEC-402-Emerging issues in Nutrition MDNEC-403-Programme planning in public health nutrition

Elective Course for Group C:

MDNEC-404-Advance nutrition-II MDNEC-405-Nutrition communication and diet counseling

9. PROGRAMME SPECIFIC OUTCOME (PSO)

After completion of the Masters in Nutrition and dietetics, the post graduates will be able to:

- **PSO1:** Understand the basics of nutrition, nutritional assessment, nutritional requirements for different age groups, R&D, Medical nutrition therapy (MNT) or Nutritional management of various disease at clinical and community level. Acquire skills in planning menus as per requirements, role of balanced diet and disease prevention through various government programmes and policy implementation.
- **PSO2:** Develop understanding in food processing, new product development, institutional food administration, R&D, quality control,entrepreneurship in food management and food service management in hospitals.
- **PSO3:** Have insight for human physiology, nutritional biochemistry, R&D, molecular nutrition and nutrigenomics in relation to health and disease.
- **PSO4:** Pursue profession as Clinical dietician, public health nutritionist, food quality control officer, researcher, diabetes health educator, academician, scientist in public and private organizations.

10. PROGRAM OUTCOMES (POs)

After going through the two years Masters in Nutrition and dietetics, post graduates will exhibit the ability to:

- **PO1: Practical Knowledge:** Use knowledge of the fundamental elements in sync with updated technologies, tailored food technological application and regulatory requirements pertaining to the development of innovative food products.
- **PO2:** Research and development: Apply skills to generate novel food products and relevant products. Utilize software tools and computer bases programing for research oriented developments.
- **PO3: Problem investigation:** Encourage the problem solving skills observed through practical developments along with meeting the set regulations by applying the concept of critical thinking and in-depth analysis.
- **PO4:** Modern tool usage: Use latest product optimization tools along with statistical analysis during the novel product development.
- **PO5:** Communication: Develop valued credentials, reports and effective presentation. Improve communication skills and the ability to successfully carry out responsibilities related to the development of knowledge in accordance with the demands of the academia and industry.
- **PO6: Professional identity:** Create a profession that is dedicated to providing quality services that exceed the stakeholder's expectations like customers, industries, academia, and regulatory bodies and to give direction and contribute to the improvement of services and technologies.
- **PO7:** Leadership skills: Organize and execute the objectives related to research and development within a set timeline. Nurturing the skills from the beginning to manage and utilize the available resources judiciously.

- **PO8: Planning abilities:** Implement the knowledge and skills for proper planning and running different steps which are involved in the time bound deliverables like R&D, production, regulatory submissions and product life cycle management.
- **PO9:** Ethics: Show a high level of morality, honesty and integrity. Implement ethical principles when drawing conclusions and accept responsibility for the consequences if any.
- **PO10:** Environmental sustainability: Utilise expertise to resolve environmental pollution, harmful industrial waste, along with wastage and also improve manufacturing processes while maintaining the sustainability practices.
- **PO11:** Life-long learning: Engage in self-governing and ongoing learning in response to evolving needs and scientific advances. Using input from other professionals and identifying learning needs for life-long learning improvement. Recognize the importance of conferences, seminars, and workshops in the advancement of knowledge.

Mapping of Program Outcomes (POs) and Program Specific Outcomes (PSOs) with Program Educational Objectives (PEOs)

	PEO-1	PEO-2	PEO-3	PEO-4	PEO-5	PEO-6	PEO-7
PO-1	3	3	3	3	3	3	3
PO-2	3	3	3	3	2	3	3
PO-3	3	3	3	3	2	2	3
PO-4	3	3	3	3	2	3	3
PO-5	3	3	2	3	3	3	3
PO-6	3	2	3	3	3	3	3
PO-7	3	3	3	3	3	3	3
PO-8	3	3	3	3	3	3	3
PO-9	3	3	3	3	2	3	3
PO-10	3	2	3	2	2	3	3
PO-11	3	3	2	3	3	3	3
PSO-1	3	3	3	3	3	3	3
PSO-2	3	3	3	3	3	3	3
PSO-3	3	3	3	3	3	3	3
PSO-4	3	3	3	3	3	3	3

Level of Mapping: '3' is for 'high-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' map.

MASTERS PROGRAMME IN NUTRITION AND DIETETICS OF DEPARTMENT OF FOOD TECHNOLOGY

1. Programme of study:	Master of Science (M.Sc.) Nutrition and Dietetics
2. Programme code:	584
3. Course abbreviation:	MDN
4. Duration:	Two years spread over four semesters

M.Sc. Nutrition and Dietetics is a two-year full time academic program of study spread over four semesters. A candidate enrolled in M.Sc. Nutrition and Dietetics shall not be allowed to enroll for any other full-time programme of study and shall not appear in any other examination of a full-time course of Jamia Hamdard (JH) or any other university. Each year, new session will start in July, and the four semesters will be as under:

Semester I (1st year) July-Dec (Odd Semester) Semester II (1st year) Jan-Jun (Even Semester) Semester III (2nd year) July-Dec (Odd Semester) Semester IV (2nd year) Jan-Jun (Even Semester)

The number of teaching days in each semester shall not be less than 90 days.

5. Medium of instruction: English

6. Eligibility for admission:

Applicants seeking admission M.Sc. Nutrition and Dietetics must have completed graduation in any of the relevant disciplines, such as Home Science, food and Nutrition, Dietetics, Food Science, Biology, Microbiology, Clinical Biochemistry, Life Sciences, BNYS (Naturopathy), BAMS (Ayurveda), BUMS (Unani) and B.Sc. Nursing or other Allied Sciences with a minimum aggregate score of 50% at the level of graduation.

7. Course Structure:

a. The course, as approved by the Board of Studies and reviewed regularly, is divided into nine theory courses in Semester I, II and six theory papers and thesis/project in

Semester III and IV. There are eleven practical subjects spread over in four semesters.

- A minimum of three credits are assigned for each theory paper and minimum of two credits are for the lab work (practical). The lab work also includes report or industrial visit.
- c. One theory credit is counted as 50-60 min of teaching per week, and two practical hours is counted as 1 credit per week.
- d. There are 48 credits for I and II Semesters and 58 credits for III and IV semester respectively. This includes the lab work, internship and dissertation also.
- e. There is project/thesis work in the third and fourth semester including theory papers. The thesis work includes experimental research work on a specified topic and submission of the thesis towards the end of the Semester IV. The project work/thesis will be evaluated as per the guidelines proposed by the Board of Studies and specified into the syllabus. For the project work/thesis, the Head of the Department/Program Coordinator will convene a meeting of all teachers of the Department and assign appropriate number of students to each teacher to act as supervisor for the project work. The student in consultation with the supervisor will select a topic for the project work under the intimation to the Head of the Department/Program Coordinator in writing. The project/thesis work may be carried out in any institute/industry/university other than JH as well. The evaluation of the dissertation, project presentation and viva voce in 4thSEM will be conducted in presence of Head nominated faculty/external examiner approved through BoS. The project shall comprise of the two components namely Internal and External. Internal will be assigned 300 marks (for IV SEM) and will comprise of submission of a project report after completion of the project. External will be assigned 200 (for IV SEM) and will comprise of conducting a scientific research, data collection, writing review of literature detailed methodology, results and discussion report writing and presentation of the topic his/her work carried on project out in department/industry/institute/research Centre and viva voce examination.
- f. The dissertation shall comprise of the following three components:
 - Each student will undertake a dissertation work in the third semester under the

supervision of either faculty member from Jamia Hamdard or an expert from industry/ institute research centre and under the overall supervision of Dean and Head of the faculty. After the completion of dissertation each student has to submit a dissertation report before the deadline proposed for the same.

- Each student will deliver their research work in two phases; **Phase 1:** The presentation will be evaluated by the internal faculty members and in **Phase 2:** the same presentation will be evaluated by an external examiner on the date and time fixed for the purpose.
- The topic for the IV Semester project dissertation shall be finalized in the III Semester in consultation with the respective supervisor.
- g. A student shall have to score minimum pass marks (50%) of the total marks for each paper.
- h. Internship: One month internship or training in a tertiary hospital/ food industry/ NGO is compulsory at the end of the second semester; and the students have to submit the internship report in semester III.

8. Attendance

- a) 100% attendance is desirable, but 75% attendance is mandatory in each paper for a student to enable him to appear in the Semester examination. In unforeseen contingencies, on the recommendation of the Dean of the Faculty/competent authority, 5% relaxation in attendance may be considered. This 5% condoning may be on account of sickness, provided the medical certificate, duly certified by a Registered Medical Practitioner/Public Hospital had been submitted in the office of the Head of the Department/Program Coordinator at the time of rejoining the classes immediately after the recovery from illness. Head of the Department/Program Coordinator shall forward such cases along with all related documents to the Dean. The relaxation may not be considered as the right of the student.
- b) In order to maintain the attendance record of a particular course, a roll call will be taken by the teacher in every scheduled lecture and practical class. For the purpose of attendance, each practical class will count as one attendance unit, irrespective of the number of contact hours. Attendance on account of participation in the prescribed and

notified activities such as, NCC, NSS, Inter-university sports, educational tours/field work, shall be granted provided the participation of the student is duly verified by the officer-incharge and is sent to the Head of the Department/Program Coordinator within two weeks of the function/activity etc.

- c) The subject teacher shall consolidate the attendance record for lectures and practical at the end of each month and submit to the Head of the Department/Program Coordinator. At the end of the semester, the teacher shall consolidate the attendance record for the whole semester and submit it to the Head of the Department/Program Coordinator. The statement of attendance of students shall be displayed by the Head of the Department/Program Coordinator on the Notice Board. A copy of the same shall be preserved as record. Attendance record displayed on the Notice Board shall deem to be a proper notification for the students and no individual notice shall be sent to any student.
- **d**) If a student is found to be continuously absent from the classes without any information for a period of 30 days, the concerned teacher shall report the matter to the Head of the Department/Program Coordinator who will report the matter to the Dean for appropriate action that may include striking off the name of such student(s) from the roll. Such a student may, however, apply for re-admission within 7 days from the date of issue of the notice of striking off the name from the rolls. Such a student may, however, apply for re-admission within 7 days from the date of the name. The request for re-admission may be considered by the Dean of the Faculty. Such a student shall not be eligible for re-admission after the prescribed period of 7 days. The re-admission shall be effected only after the payment of prescribed re-admission fee.
- e) A student detained on account of shortage of attendance in any semester may be readmitted to the same class in the subsequent academic year on payment of prescribed fees applicable in that year to complete the attendance requirement of that course

9. Internal assessment

The performance of the student in each paper will be evaluated both continuously (Internal Assessment) and at the end of semester (Semester Examination). 40% marks for each theory paper will be allocated for internal assessment and 60% marks will be kept for

semester examination at the end of each semester. For a paper carrying 100 marks, for example, 40% marks (= 40 marks) allocated for internal assessment will be divided as follows:

There will be

- (i) Three sessional tests for each paper (Best two will be counted) totaling 30 marks,
- (ii) An assignment of 5 marks, and
- (iii) 5 marks will be allocated to attendance,

As per the guidelines provided by the Office of the Controller of Examination. For practical courses, 20 marks will be allocated for the internal assessment and 30 marks will be kept for semester examination (theory) at the end of each semester. For the evaluation of the lab work, laboratory notebook, practical test/viva voce shall be taken into account. The marks shall be awarded by the respective teacher conducting the practical course. For sessional test, discontinuance of classes will not be permitted and the teacher may take the test in his/her schedule class. Under the compelling circumstance such as sickness of the student or mourning in the family the candidate may be given another chance. For sickness only, a credible medical certificate issued by a hospital shall be considered. In case of casualities, a letter from the parents would be required.

10. Semester examination:

- a) Semester examination shall be held at the end of each semester as per schedule given in the Academic Calendar of the Faculty.
- b) Up to maximum of seven days preparatory holidays may be given to the examinees before the start of the semester examinations.
- c) Each theory paper having 04 credits shall be of 100 marks out of which 60% marks shall be for semester examination and 40% marks for internal assessment.
- d) Each practical paper having 02 credits shall be of 50 marks out of which 60% marks shall be for semester examination and 40% marks for internal assessment.
- e) The question paper for semester examinations shall be set either by the external examiner or an internal examiner. The Board of Studies of a department shall draw a panel of name of examiners, both internal and external, for approval by the concerned authorities. If the

external examiner is unable to send the question paper by the deadline set by the examination branch of the University, the Head of the Department after consultation with the examination branch shall get the paper set internally by faculty. The papers set by the examiners can be moderated in consultation with the teacher who taught that course. Teachers appointed on contractual basis with appointment of less than one academic session, may not ordinarily be appointed as examiners. All such teachers, however, will be expected to assist in the practical examination.

- f) The question paper shall have five questions. There shall be one question from each of the 4 units of the course and one question shall contain objective type/short answer questions covering all the units of the course. The candidate shall have to answer all the five questions. There shall, however, be internal choice within a unit. The choice shall be given by setting alternative questions from the same unit. The question paper should be such that it covers all the topics of that course.
- g) The duration of the semester examination of a theory course shall be three hours. Practical exams of a lab course shall be of at least three hours duration. The practical examination shall be conducted by an internal and external examiner assisted by other teachers.
- h) For dissertation, each student shall submit three typed bound copies of his/her project work to the supervisor(s) by the end of the 4th semester. A student shall not be entitled to submit the project report unless he/she has pursued project work during 4th semester under the guidance of a duly appointed supervisor(s). The report shall embody the candidates own work and an up-to-date review of the subject area. The write-up shall detail a critical assessment of the subject area and indicate in what respect the work appears to advance the knowledge of the subject concerned and future course of investigation required.
- The dissertation report shall be examined by a Board of Examiners and the student shall have to appear for viva-voce. The Board of Examiners shall consist of the following,
 - One external examiner
 - Head of the Department/Program Coordinator
 - Supervisor(s)

The Board shall examine the project report of all the students and award the marks. A presentation by the student and the viva-voce shall be conducted by one of the external examines along with the other members of the board by and marks shall be awarded by the

external examiner for the same. All other teachers of the department will also be invited by the Head of the Department to be present during the examination. In case a student fails to secure the minimum pass marks, he/she may be asked to appear in the viva-voce again, or he/she may be asked to revise the project report in the light of the suggestions of the examiners and resubmit. For this, he/she will have to enroll as an ex-student in the next session. A resubmitted dissertation report will be examined as above and viva voce shall be conducted along with other students.

11. Classification of result:

Range of Percentage of Marks	Grade	Grade Point	Description of Performance
90-100	0	10	Outstanding
80-89	A+	9	Excellent
70-79	А	8	Very Good
65-69	B+	7	Good
55-64	В	6	Above Average
50-54	С	5	Average/Pass
00-49	F	0	Fail
-	AB	0	Absent

The letter grades and their equivalent numerical points are listed below:

A student obtaining Grade 'F' / 'AB' shall be considered as failed and will be required to reappear in the examination.

12. Earned credits (EC):

The credits for the courses in which a student has obtained E (minimum passing grade for a course) or a higher grade in the semester exam shall be counted as credits earned by him/her. Any course in which a student has obtained 'F' or 'I' grade shall not be counted towards his/her earned credits.

13. Evaluation of Performance:

SGPA (Semester Grade Point Average) shall be awarded on successful completion of each semester. CGPA or Cumulative Grade Point Average, which is the Grade Point Average for all the completed semesters at any point in time shall be awarded in each semester on successful completion of the current semester as well as all of the previous semester. In 1st semester, CGPA is not applicable.

14. Calculation of SGPA and CGPA of A Student in a Semester:

	\sum (Earned Credits X Grade Point)
SGPA =	
	\sum (Course Credits Registered)

 $CGPA = \frac{\sum (Earned Credits X Grade Point)}{\sum (Course Credits Registered)}$

15. Promotion

- a) Promotion from 1st semester to 2nd semester and from 3rd semester to 4th semester shall be automatic.
- b) A student shall be promoted to the 3rd semester of the programme if he/she has passed in each theory and practical courses separately of 1st and 2nd semesters. Provided that student has 40% of the subjects. A candidate will be given a total number of 2 attempts, inclusive of the first attempt, to clear the papers in which he/she fails. For such students, promotion to the next higher class will be considered subject to rules relating to passing the 1st and 2nd semester examinations within two academic years, Award of degree shall be subject to successfully completing all the requirements of the programme of study within four years from admission. A student who fails in theory papers of end semester

Where 'm' is the number of semesters passed

examination may be given a chance to appear in 3 papers in Make-up test to clear those papers. In no case shall it be allowed to the students who abstain from appearing in the semester examination.

c) Candidates who are unable to appear in the examination because of serious illness at the time of examinations may be given another chance. The request has to be processed through the Head of the Department to the Vice Chancellor. The Vice chancellor may look into the merit of the case and decide accordingly.

16. CLASSIFICATION SHALL BE DONE ON THE BASIS OF FOLLOWING CRITERIA:

The result of successful candidates who fulfill the criteria of the award of degree shall be classified at the end of last semester on the basis of his/her final CGPA.

- a) He/she will be awarded "I Division with Distinction" if his/her final CGPA is 7.5 and above and up to 10.
- b) He/she will be awarded "I Division" if his/her final CGPA is 6.00 and above and 7<.50.
- c) He/she will be awarded "II Division" if his/her final CGPA is 5.00 and above and <6.00.

17. Span Period:

a. 1st and 2nd Semester Exams: Within two years from the first admission to the programme

b. All requirement of M.Sc. degree within a total period of two years from the date of their first admission.

18. Improvement:

A candidate who wishes to improve the previous performance will be allowed to do so as per the following regulation:

a) A student shall be allowed only once to reappear in the semester examination of up to four theory courses along with regular students of that semester to improve upon the previous performance. The examination fee charged from such candidates shall be double the current examination fee.

b) Such a student shall inform the Head of the Department in writing of his/her intention to improve the performance two months before the date of semester examination is to be held.

c) If the student improves the performance, he/she shall be required to submit the earlier mark-sheet/degree. A new mark-sheet and degree shall be issued. The new mark-sheet/degree shall bear the year in which the student improved the grade.

d) In case the grade obtained in improvement is lower than the one obtained earlier, the higher grade shall be retained.

Department of Food Technology

School of Interdisciplinary Sciences and Technology Jamia Hamdard, New Delhi – 110062

SYLLABUS M.Sc. Nutrition and Dietetics

Semester – I								
Course Code	Course Name	Course Code	Lab Course Name					
MDNCC-101	Human Physiology	MDNCC-106	Principles of Food Science					
			Lab					
MDNCC-102	Principles of Food Science	MDNCC-107	Food Microbiology Lab					
MDNCC-103	Research Methodology – I	MDNCC-108	Nutritional Biochemistry- I					
			Lab					
MDNCC-104	Food Microbiology							
MDNCC-105	Nutritional Biochemistry –I							
Semester – II								
Course Code	Course Name	Course Code	Lab Course Name					
MDNCC-201	Therapeutic Nutrition-I	MDNCC-205	Therapeutic Nutrition-I Lab					
MDNCC-202	Research Methodology – II	MDNCC-206	Human Nutritional					
			Requirement Lab					
MDNCC-203	Human Nutritional	MDNCC-207	Principles of Dietetics Lab					
	Requirement							
MDNCC-204	Principles of Dietetics	MDNCC-208	Seminar					
			Internship					
	Semest	er – III						
Course Code	Course Name	Course Code	Lab Course Name					
MDNCC-301	Advance Nutrition –I	MDNCC-304	Advance Nutrition-I lab					
MDNCC-302	Nutritional Biochemistry – II	MDNCC-305	Nutritional Biochemistry – II					
			Lab					

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MDNCC-303	Community Nutrition	MDNCC-306	Community Nutrition Lab
		MDNCC-307	Educational Tour
		MDNCC-308	Internship, Report Writing and Submission
Course Code	Elective Course	Course Code	Elective Lab Course Name
	Group A		Group A
MDNEC-301	Institutional Food	MDNEC-307	Institutional Food
	Administration		Administration Lab
MDNEC-302	Food Processing and	MDNEC-308	Food Processing and
	Technology		Technology Lab
	Group B		Group B
MDNEC-303	Public Health Nutrition	MDNEC-309	Public Health Nutrition Lab
MDNEC-304	Nutritional epidemiology	MDNEC-310	Nutritional epidemiology Lab
	Group C		Group C
MDNEC-305	Therapeutic Nutrition - II	MDNEC-311	Therapeutic nutrition-II Lab
MDNEC-306	Nutrigenomics	MDNEC-312	Nutrigenomics Lab
	Semest	ter – IV	
MDNCC-401	Dissertation		
Course Code	Elective course for	Course Code	Elective Course for
			Group C
MDNEC 402	Group A and B		
MDNEC-402	Energing issues in Nutrition	MDNEC-404	Advance nutrition-11
MDNEC-403	Programme planning in public	MDNEC-405	Nutrition communication and
	health nutrition		diet counseling

In Semester –III Students shall opt for any group of elective subjects (Either Group A or Group B or Group C), and in semester IV students shall opt for any group of elective subjects (Either Group A and B or Group C).

		Sen	nester – I					
S.No.	Course Code	Course Title	Course Credits	Total Contact Hours	Contact Hours/week	Total Marks (I/E)		
		Name of	Core Cours	se				
1	MDNCC-101	Human Physiology	4	4 60 4				
2	MDNCC-102	Principles of Food Science	4	60	4	40/60		
3	MDNCC-103	Research Methodology – I	4	60	4	40/60		
4	MDNCC-104	Food Microbiology	4	60	4	40/60		
5	MDNCC-105	Nutritional Biochemistry -I	4	60	4	40/60		
			20	300	20	500		
	1	Name of La	ab Course C	Core				
1	MDNCC-106	Principles of Food Science	2	60	4	20/30		
2	MDNCC-107	Food Microbiology	2	60	4	20/30		
3	MDNCC-108	Nutritional Biochemistry- I	2	60	4	20/30		
			6	180	12			
		Total	26	480	32	650		
Total	credits in Seme	ster I	26					

	Semester – II												
S.No.	Course Code	Course Title	Course Credits	Total Contact	Contact Hours/week	Total Marks							
				Hours		(I/E)							
	1	Name of	Core Cou	rse	1								
1	MDNCC-	Therapeutic Nutrition –I	4	60	4	40/60							
	201												
2	MDNCC-	Research Methodology –	3	45	3	40/60							
	202	П											
3	MDNCC-	Human Nutritional	3	45	3	40/60							
	203	Requirement											
4	MDNCC-	Principles of Dietetics	4	60	4	40/60							
	204	_											
			14	210	14	400							
		Name of Co	ore Lab Co	ourse									
1	MDNCC-	Therapeutic Nutrition –I	2	60	4	20/30							
	205	*											
2	MDNCC-	Human Nutritional	2	60	4	20/30							
	206	Requirement											

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3	MDNCC- 207	Principles of Dietetics	2	60	4	20/30
4	MDNCC- 208	Seminar	2	2 hrs/week 40 hrs	_	50
		Internship	-	-	-	-
			8	220	12	200
		Total	22	430	26	600
Total	credits in Seme	ster II		,	22	

		Semest	er – III			
S.No.	Course Code	Course Title	Course Credits	Total Contact Hours	Contact Hours/week	Total Marks (I/E)
		Name of Core Co	ourse (The	ory)		
1	MDNCC-301	Advance Nutrition-I	4	60	4	40/60
2	MDNCC-302	Nutritional Biochemistry- II	4	60	4	40/60
3	MDNCC-303	Community Nutrition	4	60	4	40/60
		Name of Lab	Course Con	re		
1	MDNCC-304	Advance Nutrition-I Lab	2	60	4	20/30
2	MDNCC-305	Nutritional Biochemistry- II Lab	2	60	4	20/30
3	MDNCC-306	Community Nutrition Lab	2	60	4	20/30
4	MDNCC-307	Educational Tour	2	2 hrs/week 40 hrs		50
5	MDNCC- 308	Internship	3	100 hours	-	100
		Total credits in core course	23	500	24	600
	·	Name of Elective	Course (Th	neory)		
	Course Code	Group A				
1	MDNEC-301	Institutional Food Administration	4	60	4	40/60
2	MDNEC-302	Food Processing and Technology	4	60	4	40/60
		Group B				
3	MDNEC-303	Public Health Nutrition	4	60	4	40/60
4	MDNEC-304	Nutritional epidemiology	4	60	4	40/60
		Group C				
5	MDNEC-305	Therapeutic Nutrition- II	4	60	4	40/60
6	MDNEC-306	Nutrigenomics	4	60	4	40/60
	P	Name of Lab Co	ourse Elect	ive		
		Group A				

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1	MDNEC-307	Institutional Food	2	60	4	20/30		
		Administration Lab						
2	MDNEC-308	Food Processing and	2	60	4	20/30		
		Technology Lab						
		Group B						
3	MDNEC-309	Public Health Nutrition	2	60	4	20/30		
		Lab						
4	MDNEC-310	Nutritional epidemiology	2	60	4	20/30		
		Lab						
		Group C						
5	MDNEC-311	Therapeutic Nutrition - II	2	60	4	20/30		
		Lab						
6	MDNEC-312	Nutrigenomics Lab	2	60	4	20/30		
		Total credits in elective	12	240	16	300		
		course						
		Total	35	740	40	900		
Total o	credits in Semest	ter III	35					

In Semester –III Students shall opt for any group of elective subjects (Either Group A or Group B or Group C).

Semester – IV

S.No.	Course Code	Course Title	Course	Total	Contact	Total		
			Credits	Contact	Hours/week	Marks		
				Hours		(I/E)		
		Lab Co	<u>urse Name</u>		•			
1	MDNCC- 401	Dissertation	15	450	30	300/200		
	Course Code	Name of Elective Cours	e					
		Elective Course for						
		Group A and B						
2	MDNEC-402	Emerging issues in	4	60	4	40/60		
		Nutrition						
3	MDNEC-403	Programme planning in	4	60	4	40/60		
		public health nutrition						
	Course Code	Elective Course for	4	60	4	40/60		
		Group C						
4	MDNEC-404	Advance nutrition-II	4	60	4	40/60		
5	MDNEC-405	Nutrition	4	60	4	40/60		
		communication and diet						
		counseling						
		Total credits in	23	570	38	700		
		Semester IV						
		Total	106	2220	136	2850		
Total	Course credits		106					

In semester IV students shall opt for any group of elective subjects (Either Group A and B or Group C).

SEMESTER – I

CORE PAPER

SEMESTER -

Ι

SUBJECT: HUMAN PHYSIOLOGY (Theory) Paper Code-MDNCC-101

Total Credits: 4, Total Lectures-60, Maximum Marks: 100 (Internal Assessment-40, Final Exam-60)

COURSE OUTCOMES (COs)

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

CO1: Understand the functional structure of human body (Cognitive level: Understand)

- **CO2:** Gain the insight of pathophysiology of commonly occurring diseases (*Cognitive level: Understand*)
- **CO3:** Comprehend the normal mechanism and functioning of various human systems (*Cognitive level: Understand*)

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	1	1	1	1	3	2	3	3	3	1	3	3	3	3	3
CO2	2	2	2	1	3	2	3	3	3	1	3	3	3	3	3
CO3	2	1	2	1	3	2	3	3	3	1	3	3	3	3	3

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed syllabus (Theory)

Unit–I

- Cell, structure and functions
 - Structure and functions of nucleus, cytoplasm, endoplasmic reticulum, Golgi apparatus, mitochondria etc.
 - Active and Passive transport of nutrients
- Gastro intestinal physiology
 - Structure of functions of organs involved in gastro intestinal systems stomach, liver, pancreas, gall bladder

- Juices and secretion of GI salivary juice, gastric juice, pancreatic juice, bile juice and intestinal juice
- Hormones of the GI
- Overview of common diseases in GI fatty liver, IBD, Peptic ulcer, GERD etc.

Unit –II

- **Respiratory system** Structure and functions of organs of respiration, mechanism of respiration, pulmonary ventilation, external and internal respiration, control and regulation of respiration, transport and exchanges of gases, common respiratory disorders, respiratory function tests.
- Excretory system-
 - Physiology of Kidney, structure and function of nephron, urine formation, acid balance, patho-physiology of UTI, Glomerulonephritis, renal stones.

Unit – III

- Circulatory system-
 - Structure and function of heart and blood vessels, cardiac cycle, cardiac output, heart sound, blood formation and factor controlling erythropoiesis, blood pressure and factors affecting it, hypertension, coronary heart diseases

Unit –IV

- Endocrine system
 - Mechanism and physiological function of pituitary, thyroid, parathyroid, adrenal and reproductive hormones
 - Patho-physiology of diabetes mellitus, metabolic syndrome, hashimoto's diseases etc.
 - Physiology of ageing

Unit –V

- Regulation of body temperature:-
 - Thermogenesis, thermolysis, hypothermia, role of skin in maintaining body temperature
- Overview of organization of nervous system.
- Overview of reproductive system and pathophysiology of PCOD
- Lymphatic system- lymph, lymph glands & functions, spleen-structure & function.

Suggested Readings:

- Ganong W.F. (2003) Review of Medical Physiology.21sted. McGraw Hill.
- Guyton A.C. and Hall J.E.(2000) Textbook of Medical Physiology.10th ed. India: Harcourt Asia.
- Tortora G.J and Grabowski S.R.(2000) Principles of Anatomy and Physiology.9th ed. John Wiley and Sons.Inc.

- West J.B.(1996). Physiological Basis of Medical Practice.12th Edition. B. I. Waverly Pvt. Ltd.
- Marieb E.N (2001) Human Anatomy and Physiology (5thed) Pearson Education, Inc, publishing as Benjamin Cummings.
- Jain A. K (2014) Human Physiology for BDS (5thed), Publisher: Avichal Publishing Company; ISBN: 9788177394337.
- Pal G.K and Pal Pravati (2016) Comprehensive Textbook of Medical Physiology (2Vols) Publisher: Jaypee Brothers Medical Pub (P) Ltd.) ISBN: 5551234080758
- Manual of Practical Physiology for MBBS (2017) 5 edition; Jain A.K. Publisher: Arya Publications, India
- Text book of Practical Physiology (2010) 3rd edition. Paul G.K. Publisher: Universities Press (India) Limited.
- Medical Laboratory Technology a Procedure Manual for Routine Diagnostic Tests Vol. I (2010), Mukherjee, K.L., Tata Mc Graw–Hill Publishing Company Limited (New Delhi). ISBN:9780070076594 / ISBN:9780070076631

Teaching-Learning Strategies in brief

- The teaching learning strategies, followed are chalk-board teaching, learning through discussion among the peer group, classroom interaction, quiz, presentations, Q & A session and reflective learning.
- Assessment methods and weightages in brief
- <u>There are two components of assessment:</u> Internal assessment (40 marks) and End semester examination (60 marks). Internal assessment consists of continuous mode (10 marks) and sessional examinations (30 marks). Continuous mode evaluation is of 10 marks comprising of Attendance -5 marks (calculated as: Percentage of Attendance: Allotment of marks- Less than 75: 0 marks; 75-80: 2 mark; 81-85: 3 marks; 86-90: 4 marks and >90: 5 marks),
- Assignments contain 3 marks and Student teacher interaction-2 marks. There are two Sessional exams (each conducted for 15 marks) and one improvement exam (15 marks). The average marks of two best sessional exams are computed out of 30 marks.
- Total Marks are 100 for the subject (Internal Assessment: 40 marks and End Semester Examination: 60 Marks).

CORE PAPER

SEMESTER I

Paper Title: Principles of Food Science (Theory) Paper Code: MDNCC-102

Total Credits: 4, Total Lectures-60, Maximum Marks: 100 (Internal Assessment-40, Final Exam-60)

COURSE OUTCOMES (COs)

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

CO1: Understand the chemical and functional properties of carbohydrates, protein, lipids, water, pigments, flavor and enzymes, Vitamins and minerals.

(Cognitive level: Understand)

CO2: Gain an insight of Food Additives its classification and functions (*Cognitive level: Understand*)

- **CO3:** Understand new food product development Stages of Product development and standardization, Sensory evaluation of foods, Quality control and management, Packaging, labeling and marketing of new product (*Cognitive level: Understand*)
- **CO4:** Comprehend Food processing techniques, food safety and quality control, food laws and regulation (*Cognitive level: Understand*)

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	2	1	1	1	3	2	3	1	1	1	1	3	3	3	3
CO2	2	2	2	2	3	2	3	3	3	2	3	3	3	3	3
CO3	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3
CO4	2	1	2	1	3	3	3	3	3	3	3	3	3	3	3

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus (Theory)

Unit –I Introduction of Food Science

- Physical, chemical and functional properties of carbohydrates, protein, lipids, water, pigments, flavor and enzymes, Vitamins and minerals.
- Colloidal chemistry of foods sols, gels, foams and emulsions
- Physical properties of food hydrogen ion concentration, oxidation reduction potential, surface tension, adsorption, viscosity, plasticity, iso-electric points or proteins

Unit –II

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- Food Additives- Its definition, classification and functions
 - Antioxidant, preservative, colours, flavours, emulsifiers, sequestrants, humectants, sweetener, anticaking etc.
 - o Toxicological evaluation of additives

Unit –III

• New food product development

- Stages of Product development and standardization
- Sensory evaluation of foods
- Quality control and management
- Packaging, labeling and marketing of new product
- Food adulteration
- Important food quality attributes- sensory quality, microbiological quality, nutritional quality evaluation of food products.

Unit-IV Food Processing Techniques:

• Food processing techniques, chemical, physical, nutritional alteration occurring in food products during freezing, thermal processing, dehydration, irradiation, environmental control.

Unit –V Food Safety & Quality Control

- Food Safety Quality Management Systems
- ISO 22000
- Food laws and Regulations

Suggested Readings:

- Fellows P J (2002) Food Processing Technology- Principles and Practices, 2nd Edition. Wood head Publishing Ltd.
- Mahindru, S N (2000) Food Additives- Characteristics Detection and Estimation. Tata McGraw Hill Publishing Co. Ltd.
- Food and Agriculture Organization. (1980) Manual of Food Quality Control. Additive Contaminants Techniques. Rome.
- Branen AL, Davidson PM & Salminen S. (2001) Food Additives. 2nd Ed. Marcel Dekker.
- Fuller, G.W. (1999) New Food Product Development. From concept to market place. CRC press, New York.
- Peter Murano (2003) Understanding Food Science and Technology (with InfoTrac)
- BIS standards for food products and analysis manual.
- Manuals of methods of analysis of various food products, FSSAI, 2016
- Food Facts and Principles Shakuntala Manay, New Age International Publishers.
- Food Science B. Sri Lakshmi, New Age International Publishers.
- Food Science Norman N Potter, Joseph H. Hotchkiss, 5th edition, CBS Publishers & Distributors, New Delhi.
- Fruit and Vegetable Preservation Principles & Practices R P Srivastava, Sanjeev Kumar. 3rd edition, international Book Distributing Co., Lucknow.
- Food Science, Chemistry and Experimental Foods Dr.M.Swaminathan, The Bangalore Printing & Publishing Co. Ltd., Mysore.

Teaching-Learning Strategies in brief

The teaching learning strategies, followed are chalk-board teaching, learning through discussion among the peer group, classroom interaction, quiz, presentations, Q & A session and reflective learning.

Assessment methods and weightages in brief

- <u>There are two components of assessment:</u> Internal assessment (40 marks) and End semester examination (60 marks). Internal assessment consists of continuous mode (10 marks) and sessional examinations (30 marks). Continuous mode evaluation is of 10 marks comprising of Attendance -5 marks (calculated as: Percentage of Attendance: Allotment of marks- Less than 75: 0 marks; 75-80: 2 mark; 81-85: 3 marks; 86-90: 4 marks and >90: 5 marks),
 - Assignments contain 3 marks and Student teacher interaction-2 marks. There are two Sessional exams (each conducted for 15 marks) and one improvement exam (15 marks). The average marks of two best sessional exams are computed out of 30 marks.
 - Total Marks are 100 for the subject (Internal Assessment: 40 marks and End Semester Examination: 60 Marks).

CORE PAPER

SEMESTER I

Paper Title: PRINCIPLES OF FOOD SCIENCE LAB Paper code - MDNCC-106

Total Credits: 2, Total practical hours-60, Maximum Marks: 50 (Internal Assessment-20, FinalExam-30)

COURSE OUTCOMES (COs)

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

CO1: Understand the techniques, quality assessment of foods and adulteration.

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(Cognitive level: Understand)

CO2: Gain an insight for sensory evaluation of new food product development (*Cognitive level: Understand*)

CO3: Develop skills in conducting dietary survey and interpreting data

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	3	3	1	2	1	3	2	3	2	3	1	3
CO2	3	3	2	3	3	2	3	2	3	3	3	1	3	1	3
CO3	3	3	2	3	3	2	3	2	3	3	3	3	3	1	3

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus Lab

Unit-I

- Physical examination of various food grains.
- Detection of adulteration in milk, khoa, turmeric, ghee, wheat flour.
- Determination of carbohydrate, protein content, fat content, total ash, moisture content and crude fiber content in food sample.

Unit-II

- Estimation of polyphenols in foods.
- Gelatinization and factors affecting gelatinization
- Egg– Preparation of stable emulsion- Mayonnaise
- Stages of Sugar cookery Any two Preparations
- Refractive index, melting point, solidification point of fats & oils.

Unit-III

- Survey of ready to eat foods available in market and preparing list of ready to eat foods with nutrition, ingredient and food label details.
- Sensory Evaluation:
 - \circ Threshold test for salt/ sugar
 - o Triangle Test
 - o Paired Comparison Test
 - Hedonic Rating Test

Suggested Readings:

- Fellows P J (2002) Food Processing Technology- Principles and Practices, 2nd Edition. Wood head Publishing Ltd.
- Peter Murano (2003) Understanding Food Science and Technology (with InfoTrac)
- BIS standards for food products and analysis manual.
- Manuals of methods of analysis of various food products, FSSAI, 2016
- Food Facts and Principles Shakuntala Manay, New Age International Publishers.
- Food Science B. Sri Lakshmi, New Age International Publishers.

CORE PAPER

SEMESTER I

Paper Title: RESEARCH METHODOLOGY-I(Theory) Paper Code: MDNCC-103

Total Credits: 4, Total Lectures-60, Maximum Marks: 100 (Internal Assessment-40, Final Exam-60)

COURSE OUTCOMES (COs)

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

CO1: Demonstrate knowledge of the scientific method, purpose, and approaches to research

CO2: Compare and contrast quantitative and qualitative research.

CO3: Explain research design and the research process.

CO4: Prepare key elements of a research proposal.

CO5: Explain ethical principles, issues, and procedures.

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	2	2	2	1	3	3	3	3	3	2	3	3	1	3	3
CO2	1	2	2	1	3	3	3	3	3	2	3	3	3	3	2
CO3	1	1	1	1	3	3	3	3	2	1	3	3	3	3	3
CO4	2	2	1	1	1	3	2	3	1	2	3	3	3	3	3
CO5	3	1	2	1	2	3	3	3	3	1	3	3	3	3	1

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus (Theory)

Unit-I Introduction to Research

- Definition, objective & types of research
- Research process and Review of literature
- Quantitative and Qualitative research
- Induction and deduction

- Sample Methods, Sampling Error, Sample size
- Research designs

Unit-II Data Collection and Instrumentation in Research

- Type of Variables and Hypothesis
- Type I and Type II Error
- Methods and type of Data collection
- Scales and Measurement errors
- Understanding reliability and validity
- Research report styles and referencing (APA, MLA etc.)
- Errors: compounding, biasness etc.

Unit-III Ethics in Research and its related Conflicts

- Concept (informed consent), privacy, confidentially of participants
- Conflict in publications and Misuseof information
 - o Plagiarism
 - Fabrication
 - \circ Falsification

Suggested Readings:

- Aschengrau A, Seage III GR. (2014) Essentials of Epidemiology in Public Health. (Third Edition). Sudbury, MA: Jones & Bartlett.
- Bell, J. (1999). Doing your research project: Guide for first time researchers in social sciences. New Delhi: Viva Books.
- Bernard, H. R. (2000). Social research methods: Qualitative and quantitative approaches. Thousand Oaks, CA: Sage.
- Blaxter, L. Hughes, C., & Tight, K. (1999). How to research. New Delhi: Viva Books.
- Bryman, A. (2008). Social research method. Oxford: Oxford University Press.
- Creswell, J. W. (2009). Research design: Qualitative, quantitative, and mixed methods approach. Thousand Oaks, CA: Sage Publications.
- Denscombe, M. (1999). The good research guide for small-scale social research projects. New Delhi: Viva Publications.
- Research Methodology a step-by-step guide for beginners by Ranjit Kumar
- Research Methodology by C R Kothari

Teaching-Learning Strategies in brief

• The teaching learning strategies, followed are chalk-board teaching, learning through discussion among the peer group, classroom interaction, quiz, presentations, Q & A session and reflective learning.

• Assessment methods and weightages in brief

- <u>There are two components of assessment:</u> Internal assessment (40 marks) and End semester examination (60 marks). Internal assessment consists of continuous mode (10 marks) and sessional examinations (30 marks). Continuous mode evaluation is of 10 marks comprising of Attendance -5 marks (calculated as: Percentage of Attendance: Allotment of marks- Less than 75: 0 marks; 75-80: 2 mark; 81-85: 3 marks; 86-90: 4 marks and >90: 5 marks),
 - Assignments contain 3 marks and Student teacher interaction-2 marks. There are two Sessional exams (each conducted for 15 marks) and one improvement exam (15 marks). The average marks of two best sessional exams are computed out of 30 marks.
 - Total Marks are 100 for the subject (Internal Assessment: 40 marks and End Semester Examination: 60 Marks).

CORE PAPER

SEMESTER I

Paper Title: FOOD MICROBIOLOGY (Theory) Paper Code: MDNCC-104

Total Credits: 4, TotalLectures-60, Maximum Marks: 100 (Internal Assessment-40, Final Exam-60)

COURSE OUTCOMES (COs)

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

CO1: Understand the nature of microorganisms involved in food spoilage, food infections and intoxications.

CO2: Comprehend principles of various preservation and control techniques.

CO3: Understand the concept of Probiotics and prebiotics and discuss the functionality of single cell protein and their application in food industry. (*Cognitive level: Understand*)

CO4: Understand microbial safety in various foods operations.

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	3	2	1	1	2	2	3	3	3	3	3	3	1	3	2
CO2	2	3	1	1	3	3	2	3	3	2	3	3	3	3	3
CO3	1	1	1	1	3	3	3	3	2	1	3	3	3	3	1
CO4	3	3	3	1	3	3	3	3	1	2	3	3	3	3	2

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Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus (Theory)

Unit–I Introduction to Basic Microbiology

- History of Microbiology
- Importance of Microorganism and their characteristics
 - o Bacteria
 - o Molds
 - o Yeast
- Factors affecting growth of microorganism

Unit -II Spoilage of different food items

- Cereals and its products
- Vegetable and its fruits
- Eggs
- Milks and milk products
- Canned food
- Principles and method for preservation

Unit -III Beneficial role of Microorganism

- Single cell protein
- Pro-biotic and pre-biotic
- Fermented food products
 - o Cheese
 - o Koji
 - Sauerkraut
 - Vinegar
 - o Idli

Unit –IV Food Borne Diseases

- Infection and Intoxication (Clostridium, E. coli, Staphylococcus, salmonella, botulism, listeria monocytogene
- Symptoms and mode of Transmission
- Emerging food pathogens
- HACCP
- Personal Hygiene and Waste water management

Suggested Readings:

• Frazier, W.C. &West off, D.C. (2013). Food Microbiology. 5th Edition. Tata McGraw-Hill Publishing Co. Ltd.

- Garbutt, J. (1997). Essentials of Food Microbiology. Arnold London.
- Jay, J.M., Loessner, D.A. & Martin, J. (2006). Modern Food Microbiology. 7th Edition. Springer
- Banwart, G.J. (2004). Basic Food Microbiology. 2nd Edition. CBS Publishers and Distributors, India
- Pelczar, M.J., Chan, E.C.S., Krieg, N. (1993). Microbiology. 5th Edition. Tata McGraw-Hill Publishing Co. Ltd.
- Prescott, L.M., Harley, J.P. & Klein, D.A. (2017). Microbiology. 10th Edition. Tata McGraw-Hill Publishing Co. Ltd.
- Mathur, P. (2018). Food Safety and Quality Control. 1st Edition. Orient Blackswan Private Ltd. India.
- Forsythe, J.S. (2011). The Microbiology of Safe Food. 2nd Edition. Wiley-Blackwell Publishing.
- Ravishashankar, R. & Jamuna, B. (2015). Microbial Food Safety and Food Preservation. CRC Press, Boca Raton.
- Manual of Methods of Analysis of Foods- Microbiological Testing. (2012). Lab Manual 14. FSSAI, GoI, New Delhi.

Teaching-Learning Strategies in brief

- The teaching learning strategies, followed are chalk-board teaching, learning through discussion among the peer group, classroom interaction, quiz, presentations, Q & A session, and reflective learning.
- Assessment methods and weightages in brief
- <u>There are two components of assessment:</u> Internal assessment (40 marks) and End semester examination (60 marks). Internal assessment consists of continuous mode (10 marks) and sessional examinations (30 marks). Continuous mode evaluation is of 10 marks comprising of Attendance -5 marks (calculated as: Percentage of Attendance: Allotment of marks- Less than 75: 0 marks; 75-80: 2 mark; 81-85: 3 marks; 86-90: 4 marks and >90: 5 marks),
 - Assignments contain 3 marks and Student teacher interaction-2 marks. There are two Sessional exams (each conducted for 15 marks) and one improvement exam (15 marks). The average marks of two best sessional exams are computed out of 30 marks.
 - Total Marks are 100 for the subject (Internal Assessment: 40 marks and End Semester Examination: 60 Marks).

CORE PAPER

SEMESTER I

Paper Title: FOOD MICROBIOLOGY LAB Paper Code: MDNCC-107

Total Credits: 2, Practical hours-60, Maximum Marks: 50 (Internal Assessment-40, Final Exam-60)

COURSE OUTCOMES

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

CO1: Understand the morphology and structural features of various micro-organisms.

CO2: Comprehend various techniques used for isolation, purification, identification and controlling the growth of micro-organisms

CO3: Assess the microbial safety of personal hygiene, water, milk, and other food products.

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	3	2	1	1	2	2	3	3	3	3	3	3	1	3	3
CO2	2	3	1	1	3	3	2	3	3	2	3	3	3	3	1
CO3	1	1	1	1	3	3	3	3	2	1	3	3	3	3	2

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus Lab

Unit -I

- Instruments: Principles of Microscope
- Techniques-Sterilization and Disinfection
- Bio- Safety Cabinet

Unit -II

- Staining
 - Simple staining

 \circ Differential staining

Unit -III

• Preparation of culture media and pure culture technique

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- Preparation of general-purpose media
- Isolation of pure culture bacteria by steak plate method/swab method

Unit -IV

- Quantitative techniques:
 - Standard plate count method

Unit -V

- Microbiological analysis for
 - o MBRT (Methylene blue reduction test)
 - o Adulteration test
 - HACCP plan

Suggested Readings:

- Bell, C., Neaves, P. & Williams, A.P. (2005). Food Microbiology and Lab Practice. Wiley Press.
- Yousef, A.L. (2003). Food Microbiology. A Laboratory Manual. Wiley Inter-Science New Jersey.
- Benson, H.J. (2002). Microbiological Application.8th Edition. Tata McGraw Hill.
- Mortimore & Wallace. (2013). HACCP: A Practical Approach. 3rd Edition. Springer Publication.
- Cappuccino & Sherman. (2007). Microbiology: A laboratory Manual. 7th Edition. Pearson Education Inc.
- Hoorfar, J. (2011). Rapid Detection, Characterization and Enumeration of Food Borne Pathogens. American Society for Microbiology, Washington, USA.
- Drinking Water Specification- Indian Standard. (2012). 2nd Revision. IS 10500:2012. Bureau of Indian Standard, Manak Bhawan, New Delhi, India.
- Manual of Methods of Analysis of Foods- Microbiological Testing. (2012). Lab Manual 14. FSSAI, GoI, New Delhi.

CORE PAPERSEMESTER I

Paper Title: NUTRITIONAL BIOCHEMISTRY-I (Theory) Paper Code: MDNCC-105

Total Credits: 4, Total Lectures-60, Maximum Marks: 100 (Internal Assessment-40, Final Exam-60)

COURSE OUTCOMES (COs)

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

CO1: Understand the enzymes, their types, enzyme activity and their diagnostic role **CO2**: Have coherent and systematic knowledge on carbohydrate metabolic regulation

CO3: Understand the lipid metabolism and its regulationCO4: Correlate the action of hormones with metabolic regulationCO5: Learn the principles of spectrophotometry

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	2	2	2	2	3	2	3	3	3	3	3	3	1	3	3
CO2	3	2	2	1	3	3	3	2	3	2	3	3	3	3	3
CO3	1	1	1	2	3	3	3	3	2	1	3	3	3	3	2
CO4	3	3	3	1	3	3	3	2	1	2	3	3	3	3	1
CO5	3	1	2	1	2	3	3	3	3	1	3	3	3	3	2

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' Mapping

Detailed Syllabus (Theory)

Unit-I Carbohydrates

- Introduction-Classification, functions, and sources
- Metabolic regulations of:
 - o Glycolysis,
 - o Gluconeogenesis
 - TCA cycle,
 - HMP shunt
 - o Glycogenesis
 - Electron transport chain.

• Inborn errors of carbohydrate metabolism-

- o Glycogen storage diseases
- o Galactosemia
- o Fructose Intolerance
- o Fructosuria,
- o Lactose Intolerance,
- o Pentosuria.

Unit-II Lipids

- Introduction-Classification, functions and sources
- Metabolic regulation
 - Oxidation of fatty acids (saturated and unsaturated)

- o Lipogenesis
- o Ketone bodies
- Metabolism of triacylglycerol,
- Metabolism of phospholipids,
- Metabolism of cholesterol
- o Lipoprotein metabolism

• Inborn errors of lipids

- o Graucher's disease,
- o Niemann's picks disease,
- o Taysach's disease
- o Fabry's disease
- o Hyperlipoproteinemia,
- o Ketosis,
- o Cachexia,
- \circ Metabolic changes during starvation
- $\circ~$ Inter –relationship between carbohydrate, fat, and protein metabolism

Unit-III Bio-Signaling and Hormones

- Concept of Hormones
- Signaling mechanisms
- Role of insulin, glucagon, and epinephrine in intracellular signaling
- Steroid hormones

Unit-IV Techniques – I

• Spectrophotometry

 \circ Beer - lambert's law, colorimetry and spectrophotometry, atomic absorption spectroscopy, flame photometry

Unit-V

• Protein and its synthesis

- o Classification, functions & sources
- $\circ~$ Deamination, transamination, decarboxylation
- \circ Urea cycle
- $\circ~$ Inborn errors of protein metabolism
- Enzymes
 - o Classification of enzymes, Cofactor & Prosthetic groups, Concept of active site.
 - Effect of pH, temperature, substrate concentration (Km and Vmax, Michaelis-Menten equation) & metal ions on enzyme activity
 - Isozyme and Ribozyme

• Application of enzymes in diagnostics (SGPT, SGOT, Creatine kinase & Alkaline phosphatase)

CORE PAPER

SEMESTER I

Paper Title: NUTRITIONAL BIOCHEMISTRY-I LAB Paper Code: MDNCC-108

Total Credits: 2, Practical hours-60, Maximum Marks: 50 (Internal Assessment-20, Final Exam-30)

COURSE OUTCOMES (COs)

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

CO1: Acquire skills on preparation of solutions **CO2:** Colorimetric estimation of biochemical molecules

CO3: Detect the enzymatic activity

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	2	2	2	1	3	3	3	3	3	2	3	3	1	3	3
CO2	1	2	2	1	3	3	3	3	3	2	3	3	3	3	3
CO3	1	1	1	1	3	3	3	3	2	1	3	3	3	3	2

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping.

Detailed Syllabus Lab

Unit -I

• Preparation of Solutions

• Normal, molar, molal and percentage

Unit -II

• Techniques

○ Estimation- Phosphorous, protein, iron, cholesterol, glucose, vitamin –C, Potassium, Magnesium, Chloride

Unit -III

• Enzyme Assays

Assay of salivary amylase

o Assay of alkaline phosphatase

Suggested Readings:

• Berg JM, Stryer. L, Tymoczko JL and Gatto, GJ. (2015) Biochemistry 8th ed. W.H. Freeman.

• Devlin TM. (2010) Text Book of biochemistry with Clinical Correlations 7th ed. John Wiley and Sons.

• Rodwell VW, Bender DA, Botham KM, Kennelly PJ, and Weil PA. (2015) Harper's Illustrated Biochemistry. 30thed McGraw-Hill, Asia.

• Nelson DL and Cox MM. (2017) Principles of Biochemistry. 7th ed. W.H. Freeman.

• Wilson K and Walker J. (2000) Practical Biochemistry5th ed. Cambridge University Press.

Teaching-Learning Strategies in brief

- The teaching learning strategies, followed are chalk-board teaching, learning through discussion among the peer group, classroom interaction, quiz, presentations, Q & A session and reflective learning.
- Assessment methods and weightages in brief
- <u>There are two components of assessment:</u> Internal assessment (40 marks) and End semester examination (60 marks). Internal assessment consists of continuous mode (10 marks) and sessional examinations (30 marks). Continuous mode evaluation is of 10 marks comprising of Attendance -5 marks (calculated as: Percentage of Attendance: Allotment of marks- Less than 75: 0 marks; 75-80: 2 mark; 81-85: 3 marks; 86-90: 4 marks and >90: 5 marks),
 - Assignments contain 3 marks and Student teacher interaction-2 marks. There are two Sessional exams (each conducted for 15 marks) and one improvement exam (15 marks). The average marks of two best sessional exams are computed out of 30 marks.
 - Total Marks are 100 for the subject (Internal Assessment: 40 marks and End Semester Examination: 60 Marks).

SEMESTER II

CORE PAPER

SEMESTER II

Paper Title: THERAPEUTIC NUTRITION-I (Theory) Paper Code: MDNCC-201

Total Credits: 4, Total Lectures-60, Maximum Marks: 100 (Internal Assessment-40, Final Exam-60)

COURSE OUTCOMES (COs)

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

CO1: Assess the needs of patients.

CO2: Plan and prepare diets suitable for patients of different diseases

CO3: Comprehend types and availability of foods for special dietary uses.

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	1	1	2	1	3	2	3	3	3	3	3	3	1	3	3
CO2	1	2	2	1	3	3	3	3	3	2	3	3	3	3	3
CO3	1	1	1	1	3	3	3	3	2	1	3	3	3	3	2

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping.

Detailed Syllabus (Theory)

Unit-I Gastrointestinal Diseases: (Aetiopathogenesis, clinical picture, diagnostic tests, treatment, preventive aspects) Peptic ulcer, Ulcerative colitis, diarrhoea, dysenteries, malabsorption syndrome and IBD

- Nutritional management for Weight Imbalance
- Enteral and Parenteral feeding
- Nutritional Management for Food Allergies

Unit-II Diet for Hepatic Disorders

- Liver:
 - o Etiology, symptoms, diagnosis/functional test and dietary management of:
 - Jaundice Types hemolytic, obstructive and infective
 - o Viral Hepatitis
 - o Fatty liver
 - o Cirrhosis
 - Alcoholic liver disease
 - Hepatic Coma

o Liver Transplant

• Gall Bladder:

- o Etiology, symptoms, diagnosis and dietary management of:
- Cholecystitis
- \circ Cholelithiasis

Unit-III Diet for Renal Disorders

• Kidney:

- o Etiology, symptoms, diagnosis and dietary management of:
- \circ Acute and Chronic Glomerulonephritis
- \circ Nephrosis
- o Acute Renal Failure
- o Chronic Renal Failure
- \circ Kidney Transplant
- o Urinary calculi Types Calcium oxalate, uric acid and struvite
- Dialysis
- o Hemodialysis Advantages, disadvantages and Dietary management
- o Peritoneal dialysis- Advantages, disadvantages and Dietary management

Unit-IV Diet for Hormonal Disturbances

- Disease of Pancreas:
- o Etiology, symptoms, diagnosis and dietary management: Acute Pancreatitis, Chronic
- \circ Pancreatitis

• Diabetes Mellitus:

- Types, metabolic changes
- Etiology, symptoms, diagnosis
- o Complications
- o Treatment exercise, hypoglycemic drugs, insulin and diet
- o Dietary Management Role of fibre, glycemic index, food exchange list

• Diseases of Adrenal Cortex:

- Dietary management in Addison's diseases
- Dietary management in Cushing's syndrome
- Diseases of Thyroid Gland:
- o Dietary management in Hypothyroidism
- o Dietary management in Hyperthyroidism

Unit-V Diet for Degenerative and Chronic Disorders Disorders of circulatory system

- Dietary management of Hypotension, Hypertension
- o Dietary management of Cardio Vascular Diseases
- o Ischemic Heart Disease- Arteriosclerosis, Atherosclerosis, Coronary Artery Disease,

- Myocardial Infarction, Angina, Heart Failure
- Non- Ischemic heart disease-Cardiac Myopathy, Congenital Heart Disease

Suggested Readings

- Clinical Dietetics and Nutrition F P Anita and Philip Abraham.
- Food, Nutrition and Diet Therapy Kathleen Mahan & Krause, Sylvia EscottStump.
- Normal and Therapeutic Nutrition Robinson & Lawler, 17th edition, Mac MillanPublishers.
- Clinical Nutrition Ed Michael J Gibney, MarinosElia, OlleLjungqvist and Julie Dowsett.
- Basics of Clinical Nutrition, 2nd Edition, Joshi, Jaypee Publishers

Teaching-Learning Strategies in brief

- The teaching learning strategies, followed are chalk-board teaching, learning through discussion among the peer group, classroom interaction, quiz, presentations, Q & A session and reflective learning.
- Assessment methods and weightages in brief
- <u>There are two components of assessment:</u> Internal assessment (40 marks) and End semester examination (60 marks). Internal assessment consists of continuous mode (10 marks) and sessional examinations (30 marks). Continuous mode evaluation is of 10 marks comprising of Attendance -5 marks (calculated as: Percentage of Attendance: Allotment of marks- Less than 75: 0 marks; 75-80: 2 mark; 81-85: 3 marks; 86-90: 4 marks and >90: 5 marks),
 - Assignments contain 3 marks and Student teacher interaction-2 marks. There are two Sessional exams (each conducted for 15 marks) and one improvement exam (15 marks). The average marks of two best sessional exams are computed out of 30 marks.
 - Total Marks are 100 for the subject (Internal Assessment: 40 marks and End Semester Examination: 60 Marks).

CORE PAPER

SEMESTER II

Paper Title: THERAPEUTIC NUTRITION- I LAB Paper Code: MDNCC-205

Total Credits: 2, Total Lectures-60, Maximum Marks: 50 (Internal Assessment-20, Final Exam-30)

COURSE OUTCOMES (COs)

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

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CO1: Assess the nutritional needs of patients.

CO2: Plan and prepare diets suitable for patients suffering with different diseases

CO3: Comprehend types and availability of foods for special dietary uses.

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	2	2	2	1	3	3	3	3	3	2	3	3	1	3	2
CO2	1	2	2	1	3	3	3	3	3	2	3	3	3	3	1
CO3	1	1	1	1	3	3	3	3	2	1	3	3	3	3	3

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus (Lab)

Unit-I Nutritional Care Assessment- anthropometric assessment, Dietary and nutrient assessment, clinical assessment etc.,

Unit-II Nutritional diet modifications -planning and preparation of diets for following:

- Obesity
- Constipation and Diarrhoea
- GERD
- Malabsorption Syndrome
- Celiac disease
- IBS
- Diabetes
- Hepatitis
- Pancreatitis

Unit-III

- Plan and calculate diet for Ulcerative colitis and kidney disorders
- Planning and preparation of diet for tube feeding
- Visit to ICU to understand the different feeding methods.

- Nutritional assessment of hospitalized patients.
- NABH guidelines in relation to clinical dietician

CORE PAPER

SEMESTER II

Paper Title: RESEARCH METHODS-II (Theory) Paper Code: MDNCC-202

Total Credits: 3, Total Lectures-45, Maximum Marks: 100 (Internal Assessment-40, Final Exam-60)

COURSE OUTCOMES (COs)

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

CO1: Differentiate between the qualitative and quantitative methods of analysis of data.

CO2: Suitably apply data reduction strategies and illustrate data using various graphical methods.

CO3: Use appropriate parametric and non-parametric statistical tests.

CO4: Understanding type I and type II error and its application in research.

CO5: Draw conclusions and interpretations from the analysis of data using various statistical software.

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	1	1	2	1	3	2	3	3	3	3	3	3	1	3	2
CO2	1	2	2	1	3	3	3	3	3	2	3	3	3	3	3
CO3	1	1	1	1	3	3	3	3	2	1	3	3	3	3	2
CO4	3	3	3	1	3	3	3	3	1	2	3	3	3	3	2
CO5	1	2	3	3	2	2	2	3	3	3	3	3	3	2	1

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus (Theory)

Unit-I Introduction to Statistics

- Basic principles and concepts in statistics
- Orientation to qualitative and quantitative research procedures
- Measurement and computation- Scales of measurement, Reliability, and validity

Unit-II Descriptive Statistics

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- Applications of descriptive statistics
- Measures of Central tendency and Variability

Unit-III Probability and Normal Distribution

- Basic principles and applications of probability
- Normal curve
- Characteristics of distributions: Skewness, kurtosis
- Testing hypotheses: Levels of significance and p values
- Errors in hypothesis testing: Type I, Type II
- Sampling distribution
- Standard scores, calculation, and application

Unit-IV Statistical Tests

- Concept of parametric and non-parametric tests, statistical tests and level of measurement
- Parametric tests of difference: T test, ANOVA and post hoc analysis of significance
- Parametric tests of association: Pearson's product moment r
- Non-parametric tests of difference: Mann-Whitney, Sign, Median, and Kruskal-Wallis
- Non-parametric tests of association: Spearman's r
- Chi-square test
- Regression and its applications
- Tests for ascertaining reliability of instruments

Suggested Readings:

- Agresti, A. & Franklin C.A. (2009) Statistics: The Art and Science of Learning from Data (Second Edition) Boston, MA: Pearson Prentice Hall, ISBN 978-0-13-513199-2
- Bernard, H.R. (2000). Social Research Methods: Qualitative and Quantitative Approaches. Thousand Oaks, CA: Sage.
- Black, J.A. and Champion, D.J. (1976). Methods and Issues in Social Research. New York: John Wiley and Sons.
- Blaxter, L., Hughes, C, and Tight, K. (1999). How to Research. New Delhi: Viva books.
- Diez, D. M., Barr, C. D., Cetinkaya-Rundel M. (2015). Open Intro Statistics:(Third Edition). CreateSpace Independent Publishing Platform. ISBN-10: 194345003X, ISBN13: 978-1943450039 Http://www.openintro.org/stat/ Textbook.php.
- Elmes, D.G., Kanowitz, B.H. and Roediger, H.L. (1989). Research Methods in Psychology (Third Edition). New York: West Publishing Company.
- Fowler, F.J. (1988). Survey Research Methods. Applied Social Research Methods Series, Vol. 1. Newbury Park, CA: Sage.
- Greene, S. and Hogan, D. (Eds.). (2005). Researching Children's Experiences: Methods and Approaches. London: Sage.
- Gordis L. (2013) Epidemiology. (Fifth Edition). Philadelphia, PA: Saunders Elsevier,

- Minium, E. W., King, B. M., & Bear, G. (1995/2004). Statistical Reasoning for Psychology and Education. New York: Wiley and Sons.
- Muijs, D. (2004). Doing Quantitative Research in Education with SPSS. London: Sage

Teaching-Learning Strategies in brief

- The teaching learning strategies, followed are chalk-board teaching, learning through discussion among the peer group, classroom interaction, quiz, presentations, Q & A session and reflective learning.
- Assessment methods and weightages in brief
- <u>There are two components of assessment:</u> Internal assessment (40 marks) and End semester examination (60 marks). Internal assessment consists of continuous mode (10 marks) and sessional examinations (30 marks). Continuous mode evaluation is of 10 marks comprising of Attendance -5 marks (calculated as: Percentage of Attendance: Allotment of marks- Less than 75: 0 marks; 75-80: 2 mark; 81-85: 3 marks; 86-90: 4 marks and >90: 5 marks),
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- Total Marks are 100 for the subject (Internal Assessment: 40 marks and End Semester Examination: 60 Marks).

CORE PAPER

SEMESTER II

Paper Title: HUMAN NUTRITIONAL REQUIREMENTS (Theory) Paper Code: MDNCC-203

Total Credits: 3, Total Lectures-45, Maximum Marks: 100 (Internal Assessment-40, Final Exam-60)

COURSE OUTCOMES (COs)

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

CO1: Critically evaluate and derive requirements for specific macronutrients.

CO2: Understand critical periods in growth and development and impact of malnutrition.

CO3: Assess the nutritional status of children and adults.

CO4: Appreciate implications of poor dietary and lifestyle practices.

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	3	2	2	1	3	2	3	3	3	3	3	3	1	3	3
CO2	1	2	2	1	3	3	3	3	3	2	3	3	3	3	2
CO3	3	1	1	1	3	3	3	3	2	1	3	3	3	3	2
CO4	3	3	3	1	3	3	3	3	1	2	3	3	3	3	3

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus (Theory)

Unit -I

- General principle for deriving human nutrient requirements
- Methods of determining requirements and allowance and body weights
- Energy requirements- units, definition, assessment, methods for determining requirements, energy requirements for infants, children, adolescents, adults, pregnancy, lactation
- **Protein requirements-** protein quality and protein requirements, human amino acid requirements, quality of protein, methods for arriving at RDAs for Indians, protein requirements during pregnancy, lactation, growth- infants, children and adolescents, adults, protein energy ratio.

Unit -II

- **Lipid requirements-** functions of fatty acids, recommendations of dietary fat, RDAs for Indians, sources of fat, recommended intakes, quality of fat
- Dietary fiber- nutritional and health significance, requirements
- **Mineral requirements-** calcium, phosphorus, magnesium, sodium, potassium, iron and zinc- dietary requirements for different physiological ages and states. Methods for estimating requirements, dietary deficiency, biochemical functions, stores, sources
- Traces elements requirements- iodine requirements, deficiency, losses, RDAs.

Unit- III

• Vitamin requirements- water soluble vitamins, thiamine, riboflavin, niacin, pyridoxine, folic acid, vitamin B12, ascorbic acid- functions, sources, requirements, deficiency, and stability during processing. Fat soluble vitamins- vitamin A and vitamin D- significance, deficiency, dietary sources, requirements, role.

Evaluation of protein quality

- Analytical methods for the determination of nitrogen and amino acids in foods
- Evaluation of protein quality of foods from their amino acids content
- Biological methods
- Clinical methods
- Biochemical methods.

Unit IV-Assessment of Nutritional Status

- Critical overview of various methods of nutritional assessment- diet surveys, anthropometric measurements, biochemical and clinical. Rapid methods of assessment
- Analysis and Interpretation of results
- National and International growth standards/references, development of WHO child growth standards
- National Nutrition Surveys
- EAR

Suggested Readings:

- 1. Evaluation of protein quality. Publication 1100, National Academy of Science, National Research Council, Washington, DC, 1963
- 2. Nutritional evaluation of protein foods. PL, Pellet and VR Young. The United Nations University, 1980
- 3. Raghuramulu N, Madhvan Nair K and Kalyansundaram S. A laboratory of manual techniques, NIN and ICMR Hyderabad, 2003
- 4. Swaminathan M. Essentials of Foods and Nutrition. The Bangalore Printing & Publishing Co. Ltd. II ed. 2008
- 5. Goodhart and Shills ME. Modern Nutrition in Health and Disease, Henry Kimpton Publishers, USA, 1974
- 6. Pike RL and Brown ML. Nutrition an Integrated Approach, John Wily and Sons, New York, 1984
- 7. Energy and protein requirements. Report of Joint FAO/WHO/UNU Experts Consultation, Technical Report Series of No. 724, WHO, Geneva, 1985
- 8. Anonymous. Nutrient requirements and recommended dietary allowances for Indians, ICMR, Hyderabad, 2010
- 9. Human energy requirements. Report of Joint FAO/WHO/UNU Experts Consultation, Technical Report Series of No. 1, WHO, Geneva, 2004
- Protein and amino acid requirements in human nutrition. Report of Joint FAO/WHO/UNU Experts Consultation, Technical Report Series of No. 935, WHO, Geneva, 2007
- 11. World Review of Nutrition and Dietetics. Vol. 32, Kargel, Basel, 1978
- 12. Vitamins and Mineral Requirements in Human Nutrition, Report of Joint FAO/WHO Expert Consultation of Human vitamin and mineral requirements. WHO, Geneva, 2004
- 13. Indicators for Assessing Vitamin A Deficiency and their Application in Monitoring and Evaluating Intervention Programme. Micronutrient series. WHO/NUT/96.10. WHO, Geneva, 199

Teaching-Learning Strategies in brief

- The teaching learning strategies, followed are chalk-board teaching, learning through discussion among the peer group, classroom interaction, quiz, presentations, Q & A session and reflective learning.
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- Assignments contain 3 marks and Student teacher interaction-2 marks. There are two Sessional exams (each conducted for 15 marks) and one improvement exam (15 marks). The average marks of two best sessional exams are computed out of 30 marks.
- Total Marks are 100 for the subject (Internal Assessment: 40 marks and End Semester Examination: 60 Marks).

CORE PAPER

SEMESTER II

Paper Title: HUMAN NUTRITIONAL REQUIREMENTS LAB Paper Code: MDNCC-206

Total Credits: 2, Total Lectures-60, Maximum Marks: 50 (Internal Assessment-20, Final Exam-30)

COURSE OUTCOMES (COs)

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

CO1: To calculate requirements of energy, protein, minerals, and vitamins for different age groups

CO2: To compare intakes with the RDAs

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4

CO1	2	2	2	1	3	3	3	3	3	2	3	3	1	3	2
CO2	1	2	2	1	3	3	3	3	3	2	3	3	3	3	1

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus Lab

Unit-I Energy requirements

- Calculation of BMR using different methods- 3 sets of data
- Calculation of energy requirement for
 - Reference adult man and woman
 - Adults of different body weights and age categories
 - Infants
 - Children of 2-3 ages
 - Adolescents of 2-3 ages
 - Pregnant woman
 - Lactating woman
- Calculation of energy requirement by indirect calorimetry

Unit- II Protein requirements

- Calculation of protein allowances for
 - Reference adult man and woman
 - Infants and children of 2-3 ages
 - Adolescents of 2-3 ages
 - Pregnant woman
 - Lactating woman
- Protein energy ration for different age groups

Unit-III Lipids

- Comparison of fatty acid composition profile of various edible fat and oils available in market
- o Critical analysis of labelling of processed foods for fatty acid composition profile
- o Calculation of dietary fatty acids according to FAO/WHO recommendations for
- Adult man and woman
- Pregnant and lactating woman
 - Children of different ages
 - Adolescents of different ages

Unit- IVMinerals and Vitamins

• Estimation of calcium requirement through factorial approach

- Visit to DEXA centre for observation of bone density measurement
- Make a list of foods which fulfil one day's requirement of the following nutrients-
 - Calcium
 - Sodium
 - Iron
 - Vitamin A
 - Potassium
 - Folic acid

Unit- VEvaluation of protein quality

- Calculation of chemical score of different foods and food products
- Calculation of NDP Cal% of
 - A snack/ meal
 - A mix for PDS system

Suggestive Readings:

- Cameron N. (1984). The measurement of Human Growth. London and Sydney: Croom Helm Ltd.
- Gibson R S. (2005). Principles of Nutritional Assessment. 2nd ed. Oxford University Press.
- WHO (2006). WHO Child growth standards: Length/height for age, weight for age, weight for length, weight for height and body mass index. Available at http://www.who.int.
- Report of a joint WHO/FAO/UNU expert consultation (2007). Protein and Amino acid Requirements in Human Nutrition. WHO Technical Report Series 935. Geneva: WHO.
- WHO (2007). WHO Reference Data for Children and Adolescents (5-19 years). Available at http://www.who.int/growthref/en/
- WHO (2009). WHO Child growth standards: Growth velocity based on weight, length and head circumference. Available at http://www. who.int
- ICMR recommended Dietary allowances book 2020.

CORE PAPER

SEMESTER II

Paper Title: PRINCIPLES OF DIETETICS (Theory) Paper Code: MDNCC-204

Total Credits: 4, Total Lectures-60, Maximum Marks: 100 (Internal Assessment-40, Final Exam-60)

COURSE OUTCOMES (COs)

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

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CO1: Understand the principles of meal planning, food exchange list dietary guidelines.

CO2: Understanding nutrition among adults- pregnant, lactating, elderly etc.

CO3: Understanding special needs for childhood nutrition including, infants, preschool and adolescents.

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
(CO1	1	1	2	1	3	2	3	3	3	3	3	3	1	3	2
(CO2	1	2	2	1	3	3	3	3	3	2	3	3	3	3	2
(CO3	1	1	1	1	3	3	3	3	2	1	3	3	3	3	3

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus (Theory)

Unit –I Principles of meal planning

- Food groups and Food exchange list
- Factors affecting meal planning and food related behavior
- Methods of assessment of nutrient requirements
- Dietary guidelines for Indians

Unit –II Nutrition during adulthood-Physiological changes, RDA, nutritional guidelines, nutritional concerns, energy balance and healthy food choices.

- Adults
- Pregnant women
- Lactating mothers
- Elderly

Unit- III Nutrition during childhood- Growth and development, growth reference/standards, RDA, nutritional guidelines, nutritional concerns, and healthy food choices.

- Infants
- Preschool children
- School children
- Adolescents

Suggested Readings:

- Bamji MS, Krishnaswamy K, Brahmam GNV (2009). Textbook of Human Nutrition, 3 rd edition. Oxford and IBH Publishing Co. Pvt. Ltd.
- Khanna K, Gupta S, Passi SJ, Seth R, Mahna R, Puri S (2013). Textbook of Nutrition and Dietetics. Phoenix Publishing House.
- Wardlaw GM, Hampl JS, DiSilvestro RA (2004). Perspectives in Nutrition, 6th edition. McGraw Hill.
- Chadha R and Mathur P (eds). Nutrition: A Lifecycle Approach. Orient Blackswan, Delhi. 2015
- Gopalan C, Rama Sastri BV, BalasubramanianSC (1989) Nutritive Value of Indian Foods. National Institute of Nutrition, ICMR, Hyderabad.
- Seth V and Singh K (2005). Diet Planning through the Life Cycle: Part 1 Normal Nutrition. A Practical Manual. Elite Publishing House Pvt. Ltd. New Delhi.

Teaching-Learning Strategies in brief

- The teaching learning strategies, followed are chalk-board teaching, learning through discussion among the peer group, classroom interaction, quiz, presentations, Q & A session and reflective learning.
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- Total Marks are 100 for the subject (Internal Assessment: 40 marks and End Semester Examination: 60 Marks).

CORE PAPER

SEMESTER II

Paper Title: PRINCIPLES OF DIETETICS LAB Paper Code: MDNCC-207

Total Credits: 2, Total Lectures-60, Maximum Marks: 50 (Internal Assessment-20, Final Exam-30)

COURSE OUTCOMES (COs)

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

CO1: To introduce meal planning for various dishes and its food exchange.

CO2: Planning various dishes for different physiological conditions and age groups

CO3: Planning Nutrient Rich snack for infants and toddlers.

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	1	1	3	1	3	2	3	3	3	3	3	3	1	3	2
CO2	1	2	2	1	3	3	3	3	3	2	3	3	3	3	2
CO3	3	2	3	1	3	3	3	3	2	1	3	3	3	3	3

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level'

mapping

Detailed Syllabus Lab

Unit- I Introduction to meal planning

- Rich sources of nutrients
- Use of food exchange lists

Unit- II Planning nutritious diets for:

- Young Adult
- Pregnant/ Lactating woman
- Preschooler
- School age child/Adolescent
- Elderly

Unit-III planning nutrient rich snacks/dishes for:

- Infants (Complementary foods)
- Children/Adults

<u>Internship</u>

Semester III

CORE PAPER

SEMESTER III

Paper Title: ADVANCE NUTRITION-I Paper Code: MDNCC-301

Total Credits: 4, Total Lectures-60, Maximum Marks: 100 (Internal Assessment-40, Final Exam-60)

COURSE OUTCOMES (COs)

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

CO1: Understand concepts of fitness, its assessment and exercises for physical fitness training.

CO2: Function effectively as a sports dietitian, with knowledge and skills, to support recreational and competitive athletes

CO3: Exhibit knowledge of the metabolism and bioenergetics of exercise and continuum in various sports

CO4: Successfully plan, implement and monitor sport-specific diets for athletes through all age groups

CO5: Provide diet and nutritional care in terms of nutrition education, diet plans and counselling to special groups of athletes.

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	1	1	2	1	3	2	3	3	3	3	3	3	1	3	2
CO2	1	2	2	1	3	3	3	3	3	2	3	3	3	3	1
CO3	1	1	1	1	3	3	3	3	2	1	3	3	3	3	2
CO4	2	2	3	3	3	3	2	2	1	3	3	2	1	2	3
CO5	1	2	3	3	3	3	1	2	1	3	3	2	`1	2	3

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus (Theory)

Unit-I Nutrition in Special Conditions

- Extreme temperatures- low and high
- High altitude
- Space nutrition and food systems
- Introduction to sports nutrition

Unit -II Growth and Development through the Life Cycle

Department of Food Technology, Jamia Hamdard

- Different aspects of growth- cellular to physical
- Determinants of growth and development
- Changes in body composition throughout the life cycle
- Impact of altered nutrition on growth and development
- Maternal malnutrition and pregnancy outcome
- Malnutrition and cognitive development

Unit-III Nutrition transition

- Changing trends in lifestyle and dietary patterns in population groups and their implications on nutritional status and disease
- Triple burden of malnutrition
- Improving nutritional quality of diets- fortification, bioavailability of nutrients, dietary diversity, new food basket

Unit -IV Diet Counselling

- Concept of Counselling, Counsellor, Client
- The Counselling Process- Techniques for obtaining relevant information • Clinical Information
 - o Medical History and General profile
 - o Dietary Diagnosis
- Assessing food and nutrient intakes
- Lifestyles, physical activity, stress
- Nutritional Status
- Correlating relevant information and identifying areas of need
- Stage I- Problem exploration and clarification
- Stage II- Development new perspectives and setting goals
- Stage III- Implementation follow up and evaluation

Unit -V Sport Nutrition

- \circ Introduction
- Evolution and growth of sports nutrition
- o Anthropometric and physiological measurement
- Various techniques
- o Work capacity
- o Physical fitness
- o Parameters of fitness
- Fitness tests
- o Nutritional demands of sports and dietary recommendations

• Energy metabolism in sports.

Suggested Readings:

- Branen AL, Davidson PM & Salminen S. (2001) Food Additives. 2nd Ed. Marcel Dekker.
- Fellows P J (2002) Food Processing Technology- Principles and Practices, 2nd Edition. Woodhead Publishing Ltd.
- Food and Agriculture Organization (1980) Manual of Food Quality Control, Additive Contaminants Techniques. Rome.
- Fuller, G.W. (1999) New Food Product Development. From concept to market place. CRC press, New York.
- Mahindru, S N (2000) Food Additives- Characteristics Detection and Estimation. Tata Mc Graw Hill Publishing Co. Ltd.

Teaching-Learning Strategies in brief

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CORE PAPER III

SEMESTER

Paper Title: ADVANCE NUTRITION-I LAB Paper Code: MDNCC-304

Total Credits: 2, Total Lectures-60, Maximum Marks: 50 (Internal Assessment-20, Final Exam-30)

COURSE OUTCOMES (COs)

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

CO1: Analyze nutrients in foods and biological fluids like urine

CO2: Recognize clinical symptoms of deficiency and excess

CO3: Comprehend research done in the field of nutrition

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	2	2	2	1	3	3	3	3	3	2	3	3	1	3	3
CO2	1	2	2	1	3	3	3	3	3	2	3	3	3	3	2
CO3	1	1	1	1	3	3	3	3	2	1	3	3	3	3	1

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus Lab

Unit-I Estimation of Micronutrient

- Iodine in salt and urine
- Carotenoids/phytochemicals in fruits/vegetables
- Estimation of iron content of a food
- Load test of Vitamin C
- Clinical assessment of micronutrient status

Unit-II Exposure to Research in Human Nutrition

- Field visits to institutions conducting research in human nutrition and report
- Report writing of the visits
- Critical review of original research articles

Unit-III Developing resources and aids for education and counselling

- Working with-
 - Hospitalized patients (adult, pediatric, elderly, handicapped), adjusting and adopting to individual needs

• Outpatients (adults, pediatric, elderly, handicapped), patients' education, techniques and modes

CORE PAPER

SEMESTER III

Paper Title: NUTRITIONAL BIOCHEMISTRY-II Paper Code: MDNCC-302

Total Credits: 4, Total Lectures-60, Maximum Marks: 100 (Internal Assessment-40, Final Exam-60)

COURSE OUTCOMES (COs)

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

CO1: Understand the purine, pyrimidine, iron and heme metabolism

CO2: Develop insight into structure, functioning and repair of DNA

CO3: Learn basics of RNA and translation process

CO4: Comprehend the principles and application of various chromatographic and electrophoretic techniques

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	1	1	2	1	3	2	3	3	3	3	3	3	1	3	1
CO2	2	2	2	1	3	3	3	3	3	2	3	3	3	3	2
CO3	1	1	1	1	3	3	3	3	2	1	3	3	3	3	3
CO4	2	1	2	1	2	3	3	1	1	1	2	1	3	3	3

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus (Theory)

Unit-I Purine, pyrimidines metabolism and Iron Metabolism

- Metabolism of Purine and its regulation, Metabolism of pyrimidine and its regulations,
- Disorders of purine catabolism (LeschNyhan Syndrome, Gout, Adenosine deaminase deficiency, Hypouricemia)
- Iron Metabolism

Unit-II DNA Organization, Replication and Repair

- Structure of DNA
- DNA Organization, replication, and repair

- Regulation of gene expression
- Genetic Mutation

Unit –III RNA synthesis

- Structure of RNA
- Synthesis of RNA
- Genetic Code
- Translation
- Post translational modification

Unit-IV Techniques- II

• Chromatographic

- Gel filtration
- Ion exchange chromatography
- Affinity chromatography
- o HPLC
- Gas chromatography

• Electrophoresis

- Polyacrylamide gel electrophoresis
- Agarose gel electrophoresis

CORE PAPER

SEMESTER III

Paper Title: NUTRITIONAL BIOCHEMISTRY-II LAB Paper Code: MDNCC-305

Total Credits: 2, Total Lectures-60, Maximum Marks: 50 (Internal Assessment-20, Final Exam-30)

COURSE OUTCOMES (COs)

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

CO1: Gain skill on preparation of buffers

CO2: Learn DNA and RNA estimation in solutions

CO3: Comprehend the application of chromatography and electrophoresis in biochemistry

CO4: Knowledge on blood analysis

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

PO1 PO	PO2 PO3	PO4 PO5	PO6 P	PO7 PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4				
--------	---------	---------	-------	---------	-----	------	------	------	------	------	------				
CO1	2	2	2	1	3	3	3	3	3	2	3	3	1	3	3
-----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CO2	1	2	2	1	3	3	3	3	3	2	3	3	3	3	2
CO3	1	1	1	1	3	3	3	3	2	1	3	3	3	3	1
CO4	2	2	1	1	1	3	2	3	1	2	3	3	3	3	2

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus Lab

Unit-I Preparation of Buffers

• Acidic buffers, Basic buffers

Unit -II Techniques- II

• Estimation of DNA, RNA, separation of amino acids- chromatographic

Unit-III Electrophoresis

- Agarose gel electrophoresis
- SDS polyacrylamide gel electrophoresis

Unit –**IV** Blood analysis

Suggested Readings:

- Berg JM, Stryer. L, Tymoczko JL and Gatto, GJ. (2015) *Biochemistry* 8th ed. W.H. Freeman.
- Devlin TM. (2010) *Text Book of biochemistry with Clinical Correlations* 7th ed. John Wiley and Sons.
- Rodwell VW, Bender DA, Botham KM, Kennelly PJ, and Weil PA. (2015) *Harper's Illustrated Biochemistry*. 30th ed. McGraw-Hill. Asia.
- Nelson DL and Cox MM. (2017) Principles of Biochemistry. 7th ed. W.H. Freeman.
- Wilson K and Walker J. (2000) *Practical Biochemistry*5th ed. Cambridge University Press.

Teaching-Learning Strategies in brief

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Assessment methods and weightages in brief

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CORE PAPER

SEMESTER III

Paper Title: COMMUNITY NUTRITION Paper Code: MDNCC-303

Total Credits: 4, Total Lectures-60, Maximum Marks: 100 (Internal Assessment-40, Final Exam-60)

COURSE OUTCOMES (COs)

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

CO1: Understand the concept and purpose of nutritional status assessment in community setting.

CO2: Explain nutritional concerns among vulnerable sections of the community and strategies to combat them.

CO3: Gain knowledge about standard methods and techniques for assessing nutritional status. **CO4:** Be familiar with the use of indices and indicators for screening and consequent identification of malnutrition in the community

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	1	1	2	1	3	2	3	3	3	3	3	3	1	3	2
CO2	1	2	2	1	3	3	3	3	3	2	3	3	3	3	3
CO3	1	1	1	1	3	3	3	3	2	1	3	3	3	3	1
CO4	2	1	2	1	2	3	3	3	3	3	1	2	1	2	2

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus (Theory)

Unit-I Assessment of nutritional status

• Anthropometry:

- Weight, height, mid arm circumference, head, and chest circumference
- Skin fold thickness, BMI uses and limitations

 Weight / Height, Weight / Age, Height / Age – ICMR, NCHS standards, Gomez, and Waterloo's classification, WHO standards

• Diet Surveys:

- Individual
- Institutional and National
- Uses and limitations of diet surveys
- o Biochemical methods: uses and limitations
- Clinical assessment: uses and limitations
- o Biomarkers Definition, Classification Genetic and biochemical
- Examples of biomarkers RBC, folate, calcium, LDL receptors in CVD, vitamin A.

Unit-II Nutrition Education and Health Administration

- Importance of Nutrition and Health Education
- o Tools and techniques of health education
- o Audio aids
- o Visual aids
- o Audiovisual aids, advantages, and disadvantages
- o Types of approaches: personal, group and mass, advantages and disadvantages

Health administration

- Central level
- State level
- Village level
- Primary Health Care

Unit-III Nutrition and Health Interventions

- Magnitude of malnutrition in India
- o Consequences of malnutrition in India
- Nutritional problems in India:
- o PEM, Anaemia
- o Iodine Deficiency Disorder and Vitamin A Deficiency
- Dental caries, Fluorosis

• Measures to combat malnutrition:

- ICDS, IDDCP
- Vitamin A Prophylaxis Programme
- Anemia Prophylaxis Programme
- Nutrition and Health Policies
- Role of National organizations in combating malnutrition: ICMR, ICAR, NIN.

• Role of International organizations in combating malnutrition: CARE, UNICEF, WHO, FAO, ICRISAT.

Unit-IV Vital statistics and occupational hazards

• Vital statistics:

- Mortality
- Morbidity
- Occupational hazards:
 - Physical and chemical
 - o Biological

Protection of health and nutritional status of workers:

- Women employees in industries and establishments
- Medical measures
- Infrastructure measures and legislation

Suggested Readings:

- Public Health Nutrition Michale J. Gibney, Barrie M. Margetts, John M. Kearney, and Lenore Arab (Eds.) Nutrition Society Textbook Series, Blackwell Publishing.
- Nutritional Science B. Sri Lakshmi, New Age International Publishers, 2nd edition.
- Text Book of Human Nutrition Mahtab S Bamji, NPrahladRao, Vinodini Reddy, 2ndediton, Oxford & IBH Publishing Co. Pvt. Ltd.
- Social and Preventive Medicine Part & Park.
- Goyet, Fish.V. Seaman, J and Geijer.U(1978) The management of Nutrition Emergencies in Large Population, WHO, Geneva.
- The Management of Nutrition in Major emergencies, WHO in collaboration with UNHCR, International Federation of Red Cross and Red Crescent societies and WFP.
- Owen. A. Y. and Frankle, R. T. (1986) Nutrition in the Community. The Art of delivering Services, 2nded. Times Mirror/ Mosby.
- WFP/ UNHCR (1998) WEP/ UNHCR Guidelines for Selective Feeding Programmes in Emergency Situations. Rome and Geneva: WEP & UNHCR.
- Goyet, Fish. V. Seaman, J. and Geijer, U. (1978) The Management of Nutritional emergencies in Large Populations, World Health Organization, Geneva

Teaching-Learning Strategies in brief

• The teaching learning strategies, followed are chalk-board teaching, learning through discussion among the peer group, classroom interaction, quiz, presentations, Q & A session and reflective learning.

Assessment methods and weightages in brief

- <u>There are two components of assessment</u>: Internal assessment (40 marks) and End semester examination (60 marks). Internal assessment consists of continuous mode (10 marks) and sessional examinations (30 marks). Continuous mode evaluation is of 10 marks comprising of Attendance -5 marks (calculated as: Percentage of Attendance: Allotment of marks- Less than 75: 0 marks; 75-80: 2 mark; 81-85: 3 marks; 86-90: 4 marks and >90: 5 marks),
- Assignments contain 3 marks and Student teacher interaction-2 marks. There are two Sessional exams (each conducted for 15 marks) and one improvement exam (15 marks). The average marks of two best sessional exams are computed out of 30 marks.
- Total Marks are 100 for the subject (Internal Assessment: 40 marks and End Semester Examination: 60 Marks).

CORE PAPER

SEMESTER III

Paper Title: COMMUNITY NUTRITION LAB Paper Code: MDNCC-306

Total Credits: 2, Total Lectures-60, Maximum Marks: 50 (Internal Assessment-20, Final Exam-30)

COURSE OUTCOMES (COs)

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

CO1: Assess the health and nutrition needs of the community.

CO2: Acquire skills to design an action plan for addressing a public health nutrition problem in the community.

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
	CO1	2	2	2	1	3	3	3	3	3	2	3	3	1	3	3
-	CO2	1	2	2	1	3	3	3	3	3	2	3	3	3	3	2

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping.

Detailed Syllabus Lab

- Development of low-cost nutritious recipe
 - o Standardization of Recipe
 - Calculation of cost and Nutritive Value

- Diet survey Food frequency questionnaire and 24 hr dietary recall.
 - \circ Data collection and compilation.
- Market survey on Labelling of Food Products
- Plan and prepare recipes for PEM and micronutrient deficiencies

Paper Title: EDUCATIONAL TOUR Paper Code: MDNCC-307

Total Credits: 2, Total hours- 2 hrs/week, Maximum Marks: 50 (Attendance: 20, Report-30)

FIELD VISITS

Visit to different institutes and report writing on organization chart, menu, layout etc., of the following-

- Girls hostel mess
- Railway canteen/ Restaurant kitchen Office mess
- Hospital kitchen
- College canteen / cafeteria

Paper Title: INTERNSHIP LAB Paper Code: MDNCC-308

<u>Total Credits: 3, Total hours-100 hrs, Maximum Marks: 100 (Internal -40, External -60)</u> INTERNSHIP

• One month internship or training in a tertiary hospital/ food industry/ NGO is compulsory at the end of the second semester; and the students have to submit the internship report in semester III.

COURSE OUTCOMES (COs)

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

- **CO1:** Implement practical knowledge in a systematic way.
- **CO2:** Write and present the report based on training.
- **CO3:** Get trained in any specialized area of nutrition.

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3	3	2	3	3	3	2	3	3	3	2	3
CO2	3	3	3	3	3	3	3	3	3	2	3	3	3	2	3
CO3	3	3	3	3	3	3	3	3	3	2	3	3	3	2	3

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

ELECTIVE PAPER

SEMESTER III

GROUP-A

Paper Title: INSTITUTIONAL FOOD ADMINISTRATION (Theory)

Paper Code: MDNEC-301

Total Credits: 4, Total Lectures-60, Maximum Marks: 100 (Internal Assessment-40, Final Exam-60)

COURSE OUTCOMES (COs)

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

CO1: Understand the basics of food service administration (*Cognitive level: Understand*) **CO2:** To develop knowledge and skill for quantity food production (*Cognitive level: Understand and learn*)

CO3: Attain knowledge and skill in management of personnel and planning of resources, aspects food service setup and menu planning (*Cognitive level: Understand and learn*)

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3	3	3	3	3	3	3	3	3	2	3	1	3
CO2	3	2	3	3	3	3	3	3	3	3	3	2	3	1	3
CO3	3	2	3	3	3	3	3	3	3	3	3	2	3	1	3

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus (Theory)

Unit-I Introduction to food service in institutions

- Development of food services in institutions
- Consumer behavior and eating trends

Food service facility planning- planning process, planning the team, atmosphere planning, workplace design, equipment specifications and requirements –type of equipment, factors affecting equipment selection, preventive maintenance, space requirement and layout.

Organization and management – definition, steps in process of organization, principles of organization and types of organizations.

Unit-II

- Systems approach to management- definition and management process, principles of management, tools of management, management of resources.
- Time management.
- **Energy management** Energy utilization, energy conservation, energy management systems.
- **Financial Management:** factors affecting food cost pricing the product, component of cost, behavior of cost, and concept of contribution and breakeven.
- **Cost control** Importance of cost control, Factors affecting losses, Methods of controlling food cost and labour cost, Cost concept, Food cost control, Book keeping, Books of account.
- **Food sanitation**-principles of food sanitation, controlling microbial quality of food. - Safety- food safety and standards act of India, HACCP, and 3E's of safety, accident and fire prevention. Food laws and standards

Unit-III

- Menu planning and food service- Factors affecting menu planning, types of menus, Delivery and Service of Foods-Food service systems - Conventional, Commissary, ready prepared, assembly service, Types of service-Self-service, tray service, waiter-waitress service, portable meals, Types of food services: Campus food service, Food service in commercial restaurants, Hotel
- Food purchasing, selection and storage
- **Food Purchase** Food purchasing procedure, purchasing methods, selection of foods, mode of purchasing (centralized and independent purchasing). Important points to be observed for various food commodities selection and purchase, importance of sanitary procedures while preparing, cooking and holding of foods.
- **Food Storage**: General Guidelines for Storage of food (Dry Storage and low temperature storage), importance of pest control.

Unit -IV

• **Quantity food production** - Food production planning and production schedules, Construction and selection of recipes for quantity cooking, Standardization of recipes, Storage and use of leftover foods, Quality control of food production, hygiene and safety procedures for prevention of contamination of raw and cooked foods for different areas of food service for personnel working in food service, Calculation of food costs, portion control, loss and profit made.

Unit- V

- Kitchen Management- Cost control, optimal utilization of space, material, manpower
- Food acceptability and sensory evaluation
- **Personnel management-**Employment process (selection, recruitment, orientation, training, development)
- Human resource planning, factors affecting labour control, employee facilities and benefits, labour laws affecting food service operations.

Suggested Readings:

- Sethi M and Mahan S (2nd edition, 2007)). Catering Management, an Integrated Approach. New Age International (P) Ltd.
- Andrews S (2009) Food and beverage service: Training Manual 2nd edition. New Delhi Tata McGraw Hill. Fuller J and Thomas S (2006). Modern Restaurant Service, Amazon.
- Kotler P and Keller K (2008). Marketing Management (13th Ed.). Prentice Hall, USA.
- Wailey BH (1986) Production management handbook. U.K.: Gower Publishing.
- Kotas R (1981). Accounting in hotel and catering industry. Publisher- Thomson Learning; 4th Revised Edition (Jun 1981).
- Bessie Brooks West and Levelle Wood MS (1988). Food Service in Institutions (6th Ed.). John MacMillan Publishing Co., New York
- Harris N (1984) Meal management (6th Ed.). New York: Mac Millan.

Teaching-Learning Strategies in brief

The teaching learning strategies, followed are chalk-board teaching, learning through discussion among the peer group, classroom interaction, quiz, presentations, Q & A session and reflective learning.

Assessment methods and weightages in brief

• <u>There are two components of assessment</u>: Internal assessment (40 marks) and End semester examination (60 marks). Internal assessment consists of continuous mode (10 marks) and sessional examinations (30 marks). Continuous mode evaluation is of 10 marks comprising of Attendance -5 marks (calculated as: Percentage of Attendance:

Allotment of marks- Less than 75: 0 marks; 75-80: 2 mark; 81-85: 3 marks; 86-90: 4 marks and >90: 5 marks),

- Assignments contain 3 marks and Student teacher interaction-2 marks. There are two Sessional exams (each conducted for 15 marks) and one improvement exam (15 marks). The average marks of two best sessional exams are computed out of 30 marks.
- Total Marks are 100 for the subject (Internal Assessment: 40 marks and End Semester Examination: 60 Marks).

ELECTIVE PAPER

SEMESTER III

GROUP-A

Paper Title: INSTITUTIONAL FOOD ADMINISTRATION LAB

Paper code: MDNEC-307

Total Credits: 2, Total Practical hours-60, Maximum Marks: 50 (Internal Assessment-20, Final Exam-30)

COURSE OUTCOMES (COs)

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

CO1: Understand food service operational systems of various institutions (*Cognitive level: Understand*)

CO2: Acquire skills for execution and planning of menus for specific budgets or occasions (*Cognitive level: Understand, analyse and learn*)

CO3:Visit food service institutions to gain knowledge in easy functioning. Application of learned skills in quantity food production (*Cognitive level: Understand, analyse and learn*)

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3	3	3	3	3	3	3	3	3	2	3	1	3
CO2	3	2	3	3	3	3	3	3	3	3	3	2	3	1	3
CO3	3	2	3	3	3	3	3	3	3	3	3	2	3	1	3

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed syllabus Lab

Unit-I Planning Menu

- Carrying out market survey of various food products (perishable, non-perishable and processed foods for meal planning and available in markets.
- Planning menus for conference and food stalls

Unit-II

- Planning menus and preparation of meals for various categories and occasions, general consideration, and adjusting nutrients and budget breakup, cost calculations for the following:
- Food items for Mid-day meal programme.
- Cyclic menu for hospital (government/private)
- Standardizing recipes in quantity cooking (hostel mess, canteen etc.)
- Canteen project/ Event catering
- Developing/training
- Development of sale promotion tool
- Training Food service unit personnel in hygiene and sanitation

ELECTIVE PAPER

SEMESTER III

GROUP-A

FOOD PROCESSING AND TECHNOLOGY (Theory)

Paper Code: MDNEC-302

Total Credits: 4, Total Lectures-60, Maximum Marks: 100 (Internal Assessment-40, Final Exam-60)

COURSE OUTCOMES (COs)

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

CO1: Understand the processing of cereals and legume-pulses and their value-added products, principles of baking. Effect of cooking treatment on legume's nutrient composition (*Cognitive level: Understand*)

CO2: Understand the processing, packaging and composition of milk, factors affecting milk quality (*Cognitive level: Understand*)

CO3: Understand the composition and properties of sugars, crystallization, caramelization, Millard reaction and its industrial application.Production and processing methods of fats and oils (*Cognitive level: Understand*)

CO4: Analyse the modern techniques and advances in food processing. Packaging and labelling of foods as per FSSAI (*Cognitive level: Analyse*)

CO5: Understand physico-chemical changes in fruits and vegetables. Enzymatic Browning and its prevention.Principles of fruits and vegetables preservation and processing technologies. (*Cognitive level: Understand*)

CO6: Understand the Operational factors affecting Egg, meat, poultry and Fish quality

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	3	2	2	3	2	2	2	1	2	3	2	1	3	1	3
CO2	3	2	2	3	2	2	2	1	2	3	2	2	3	1	3
CO3	3	2	2	3	2	2	2	1	2	3	2	1	3	1	3
CO4	3	2	2	3	2	2	2	1	2	3	2	2	3	1	3
CO5	3	2	2	3	2	2	2	1	2	3	2	2	3	1	3
CO6	3	2	2	3	2	2	2	1	2	3	2	1	3	1	3

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus (Theory)

Unit- I

- **Introduction to cereal and legumes-**Milling process, types of milling process, flour treatments, flour grade, milled products, their nutritive values and applications. Gluten, factors affecting gluten formation. Gelatinization, factors affecting gelatinization, Changes in cooked starches gel formation, retrogradation, syneresis.
- **Breakfast cereal, macaroni and malt-** wheat, oats, pearl millet, rice and corn production and quality of breakfast products, flour for various purposes, products and by-products. Role of natural leavening agents, Role of yeast.
- Principles of baking, types of bakery products.
- **Bread, biscuits/ cookies and cake,** ingredients, their functions and processes, equipment used, product quality characteristics, scoring of quality parameters, faults and remedies.
- Legumes technology-Composition and processing, germination, fermentation, agglomeration, roasting and puffing, effect of cooking treatments on the nutrient composition, quality and quantity of legumes

Unit-II

- **Milk-** composition, factors affecting milk quality and its processing. Clarification, separation, centrifugal processes, pasteurization, homogenization. Effect of processing on nutritive value of milk.
- Milk products- Composition and Nutritive Value of Milk, types of milk, Properties of milk proteins effect of heat, acid and phenolic compounds on milk. Milk powder, khoa, cottage cheese, butter, margarine, cheese, ice –cream- commercial processing. BIS standards, packaging and distribution.
- Vegetables and fruits- Factors affecting plant pigments on cooking: acid, alkali, metals, heat. Water insoluble and Water-soluble plant pigments, flavour compounds: terpenoids, flavonoids, Sulphur compounds and other volatile flavor compounds, Physio Chemical changes in Fruits and Vegetables. Enzymatic Browning and its prevention.
- Ripening of fruits and food spoilage, principles of fruits and vegetables preservation, processing technologies: freezing, dehydration, drying, blanching, canning, preserves such as jam, jelly, marmalade, pickle, sauce, squash, syrup, chutney. Processing and preservation for small scale industry with special reference of FPO 1955.

Unit- III

- **Eggs** Structure and nutritive composition, quality factors, Quality and Grading of Eggs, storage, pasteurization, freeing, drying and egg substitutes.
- **Poultry:** Production consideration, processing plant operation, cooking, tenderness, flavour and color changes.
- **Meat:** slaughter handling, grading ageing and curing, smoking and tenderizing of meat, meat pigments and color changes, cooking storage, methods of preservation for value addition and spoilage. Sausages and table ready meat products.
- **Fish:** Handling, preservation, drying and dehydration, salt curing, smoking, marinades, fermented products, canning, Classification and types of fishes, Characteristics of fresh fish, Spoilage, modified atmosphere packaging and quality factors, nutritional importance of fish.

Unit- IV

• Fat and oil products: Production and processing methods of fats and oils, hydrogenation, margarine shortenings and frying oils, mayonnaise and salad dressing, fat substitutes. Fat as emulsifying, leavening and shortening agent. Rancidity – types,

mechanism and prevention, Factors affecting amount of fat absorbed during cooking, fat replacers.

• **Sugars:** Composition and properties of different types of sugars, their application in food systems, crystallization, caramelization, Millard reaction and its industrial application. Fondants, fudges and icings etc.

Unit – V

• Unit operations in food processing

-Cleaning, sorting, grading, peeling, mixing and forming, Separation techniques, Process Plant design.

Packaging and labelling of foods

- **Food packaging**: Importance, principles of packaging, Types of packaging material: Metal, glass, Paper, plastic, edible packaging material, miscellaneous packaging materials. Packages with special features- boil-in-bag package, plastic-shrink package, cryovac film, microwave oven packaging, high barrier plastic bottles, Aseptic packaging in composite cartons, military food packaging, Packaging laws-SWMA.
- Nutrition labelling- Principles and Codex guidelines, Labelling Provisions in existing Food Laws- FSSAI

Teaching-Learning Strategies in brief

The teaching learning strategies, followed are chalk-board teaching, learning through discussion among the peer group, classroom interaction, quiz, presentations, Q & A session and reflective learning.

Assessment methods and weightages in brief

- <u>There are two components of assessment</u>: Internal assessment (40 marks) and End semester examination (60 marks). Internal assessment consists of continuous mode (10 marks) and sessional examinations (30 marks). Continuous mode evaluation is of 10 marks comprising of Attendance -5 marks (calculated as: Percentage of Attendance: Allotment of marks- Less than 75: 0 marks; 75-80: 2 mark; 81-85: 3 marks; 86-90: 4 marks and >90: 5 marks),
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• Total Marks are 100 for the subject (Internal Assessment: 40 marks and End Semester Examination: 60 Marks).

ELECTIVE PAPER

SEMESTER III

GROUP-A

Paper Title: FOOD PROCESSING AND TECHNOLOGY LAB

Paper Code: MDNEC-308

Total Credits: 2, Total practical hours-60, Maximum Marks: 50(Internal Assessment-20, FinalExam-30)

COURSE OUTCOMES (COs)

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

CO1: Understand food composition and its nutritional physico-chemical and sensory properties.

CO2: Understand the food processing technology and preservation of milk, fruits and vegetables.

CO3: Gain insight in analysing processing technology used in preparation of different food products.

CO4:Visit to milk processing and bread and biscuit industry to understand the equipment, processing technology and preservation method utilized.

CO5: Develop knowledge of packaging equipment and processing by heat or low temperature.

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	1	1	1	2	2	1	3	1	2	3	2	2	3	1	3
CO2	2	3	2	2	2	1	3	1	2	3	2	2	3	1	3
CO3	2	3	2	2	2	2	3	2	2	3	2	2	3	1	3
CO4	2	2	2	1	2	2	3	3	3	3	3	3	3	1	3
CO5	2	3	2	2	2	2	3	2	2	3	2	2	3	1	3

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus Lab

Unit-I

- Market survey of packaging equipment/ processing by heat/ processing by low temperature
- Visit to bread and biscuit industry to observe mixing and forming operation and their equipment

Department of Food Technology, Jamia Hamdard

Technology of Cereal and cereal products

- **Bread baking**-quality testing of different flour: moisture and ash content, gluten quality
- Maltose test, Pekar color test, water absorption power, falling number, dough raising capacity.
- **Bread Processing**: Straight dough method, sponge & dough method (delayed salt method) and use of improvers in bread, optimization of brown bread process, preparation of sweet buns/pizza base/ Nan/French pao.
- **Biscuits**: Short and hard dough biscuits, their quality parameters packaging and shelf life study.
- Preparation of short and hard dough biscuits, packaging and shelf life study for 5 weeks.
- Preparation of sponge and cream and their quality parameters, packaging and shelf life study for 5 weeks

Unit-II

Visit to milk processing industry

- **Technology of Milk:** Chemical analysis of milk and determination of its components like fat, SNF, protein, TSS
- Detection of preservative in milk acid (boric acid and borate)
- Detection of adulterants in milk and analysis of cheese, paneer, khoa as per BIS standards.

Unit-III

Fruits and vegetables technology:

- Analysis of proximate principles: carbohydrate, sugar, ash moisture, fat and protein.
- Preservation of fruits and vegetables using low temperature, heat, salt and sugar and estimation of effect of processing on nutrients and color.
- Processing, jam, jellies and marmalade
- Processing of pickles
- Dehydration of fruits and vegetables and shelf life studies its effect on texture, color and flavour. Rehydration ratio and rehydration coefficient.

Fat and oil technology:

• Saponification value, fat absorbance, degree of unsaturation, peroxide value, acid value.

ELECTIVE PAPER

SEMESTER III

GROUP-B

Paper Title: PUBLIC HEALTH NUTRITION (Theory) Paper Code: MDNEC-303

Total Credits: 4, Total Lectures-60, Maximum Marks: 100 (Internal Assessment-40, Final Exam-60)

COURSE OUTCOMES (COs)

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

CO1: Understanding the concepts, scope, and role of public health nutrition.

CO2: Gaining an insight of healthcare levels in India and Understanding Sustainable Development Goals.

CO3: Demonstrate Knowledge of Nutrition epidemiology and its scope in nutrition.

CO4: Comparing various study designs and measuring the exposure and its outcome relationship and their interpretation.

CO5: Understanding Community needs assessment and various nutrition related health policies.

CO6: Getting knowledge of Nutrition in emergency and Disasters.

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	1	1	2	1	3	2	3	3	3	3	3	3	1	3	3
CO2	1	2	2	1	3	3	3	3	3	2	3	3	3	3	3
CO3	1	1	1	1	3	3	3	3	2	1	3	3	3	3	2
CO4	3	3	3	1	3	3	3	3	1	2	3	3	3	3	2
CO5	3	1	2	1	2	3	3	3	3	1	3	3	3	3	1
CO6	2	1	2	3	3	3	3	1	2	2	1	1	3	2	2

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus (Theory)

Unit-I Introduction to Public health and nutrition (PHN)

- Concept, Scope, and Role of PHN in developing nation (Health Definition, Dimensions etc.)
- Current concerns in PHN
- Levels of Healthcare system in India
- Overview of National Health Mission, Sustainable and Millennium Developmental Goals

• Triple burden of malnutrition

Unit- II Approaches / Strategies for improving nutrition and health status of the community

- **Health based interventions** including immunization, provision of safe drinking water/ sanitation, prevention, and management of diarrhoeal diseases
- **Food based interventions** including food fortification, dietary diversification, supplementary feeding, and biotechnological approaches.
- Education based interventions like, Growth Monitoring and Nutrition Health Education / Behavioral Change communication

Unit-III Programme planning in Public Health Nutrition

- Importance of Public health Nutrition programmes and policies in preventing diseases among Maternal, infant, child, and adolescent nutrition
- Nutrition Surveillance- Objectives, initial assessment indicators for use in nutrition surveillance
- Nutritional surveillance for program planning: Triple A approach

Unit-IV Nutrition in Emergencies and Disasters-

- Natural and manmade disasters resulting in emergency situations
- Nutritional problems and approach to tackle nutrition problems in emergencies among vulnerable groups

• Management during calamities and emergencies

 Nutritional relief and rehabilitation - assessment of food needs, food distribution strategy, Mass and supplementary feeding, Sanitation and hygiene, Evaluation of feeding programmes

Unit-V

Nutrition Counselling

- Concept and importance of counseling in the nutrition care process
- Diet counseling : Definition, responsibilities of a counselor and a counsel and tips for successful counseling, components of counseling process, formulation of a proforma
- Understanding dietary patterns and food choices and their impact on counseling

Basics of Communication

- Meaning of Communication, Forms methods of communication.
- Approaches, characteristics and barriers of effective communication
- Behaviour Change Communication and Models for behaviour change
- Digital communication- concepts, types, and its access
- Tools and methods to create digital design for web page

Suggestive Readings:

- Gibney M J, Margetts B M, Kearney J M Arab (1stEd) (2004) Public Health Nutrition, NS Blackwell Publishing
- Gopalan C (Ed) (1987) Combating Under nutrition- Basic Issues and Practical Approaches, Nutrition Foundation of India
- Kaufman M (2007) Nutrition in promoting the public health strategies, principles and practices. Jones and Barlett Publishers
- Park K (24th ed) (2017) Park's Textbook of Preventive and Social Medicine, Jabalpur M/s. BanarsidasBhanot
- Dietary Guidelines for Indians (2nd ed) (2011) Dietary Guidelines for Indians: A manual., NIN IFCT (2017) Indian food composition table, NIN
- Bonita, R., Beaglehole, R., Kjellström T. (2006) Basic Epidemiology, 2nd Edition, WHO, 2006 http://whqlibdoc.who.int/publications/2006/9241547073_eng.pdf
- Moon, G., Gould, M. (2000). Epidemiology: An Introduction. Philadelphia, Open University Press
- Langseth L. (1996). Nutritional Epidemiology: Possibilities and Limitations. Washington DC, ILSI Pres

Teaching-Learning Strategies in brief

• The teaching learning strategies, followed are chalk-board teaching, learning through discussion among the peer group, classroom interaction, quiz, presentations, Q & A session and reflective learning.

Assessment methods and weightages in brief

- <u>There are two components of assessment:</u> Internal assessment (40 marks) and End semester examination (60 marks). Internal assessment consists of continuous mode (10 marks) and sessional examinations (30 marks). Continuous mode evaluation is of 10 marks comprising of Attendance -5 marks (calculated as: Percentage of Attendance: Allotment of marks- Less than 75: 0 marks; 75-80: 2 mark; 81-85: 3 marks; 86-90: 4 marks and >90: 5 marks),
- Assignments contain 3 marks and Student teacher interaction-2 marks. There are two Sessional exams (each conducted for 15 marks) and one improvement exam (15 marks). The average marks of two best sessional exams are computed out of 30 marks.
- Total Marks are 100 for the subject (Internal Assessment: 40 marks and End Semester Examination: 60 Marks).

ELECTIVE PAPER

SEMESTER III

GROUP-B

Paper Title: PUBLIC HEALTH NUTRITIONLAB Paper Code: MDNEC-309

Total Credits: 2, Total Lectures-60, Maximum Marks: 50 (Internal Assessment-20, Final Exam-30)

COURSE OUTCOMES (COs)

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

CO1: Understanding menu planning for school feeding programmes.

CO2: Field Visit to Primary Health care centre.

CO3: Designing of public health programmes for various community.

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	1	1	2	1	3	2	3	3	3	3	3	3	1	3	3
CO2	1	2	2	1	3	3	3	3	3	2	3	3	3	3	3
CO3	1	1	1	1	3	3	3	3	2	1	3	3	3	3	2

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus Lab

- Planning and preparation of cyclic menu for a school feeding program
- Meal planning for infant, children, and pregnant women
- Field visit to Primary Health Centre
- Designing a suitable action plan for a public health nutrition program for the identified community.

ELECTIVE PAPER

SEMESTER III

GROUP-B

Paper Title: NUTRITIONAL EPIDEMIOLOGY Paper Code: MDNEC-304

Total Credits: 4, Total Lectures-60, Maximum Marks: 100 (Internal Assessment-40, Final Exam-60)

COURSE OUTCOMES (COs)

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

CO1: Get acquainted with research designs in nutritional epidemiology

CO2: Know the importance of epidemiological research studies in improving health and nutritional status.

CO3: Understand methods of nutritional status assessment and study design in nutritional epidemiology

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	3	3	3	3	3	3	3	3	3	3	3
CO2	3	2	2	3	3	3	3	3	3	2	3	3	3	3
CO3	3	3	2	3	3	3	3	3	3	3	3	3	3	3

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus (Theory)

Unit-1 Basics of Epidemiology

- Definition, scope and purpose of epidemiology
- Basic measurements in epidemiology
- Measurement of mortality, morbidity and disability rates, ratios and proportions
- Epidemiologic study methods- observational and experimental studies
- Observational epidemiology, Experimental epidemiology, Randomized control trials, Field trials and community trials
- Population, sampling, sample size and power

Unit-II

- Nutritional epidemiology: Definition, scope and significance of nutritional epidemiology in public health nutrition.
- Research Design, data collection, data analysis, interpretation and potential errors in epidemiologic studies

Unit -III

- Design of nutritional epidemiological studies, Correlation regression analysis
- Interpretation and multi-variate relationship of epidemiologic research in diet and disease
- Gene diet interactions: Genetics in nutritional epidemiology- genetic variation and epigenetics

Unit-IV Nutrition policies, implementation and evaluation

- Generating evidences for policy making, effective implementation of nutrition and health interventions and programmes, evaluation of the effectiveness of such interventions based on previous epidemiological research data for improvement of nutrition interventions.
- Ethical aspects of research in nutritional epidemiology

Unit-V Measurements of exposure and outcomes in Nutritional epidemiology

- Diet assessment methods- assessment of food consumption 24 dietary recall, diet record and food frequency methods/Analysis of dietary patterns. Analysis and interpretation of dietary data.
- Biomarkers in nutritional epidemiology: Uses and limitations of biomarkers as measures of nutritional status and in dietary validation studies.
- Physical activity assessment, interpretation and limitations

Suggested Readings:

- Gordis L. Epidemiology. 5th ed. Philadelphia, PA: Saunders Elsevier, 2013
- Aschengrau A., Seage G.R. (2014) Essentials of Epidemiology in Public Health. 3rd ed. Sudbury, MA: Jones & Bartlett.
- Willett, W. (2013) Monographs in Epidemiology and Biostatistics, Third Edition, Oxford University Press.
- Park, K. (2017) Park's Textbook of Preventive and Social Medicine, 24th ed. Jabalpur M/s. Banarsidas Bhanot
- Moon, G., Gould, M. (2000). Epidemiology: An Introduction. Philadelphia, Open University Press
- Vir, S. (2011) Public health nutrition in developing countries, Woodhead Publishing India limited
- Gibney, M.J., Margetts, B.M., Kearney, J.M., Arab, L. (Eds) (2004) Public Health Nutrition. NS Blackwell Publishing
- Gibson, R. S. (2005). Principles of Nutritional Assessment. 2nd ed. Oxford University Press

Teaching-Learning Strategies in brief

The teaching learning strategies, followed are chalk-board teaching, learning through discussion among the peer group, classroom interaction, quiz, presentations, Q & A session and reflective learning.

Assessment methods and weightages in brief

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 - Assignments contain 3 marks and Student teacher interaction-2 marks. There are two Sessional exams (each conducted for 15 marks) and one improvement exam (15 marks). The average marks of two best sessional exams are computed out of 30 marks.
 - Total Marks are 100 for the subject (Internal Assessment: 40 marks and End Semester Examination: 60 Marks).

ELECTIVE PAPER

SEMESTER III

GROUP-B

Paper Title: NUTRITIONAL EPIDEMIOLOGY LAB Paper Code: MDNEC-310

Total Credits: 2, Total Lectures-60, Maximum Marks: 50 (Internal Assessment-20, Final Exam-30)

COURSE OUTCOMES (COs)

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

CO1: Assess the nutritional problem and analyze secondary data.

CO2: Attain skills to design teaching aids for addressing a public health nutrition problem in the community.

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	2	2	2	1	3	3	3	3	3	2	3	3	2	3	3
CO2	2	2	2	2	3	3	3	3	3	2	3	3	3	3	2

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping.

Detailed Syllabus Lab

- **Development of Teaching aids for Nutrition and Health Education:** Audio, Visual, or Audio-Visual aids.
- Identification of the type of nutritional problems and their determinants in different population groups based on National/regional level Nutrition and Health Surveys-Secondary data analysis

ELECTIVE PAPER

SEMESTER III

GROUP-C

Paper Title: THERAPEUTIC NUTRITION II Paper Code: MDNEC-305

Total Credits: 4, Total Lectures-60, Maximum Marks: 100 (Internal Assessment-40, Final Exam-60)

COURSE OUTCOMES (COs)

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

CO1: Understand the concept of body composition

CO2: Get acquainted with the etiology, diagnosis, nutritional management of various diseases **CO3:** Attain knowledge of neurological disorders, nutritional management in surgery, burn and trauma

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	2	3	3	3	3	3	3	3	3	3	3	3
CO2	2	2	2	3	3	3	3	3	3	3	3	3	3	3
CO3	2	2	2	3	3	3	3	3	3	3	3	3	3	3

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus (Theory)

Unit-I

Nutritional Care Assessment

• Body composition, significance and methods used for measurement of body composition, application of body composition

Unit-II

- Nutrition care process- Nutritional assessment, nutritional diagnosis, nutritional intervention, monitoring and evaluation, documentation, ethical issues, tools for screening
- Surgery and Critical Care- Diagnosis, complications, treatment, MNT and dietary counseling in Metabolic Stress –Critical care, Surgery, Burns, Sepsis and Trauma

Unit-III

- Dietary management of eating disorders
- Nutritional Management for Pediatric
- Nutritional Management for Geriatric

Unit-IV

Disorders of Musculo – Skeletal system:

- Rheumatoid Arthritis Types, etiology, symptoms and dietary management
- Osteoarthritis Types, etiology, symptoms and dietary management
- Gout etiology, symptoms and dietary management.

Cancer:

- Types, Mechanism
- Etiology, metabolic changes, treatment (drugs, chemotherapy and radio therapy)
- Nutritional management of cancer

AIDS:

- Causes, symptoms, metabolic changes, diagnosis
- Treatment and dietary management

Unit-V

Neurological disorders-Etiology, metabolic & clinical aberrations, diagnosis, complications, treatment, MNT and dietary counselling in Alzheimer's disease, Parkinson disease and Epilepsy

Suggested Readings

- Clinical Dietetics and Nutrition F P Anita and Philip Abraham.
- Food, Nutrition and Diet Therapy Kathleen Mahan & Krause, Sylvia Escott Stump.
- Normal and Therapeutic Nutrition Robinson & Lawler, 17th edition, Mac Millan Publishers.

- Clinical Nutrition Ed Michael J Gibney, Marinos Elia, OlleLjungqvist and Julie Dowsett.
- Basics of Clinical Nutrition, 2nd Edition, Joshi, Jaypee Publishers

Teaching-Learning Strategies in brief

The teaching learning strategies, followed are chalk-board teaching, learning through discussion among the peer group, classroom interaction, quiz, presentations, Q & A session and reflective learning.

Assessment methods and weightages in brief

- <u>There are two components of assessment</u>: Internal assessment (40 marks) and End semester examination (60 marks). Internal assessment consists of continuous mode (10 marks) and sessional examinations (30 marks). Continuous mode evaluation is of 10 marks comprising of Attendance -5 marks (calculated as: Percentage of Attendance: Allotment of marks- Less than 75: 0 marks; 75-80: 2 mark; 81-85: 3 marks; 86-90: 4 marks and >90: 5 marks),
- Assignments contain 3 marks and Student teacher interaction-2 marks. There are two Sessional exams (each conducted for 15 marks) and one improvement exam (15 marks). The average marks of two best sessional exams are computed out of 30 marks.
- Total Marks are 100 for the subject (Internal Assessment: 40 marks and End Semester Examination: 60 Marks).

ELECTIVE PAPER

SEMESTER III

GROUP-C

Paper Title: THERAPEUTIC NUTRITION II LAB Paper Code: MDNEC-311

Total Credits: 2, Total Lectures-60, Maximum Marks: 50 (Internal Assessment-20, Final Exam-30)

COURSE OUTCOMES (COs)

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

CO1: Attain knowledge of various commercial nutritional therapeutic formula products available in the market

CO2: Gain skills in planning and providing suitable therapeutic diets for various diseases **CO3:** Able to give effective dietary counselling for these disorders

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	2	3	3	3	3	3	3	3	3	3	3	3
CO2	2	2	2	3	3	3	3	3	3	3	3	3	3	3
CO3	2	2	2	3	3	3	3	3	3	3	3	3	3	3

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus Lab

Unit-I Market Survey for commercial nutritional therapeutic formulas available in market

Unit-II Planning & preparation of diets for the following conditions:

- Cancer
- Rheumatoid arthritis
- Gout
- Post burn

ELECTIVE PAPER

GROUP-C

SEMESTER III

Paper Title: NUTRIGENOMICS (Theory)

Paper Code: MDNEC-306

Total Credits: 4, Total Lectures-60, Maximum Marks: 100 (Internal Assessment-40, Final Exam-60)

COURSE OUTCOMES (COs)

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

- **CO1:** Understand the fundamentals of nutrigenomics.
- **CO2:** Understand the impact of genetics and molecular nutrition.
- **CO3:** Gain insight in genetics and nutrition therapy leading to early detection and solutions in food intolerances, diabetes, metabolic syndrome, CVD's and obesity.
- **CO4:** Develop knowledge about dietary supplements & nutraceuticals.

CO5: Develop knowledge of ethical, social and legal implications in molecular nutrition.

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	1	1	1	2	3	2	3	1	3	1	3	3	1	3	3
CO2	2	3	2	2	3	2	3	1	3	1	3	3	1	3	3
CO3	3	3	2	2	3	3	3	3	3	2	3	3	1	3	3
CO4	3	2	2	2	3	3	3	2	3	3	3	3	1	3	3
CO5	3	3	2	2	3	3	3	1	3	2	3	3	1	3	3

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus (Theory)

Unit-I

- Introduction to Nutri-genomics
- The Human Genome Project and the "Omic" disciplines,
- Genotype and Nutrition Assessment,
- Genetic Fundamentals.

Unit-II

• Molecular nutrition

- The molecular nutrition paradigm
- Nutri-epigenomics & metabolomics
 - Targeting Foodome Metabolome Interaction: a combined Modeling Approach
- Metabolic syndrome in relation to different diseases
- Genetics and Nutrition Therapy
 - ∘Diabetes,
 - \circ Food intolerances and insensitivities- Gluten intolerance, lactose intolerance

∘CVD,

 \circ Tendency of osteoarthritis and osteoporosis.

Unit-III

- Dietary supplements & nutraceuticals.
- Solutions to implement Molecular Nutrition.
- Ethical, Legal, and Social Implications.

Suggested reading:

Department of Food Technology, Jamia Hamdard

- Nutritional Epigenomics, Bradley Ferguson,1st edition, 2019, Elsevier publication.
- Molecular Nutrition The Practical Guide. Jeffrey I, Mechanical MD, Michael A, Via MD & Shan Zhao, Endocrine Press 2018
- Gastronomy and Food Science CharisGalanakis, It edition 2020, Elsevier publication
- Epigenomics in Health and Disease, Mario Fraga and Agustin Fernandez, edition 1st, 2015, Elsevier publication
- Krause and Mahan's Food & the Nutrition Care Process, Janice L Raymond, Kelly Morrow, 15th Edition, 2020, Elsevier publication
- Dietary Supplements, K Berginc and S Kreft, 1st edition, 2014 Elsevier publication

Teaching-Learning Strategies in brief

The teaching learning strategies, followed are chalk-board teaching, learning through discussion among the peer group, classroom interaction, quiz, presentations, Q & A session and reflective learning.

Assessment methods and weightages in brief

- <u>There are two components of assessment:</u> Internal assessment (40 marks) and End semester examination (60 marks). Internal assessment consists of continuous mode (10 marks) and sessional examinations (30 marks). Continuous mode evaluation is of 10 marks comprising of Attendance -5 marks (calculated as: Percentage of Attendance: Allotment of marks- Less than 75: 0 marks; 75-80: 2 mark; 81-85: 3 marks; 86-90: 4 marks and >90: 5 marks),
 - Assignments contain 3 marks and Student teacher interaction-2 marks. There are two Sessional exams (each conducted for 15 marks) and one improvement exam (15 marks). The average marks of two best sessional exams are computed out of 30 marks.
 - Total Marks are 100 for the subject (Internal Assessment: 40 marks and End Semester Examination: 60 Marks).

ELECTIVE PAPER

SEMESTER III

GROUP-C

Paper Title: NUTRIGENOMICS LAB

Paper Code: MDNEC-312

Total Credits: 2, Total Lectures-60, Maximum Marks: 50 (Internal Assessment-20, Final Exam-30)

COURSE OUTCOMES (COs)

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

- **CO1:** Understand the basics of Nutrigenomics.
- **CO2:** Acquire skill in planning diet for disorders as per genetic make up for allergies or other diseases.
- **CO3:** Gain insight in genetics and nutrition therapy such as food intolerances, diabetes, metabolic syndrome, CVD's and obesity.
- CO4: Develop knowledge about dietary supplements & nutraceuticals.
- **CO5:** Understand the fundamentals of nutrition counselling and assessments.

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	1	1	1	2	3	2	3	1	3	1	3	3	1	3	3
CO2	2	3	2	2	3	2	3	1	3	1	3	3	1	3	3
CO3	3	3	2	2	3	3	3	3	3	2	3	3	1	3	3
CO4	3	2	2	2	3	3	3	2	3	3	3	3	1	3	3
CO5	3	3	2	2	3	3	3	1	3	2	3	3	1	3	3

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus Lab

- 1. Assignments based on various gene and diet related diseases and their diet planning as per requirements.
- 2. Counselling requisites: techniques for obtaining general profile, medical history, dietary and nutrient intake, lifestyle and nutritional status.
- 3. Identification of vitamin & mineral deficiencies in patients.
- 4. Survey, analysis and presentation of nutraceuticals available in market.

5. Collection, analysis and presentation of literature on Nutrigenomics or molecular nutrition.

SEMESTER IV

CORE PAPER

SEMESTER IV

Department of Food Technology, Jamia Hamdard

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DISSERTATION (LAB)

Paper Code: MDNEC-401

Total Credits: 15, Total contact hours-450, Maximum Marks: 500 (Internal Assessment-300, Final Exam-200)

COURSE OUTCOMES (COs)

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

CO1: Implement practical and research knowledge in a systematic way.

CO2: Conduct, write and present research proposal and thesis work.

CO3: Develop scientific aptitude.

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3	3	2	3	3	3	2	3	3	3	2	3
CO2	3	3	3	3	3	3	3	3	3	2	3	3	3	2	3
CO3	3	3	3	3	3	3	3	3	3	2	3	3	3	2	3

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

DISSERTATION

- Identification, analysis and selection of research problem and its relevance
- Collecting relevant review and research papers regarding research topic
- Synopsis writing and power-point presentation in following heads:
- Introduction
- Rationale of the study
- Objectives review of literature
- Methodology
- Plan of action
- Results and discussion
- bibliography

ELECTIVE PAPER

SEMESTER IV

GROUP-A & B

Paper Title: EMERGING ISSUES IN NUTRITION (Theory) Paper Code: MDNEC-402

Total Credits: 4, Total Lectures-60, Maximum Marks: 100 (Internal Assessment-40, Final Exam-60)

COURSE OUTCOMES (COs)

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

CO1: Attain knowledge of food and nutrition security

CO2: Get acquainted with knowledge of public health problems, government programs policies **CO3:** Understand the recent advances & strategies for improving nutritional status of populations

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	3	3	1	2	2	3	3	3	3	3	3	3	3
CO2	2	3	3	1	3	3	3	3	3	2	3	3	3	3
CO3	2	3	3	3	2	3	3	3	3	2	3	3	3	3

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus (Theory)

Unit-I Food and Nutrition Security

- Food and nutrition security: Definitions, concept and components.
- Impact of economic, agricultural policies and practices. Effect on health care system and food consumption.
- Tracking systems for nutritionally vulnerable groups.
- Recent advances & strategies for improving nutritional status of populations such as
 - \circ Food fortification
 - Genetic modification of foods

Unit-II Nutrition programs and sustainable development goals

• Sustainable development goals & nutrition.

- Emerging public health problem of non-communicable diseases. Approaches for Under nutrition control in India and other countries
- National health programs & guidelines for controlling under nutrition in India such as NRHM, IYCF, ICDS, RCH, IMNCI, NUHM, Janani Suraksha yojana, etc
- Malnutrition both under and over nutrition, stunting & wasting, their diagnosis, causes, & strategies & management

Unit-III

Combating Micronutrient Deficiencies

- Importance of focusing on health & nutrition interventions in first 1000 days of life & improving delivery system of nutrition interventions
- Problems in improving micronutrient deficiencies in children, adolescent girls and women of reproductive age: Issues, weaknesses, health programs and government initiatives (like Kishori shakti, SABLA) micronutrient supplementation
- School Health Programs in India: Current scenario and barriers in successful implementation

Unit-IV

• **Nutrition labelling-**Definition, types, FSSAI and CODEX guidelines, impact of labelling on controlling health issues. Nutrition labelling in India and other countries.

Suggested reading

- Park K (2007). Park's textbook of preventive and social medicine (19th ed.). M/s Banarsidas Bhanot Publishers, Jabalpur
- Gopalan C and Kaur S (1993). Towards better nutrition Problems and Policies. Special Publication Series No. 9. Nutrition Foundation of India, New Delhi, India
- Jelliffe DB &Jelliffe EFP (1989). Community nutritional assessment with special reference to less technically developed countries. Oxford Medical Publications. Oxford University Press, Oxford, UK
- Allen L, Gillespe S (2001). What works? A review of the efficacy and the effectiveness of Nutrition Interventions. ACC/SCN Paper No. 19, ADB Nutrition and development Series No.5

Teaching-Learning Strategies in brief

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Assessment methods and weightages in brief

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 - Total Marks are 100 for the subject (Internal Assessment: 40 marks and End Semester Examination: 60 Marks).

ELECTIVE PAPER

GROUP-A & B

SEMESTER IV

Paper Title: PROGRAMME PLANNING IN PUBLIC HEALTH NUTRITION Paper Code: MDNEC-403

Total Credits: 4, Total Lectures-60, Maximum Marks: 100 (Internal Assessment-40, Final Exam-60)

COURSE OUTCOMES (COs)

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

CO1: Get acquainted with nutrition monitoring and nutrition surveillance.

CO2: Understand the nutritional problems and strategies to combat during emergencies.

CO3: Develop an understanding of the process of planning and management of public health nutrition.

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	3	3	2	3	3	3	3	3	3	3	3
CO2	3	2	2	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	2	3	3	3	3	3	2	3	3	3	3	3

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping
Detailed Syllabus (Theory)

Unit-I Programme planning in public health nutrition

- Basic principles and models of programme planning
- Planning process in public health nutrition Assessment of need, setting objectives, selection of indicators, selecting interventions, planning for programme implementation and resources, monitoring and evaluation.

Unit-II Programme monitoring and evaluation

- Significance of monitoring nutrition programmes; Identification and selection of indicators for monitoring, data collection and analysis system
- Purpose of evaluation of nutrition programmes; Principles, types, models, steps and indicators of evaluation

Unit-III Public health implications and preventive strategies for obesity, hypertension, coronary heart disease, diabetes, osteoporosis, cancer and dental caries

Unit-IV Nutrition in emergencies and disasters

- Nutritional problems in emergencies in vulnerable groups both Macro / micronutrient deficiencies
- Assessment and surveillance of affected population groups clinical, anthropometric and dietary
- National / Public Sector Policies for Promotion of Nutrition and Health Status of the Population -National Nutrition Policy, National Nutrition Mission, National Health Policy, National Food Security Act, National Water Policy, National Urban Sanitation Policy.

Unit-V National / Public Sector Programmes for Promotion of Nutrition and Health Status of the Population

- Etiology, prevention and management of Protein Energy Malnutrition, Chronic Energy Deficiency, Severe Acute Malnutrition and micronutrient deficiencies of public health significance
- Current programme monitoring systems in India

Suggested Readings:

- FAO. (1983) Selecting Interventions for Nutrition Improvement. A Manual. Nutrition in Agriculture.No. 3.
- Gibney M.J., Margetts, B.M., Kearney, J.M., Arab, L. (Eds) (2004) Public Health Nutrition.NS Blackwell Publishing.
- Edelstein S. (2010) Nutrition in Public Health: A handbook for developing programmes and services. Third Edition. Jones and Bartlett Learning.
- Vir, S.C. (Ed.). (2011). Public Health Nutrition in Developing Countries. Part 2. Woodhead Publishing India.
- Boyle M.A. (2016). Community Nutrition in Action: An Entrepreneurial Approach. 7th Edition. Brooks Cole.

Teaching-Learning Strategies in brief

The teaching learning strategies, followed are chalk-board teaching, learning through discussion among the peer group, classroom interaction, quiz, presentations, Q & A session and reflective learning.

Assessment methods and weightages in brief

- <u>There are two components of assessment:</u> Internal assessment (40 marks) and End semester examination (60 marks). Internal assessment consists of continuous mode (10 marks) and sessional examinations (30 marks). Continuous mode evaluation is of 10 marks comprising of Attendance -5 marks (calculated as: Percentage of Attendance: Allotment of marks- Less than 75: 0 marks; 75-80: 2 mark; 81-85: 3 marks; 86-90: 4 marks and >90: 5 marks),
 - Assignments contain 3 marks and Student teacher interaction-2 marks. There are two Sessional exams (each conducted for 15 marks) and one improvement exam (15 marks). The average marks of two best sessional exams are computed out of 30 marks.
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ELECTIVE PAPER

SEMESTER IV

GROUP-C

Paper Title: ADVANCE NUTRITION –II Paper Code: MDNEC-404

Total Credits: 4, Total Lectures-60, Maximum Marks: 100 (Internal Assessment-40, Final Exam-60)

COURSE OUTCOMES (COs)

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

CO1: Attain knowledge of Common drugs, nutrient drug interaction and mechanism of action **CO2:** Get acquainted with knowledge of nutraceutical, drug therapy and nutrient absorption and metabolism

CO3: Understand the traditional and medicinal foods in nutrition

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	
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CO1	3	2	2	3	3	3	3	3	3	3	3	3	3	3
CO2	3	2	2	3	3	3	3	3	3	2	3	3	3	3
CO3	3	3	2	3	3	3	3	3	2	3	3	3	3	3
Each C	Each Course Outcome (CO) may be manual with one on more manual Outcomes (DOr). White '2' in the													

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus (Theory)

Unit-I Nutrient-Drug Interaction Common drugs, their name and mechanism of action

- Antacids/ulcers, antibiotics, anti-inflammatory drugs, anti-pyretic drugs, antihypertensive, anti-spasmodic, diuretic, oral hypoglycemic agents, statins, anxiolytic or antianxiety, bronchodilators, anti-allergic or viral, anti-epileptic, immune booster, oral contraceptives, anti-histamines, steroids and anti-carcinogenic,
- Contraindications of various drugs and its impact on nutritional status.
- Effects of drug on nutrient absorption, metabolism and excretion.

Unit-II Nutraceuticals in Health and Disease

- Nutraceuticals and diseases: Name of the botanically active compound, Indications and common uses; Its mechanism of action and active constituents
- Supplementation dosage, contraindications, side effects and toxicity.
- Classifications: dietary supplements, medicinal foods, pharmaceuticals, their effectiveness and safety, bioavailability etc.,
- Role of prebiotic, probiotic and symbiotic in health and disease.
- Medicinal and traditional foods in Ayurveda

Unit-III

Introduction to Pharmacology

- Pharmacokinetics
- Pharmacodynamics
- Pharmacogenomics
- Effect of food on drug therapy: drug absorption, medication and enteral nutrition interactions, drug distribution, drug metabolism and drug excretion.

Suggested readings

- Wildman Robert EC (2001). Handbook of Nutraceuticals and Functional foods (1sted.). CRC series
- Mitchell Bebel Stargrove, Jonathan Treasure & Dwight L. Mckee, Chuchill Livingstone (2003). Herb, Nutrient and Drug Interactions –Clinical Implications and Therapeutic Strategies

• Mahan LK and Stump SE (2007). Krause's Food, Nutrition and Diet Therapy (Hardcover), Saunders publication

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ELECTIVE PAPER

SEMESTER IV

GROUP-C

Paper Title: NUTRITION COMMUNICATION AND DIET COUNSELING Paper Code: MDNEC-405

Total Credits: 4, Total Lectures-60, Maximum Marks: 100 (Internal Assessment-40, Final Exam-60)

COURSE OUTCOMES (COs)

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

CO1: Get acquainted with counselling plan for individuals based on their conditions **CO2:** Acquire knowledge on counselling methods to manage disorders.

CO3: Understand the basics of counselling, communication strategies

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	3	3	3	3	3	3	3	3	3	3	3
CO2	3	2	2	3	3	3	3	3	3	2	3	3	3	3
CO3	3	2	2	3	3	3	3	3	2	3	3	3	3	3

Each Course Outcome (CO) may be mapped with one or more program Outcomes (POs). Write '3' in the box for 'High-level' mapping, '2' for 'Medium-level' mapping, '1' for 'low-level' mapping

Detailed Syllabus (Theory)

Unit-I

Dietary Counselling: Processes and approach

- Counselling techniques, strategies and communication skills: Techniques for obtaining information, assessment and correlating information
- Problem exploration, developing new perspective and identifying objectives, Managing resources, designing and planning for counseling session as per patient's requirements, implementation, Evaluation, Counseling and follow up
- Rapport building and opening techniques
- Group counselling
- Developing resources and aid for education and counseling

Unit -II

Nutrition Counselling

- Concept and importance of counseling in the nutrition care process
- Diet counseling : Definition, responsibilities of a counselor and a counsel and tips for successful counseling, components of counseling process, formulation of a proforma
- Understanding dietary patterns and food choices and their impact on counseling
- Nutrition in hospitalized patients Causes of malnutrition in hospitalized patients, identification of high risk patients, assessment of nutritional status

Basics of Communication

- Meaning of Communication, Forms methods of communication
- Approaches and characteristics of effective communication, Skills and attributes of a communicator
- Behaviour Change Communication and Models for behaviour change
- Barriers to effective communication
- Digital communication- concepts, types, and its access
- Tools and methods to create digital design for web pages

Unit-III

- Managing diet related chronic diseases in adults: Diabetes, hypertension, Cardiovascular diseases, obesity, cancer, kidney disorders and liver disorders
- Considerations for nutrition counseling plans for:
- Prenatal and pregnant women, Lactating women
- o Childhood nutrition problems like SAM, weight management, micronutrient deficiencies
- Nutrition counselling for adolescents
- Weight management, eating disorders

Traditional medicines in disease management; Medicinal role of traditional foods; Naturopathy, and role of Ayurveda

Suggested Readings:

• Mahan, L. K. and Escott Stump. S. (2016) Krause's Food & Nutrition Therapy 14th ed. Saunders-Elsevier

• Snetselaar L. (2009). Nutrition Counseling Skills for the Nutrition Care Process. Fourth Ed. Sudbury, Massachusetts: Jones Bartlett Publishers.

• Holli B Betsy and Beto A Judith. (2014). Nutrition Counseling and Education Skills for Dietetics Professionals. Sixth edition. USA: Lippincot Williams and Wilkins; Wolters Kluwer.

- Gable J. (2016). Counseling Skills for dietitians. Florida, USA: JohnWiley and Sons.
- Midwinter R and Dickson J.(2015). Embedding Counseling and Communication Skills. A Relational Skills Model. Routledge 2015
- Devito Joseph A. (2015) Human Communication: The Basic Course. New York:Pearson
- King K and Klawitter B.(2007). Nutrition Therapy. Advanced Counseling Skills. Third

Edition. Philadelphia, USA: Lippincot Williams and Wilkins; Wolters Kluwer. 2007 • http://www.fao.org/docrep/X2550E/X2550e04.htm

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