PROGRAMME PROJECT REPORT

Master of Science in

Food and Nutrition

(Two Year- MFN Programme)

(According to New Education Policy-2020)

MASTER'S IN FOOD AND NUTRITION

SCHOOL OF HEALTH SCIENCES
U. P. Rajarshi Tandon Open University
Prayagraj-2022

Contents:

1. **Master's Degree Programme** The National Education Policy (NEP) 2020 envisions a new vision that enable an individual to study one or more specialized areas of interest at a deep level, and also develop capabilities across a range of disciplines including sciences, social sciences, arts, humanities, languages, as well as professional, technical, and vocational subjects. The NEP 2020 focuses on the formulation of expected learning outcomes for all higher education programmes. It states that "National Higher Education Qualifications Framework (NHEQF)" shall be align with the National Skills Qualifications Framework (NSQF) to ease the integration of vocational education into higher education. It also points out that higher education qualifications leading to a degree/diploma/certificate shall be described by the NHEQF in terms of Outcome Based Education (OBE).

   The design of M.Sc.- **Food and Nutrition**programme in line with NHEQF offers opportunities and avenues to learn core subjects but also to explore additional avenues of learning beyond the core subjects for holistic development of a learner.

   The uniform grading system will also enable potential employers in assessing the performance of the learner. In order to bring uniformity in evaluation system and computation of the Cumulative Grade Point Average (CGPA) based on learner's performance in examinations, guidelines framed by the UGC are followed. Hence, adoption of NHEQF helps to overcome the gap between university degree and employability by introducing skills and competencies in the graduates.

2. M.Sc.-**Food and Nutrition**Programme The structure and duration of postgraduate programme of Master's in Food and Nutrition in accordance with NEP 2020 includes multiple exit options within this period, with appropriate certifications:

   • Level 8: A **Bachelor' Degree (Research)** for 4 year programme after completing 4th year of 4-year B.Sc. programme OR PG Diploma in **Food and Nutrition**after completing 1styear (2 semesters) of study of M.Sc. programme.

   • Level 9: **A Master in Science (Food and Nutrition)** program after 2 years (4 semesters) of study;

Programme Mission & Objectives: In line with the mission of the University to provide flexible learning opportunities to all, particularly to those who could not join regular colleges or universities owing to social, economic and other constraints, the 2-year Post-Graduate Programme in **Food and Nutrition**aims at providing holistic and valuebased knowledge and

guidance to promote scientific temper in everyday life. The specialists in food and nutrition play a vital role in promoting the quality of life of individuals and communities, which contributes significantly to the economic and over all development of the nation. This is achieved through a blind of Academics, research training and extension as well as industrial applications. The post graduate programme in this discipline has been designed to provide the students intensive and extensive theoretical and experiential learning. The program allows flexibility in the choice of thrust areas, which students can select, based on their career goals. It is envisaged that the current scenario at the regional and national level require trained professionals in areas such as Public Nutrition, Dietetics and Clinical Nutrition, Institutional Food Administrations as well as Food Science and Quality Control. Alternatively abroad based program covering several varied aspects in this discipline is also possible.

2.1 The program offers a platform to the learners to fulfill the eligible criteria in various scientific jobs in government and private sector.

The Master of **Food and Nutrition**Programme aims at the following objectives:

- The curriculum integrated several elective courses, besides the core, has been formulated to provide professionally competent power for:-

- Academic and Research Institutions.
- Hospitals food service Institutions and industry.
- Managerial roles in agencies and Institutions- both Government and NGO sector.
- Planning, monitoring and evaluation of nutrition and health programs.
- Ensuring food safety and quality consumers.
- Entrepreneurial Ventures
- Advocacy and consultancy
- Provide strong core training so that graduates can adapt easily to changes and new demands from industry/Society and for Community Health.
- Enable students to understand not only how to apply certain methods, but when and why they are appropriate.
- Integrate fields within zoology, microbiology and in biochemistry is very useful to understand the physiology of living being and their metabolic processes.
- Expose students to real-world problems in the classroom and through experiential learning.

2.1 Relevance of the Programme with Mission and Goals

The 2-year Post-Graduate Programme in M.Sc.- Food and Nutrition is designed with the objectives of equipping learners to cope with the emerging trends and challenges in the scientific domain. In congruence with goals of the University the Programme also focuses to provide skilled manpower to the society to meet global demands. The Programme is designed in such a manner so that a successful learner can go for

higher studies as well as join the medical and pharmaceutical industry and academic sector.

2.2 Nature of Prospective Target Group of Learners

The Program is targeted to all individuals looking to earn a post graduation degree for employment, further higher education, promotion in career, professional development.

2.3 Appropriateness of Programme to be conducted in ODL mode to acquire specific skills & competence

		Learning outcomes after Level 8
Learning Outcomes	Elements of the descriptor	Level 8 Bachelor' Degree (Research) OR PG Diploma in Food and Nutrition.
LO 1	Knowledge and understanding	• Advanced knowledge about a specialized field of enquiry, with depth in one or more fields of learning within a broad multidisciplinary/interdisciplinary context. • A coherent understanding of the established methods and techniques of research and enquiry applicable to the chosen fields of learning.
LO 2	LO 2 Skills required to perform and accomplish tasks	• A range of cognitive and technical skills required for performing and accomplishing complex tasks relating to the chosen fields of learning, • Cognitive and technical skills relating to the established research methods and techniques,
LO 3	Application of knowledge and skills	• Apply the acquired advanced technical and/or theoretical knowledge and a range of cognitive and practical skills to analyze the quantitative and qualitative data gathered drawing on a wide range of sources for identifying problems and issues relating to the Food and Nutrition. • Apply advanced knowledge relating to research methods to carryout research and investigations to formulate evidencebased solutions to complex and unpredictable problems
LO 4	Generic learning outcomes	• Listen carefully, read texts and research papers analytically and present complex information in a clear and concise manner to different groups/audiences, • Communicate technical information and explanations, and the findings/results of the research studies • Present in a concise manner one's views on the relevance and applications of the findings of research and evaluation studies in the context of emerging developments and issues. • Pursue self-paced and self- directed learning to upgrade knowledge and skills that will help accomplish complex tasks and pursue higher level of education and research.

		• Problematize, synthesize and articulate issues and design research proposals, • Define problems, formulate appropriate and relevant research questions,
LO 5	Constitutional, humanistic, ethical and moral values	• Embrace and practice constitutional, humanistic, ethical, and moral values in one's life. • Adopt objective, unbiased, and truthful actions in all aspects of work and professional practice.
LO 6	Employment ready skills, and entrepreneurship skills and mindset	• Managing complex technical or professional activities or projects, requiring the exercise of full personal responsibility for output of own work as well as for the outputs of the group as a member of the group/team. • Exercising supervision in the context of work having unpredictable changes.

Learning outcomes after Level 9		
Learning Outcomes	Elements of the descriptor	Level 9 (Master's in –Food and Nutrition)
LO 1	Knowledge and understanding	• Advanced knowledge about a specialized field of enquiry with a critical understanding of the emerging developments. • Advanced knowledge and understanding of the research principles, methods, and techniques applicable professional practice. • Procedural knowledge required for performing and accomplishing complex and specialized professional tasks relating to teaching, and research and development.
LO 2	Skills required to perform and accomplish tasks	• Advanced cognitive and technical skills required for performing and accomplishing complex tasks. • Advanced cognitive and technical skills required for evaluating research findings and designing and conducting relevant research that contributes to the generation of new knowledge, • Specialized cognitive and technical skills relating to a body of knowledge and practice to analyze and synthesize complex information and problems.

LO 3	Application of knowledge and skills	• Apply the acquired advanced theoretical and/or technical knowledge about professional practice and a range of cognitive and practical skills to identify and analyze problems and issues, including real-life problems, associated with the Food and Nutrition.
LO 4	Generic learning outcomes	• Listen carefully, read texts and research papers Analytically and present complex information in a clear and concise manner to different groups/audiences, • Communicate, in a well-structured manner, technical information and explanations, and the findings/ results of the research studies, • Meet one's own learning needs relating to the chosen fields of learning, work/vocation, and an area of professional practice, • Pursue self-paced and self- directed learning to upgrade knowledge and skills, including research-related skills, required to pursue higher level of education and research.
LO 5	Constitutional, humanistic, ethical and moral values	• Embrace and practice constitutional, humanistic, ethical and moral values in one's life, • Adopt objective and unbiased actions in all aspects of work and professional practice, • Participate in actions to address environmental protection and sustainable development issues,
LO 6	Employment ready skills, and entrepreneurship skills and mindset	• Adapting to the future of work and responding to the demands of the fast pace of technological developments and innovations that drive shift in employers' demands for skills, particularly with respect to transition towards more technology-assisted work involving the creation of new forms of work and rapidly changing work and production processes. • Exercising full personal responsibility for output of own work as well as for group/ team outputs and for managing work that are complex and unpredictable requiring new strategic approaches.

2.5 Instructional Design

2.5.1 2-year M.Sc.- Biochemistry Programme Structure

The University follows the credit system in all its programmes. One credit is equal to 30 hours of learner's study time which is equivalent to 15 lectures in conventional system. To earn a Master's Degree, a learner has to earn 80 credits in minimum four semesters (two years) with 20 credits per semester. For earning 80 credits, a learner has to go through the following Programme Structure:

Programme Structure of M.Sc.- Food and Nutrition under NHEQF

Level	Year	Sem	Core Course 1	Core Course 2	Core Course 3	Practical Lab	Research component/ Literature Survey/ Research Project	Total credit
8	1	1st	4	4	4	4	4	20
		2nd	4	4	4	4	4	20
9	2	1st	4	4	4	4	4	20
		2nd	4	4	4	4	4	20
Total Credits			16	16	16	16	16	80

Explanation of terms used for categorization of courses:

A. Course 1 to 3: A course, which should compulsorily be studied by a learner as a core requirement is termed as a Core course.

B. Practical Lab: Lab based on courses discussed in theory papers.

C. Industrial Training/ Survey/ Research Project/ Field Work/Apprenticeship/ Dissertation/Internship: An elective course designed to acquire special/advanced knowledge, such as supplement study/support study to a project work, and a learner studies such a course on his own with an advisory support by a counselor/faculty member. Currently, Literature survey and Research Project is offered under code; **LS101N and RP102N.**

2.5.2 Course curriculum: The details of syllabus is given in Appendix-I

2.5.3 Language of Instruction: SLM is provided in English. However, learner can write assignment and give Term End Examination (TEE) either in Hindi or English.

2.5.4 Duration of the Programme Minimum duration in years: 02 Maximum duration in years : 04

2.5.5 Faculty & Support Staff: Professor (02), Associate Professor (01)Assistant Professor (02) and support staff (2)

2.4 Instructional Delivery Mechanisms

The Open University system is more learner-oriented, and the student is an active participant in the teaching-learning process. Most of the instructions are imparted through distance rather than face-to-face communication.

The University follows a multi-media approach for instruction. It comprises of:

- self-instructional printed material (Self Learning Material)
- audio and video lectures
- face-to-face counseling
- assignments
- laboratory work
- Project work in some courses
- teleconference/web conference
- Web Enabled Academic Support Portal
- e-GYANSANGAM (Open Educational Repository): http://gyansangam.uprtou.ac.in
- e-GYANARJAN:Its a Learning Management System based on Module (http://gyanarjan.uprtou.ac.in) to aid the learner through web conferencing, sharing of learning resources, counseling classes etc.

2.6.1 Self-Learning Material

The Self Learning Material (SLMs) are prepared in line with the UGC guidelines on preparation of SLMs. The prepared study materials are self-instructional in nature.

The course material is divided into blocks. Each block contains a few units. Lessons, which are called Units, are structured to facilitate self-study. The units of a block have similar nature of contents. The first page of each block indicates the numbers and titles of the units comprising the block. In the first block of each course, we start with course introduction. This is followed by a brief introduction to the block. After the block introduction, emphasis is given on contribution of ancient Indian knowledge into that specific course. Next, each unit begins with an introduction to talk about the contents of the unit. The list of objectives is outlined to expect the learning based outcome after working through the unit. This is followed by the main body of the unit, which is

divided into various sections and sub-sections. Each unit is summarized with the main highlights of the contents.

Each unit has several "Check Your Progress" Questions and Terminal Questions /exercises. These questions help the learner to assess his/her understanding of the subject contents. At the end of units, additional references/books/suggested online weblink for MOOCs/Open Educational Resources for additional reading are suggested.

2.6.2 Audio and Video lectures Apart from SLM, audio and video lectures have been prepared for some courses. The audio-video material is supplementary to print material. The video lectures are available at YouTube channel of university(https://www.youtube.com/channel/UCj2XTEB6iCZwwIqmKw_jzYg).

2.6.3 Counseling Classes The face to face (F2F) counseling classes are conducted at head quarter and study centers. The purpose of such a contact class is to answer some of questions and clarify the doubts of learner which may not be possible through any other means of communication. Well experienced counselors at study centers provide counseling and guidance to the learner in the courses that (s) he has chosen for study. The counseling sessions for each of the courses will be held at suitable intervals throughout the whole academic session. The time table for counseling classes is displayed at head quarter as well as by the coordinator of study center; however, attending counseling sessions is not compulsory. It is noted that to attend the counseling sessions, learner has to go through the course materials and note down the points to be discussed as it is not a regular class or lectures.

2.6.4 Assignments the purpose of assignments is to test the comprehension of the learning material that learner receives and also help to get through the courses by providing self-feedback to the learner. The course content given in the SLM will be sufficient for answering the assignments.

Assignments constitute the continuous evaluation component of a course. The assignments are available at the SLM section of the home page of university website. In any case, learner has to submit assignment before appearing in the examination for any course. The assignments of a course carry 30% weightage while 70% weightage is given to the term-end examination (TEE). The marks obtained by learner in the assignments will be counted in the final result. Therefore, it is advised to take assignments seriously. However, there will be no written assignments for Lab courses.

2.6.5 Laboratory Work Laboratory courses are an integral component of the M.Sc. programme. While designing the curricula for laboratory courses, particular care has been taken to weed out experiments not significant to the present-day state of the discipline. Importance has been given to the utility of an experiment with respect to real life experience, development of experimental skills, and industrial applications. It is planned to phase the laboratory courses during suitable periods (such as summer or autumn vacations) so that in-service persons can take them without difficulty. Laboratory courses worth 2 credits will require full-time presence of the student at the Study Centre for one week continuously. During this time a student has to work for around 60 hours. Around 40 hours would be spent on experimental work and the remaining time will be used for doing calculations, preparations of records, viewing or listening to the video/audio programmes.

2.6.6 Teleconference/Web conference Teleconference/web conference, using done through ZOOM/WebEx in form of online special counseling sessions is another medium to impart instruction to and facilitate learning for a distance learner. The students concerned would be informed about the teleconferencing schedule and the place where it is to be conducted by sending bulk SMS.

2.6.7 Web Enabled Academic Support Portal the University also provide Web Enabled Academic Support Portal to access the course materials, assignments, and other learning resources.

2.6.8 e-GYANSANGAM The e-GYAMSANGAM (UPRTOU-OER REPOSITORY) is an open access platform for educational resources that rely on the concept of 5Rs namely; Reuse, Revise, Remix, Retain and Redistribute. Uttar Pradesh Rajarshi Tandon Open University in support with Commonwealth Educational Media Centre for Asia initiated the implementation of philosophy behind the NEP-2020 to provide equitable use of technology to support learners (SDG4). This not only ensure inclusive and equitable quality education opportunities but also provide faculty to repurpose high quality open educational resources (OER) such that innovative, interactive and collaborative learning environment is built. UPRTOU believes the philosophy of Antyoday (reaching toast person of the society) and facilitate the learner by providing Self Learning Materials, Lecture Notes, Audio/video Lectures, Assignments, Course materials etc. through face-to-face mode as well as distance mode. This e-GYANSANGAM depository will fulfill the educational facilities through equitable use of technology to the learners.

Objectives:

• To provide low-cost access model for learners. To foster the policy of reaching to unreached.

- To break down barriers of affordability and accessibility of educational resources.
- To give faculty the ability to customize course materials for learners.
- To provide equal access to affordable technical, vocational and higher education resources (SDG 4.3).
- To provide ubiquitous access to anyone. This will facilitate the quick availability of educational resources and reduces time.
- To supplement Self Learning Material (SLM).
- To reduce the mentor-mentee gap as depository provide access to number of local access as well as global access to educational resources.

2.6.9 e-GYANARJAN: It's a Learning Management System based on Module (http://gyanarjan.uprtou.ac.in) to aid the learner through web conferencing, sharing of learning resources, counseling classes etc.

2.6.10 Learner Support Service Systems

(a) Study Centre

A Study Centre has following major functions:

(i) **Counseling:** Counseling is an important aspect of Open University System. Face to face contact-cum-counseling classes for the courses will be provided at the Study Centre. The detailed programme of the contact-cum-counseling sessions will be sent to the learner by the Coordinator of the Study Centre. In these sessions learner will get an opportunity to discuss with the Counselors his/her problems pertaining to the courses of study.

(ii) **Evaluation of Assignments:** The evaluation of Tutor Marked Assignments (TMA) will be done by the Counselors at the Study Centre. The evaluated assignments will be returned to the learner by the Coordinator of Study Centre with tutor comments and marks obtained in TMAs. These comments will help the learner in his/her studies.

(iii) **Library:** Every Study Centre will have a library having relevant course materials, reference books suggested for supplementary reading prepared for the course(s).

(iv) **Information and Advice:** The learner will be given relevant information about the courses offered by the University. Facilities are also provided to give him/her guidance in choosing courses.

(v) **Interaction with fellow-students:** In the Study Centre learner will have an opportunity to interact with fellow students. This may lead to the formation of

self-help groups. (b) Learner Support Services (LSS) the University has formed an LSS cell at the head quarter. The LSS cell coordinates with the Study Centre to get rid of any problem faced by the learner.

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2.7 Procedure for admissions, curriculum transaction and evaluation

2.7.1 Admission Procedure

(a) The detailed information regarding admission will be given on the UPRTOU website and on the admission portal. Learners seeking admission shall apply online.

(b) Direct admission to 2-year M.Sc. (Food and Nutrition) program is offered to the interested candidates.

Entry Eligibility:

Level 8: Bachelor degree in concern subject (B.Sc. (Bio)/B.Sc. (Honors) withHome Science/ Community Science/ Human Nutrition/Nutritional Science/Biochemistry//Biotechnology/ Zoology/Biology as one of the subject)/ BSc. Home Science / at B.Sc. Human Nutrition/ B.Sc.Community Nutrition OR Any Graduate Degree in Medical Sciences/ Allopathy-MBBS, Graduates of Ayush system of medicine-BAMS,BHMS,BUMS, Naturopathy, Yoga Science, Siddha.

Level 9: Students who successfully completed the Bachelors degree (Research) or PG Diploma in Biochemistry at level 8 will get admission in 2nd year of M.Sc. (Biochemistry) program in accordance with NEP-2020.

(c) Programme Fee: Rs. 10000 / year. The fee is deposited through online admission portal only.

2.7.2 Evaluation The evaluation consists of two components:

(1) Continuous evaluation through assignments, and

(2) term-end examination. Learner must pass both in continuous evaluation as well as in the term-end examination of a course to earn the credits assigned to that course. For each course there shall be one written Terminal Examination. The evaluation of every course

shall be in two parts that is 30% internal weightage through assignments and 70% external weightage through terminal exams.

(a) Theory course Max. Marks

Terminal Examination 70

Assignment 30

Total 100

(b) Practical course:Max. Marks

Terminal Practical Examination 100

Marks of Terminal Practical Examination shall be awarded as per following scheme:

i. Write up /theory work 30

ii. Viva-voce30

iii. Execution/Performance/Demonstration 20

Iv. Lab Record 20

The following 10-Point Grading System for evaluating learners' achievement is used for CBCS programmes:

10-Point Grading System in the light of UGC-CBCS Guidelines

Letter Grade	Grade Point	% Range
O (Outstanding)	10	91-100
A+ (Excellent)	**9**	**81-90**
A (Very Good)	**8**	**71-80**
B+ (Good)	**7**	**61-70**
B (Above Average)	**6**	**51-60**
C (Average)	**5**	**41-50**
P (Pass)	**4**	**36-40**
NC (Not Completed)	**0**	**0-35**
Ab (Absent)	**0**	
Q	Qualified	Applicable only for Non - Credit Courses
NQ	Not Qualified	

Learner is required to score at least a 'P' grade (36% marks) in both the continuous evaluation (assignments) as well as the term-end examination. In the overall computation also, learner must get at least a 'P' grade in each course to be eligible for the M. Sc. degree.

Computation of CGPA and SGPA

(a) Following formula shall be used for calculation of CGPA and SGPA

For jth semester SGPA (Sj) = Σ (Ci *Gi)/ Σ Ci	where, Ci = number of credits of the ith course in jth semester Gi= grade point scored by the learner in the ith course in jth semester.
CGPA = Σ (Cj *Sj)/ Σ Cj	where, Sj = SGPA of the jth semester Cj = total number of credits in the jth semester

The CGPA and CGPA shall be rounded off up to the two decimal points. (For e.g., if a learner obtained 7.2345, then it will be written as 7.23 or if s(he) obtained 7.23675 then it be will written as 7.24)

CGPA will be converted into percentage according to the following formula: Equivalent Percentage = CGPA * 9.5

(b) Award of Division

The learner will be awarded division according to the following table:

Division	Classification
1 st Division	6.31 or more and less than 10 CGPA
2 nd Division	4.73 or more and less than 6.31 CGPA
3 rd Division	3.78 or more and less than 4.73 CGPA

2.7.3 Multiple Entries and Multiple Exit options

The 2-year M.Sc. programme is an Outcome-Based Education (OBE) for qualifications of different types. The qualification types and examples of title/nomenclature for qualifications within each type are indicated in Table 1.

Level	Qualification title	Programme duration	Entry Option	Exit option
8	B.Sc. (Research) OR PG Diploma in Food and Nutrition	Programme duration: First year (first two semesters) of the M.Sc. programme	Bachelor degree in concern subject (B.Sc. (Bio)/B.Sc. (Honors) with Home Science/ Community Science/ Human Nutrition/Nutritional Science/Biochemistry//Biotechnology/ Zoology/Biology as one of the subject)/ BSc. Home Science / at B.Sc. Human Nutrition/ B.Sc. Community Nutrition OR Any Graduate Degree in Medical Sciences/ Allopathy-MBBS, Graduates of Ayush system of medicine-BAMS,BHMS,BUMS, Naturopathy, Yoga Science, Siddha.	Exit Awarded with Bachelor' Degree (Research) for 4 year programme OR PG Diploma in Food and Nutrition
9	Master in (Food and Nutrition)	Programme duration: two years (four semesters) of M.Sc. programme	Level 8 Bachelor' Degree (Research) for 4 year programme OR PG Diploma in Food and Nutrition	Exit awarded with Master's in (Food and Nutrition)

2.8 **Requirement of the laboratory support and Library Resources**

The practical sessions are held in the science laboratories of the Study Centre. In these labs, the learner will have the facility to use the equipment and consumables relevant to the syllabus. The SLM, supplementary text audio and video material of the various courses of the program is available through the online study portal of the University. The University also has a subscription of National Digital Library to provide the learners with the ability to enhance access to information and knowledge of various courses of the programme.

2.9 **Cost estimate of the programme and the provisions:**

2-year M.Sc. programme consists of 14 theory courses, 01 Internship Course,4 laboratory courses and two research activities. One course is of 4 credits which consist of approx. 6 units. The total approximated expenditure on the development of 15 courses including internship mannual is:

S. No.	**Item**	**Cost per Unit (writing & editing)**	**Total cost (Rs.)**
1	Total no. of Courses=15 Total no. of Units = 15*12=180	7500	**13,50,000**
2	BOS Meetings etc.	20,000	20,000
		Total	**13,70,000**

2.10 Quality assurance mechanism and expected programme outcomes:

(a) **Quality assurance mechanism:** The program structure is developed under the guidance of the Board of studies comprising external expert members of the concerned subjects followed by the school board. The program structure and syllabus is approved by the Academic Council of the University. The course structure and syllabus is reviewed time to time according to the feedback received from the stakeholders and societal needs.

The Centre for Internal Quality Assurance will monitor, improve and enhance effectiveness of the program through the following:

- Annual academic audit
- Feedback analysis for quality improvement
- Regular faculty development programs
- Standardization of learning resources
- Periodic revision of program depending upon the changing trends by communicatingto the concerned school.

(b) Expected programme outcomes (POs) :

Knowledge and understanding	PO1	To grasp the ability of food and nutritional knowledge,and functioning of living being systems in concern to their structure and functions.
Skills related to specialization	PO2	To adapt the skills and understanding of the concepts of food science and nutrition, human physiology, anatomy, food safety and standard laws, diet plans during various diseases,microbiology, nutritional estimation, nutritional assessment in living human beings.
Application of knowledge and skills	PO3	To conceptualize and analyze the principle of different physiological /nutritional/biochemical changes of various biomolecules with their chemistry in living human system.
	PO4	To apply clinical and experimental knowledge for the diagnoses of different kinds of diseases.
Generic learning outcomes	PO5	Learner will be able to get the job in various fields related to medical professions, pharmaceutical industry, industry and community health center.
	PO6	Learner will also be able to improve the quality of life for the human welfare by understanding the principle of food science and nutrition living organisms.

APPENDIX-I
Detailed Programme Structure
&
Syllabus

MASTER'S IN FOOD AND NUTRITION (NEP-2020)

SEMESTER	COURSE CODE	Title of Course	Credits	Marks
First Semester				A+T
	MFN.101	Applied Physiology	4	100(30+70)
	MFN.102	Advanced Nutritional Biochemistry	4	100(30+70)
	MFN.103	Advances in Food Microbiology	4	100(30+70)
	MFNL.104(P)	Lab work based on paper 101,102,103	4	100
	MFNBR-01	Basics in Research	4	100
	Credits of First Semester		**20**	**500**
Second Semester	MFN.105	Food Science and Experimental Cookery	4	100(30+70)
	MFN.106	Advance Clinical and Therapeutic Nutrition	4	100(30+70)
	MFN.107	Bio Statistics	4	100(30+70)
	MFNL.108(P)	Lab work based on paper 105,106,107	4	100
	MFNMP-02	Mini Project	4	100
	Credits of Second Semester		**20**	**500**
Third semester	MFN.109	Advance Community Nutrition	4	100(30+70)
	MFN.110	Advanced Nutrition	4	100(30+70)
	MFN.111	Internship (Based on overall syllabus)	4	100(30+70)
	MFN.112(P)	Lab work based on paper 105,106,107	4	100
	MFNRT -03N	Research Tools and Practices	4	100
	Credits of Third Semester		**20**	**500**
Fourth Semester	**CHOICE BASED GROUPPAPERS**			
GROUP -1	MFN.113	Food Processing and Preservation Technology	4	100(30+70)
	MFN.114	Nutritional Management in Health and Diseases	4	100(30+70)
	MFN.115	Nutrition Policies and Intervention of Programs	4	100(30+70)
	MFNL.116(P)	Lab work based on paper 113,114,115	4	100
OR				
GROUP-2	MFN.117	Food safety and quality control	4	100(30+70)
	MFN.118	Institutional food Administration	4	100(30+70)
	MFN.119	Nutrition in Emergencies and Disaster	4	100(30+70)
	MFN.120(P)	Lab work based on MFN –117,118,119	4	100
	Compulsory paper			
	MFN-121(D)	**Dissertation/Industrial training/Internship with Viva Voce**	4	100
Credits of Forth Semester			**20**	**500**
Credits /Max. Marks			**80**	**2000**

FIRST SEMESTER

PROGRAMME: M.Sc	YEAR: 2023	SEMESTER: 1ST
PROGRAMME : FOOD AND NUTRITION		PROGRAMME : 1117
COURSE CODE :MFN.101	COURSE TITLE : APPLIED PHYSIOLOGY	
COURSE OBJECTIVES: ❖ To discuss the nutrition and physiology of human ❖ To discuss the element of human nutrition ❖ To discuss the protein that is the building block of living being ❖ To discuss the digestive system and respiration		
COURSE OUTCOMES: ❖ CO 1: Able to understand the role of nutrition in physiology ❖ CO 2: Learn the Basal metabolic rates (BMR) ❖ CO 3: Able to describe the dietary resource and metabolic functions of nutrients ❖ CO 4: Able to know the blood composition ❖ CO 5: Also able to know all the Organs physiology.		
CREDITS: 4		**TYPE OF COURSE: CORE**
MAXIMUM MARKS :100		**MINIMUM MARKS : 36**
BLOCK-1:CELL STRUCTURE AND FUNCTION, NERVOUS SYSTEM AND ENDOCRINE SYSTEM:		
UNIT : 1	**Cell Structure and Function** Levels of cellular organization and function- organelles, tissues, organs and systems – Brief review Cell membrane, transport across cell membrane and intercellular communication. Regulation of cell multiplication	
UNIT : 2	**Nervous System** Review of structure and function of neuron, Conduction of nerve impulse, synapses, and role of neurotransmitters. Organization of central nervous system, structure and function of Brain and spinal cord, Afferent and efferent nerves, Blood Brain Barrier, CSF, Hypothalamus and its role in various body functions-obesity, memory.	
UNIT : 3	**Endocrine System** Endocrine glands – structure, function, role of hormones, regulation of hormonal secretion. The Neuro-endocrine axis. Disorders of endocrine glands. Emphasis on *physiology* of diabetes and stress hormones	
BLOCK-2: SENSE ORGANS, DIGESTIVE SYSTEM, AND RESPIRATORY SYSTEM:		
UNIT : 4	**Sense Organs** Review of structure and function. Role of skin, eye, ear, nose and tongue in perception of stimuli.	
Unit: 5	**Digestive System** Review of structure and function. Secretary, Digestive and Absorptive functions, Role of liver, pancreas and gall bladder and their dysfunction. Motility and hormones of GIT	
Unit: 6	**Respiratory System**	

	Review of structure and function. Role of lungs in the exchange of gases. Transport of oxygen and CO_2. Role of hemoglobin and buffer systems. Cardio-respiratory response to exercise and physiological effects of training.
BLOCK-3 : CIRCULATORY SYSTEM, EXCRETORY SYSTEM AND SKELETAL SYSTEM:	
Unit: 7	**Circulatory System** Structure and function of heart and blood vessels. Regulation of cardiac output and blood pressure, heart failure, hypertension. Blood formation, composition, blood clotting and hemostasis: Formation and function of plasma proteins.
Unit: 8	**Excretory System** Structure and function of nephron. Urine formation. Role of kidney in maintaining pH of blood. Water, electrolyte and acid bases balance, diuretics
Unit: 9	**Muscular – Skeletal System** Structure and function of bone, cartilage and connective tissue. Disorders of the skeletal system, Types of muscles, structure and function.
BLOCK-4 : IMMUNE SYSTEM , REPRODUCTION:	
Unit: 10	**Immune System** Cell mediate and humeral immunity. Activation of WBC and production of antibodies. Role in inflammation and defence.
Unit: 11	**Reproduction** Menstrual cycle, spermatogenesis, physiological changes in pregnancy
Suggested Readings: • Ganong WF (2014). Review of Medical Physiology, 24th ed. McGraw Hill. • Ross and Wilson (2013). Anatomy and Physiology in health and illness, 11th ed. Medical Division of Longman Group Ltd. • Guyton, A.C. and Hall, J.E.(2000)Textbook of Medical Physiology.10th ed. India: Harcourt Asia • Das, A.(2004)Medical Physiology-Vol. I and II 3rd Books and Allied (P) Ltd. • Tortora, G.J and Grabowski, S.R.(2000)Principles of Anatomy and Physiology.9th ed. John Wiley and Sons.Inc. • Chaudhari S K.(2000) Concise Medical Physiology.3rd Edition. Central . • Mahapatra, A.B.S.(2003):Essentials of Medical Physiology.3rd Edition. Current Books International.	
Suggested Online Readings: 1. You tube 2. Web resources 3. Hot articles 4. Science Direct 5. SciFinder, Scopus Google scholar	
This course can be opted as an elective by the students of following subjects: NA	
Suggested equivalent online courses (MOOCs) for credit transfer: NA	

PROGRAMME: M.Sc	YEAR: 2023	SEMESTER: 1th
PROGRAMME :HUMAN NUTRITION		PROGRAMME : 1117
COURSE CODE :MFN.102	COURSE TITLE:ADVANCED NUTRITIONAL BIOCHEMISTRY	

COURSE OBJECTIVES:

- To discuss the clinical process and chemical control
- To discuss the genetic and chemical control
- To discuss nutrition, drugs and digestion

COURSE OUTCOMES:

- CO 1: Able to understand the role of clinical biochemistry in laboratory
- CO 2: Able to know the composition of body fluids and macro and micronutrient
- CO 3: Know genetic damage by ionization radiation
- CO 4: Able to know the control of water and electrolyte metabolism
- CO 5: Also able to know inborn errors of metabolism

CREDITS: 4	**TYPE OF COURSE: CORE**
MAXIMUM MARKS :100	**MINIMUM MARKS : 36**

BLOCK-I: Heteropolysaccharides, Plasma Proteinsand Intermediary metabolism	
Unit-I	**Heteropolysaccharides:** Definition, classification, structure and properties of glycoproteins and proteoglycans.
Unit-II	**Plasma Proteins:** Nature, properties and functionOverview of regulation of intermediary metabolism: Equilibrium and non-equilibrium reactions, committed steps, allosteric modifications, covalent modulation, hormonal induction and repression, cross-over theorem, starve-feed cycle, caloric homeostasis and futile cycies.
Unit-III	**Intermediary Metabolism:** Reactions standard free energy changes and regulation. Carbohydrates-glycolysis, gluconeogenesis, citric acid cycle, hexose monophosphate pathway.Lipids, beta-oxidation, de novo synthesis of fatty acids, synthesis and breakdown of unsaturated fatty acids, cholesterol, phospholipids and triacylglycerol.
BLOCK-II	**Purines and Pyrimidines, Nucleic Acidsand Hormones**
Unit-IV	**Purines and Pyrimidines :**Synthesis and breakdown.
Unit-V	**Nucleic Acids :** DNA replication and transcription, DNA repair systems, DNA recombinant Genetic mutation, regulation of gene expression and protein biosynthesis.

Unit-VI	**Hormones:**Mechanism of action of hormones.
BLOCK-3 Minerals, Detoxification in the Body	
Unit-VII	**Minerals :**Biological role of trace elements.
Unit-VIII	**Detoxification in the Body :**Metabolism of foreign compounds
Unit-IX	**Major Alterations:** Carbohydrates, protein and fat metabolism in chronic nutrition-related degenerative diseases.
Suggested Book Readings: Suggested Text Book Readings: • Clinical Biochemistry: Metabolic and Clinical Aspects: William J. Marshall, Elsevier • Practical Clinical Biochemistry Methods and Interpretations: Ranjna Chawla • Early Clinical Exposure: A Case Based Approach in Clinical Biochemistry: Anita Chalak, Jaypee Brothers Medical Publishers. • Clinical Biochemistry, Richard Luxton, Viva Books publisher	
Suggested online links: • DNA: The Genetic Material: Ch10-1 Gen material.pdf (csun.edu) • Pathophysiology of Water and Electrolyte Metabolism: PowerPoint Presentation (bnshungary.hu) • Inborn errors of metabolism: INBORN ERRORS of METABOLISM, Part 1 (ufl.edu) • Digestive System: PowerPoint Presentation (uc.edu)	
This course can be opted as an elective by the students of following subjects: NA	
Suggested equivalent online courses (MOOCs) for credit transfer: NA	

PROGRAMME: M.Sc	YEAR: 2023	SEMESTER: 1th
PROGRAMME : FOOD AND NUTRITION		PROGRAMME : 1117
COURSE CODE :MFN.103	COURSE TITLE:ADVANCES IN FOOD MICROBIOLOGY	

COURSE OBJECTIVES: This course will enable the students to:

- Gain deeper knowledge of role of microorganisms in human and environment
- Understand the importance of microorganisms in food spoilage and to learn advanced techniques used in food preservation.
- Understand the latest procedures adopted in various food operations to prevent food bored disorders and legal aspects involved in these areas.
- To discuss the microbial diversity and culture
- To discuss the methods in microbiology
- To discuss the nutritional microbiology and chemotherapy
- To discuss the role of microbes in agriculture and environment

COURSE OUTCOMES:

- CO 1: Able to understanding of history and scope of microbes
- CO 2:Abe to understand the microbial diversity and its growth
- CO 3: Able to learn the methods of microbial culture and techniques
- CO 4: know the role of microbes in agriculture
- CO 5: Also able to discuss the environmental microbiology and its toxicity

CREDITS: 4	**TYPE OF COURSE: CORE**
MAXIMUM MARKS :100	**MINIMUM MARKS : 36**

BLOCK-I: Introduction of Microorganisms	
UNIT-I	**Introduction to Historical Developments:** historical developments in food preservation, infections and legislation.
Unit-II	**Microorganisms of Importance in Food:** their primary sources in foods morphology cultural characteristics and biochemical activities.
Unit-III	**Factors Affecting the Growth of Microorganisms in Food:**intrinsic and extrinsic parameters that affect microbial growth.
BLOCK-2 : Methods of Isolation and Detection of Microorganisms,Food Preservation	
Unit-IV	**Methods of Isolation and Detection of Microorganisms or their Products in Food:** Conventional methods Rapid methods (newer techniques) Immunological methods: Fluorescent, Antibody, Radio immunoassay, ELISA etc. Chemical methods: Thermo stable nuclear, ATP measurement and PCR (Polymers chain reactions) only principles in brief.
Unit-V	**Spoilage of Different Groups of Foods:** serial and serial products vegetables and fruits meet and meet products eggs and poultry fish and

	other sea foods milk and Milk products
Unit-VI	**Food Preservation :**physical methods Drying freeze drying, cold storage, heat treatments, Irradiation, high pressure processing. Chemical preservatives and natural antimicrobial compounds. Biologically based preservation systems and probiotic bacteria.
BLOCK-3: Food Borne Diseases, Indicators of Food Safety, HACCPSystem and Role of Microbes:	
Unit-VII	**Food Borne Diseases:** Bacterial and viral food borne disorders, food borne important animal parasites, Mycotoxins.
Unit-VIII	**Indicators of Food Safety and Quality:**Microbiological criteria of foods and their significance.
Unit-IX	**The HACCP System and Food Safety Used in Controlling Microbiological Hazards**
Unit-X	**Role of Microbes in Fermented Foods and Genetically Modified Foods.**

Suggested Text Book Readings:

- Prescott' microbiology, eighth edition by By Joanne Willey and Kathleen Sandman and Dorothy Wood.
- A textbook of Microbiology, R.C. Dubey and D.K. Maheshwari,, S Chand & Company P Ltd, New Delhi
- Text book of microbiology by Ananthanarayan and paniker's, Seventh edition, Orient longman private limited.
- Foundations in Microbiology, By Kathleen Park Talaro and Barry Chess, 10 edition
- Microbiology: An Introduction, 13th Edition by Gerard J. Tortora, Berdell R. Funke and Christine L. Case.

Suggested online links:

- Microbial diversity and systematic: 1075X_CH03_025.qxd (jblearning.com
- Microbiological Laboratory Techniques: Microbiological Laboratory Techniques (mowr.gov.in)
- Antibiotics and chemotherapeutic agents: Micro 260 Antibiotic agents and Modes of Action.pdf (spokane.edu)
- Environmental Toxicology: Environmental Toxicology 3rd edition.pdf (unp.ac.id)
- Introduction to environmental toxicology: Introduction to Environmental Toxicology: Molecular Substructures to Ecological Landscapes (routledge.com)

This course can be opted as an elective by the students of following subjects: NA

Suggested equivalent online courses (MOOCs) for credit transfer: NA

PROGRAMME: M.Sc	YEAR: 2023	SEMESTER: 1st
PROGRAMME : FOOD AND NUTRITION PROGRAMME : 1117		
COURSE CODE :MFNBR-01	**COURSE TITLE:BASICS IN RESEARCH**	

COURSE OBJECTIVES:

- ❖ To discuss the Sources of information
- ❖ To discuss about journal abbreviations
- ❖ To discuss the monographs, dictionaries, text books etc.

COURSE OUTCOMES:

- ❖ CO 1: Able to learn about how to get information of research.
- ❖ CO 2: Learn about journal and article and research manuals
- ❖ CO 3: Able to know the role of primary, secondary and tertiary sources of information.
- ❖ CO 4: Gain knowledge about abstract and citation index.
- ❖ CO 5: Also know about digital web resources

CREDITS: 4	**TYPE OF COURSE: Core**
MAXIMUM MARKS :100	**MINIMUM MARKS : 36**

Topic 1	**Literature Survey Introductions:** Sources of information, need for reviewing literature, primary-secondary and tertiary sources, journals, journal abbreviations, abstracts, current titles, reviews, monographs, dictionaries, text books, current contents, patents. Introduction to chemical abstracts and beilstein, subject index, substance index, author index, formula index and other indices with examples. Digital: Web resources, E-journals, journal access, TOC alerts. Hot articles: Citation index, UGC infonet, E-books, Impact Factors, Search engines- Google scholar, chemical industry, Wiki-databases, chemSpider, Science Direct, SciFinder, Scopus
Topic 2	**Ethics and IPR** Regulatory bodies, practices and compliances, Good Laboratory Practices (GLP), Research Ethics & Misconduct, Patents, Copyrights, GI and Trademarks, Product and process patent, Patent Treaties and Convention, process of filing patent, database of patent, search and retrieval.
	Suggested Text Book Readings: **1.** Use different searching engine to get relevant information (Google scholar, chemical industry, Wiki-databases, chemSpider, Science Direct, SciFinder, Scopus. **2.** 2. Access to different online research library and research portal (Web resources, Ejournals, journal access, TOC alerts) **Suggested online link:** 1. You tube 2. Web resources 3. Hot articles 4. Science Direct

	5. SciFinder, Scopus Google scholar
This course can be opted as an elective by the students of following subjects: NA Suggested equivalent online courses (MOOCs) for credit transfer: **1. Research Ethics, Shri. Manoj Kumar K, INFLIBNET, https://onlinecourses.swayam2.ac.in/cec22_ge28/preview**	
Note:- In this paper student did their own search and study themselves and prepare report in two (02) copies and submit to the examination department and School of Science respectively for evaluation.	

SECOND SEMESTER

PROGRAMME: M.Sc	YEAR: 2023	SEMESTER: 2nd
PROGRAMME :FOOD AND NUTRITION		PROGRAMME : 1117
COURSE CODE:MFN.105	COURSE TITLE:FOOD SCIENCE AND EXPERIMENTAL COOKERY	

COURSE OBJECTIVES: This course is designed to:

- ❖ Provide an understanding of composition of various food stuffs
- ❖ Familiarize students with the changes occurring in various food stuffs as a result of processing and cooking
- ❖ Enable students to use the theoretical knowledge in various applications and food preparations

COURSE OUTCOMES:

- ❖ CO1: Learners will be able to understand the chemical reactions and physical changes which occur during the production and processing storage and handling of foods and their applications.
- ❖ CO2: Learners will be able to provide an understanding of composition of various foodstuffs.
- ❖ CO3: Learners will be able to familiarize students with changes occurring in various food stuff as a result of processing and cooking.

CREDITS: 4	**TYPE OF COURSE: Core**
MAXIMUM MARKS :100	**MINIMUM MARKS : 36**

BLOCK-I: Introduction to Food Science and Food Dispersions

Unit-I	**Introduction to Food Science:** evolution of the food industry and allied industries development of Food Science as a discipline as a discipline.
Unit-II	**Constituents of Foods:** properties and significance.
Unit-III	**Water and Food Dispersions:** physical properties of water and ice, chemical nature, structure of water molecule. • Sorption phenomena type of water, solutions and colligative properties. • Free and bound water • Water activity and food spoilage • Freezing and ice structure

	• Colloidal salts, stabilization of colloidal systems, rheology of food dispersions • Gels: structure formation strength types and permanence. • Emulsions: formation stability surfactants and emulsifiers. • Foams: structure,formation, stabilization.
BLOCK-2:Polysaccharides, Sugars and Sweeteners, Cereal and Oil Products	
Unit-IV	**Polysaccharides, Sugars and Sweeteners:** • Starch: structure, gelatinization characteristics of some food starches. • Non starch polysaccharides: cellulose hemicellulose, pectins , gums, animal polysaccharides. • Sugars and sweeteners: sugars,syrups, sugar products. • Sweetener chemistry related to uses in food products: fermentation non- enzymatic browning.
Unit-V	**Cereals and Cereal Products:** • Cereal grains: structure and composition • Cereal products • Flour quality and flour quality • Extruded foods,breakfast cereals, wheat germ, Puffed and flaked cereals.
Unit-VI	**Fats, Oils and Related Products:** Sources composition,effects of composition on fat properties and uses in food preparation.**Fat substitutes:** fat deterioration and antioxidants.
BLOCK-3:Proteins, Enzymes, and Milk Products	
Unit-VII	**Proteins:** classification, composition, denaturation, non enzymatic Browning.
Unit-VIII	**Enzymes:** Nature of enzymes stability and action. photolytic enzyme oxidises, lipases, immobilized enzymes.
Unit-IX	**Milk and Milk Products:** composition, Physical and functional properties, denaturation, and effects of processing and storage. Dairy products: cultured milk, yoghurt, butter, cheese, concentrated and dried products frozen desserts.
BLOCK-4 : Meat, Eggs and poultry, Sea Foods	
Unit-X	**Meat, Eggs and poultry:** muscle composition, characteristics and structure. Post-mortem changes. Processing, preservation and their effects. Heat induced changes in meat. Tenderizers. Meat products. **Eggs:** structure and composition changes during storage functional properties of eggs, used in cookery korma egg processing
Unit-XI	**Fish and Sea Foods:** types and composition, Fish storage and changes during storage.
Unit-XII	**Pulses and Legumes:** structure, composition, processing.
BLOCK-5 : Nuts and Oilseeds, Fruits and Vegetables and Spices and Condiments:	
Unit-XIII	**Nuts and Oilseeds:** composition extraction and by products.

Unit-XIV	**Fruits and Vegetables:** structural features and activities of living system. Enzymes in fruits and vegetable full stop flavor constituents Police Stop plant phenolics. Pigments postharvest changes. Effects of storage processing and preservation.
Unit-XV	**Spices and Condiments:** composition flavoring extracts- natural and synthetic.

Suggested Book readings:

- Swaminathan Research Foundation. Swaminathan, M. (1998). The First five Years. Sage Publications.
- Sethi Mohini (2005) Institution Food Management New Age International Publishers
- Gopalan C, Rama Sastri BV, Balasubramanian SC (1989) Nutritive Value of Indian Foods. National Institute of Nutrition, ICMR, Hyderabad.
- ICMR (2020) Recommended Dietary Allowances for Indians .Published by National Institute of Nutrition, Hyderabad.
- Khanna K, Gupta S, Seth R, Mahna R, Rekhi T (2004). The Art and Science of Cooking: A Practical Manual, Revised Edition. Elite Publishing House Pvt Ltd.
- Raina U, Kashyap S, Narula V, Thomas S, Suvira, Vir S, Chopra S (2010). Basic Food Preparation: A Complete Manual, Fourth Edition. Orient Black Swan Ltd.
- Bamji MS, Krishnaswamy K, Brahmam GNV (2009). Textbook of Human Nutrition, 3rd edition. Oxford and IBH Publishing Co. Pvt. Ltd.
- Srilakshmi (2007). Food Science, 4th Edition. New Age International Ltd. • Wardlaw and Insel MG, Insel PM (2004). Perspectives in Nutrition, Sixth Edition. Mosby.

Chadha R and Mathur P (eds). Nutrition: A Lifecycle Approach. Orient Blackswan, Delhi. 2015

Suggested Online readings:

1. You tube
2. Web resources
3. Hot articles
4. Science Direct
5. SciFinder, Scopus

Google scholar

This course can be opted as an elective by the students of following subjects: NA

Suggested equivalent online courses (MOOCs) for credit transfer: NA

PROGRAMME: M.Sc	YEAR: 2023	SEMESTER: 2nd
PROGRAMME : FOOD AND NUTRITION		PROGRAMME : 1117
COURSE CODE :MFN.106	COURSE TITLE: CLINICAL AND THERAPEUTIC NUTRITION_	

COURSE OBJECTIVES: This course will enable the students to:

- ❖ Understand the etiology physiology physiologic and metabolic anomalies of acute and chronic diseases and patient needs
- ❖ Know the effect of the various disease on nutritional status and nutritional and dietary requirements
- ❖ Be able to recommended and provide appropriate nutritional care for prevention and treatment of the various diseases

COURSE OUTCOMES:

- ❖ CO1: The learners will be able to understand the etiology physiologic and metabolic anomalies of acute and chronic diseases and patient needs.
- ❖ CO2: The learners will be able to know the effect of the various diseases on nutritional status and rational and dietary requirements.
- ❖ CO3: The learners will be able to recommend and provide appropriate nutritional care for prevention and treatment of the various diseases.

CREDITS: 4	**TYPE OF COURSE: Core**
MAXIMUM MARKS :100	**MINIMUM MARKS : 36**

BLOCK-I S**creening and assessment of nutritional status and Diet, nutrient, and drug interaction**	
Unit-I	**Nutritional screening and assessment of nutritional status of hospitalized and outdoor patients:** Identification of high risk patient, assessment of patient needs based on interpretation of patient data- Clinical, biochemical, biophysical, personal, etc.
Unit-II	**New trends in delivery**: Nutritional care and dietary counseling.
Unit-III	**Diet, nutrient, and drug interaction:** Effect of drugs on ingestion, station, absorption and metabolism of nutrients. Effect of food, nutrients and nutritional status on drug dose and efficacy.
BLOCK-1I **Nutritional support, Patho physiology and Childhood problems**	
Unit-IV	**Nutritional support:** Recent advances in techniques and feeding substrates.
Unit-V	**Patho physiology, metabolic and clinical aberrations, Complication, preventions and recent advances in medical nutritional management of:** Weight imbalances, cardiovascular disorders, Diabetes mellitus and other metabolic disorders, GI tract disorders, liver and gallbladder, pancreatic disorders, renal disorders, stress and trauma cancer, neurological disorders, musculoskeletal disorders, immune deficiency disorder, genetic disorders, infections and AIDS, respiratory problems.

Unit-VI	**Childhood problems/ disorders:** Including inborn errors of metabolism and their nutritional management.

- **Suggested book readings:** Swaminathan Research Foundation. Swaminathan, M. (1998). The First five Years. Sage Publications.
- Sethi Mohini (2005) Institution Food Management New Age International Publishers
- Gopalan C, Rama Sastri BV, Balasubramanian SC (1989) Nutritive Value of Indian Foods. National Institute of Nutrition, ICMR, Hyderabad.
- ICMR (2020) Recommended Dietary Allowances for Indians .Published by National Institute of Nutrition, Hyderabad.
- Khanna K, Gupta S, Seth R, Mahna R, Rekhi T (2004). The Art and Science of Cooking: A Practical Manual, Revised Edition. Elite Publishing House Pvt Ltd.
- Raina U, Kashyap S, Narula V, Thomas S, Suvira, Vir S, Chopra S (2010). Basic Food Preparation: A Complete Manual, Fourth Edition. Orient Black Swan Ltd.
- Bamji MS, Krishnaswamy K, Brahmam GNV (2009). Textbook of Human Nutrition, 3rd edition. Oxford and IBH Publishing Co. Pvt. Ltd.
- Srilakshmi (2007). Food Science, 4th Edition. New Age International Ltd. • Wardlaw and Insel MG, Insel PM (2004). Perspectives in Nutrition, Sixth Edition. Mosby.

Chadha R and Mathur P (eds). Nutrition: A Lifecycle Approach. Orient Blackswan, Delhi. 2015

Suggested online readings:

1. You tube
2. Web resources
3. Hot articles
4. Science Direct
5. SciFinder, Scopus

Google scholar

This course can be opted as an elective by the students of following subjects: NA

Suggested equivalent online courses (MOOCs) for credit transfer: NA

PROGRAMME: M.Sc	YEAR: 2023	SEMESTER: 2nd
PROGRAMME :FOOD AND NUTRITION PROGRAMME : 1117		
COURSE CODE :MFN-107	**COURSE TITLE:BIO STATISTICS**	

COURSE OBJECTIVES:

- To discuss the history and scope of bio-statistics
- To discuss the different statistical techniques used in biochemistry
- To discuss the bio chemical data analysis using statistical methods
- To discuss the research methodology and hypothesis

COURSE OUTCOMES:

- CO 1: Able to understanding of history and scope of bio-statistics
- CO 2: Able to know the role of mode, median and mode in data analysis.
- CO 3: To learn about sampling and sampling analysis
- CO 4: Able to know the process of analysis of variance
- CO 5: also able to hypothesis analysis and implementation

CREDITS: 4	**TYPE OF COURSE: Core**
MAXIMUM MARKS :100	**MINIMUM MARKS : 36**

BLOCK-1: Meaning and Types of Research, Measures of Relationship	
Unit I	Meaning and Types of Research, Significance of Research, About Research Problem and its Selection, Measures of Central Tendency, Measures of Dispersion, Measures of Asymmetry.
Unit II	Measures of Relationship, Regression Analysis Association of Attributes, 3-Sigma Limits. About Sampling, Different Types of Sampling Designs, Simple Random Sampling, Stratified Sampling, Cluster Sampling.
Block 2 Vitamins, Minerals and Physiology	
Unit III	Basic Concepts of Probability, Definitions of Probability, Additive and Multiplicative law of Probability, Conditional Probability, Bayes' Theorem. Random Variable and its types, Probability Mass Function, Probability Density Functions
Unit IV	Source of Vital Statistics and Demographic Data, Rates, ratio, proportion, Measures of Fertility, measures of mortality, measures of morbidity, Migration. Probability Distributions, Binomial Distribution, Poisson distribution, Geometric Distribution, Normal Distribution, Exponential Distribution
Block 3 Digestive system and Respiration	
Unit V	About Hypothesis and its Types, Level of Significance, Critical Region, P Value, Types of errors, Chi-Square Tests, t-tests, z-tests.

Unit VI	Respiration: Analysis of Variance and Co-Variance, Basic Principles of ANOVA and ANCOVA. (One Way, Two Way and Three Way Analysis)
Suggested Text Book Readings: 1. Introduction to Statistics, David Lane, Rice University 2. Basic Statistics, B.L. Agrawal, New Age International Private Limited 3. Basic Statistics, Thomas Higher Education Textbooks 4. Computer Fundamentals : Concepts, Systems & Application, Priti Sinha, Pradeep K., Sinha , BPB Publications	
Suggested online links: 1. Introduction to Descriptive Statistics: introduction-to-descriptive-statistics.pdf 2. Descriptive Statistics: Slide 1 (incois.gov.in) 3. Basic Probability Theory: 46628-0 Ash 1 (illinois.edu)	
This course can be opted as an elective by the students of following subjects: NA	
Suggested equivalent online courses (MOOCs) for credit transfer: 1. Introduction to Biostatistics: Introduction to Biostatistics - Course (nptel.ac.in)	

PROGRAMME: M. Sc	YEAR: 2023	SEMESTER: 2nd
PROGRAMME : FOOD AND NUTRITION		PROGRAMME : 1117
COURSE CODE : MFNMP-02	COURSE TITLE: MINI PROJECT	

COURSE OBJECTIVES:

- To discuss to project
- To discuss how to select the topic of project
- To know how writing the projects
- To discuss about needs of information for project

COURSE OUTCOMES:

- CO 1: Able to learn about how to get information of project.
- CO 2: Learn about journal and article and research manuals
- CO 3: Able to know the role of primary, secondary and tertiary sources of project work.
- CO 4: Also know how to use digital web resources for project work
- CO 5: learn about writing of project

CREDITS: 4	**TYPE OF COURSE: Core**
MAXIMUM MARKS :100	**MINIMUM MARKS : 36**

Topic	Students prepare their report on selected topic of their own choice by them self (without any, Supervisor) and submit it to the University Examination Department/ School of Science of the University for evaluation.

Suggested Text Book Readings:

1.Use different searching engine to get relevant information (Google scholar, chemical industry, Wiki-databases, chem Spider, Science Direct, SciFinder, Scopus.

2. Access to different online research library and research portal (Web resources, E-journals, journal access, TOC alerts)

Suggested online link:

1. You tube
2. Web resources
3. Hot articles
4. Science Direct
5. SciFinder, Scopus

Google scholar

This course can be opted as an elective by the students of following subjects: NA

Suggested equivalent online courses (MOOCs) for credit transfer: NA

THIRD SEMESTER

PROGRAMME: M.Sc	YEAR: 2023	SEMESTER: 3rd
PROGRAMME: FOOD AND NUTRITION PROGRAMME: 1117		
COURSE CODE:MFN -109	COURSE TITLE: ADVANCED COMMUNITY NUTRITION	
COURSE OBJECTIVES: This course will enable students to- ❖ Develop a Holistic knowledge base and understanding of the nature of important nutrition programs ❖ Problems and their prevention and control for the disadvantage and upper social economic status in society ❖ Understand the cause determinants and consequences of Nutrition problems in society		
COURSE OUTCOMES: ❖ CO1: Learners will be able to understand the factors that determine the availability and consumption of food. ❖ CO2: Learners will be able to be familiar with the common nutritional problems of the community their causes symptoms treatment and prevention. ❖ CO3: Learners will be able to get exposed to the schemes programs and policies of government of India to combat malnutrition.		
CREDITS: 4		**TYPE OF COURSE: Core**
MAXIMUM MARKS :100		**MINIMUM MARKS: 36**
BLOCK-I Concept and scope of community nutrition, **Food availability, and Nutritional problems**		
Unit-I	Concept and scope of community nutrition.	
Unit-II	**Food availability and factors affecting food availability and its consumption:**Agriculture production, postharvest handling, marketing and distribution, population economic, regional, socio-cultural industrialization.	
Unit-III	**Nutritional problems of the community and implications for public health:** common problems in India, causes (nutritional and non- nutritional) incidence of nutritional problems, sign and symptoms treatment, PEM, Micronutrient deficiencies(vitamin A iron Iodine),	
BLOCK-II Nutrition policy, Hazards to Community Health and nutritional status:		
Unit-IV	**Schemes and programmes to combat nutritional problems in India:** prophylaxis programs, midday meal programme ICDS.	
Unit-V	**Hazards to Community Health and nutritional status**: adulteration in food pollution of water, industrial offence sewage pesticide Residue in food	
Unit-VI	**Nutrition policy:**Nutrition policy in India and plan of action	
BLOCK-III Nutritional Assessment and Surveillance, Current methodologies of assessment of nutritional status		

Unit-VII	**Nutritional Assessment:** As a tool for improving the quality of life of various segments of the population including hospitalized patients.
Unit-VIII	**Current methodologies of assessment of nutritional status:** Their interpretation and comparative applications of the following. - Food consumption - Anthropometry - Clinical and laboratory - Rapid Assessment & PRA - Functional indicators such as grip strength, respiratory fitness, Harvard Step test, Squatting test.
Unit-IX	**Nutritional Surveillance:** Basic concepts, uses and setting up of surveillance systems, Monitoring and Evaluation

Suggested Text Book Readings:

- Swaminathan Research Foundation. Swaminathan, M. (1998). The First five Years. Sage Publications.
- Sethi Mohini (2005) Institution Food Management New Age International Publishers
- Gopalan C, Rama Sastri BV, Balasubramanian SC (1989) Nutritive Value of Indian Foods. National Institute of Nutrition, ICMR, Hyderabad.
- ICMR (2020) Recommended Dietary Allowances for Indians .Published by National Institute of Nutrition, Hyderabad.
- Khanna K, Gupta S, Seth R, Mahna R, Rekhi T (2004). The Art and Science of Cooking: A Practical Manual, Revised Edition. Elite Publishing House Pvt Ltd.
- Raina U, Kashyap S, Narula V, Thomas S, Suvira, Vir S, Chopra S (2010). Basic Food Preparation: A Complete Manual, Fourth Edition. Orient Black Swan Ltd.
- Bamji MS, Krishnaswamy K, Brahmam GNV (2009). Textbook of Human Nutrition, 3rd edition. Oxford and IBH Publishing Co. Pvt. Ltd.
- Srilakshmi (2007). Food Science, 4th Edition. New Age International Ltd. • Wardlaw and Insel MG, Insel PM (2004). Perspectives in Nutrition, Sixth Edition. Mosby.

Chadha R and Mathur P (eds). Nutrition: A Lifecycle Approach. Orient Blackswan, Delhi. 2015

Suggested online link:

1. You tube
2. Web resources
3. Hot articles
4. Science Direct
5. SciFinder, Scopus

Google scholar

This course can be opted as an elective by the students of following subjects: NA

Suggested equivalent online courses (MOOCs) for credit transfer: NA

PROGRAMME: M.Sc	**YEAR: 2023**	**SEMESTER: 2nd**
PROGRAMME : FOOD AND NUTRITION PROGRAMME : 1117		
COURSE CODE :MFN -110	**COURSE TITLE:ADVANCED NUTRITION**	
COURSE OBJECTIVES: This course is designed to: ❖ Provide in-depth knowledge of the physiological and metabolic role of various nutrients and their interactions in human nutrition. ❖ Enable students to understand the basis of Human nutritional requirements and recommendations through the life cycle. ❖ Enable students to understand the Pharmacological actions of nutrients and their implications. ❖ Familiarize students with the recent advances in nutrition.		
COURSE OUTCOMES:		
CREDITS: 4		**TYPE OF COURSE: Core**
MAXIMUM MARKS :100		**MINIMUM MARKS : 36**
BLOCK-IEnergy, Carbohydrates, Proteins		
Unit-I	**Energy:** Energy content of foods, physiological fuel value- review. Measurement of energy expenditure: BMR, thermal effect of feeding and physical activity methods of measurement. Estimating energy requirements of individuals and groups. Regulation of energy metabolism: of food intake, intake, and digestion, absorption and body weight.	
Unit-II	**Carbohydrates:** Types classification, digestion and transport- review, dietary fiber, oligosaccharides, resistant starch- chemical composition and physiological effects glycemic index of foods. Sweetness: nutritive and non nutritive.	
Unit-III	**Proteins:** Classification of digestion and absorption and transportation-review, metabolism of proteins: role of muscle, liver and gastrointestinal tract, protein quality, methods of evaluating protein quality. Protein and amino acid requirements. Therapeutic applications of specific amino: branched Chain and glutamine,Arginine,homosystine,cystine, taurine.	
BLOCK-IILipids, Water and Minerals		
Unit-IV	**Lipids:** Classification, digestion absorption, transport- review full stop functions of e f a. rule of n-3, n-6, fatty acids in health and diseases. Requirements of total fat and fatty acid. Tran's fatty acids. Prostaglandins.	
Unit-V	**Water:** Regulation of intra and extracellular volume. Osmolality, water balance and its regulation.	
Unit-VI	**Minerals:** Each nutrient sources, bioavailability, metabolism, function requirements, RDA, and talk toxicity, micro minerals: calcium, Phosphorus, magnesium, Sodium and potassium and chloridemicro minerals: iron, copper, zinc, magnesium iodine chloride. trace minerals: Selenium, Cobalt chromium, vanadium, Silicon, Boron	

BLOCK-IIIVitamins, Non nutritive food components and Nutrition management	
Unit-VII	**Vitamins:** Historical background structure, food sources, absorption and transport, metabolism, biochemical function assessment of status for list of interaction with other nutrients, physiological and therapeutic effects, toxicity and deficiency with respect to the followings: fat soluble vitamins-A,D,E,K., water soluble vitamins: I mean, riboflavin,,, pyridoxine, Folic acid, pantothenic acid, ascorbic acid cyanocobalamin , inositol.
Unit-VIII	**Non nutritive food components with potential health effects:** Polyphenols containing, 5, phytoestrogens, SY no Jenner compounds, lectins and saponins, Nutritional regulation of gene expression.
Unit-IX	**Nutrition management in special condition**: Space travel, high altitude low temperatures, submarines.

Suggested Text Book Readings:

- Swaminathan Research Foundation. Swaminathan, M. (1998). The First five Years. Sage Publications.
- Sethi Mohini (2005) Institution Food Management New Age International Publishers
- Gopalan C, Rama Sastri BV, Balasubramanian SC (1989) Nutritive Value of Indian Foods. National Institute of Nutrition, ICMR, Hyderabad.
- ICMR (2020) Recommended Dietary Allowances for Indians .Published by National Institute of Nutrition, Hyderabad.
- Khanna K, Gupta S, Seth R, Mahna R, Rekhi T (2004). The Art and Science of Cooking: A Practical Manual, Revised Edition. Elite Publishing House Pvt Ltd.
- Raina U, Kashyap S, Narula V, Thomas S, Suvira, Vir S, Chopra S (2010). Basic Food Preparation: A Complete Manual, Fourth Edition. Orient Black Swan Ltd.
- Bamji MS, Krishnaswamy K, Brahmam GNV (2009). Textbook of Human Nutrition, 3rd edition. Oxford and IBH Publishing Co. Pvt. Ltd.
- Srilakshmi (2007). Food Science, 4th Edition. New Age International Ltd. • Wardlaw and Insel MG, Insel PM (2004). Perspectives in Nutrition, Sixth Edition. Mosby.

Chadha R and Mathur P (eds). Nutrition: A Lifecycle Approach. Orient Blackswan, Delhi. 2015

Suggested online link:

1. You tube
2. Web resources
3. Hot articles
4. Science Direct
5. SciFinder, Scopus

Google scholar

This course can be opted as an elective by the students of following subjects: NA

Suggested equivalent online courses (MOOCs) for credit transfer: NA

PROGRAMME: M.Sc	**YEAR: 2023**	**SEMESTER:3rd**
PROGRAMME : FOOD AND NUTRITION		**PROGRAMME : 1117**
COURSE CODE :MFN -111	**COURSE TITLE:INTERNSHIP**	
COURSE OBJECTIVES: This program is designed with the following objectives- ❖ To enable the students to acquire an in-dept understanding of the practical aspect of knowledge and skills acquired during the course work in the relevant subject ❖ To gain hands on experience of higher proficiency in the year selected area of expertise ❖ To help the students to develop and have their analytical abilities for situation analysis and bringing about improvements.		
COURSE OUTCOMES:		
CREDITS: 4		**TYPE OF COURSE: Core**
MAXIMUM MARKS :100		**MINIMUM MARKS : 36**
BLOCK-1	The student will be required to undergo and internship/field placement for a total duration of three months (03 months) in their chosen area of interest which will facilitate their pursuing a professional career in the same field.It is mandatory that the organizations/ Institutions for public private participating in the field placement program be of good professional standing.The list could include hospitals, state run NGO/ administered public nutrition programs, Food Industry etc. The students will be required to submit and present a report of the internship/ field placement project after its completion.It is also envisaged that the participating organization institution will give their performance appraisal of the student work.	
INTERNSHIP GUIDELINES UPRTOU: 01_02_2023_Guidelines_for_Internship (1).pdf		
Suggested Online Readings: 1. You tube 2. Web resources 3. Hot articles 4. Science Direct 5. SciFinder, Scopus Google scholar		

PROGRAMME: M.Sc	YEAR: 2023	SEMESTER:3rd
PROGRAMME : FOOD AND NUTRITION PROGRAMME : 1117		
COURSE CODE :MFNRT-03	COURSETITLE:RESEARCHTOOLSAND PRACTICES	

COURSE OBJECTIVES:

- To discuss the application of MS office
- To discuss different research tools for research work.
- To discuss application of software's.
- To discuss about reference management tools

COURSE OUTCOMES:

- CO 1: Able to learn about basic computer application of research work.
- CO 2: Learn about Latex tools with MS-XL
- CO 3: Able to know the role of Chem-Draw, Origin, SPSS, R-software, Octave, Matlab
- CO 4: Gain knowledge about application of Mendeley-software.
- CO 5: Also know about RefWorks and Zotero, etc

CREDITS: 4	TYPE OF COURSE: Core
MAXIMUM MARKS :100	MINIMUM MARKS : 36

Topic 1	**Application of MS Office/Latex in research** : Uses and application of MS Office/ Latex Tools with MS-XL, Power point Presentation.
Topic 2	**Application of Software's:** Uses and application of Softwares such as plagiarism software, Chem-Draw, Origin, SPSS, R-software, Octave, Matlab, Mercury, etc.
Topic 3	**Reference management tools:** Uses and application of Mendeley-software, EndNote, RefWorks and Zotero, etc.

Suggested Text Book Readings:

1. Microsoft office: Microsoft Office Essentials - IT Essentials: As Practical Guide - Subject Guides at University of York
2. How to Convert an Excel Table to a Latex table: How to Convert an Excel Table to a Latex table - YouTube
3. SPSS – What Is It: SPSS - Quick Overview & Beginners Introduction (spss-tutorials.com)
4. Video Processing in MATLAB: Video Processing in MATLAB - Video - MATLAB & Simulink (mathworks.com)
5. ChemDraw Tutorial: ChemDraw Tutorial – YouTube

Suggested Online Readings:

1. You tube
2. Web resources
3. Hot articles
4. Science Direct

5. SciFinder, Scopus Google scholar
Note:-In this paper student did their own search and study themselves and prepare report in two copies and submit to the examination department and School of Science for evaluation.

FOURTH SEMESTER

GROUP- ONE

PROGRAMME: M.Sc	**YEAR: 2023**	**SEMESTER:4th**
PROGRAMME: FOOD AND NUTRITION PROGRAMME : 1117		
COURSE CODE:MFN -113	**COURSETITLE:FOOD PROCESSING AND PRESERVATION TECHCNOLOGY**	
COURSE OBJECTIVES: This course is designed to: ❖ Import systemic knowledge of basics and applied aspects of food processing and Technology ❖ Provide the necessary knowledge of basic principles and procedures in the production of important food products. ❖ Orient the students to potential use of various by products of Food Industry.		
COURSE OUTCOMES: Learning Outcome This course will help students to- ❖ Utilize the scientific knowledge to become food processing entrepreneur. ❖ Utilize the acquired knowledge for being an expert in any Processing Unit. ❖ Assist in ascertaining quality control of a consumed food in any given situation.		
CREDITS: 4		**TYPE OF COURSE: Core**
MAXIMUM MARKS :100		**MINIMUM MARKS : 36**
BLOCK- I Introduction, Physical and Chemical Principles in Food Processing		
Unit-I	**Introduction:** Main crops grown in the country – importance and storage	
Unit-II	**Physical principles in food processing operations:** **Thermal processing** – Degree of processing of preservation. Selecting heat treatments, heat resistance of microorganisms, nature of heat transfer, protective effects of food constituents, and types of thermal treatments. **Refrigeration** – Refrigeration, cool storage and shelf life extension; cool storages with air circulation, humidity control and gas modification (i.e.CA, MA, & SA) **Dehydration** – Dehydration, water activity and food safety/quality; methods of dehydration. **Ionizing radiations** – Forms of radiant energy; ionizing radiations, sources and properties; radiation units; radiation effects. Limiting indirect effects; dose fixing factors;	
Unit-III	**Chemical principles in food processing:** Preservation/processing by sugar, salt, curing, smoke, acid and chemicals; chemical changes in foods that affect texture, flavour, colour, nutritive value and safety during handing, storage and processing; Chemical and biochemical reactions affecting food quality and safety.	
BOLCK-2 Processing technology of Cereals and Pulses and Fruits and Vegetables		

Unit-IV	**Processing technology of foods and nutritional implications for the following:** **Cereals and Pulses** Wheat grain characteristics and products; wheat milling process; milling of durum or semolina; macaroni or pasta products, noodles, wheat starch and gluten fractionation, baking technology, production of bread, biscuits and cakes. Barley malting; dry milling and air classification; wet fractionation of barley, pearling. Storage and quality of cereal grains Rice processing, fractionation, quick-cooking rice, parboiled rice, rice based instant foods. Pulses – processing, elimination of toxic factors, quick-cooking dals, fermentation and germination. **Oilseeds** Oilseed pressing, solvent extraction, purification (degumming. Refining. Bleaching. Deodorization), hydrogenation, plasticising and tempering, products – butter, margarine, shortening, mayonnaise and salad dressing, inter-etherification and production of MCT.
Unit-V	**Fruits and Vegetables** Structure, composition, physiological and biochemical changes during ripening. Handling and storage. Potato processing – Raw material handling and storage. Raw material quality and suitability for chips, French fries, dehydrated granules and boiled/canned potatoes; processing for chips. Fruit-based beverages and concentrates, squashes, jams, jellies, ketchup's sauces, high sugar, high acid products.
Unit-VI	**Milk and Milk Products.** Milk processing – Classification, separation and standardization, pasteurisation, off-flavour removal, homogenisation, packaging; UH sterile milk. Milk products – Fortified milk, skim milk, concentrate milks, cream, butter,cheese, cultured milk products, dehydrated milk products, ice creams. Indigenous milk products: khoa, channa, paneer, curd, yoghurt, ghee, kulfi.
BOLCK-2 Technology	**Meat, Fish and Eggs, Additives and preservatives and Fermentation**
Unit-VII	**Meat, Fish and Eggs** Chemistry of processed meats, Ageing and tenderising, curing, smoking and freezing of meat fresh storage of meat.Fish preservation and processing. Dehydrated egg powder and frozen egg, egg storage,Sources of bone meal, gelatine, casing, plasma and blood, curing.
Unit-VIII	**Additives and preservatives** Definition of food additives; acids, buffer systems and salts, chelating agents, antimicrobial agents, sweeteners, stabilizers and thickeners, fat replacers, firming texturizers, appearance control and clarifying agents.

	Flavour enhancers, aroma substances, sugar substitutes, sweeteners, antioxidants, Anti caking agents, bleaching agents, protective gases.
BOLCK-3 Spices and Fermentation Technology:	
Unit-IX	**Spices:** Processing and extraction of essential oils and colours, stability, storage, Preservation.
Unit-X	**Fermentation Technology** Fermentation technology, yeast, milk products, fermented vegetables, beer, vinegar. Fermented soy products. Enrichment and fortification technology, high protein food technology.

Suggested Book Readings:

- Swaminathan Research Foundation. Swaminathan, M. (1998). The First five Years. Sage Publications.
- Sethi Mohini (2005) Institution Food Management New Age International Publishers
- Gopalan C, Rama Sastri BV, Balasubramanian SC (1989) Nutritive Value of Indian Foods. National Institute of Nutrition, ICMR, Hyderabad.
- ICMR (2020) Recommended Dietary Allowances for Indians .Published by National Institute of Nutrition, Hyderabad.
- Khanna K, Gupta S, Seth R, Mahna R, Rekhi T (2004). The Art and Science of Cooking: A Practical Manual, Revised Edition. Elite Publishing House Pvt Ltd.
- Raina U, Kashyap S, Narula V, Thomas S, Suvira, Vir S, Chopra S (2010). Basic Food Preparation: A Complete Manual, Fourth Edition. Orient Black Swan Ltd.
- Bamji MS, Krishnaswamy K, Brahmam GNV (2009). Textbook of Human Nutrition, 3rd edition. Oxford and IBH Publishing Co. Pvt. Ltd.
- Srilakshmi (2007). Food Science, 4th Edition. New Age International Ltd. • Wardlaw and Insel MG, Insel PM (2004). Perspectives in Nutrition, Sixth Edition. Mosby.
- Chadha R and Mathur P (eds). Nutrition: A Lifecycle Approach. Orient Blackswan, Delhi. 2015

Suggested Online Readings:

1. You tube
2. Web resources
3. Hot articles
4. Science Direct
5. SciFinder, Scopus

Google scholar

This course can be opted as an elective by the students of following subjects: NA

Suggested equivalent online courses (MOOCs) for credit transfer: NA

PROGRAMME: M.Sc	YEAR: 2023	SEMESTER: 4th
PROGRAMME : FOOD AND NUTRITION PROGRAMME : 1117		
COURSE CODE:MFN -114	**COURSE TITLE: NUTRITIONAL MANAGEMENT IN HEALTH AND DISEASES**	

COURSE OBJECTIVES: This course will enable the students to-

- Understand the concept of an adequate diet importance of meal planning.
- Know the factors affecting the nutrient needs during the life cycle and the RDA for various age groups.
- Gain knowledge about dietary management in common ailments.

COURSE OUTCOMES:

- CO1: Learners will be understood the concept of an adequate diet and the importance of meal planning.
- CO2: Learners will be able to know the factors affecting the nutrient needs during the life cycle and the RDA of various age groups.
- CO3: Learners will be able to gain knowledge about dietary management in common problems.

CREDITS: 4	TYPE OF COURSE: Core
MAXIMUM MARKS :100	**MINIMUM MARKS: 36**

BLOCK-I Health and nutrition, Energy requirements and meal planning:	
Unit-I	**Definition of Health and nutrition:** dimensions of health(physical and psychological,emotional and spiritual).
Unit-II	**Energy requirements:** factors affecting energy requirements: BMR activity, age, climate,diet- induced thermos Genesis(SDA), physiological conditions.
Unit-III	**Concept of nutritionally adequate diet and meal planning**: 1.Importance of meal planning 2.Factors affecting meal planning- social cultural and religious Geography economy availability of time and material resources, religious, Geography, economic, availability of time and material resources.
BLOCK-II Nutrition through life cycle, Principles of diet therapy and Nutritional management:	
Unit-IV	**Nutrition through life cycle:** Adulthood pregnancy, lactation, infancy, preschool, adolescence, old age.
Unit-V	**Principles of diet therapy:** Modification of normal diet for therapeutic purposes, full diet, soft diet,fluid diet,bland diet.
Unit-VI	**Nutritional management in common ailments:** Requirement and diet planning, constipation, fevers- weight management.
BLOCK-III Dieticians, Medical History Assessment and Dietary diagnosis and tests for nutritional status:	

Unit-VII	**Dieticians: A**s part of the medical team and outreach services.
Unit-VIII	**Medical history assessment:** Techniques of obtaining relevant information for patient profiles.
Unit-IX	**Dietary diagnosis and tests for nutritional status:**Correlating clinical and dietary information.
BLOCK-IV: Assessment of Patient Needs:	
Unit-X	**Assessment of Patient Needs:** rapport, counselling relationship, resources and aids to counselling.
Unit-XI	Aesthetic attributes of diets, Follow up visits and patients' education.

Suggested Text Book Readings:

- Swaminathan Research Foundation. Swaminathan, M. (1998). The First five Years. Sage Publications.
- Sethi Mohini (2005) Institution Food Management New Age International Publishers
- Gopalan C, Rama Sastri BV, Balasubramanian SC (1989) Nutritive Value of Indian Foods. National Institute of Nutrition, ICMR, Hyderabad.
- ICMR (2020) Recommended Dietary Allowances for Indians .Published by National Institute of Nutrition, Hyderabad.
- Khanna K, Gupta S, Seth R, Mahna R, Rekhi T (2004). The Art and Science of Cooking: A Practical Manual, Revised Edition. Elite Publishing House Pvt Ltd.
- Raina U, Kashyap S, Narula V, Thomas S, Suvira, Vir S, Chopra S (2010). Basic Food Preparation: A Complete Manual, Fourth Edition. Orient Black Swan Ltd.
- Bamji MS, Krishnaswamy K, Brahmam GNV (2009). Textbook of Human Nutrition, 3rd edition. Oxford and IBH Publishing Co. Pvt. Ltd.
- Srilakshmi (2007). Food Science, 4th Edition. New Age International Ltd. • Wardlaw and Insel MG, Insel PM (2004). Perspectives in Nutrition, Sixth Edition. Mosby.

Chadha R and Mathur P (eds). Nutrition: A Lifecycle Approach. Orient Blackswan, Delhi. 2015

Suggested online link:

1. You tube
2. Web resources
3. Hot articles
4. Science Direct
5. SciFinder, Scopus
   Google scholar

This course can be opted as an elective by the students of following subjects: NA

Suggested equivalent online courses (MOOCs) for credit transfer: NA

PROGRAMME: M.Sc	YEAR: 2023	SEMESTER:4th
PROGRAMME: FOOD AND NUTRITION PROGRAMME: 1117		
COURSE CODE: MFN -115	**COURSE TITLE:NUTRITION POLICIES AND INTERVENTIONS OF PROGRAMMES**	

COURSE OBJECTIVES: This course should enable the students to-

- Know the policies concerning health and communication.
- Understand the mechanism and factors related to formulation of policies for food, health, Nutrition as well as welfare and development policies.
- Be familiar with the nutritional and health problems in the country and various regions.
- Know about ongoing schemes and programs for improving nutrition and health
- Be familiar with various interventions currently in use in the country and elsewhere.

COURSE OUTCOMES:

- CO1: Learners will be able to know the policies concerning health and nutrition.
- CO2: Learners will be able to understand the mechanism and factors related to formulation of policies of food health nutrition as well as welfare and development policies.
- CO3: Learners will be able to be familiar with the nutritional and health problems in the country and various regions.
- CO4: Learners will be able to know about ongoing schemes and programmes for improving nutrition and health.

CREDITS: 4	TYPE OF COURSE: Core
MAXIMUM MARKS :100	MINIMUM MARKS : 36

BLOCK: I Global, ProgrammePlanningandDevelopment of Community	
Unit-I	**K National and regional Concerns:** Situation of vulnerable groups vis-a-vis food, nutrition and health security.
Unit-II	**ProgrammeDevelopment:**Overview of programme development models. Formative evaluation approach. Precede: proceed planning model. Sussman's four-step model of empirical curriculum development, chain model.
Unit-III	**Programme planning: P**re-requisites for planning vis-a-vis short term and long-term objectives. Planning at various levels: Government local health department, state. Voluntary sector and community- based. Approaches used in planning: Top-down approach, need-based approach. Community participation and partnership, rights-based approach. Appraisal of existing programmes and interventions**:** Merits, demerits. Lacunae-gaps vis-a-vis objectives and goals.
BLOCK: II Implementation of programmes, Current situation in India:	
Unit-IV	**Implementation of programmes:**Developing prototypes, training and HRD aspects of the programmes. Pilot and prototype studies, innovations.

Unit-V	**Scaling – up of programme:**Centralisation and decentralisation, vertical and horizontal linkages, intersectoral linkages, involvement of corporate sectors. Legal issues, financial management, Cost benefits, Cost effectiveness and Cost efficiency.
Unit-VI	**Current situation in India with regard to National and regional level rural urban:** Food availability, mortality, morbidity and illness, nutritional problems economic status, population and infrastructure available environmental sanitation women and children: situation. poverty line its significance.
BLOCK: III Need for policies and Nodal Ministries:	
Unit-VII	**Need for policies:** factors leading to current problems/ situation(cultural economic, commercial/ market forces, laws and regulations).
Unit-VIII	**Policies existing in the country:** Agriculture, food, health, nutrition, development policies which have in their perspectives and goals-improvement of Health and nutritional status. factor take when policies.
Unit-IX	**Nodal Ministries and departments at Central and state level**: responsible for formulation and implementation of policy.
BLOCK:IV Programs and Schemes, Legislations and Nutritional Plan of Action:	
Unit-X	**Programs and schemes available in various sectors with the aim of improving health and nutritional status of the population:** agriculture, food, nutrition, health, economic water environment and its relation to health.
Unit-XI	**Objectives of each programs/ scheme, focus and target groups:** Principles, /philosophy/ intervention strategies. mode of implementation, operationalization. for selection of target group and benefit through the scheme/ program. current status, success and games in focus, coverage operational hurdles and deficiencies thereof.
Unit-XII	**Legislations**: role of improve improving health and nutritional status.
Unit-XIII	**Nutritional plan of action**: State plan of action, goal to improve health and nutritional status, case studies of intervention used in other countries or within country to improve health and nutritional status.

Suggested Text Book Readings:

- Swaminathan Research Foundation. Swaminathan, M. (1998). The First five Years. Sage Publications.
- Sethi Mohini (2005) Institution Food Management New Age International Publishers
- Gopalan C, Rama Sastri BV, Balasubramanian SC (1989) Nutritive Value of Indian Foods. National Institute of Nutrition, ICMR, Hyderabad.
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- Srilakshmi (2007). Food Science, 4th Edition. New Age International Ltd. • Wardlaw and Insel MG, Insel PM (2004). Perspectives in Nutrition, Sixth Edition. Mosby.

Chadha R and Mathur P (eds). Nutrition: A Lifecycle Approach. Orient Blackswan, Delhi. 2015

Suggested online link:

1. You tube
2. Web resources
3. Hot articles
4. Science Direct
5. SciFinder, Scopus

Google scholar

This course can be opted as an elective by the students of following subjects: NA

Suggested equivalent online courses (MOOCs) for credit transfer: NA

GROUP-TWO

<table>
<tr><td colspan="2">PROGRAMME: M.Sc</td><td>YEAR: 2023</td><td>SEMESTER:4th</td></tr>
<tr><td colspan="4">PROGRAMME: FOOD AND NUTRITION PROGRAMM : 1117</td></tr>
<tr><td colspan="2">COURSE CODE: MFN -117</td><td colspan="2">COURSE TITLE: FOOD SAFETY AND QUALITY CONTROL</td></tr>
<tr><td colspan="4">COURSE OBJECTIVES: The course will enable students to-
❖ Learn the various aspects of food safety.
❖ Understand about food laws and labeling.
❖ Understand the need for consumer education.
❖ Know the importance of quality and the importance of quality assurance in food industry.
❖ Know the various tests and standards for quality assessment and food safety.
❖ Know the various tests used in detect food in adulterants.
❖ Be familiar with the fundamentals that should be considered for successful quality control program.</td></tr>
<tr><td colspan="4">COURSE OUTCOMES:Upon completion of this course, the student will be able to:
❖ Identify causes of and prevention procedures for food-borne illness, intoxication, and infection.
❖ Demonstrate good personal hygiene and safe food handling procedures; describe food storage and refrigeration techniques; explain sanitation of dishes, equipment, and kitchens including cleaning material, garbage, and refuse.
❖ Discuss Occupational Safety and Health Administration (OSHA) requirements and effective workplace safety programs in Food Service Industries.</td></tr>
<tr><td colspan="3">CREDITS: 4</td><td>TYPE OF COURSE: Core</td></tr>
<tr><td colspan="3">MAXIMUM MARKS :100</td><td>MINIMUM MARKS: 36</td></tr>
<tr><td colspan="4">BLOCK-I Introduction to quality assurance and food safety assurance and Quality Costs:</td></tr>
<tr><td>Unit-I</td><td colspan="3">Introduction to quality assurance and food safety assurance. Current concepts of quality control.</td></tr>
<tr><td>Unit-II</td><td colspan="3">Quality assurance program: Quality plan, documentation of records, product standards Product and purchase specifications, process control and HACCP, hygiene and housekeeping. Corrective action, quality and programme and total quality process.</td></tr>
<tr><td>Unit-III</td><td colspan="3">Quality Costs: Measurement and Analysis.</td></tr>
<tr><td colspan="4">BLOCK-II Product Evaluation,various tests for raw food ingredients and consumer protection:</td></tr>
<tr><td>Unit-IV</td><td colspan="3">Product Evaluation:
- Sampling for product evaluation and line control.</td></tr>
</table>

	- Statistical quality and process control - Specifications and food standards. International, National – Mandatory, Voluntary. - Sample preparation - Reporting results and reliability of analysis.
Unit-V	Tests for specific raw food ingredients and processed. Foods including additives. - Proximate Principles - Nutrient analysis - Quality parameters and tests of adulterants.
Unit-VI	Consumer protection.

Suggested Text Book Readings:

- Swaminathan Research Foundation. Swaminathan, M. (1998). The First five Years. Sage Publications.
- Sethi Mohini (2005) Institution Food Management New Age International Publishers
- Gopalan C, Rama Sastri BV, Balasubramanian SC (1989) Nutritive Value of Indian Foods. National Institute of Nutrition, ICMR, Hyderabad.
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- Bamji MS, Krishnaswamy K, Brahmam GNV (2009). Textbook of Human Nutrition, 3rd edition. Oxford and IBH Publishing Co. Pvt. Ltd.
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5. SciFinder, Scopus

Google scholar

This course can be opted as an elective by the students of following subjects: NA

Suggested equivalent online courses (MOOCs) for credit transfer: NA

PROGRAMME: M.Sc	**YEAR: 2023**	**SEMESTER: 4th**
PROGRAMME: FOOD AND NUTRITION PROGRAMME: 1117		
COURSE CODE: MFN -118	**COURSE TITLE:INSTITUTIONAL FOOD ADMINISTRATION**	

COURSE OBJECTIVES:

- To develop a knowledge base in e areas of industrial food administration.
- To provide practical field level experience in industrial food administration.
- To equip individual to start there on food service unit leading to entrepreneurship.
- To develop critical abilities and provide basic grounding in research techniques.
- To import necessary expertise to function as a food service manager.

COURSE OUTCOMES:

- CO1: The learners will be able to develop a knowledge bases space in key areas of institutional food administration.
- CO2: The learners will be able to provide practical field level experience in institutional food administration.
- CO3: The learners will be able to impart necessary expertise to function as a food service manager.
- CO4: The learners will be able to equip individual to start their own food service unit leading to entrepreneurship. The learners will be able to develop critical ability is to provide basic grounding in research techniques.

CREDITS: 4	**TYPE OF COURSE: Core**
MAXIMUM MARKS :100	**MINIMUM MARKS: 36**

BLOCK-I **Introduction to Food Service Systems, Approaches to Management and Strategies in Planning:**

Unit-I	**Introduction to Food Service Systems:** • Evolution of the food service industry • Characteristics of the various types of food service units
Unit-II	**Approaches to Management:** • Theories of management • Aspects of management • Styles of management • Management tools
Unit-III	**Strategies in Planning:** • Conceptual strategy • Marketing strategy • Financial strategy • Types of plans

BLOCK-II Management of Resources, Cost accounting:	
Unit-IV	**Management of Resources:** **Finance:** • Determining the finance needed to establish or run a unit • Budgets • Sources of finance • Planning adequate cash flow **Space and equipment:** • steps in Planning layouts • determining equipment • selection and placements • maintenance of equipment • Layout **Material:** • menu planning • planning the material needed • method of selection, storage • quantity food production • service and modes of delivery **Staff:** • manpower planning • manpower placement • record recruitment in induction training, motivation, performance. **Time and energy:** • measures for utilisation and conservation.
Unit-V	Techno economic feasibility of food production/ service Enterprise.
Unit-VI	**Cost accounting, accounting/ analysis:** food cost analysis, records to be maintained, reports and Trends analysis.
BLOCK-III Marketing and sales management and Quality assurance:	
Unit-VII	**Marketing and sales management:** marketing strategies, sales analysis, market promotion
Unit-VIII	**Quality assurance:** food quality, total quality management.
Unit-IX	Computer aided record maintenance and Management.
Suggested Text Book Readings: • Swaminathan Research Foundation. Swaminathan, M. (1998). The First five Years. Sage Publications.	

- Sethi Mohini (2005) Institution Food Management New Age International Publishers
- Gopalan C, Rama Sastri BV, Balasubramanian SC (1989) Nutritive Value of Indian Foods. National Institute of Nutrition, ICMR, Hyderabad.
- ICMR (2020) Recommended Dietary Allowances for Indians .Published by National Institute of Nutrition, Hyderabad.
- Khanna K, Gupta S, Seth R, Mahna R, Rekhi T (2004). The Art and Science of Cooking: A Practical Manual, Revised Edition. Elite Publishing House Pvt Ltd.
- Raina U, Kashyap S, Narula V, Thomas S, Suvira, Vir S, Chopra S (2010). Basic Food Preparation: A Complete Manual, Fourth Edition. Orient Black Swan Ltd.
- Bamji MS, Krishnaswamy K, Brahmam GNV (2009). Textbook of Human Nutrition, 3rd edition. Oxford and IBH Publishing Co. Pvt. Ltd.
- Srilakshmi (2007). Food Science, 4th Edition. New Age International Ltd. • Wardlaw and Insel MG, Insel PM (2004). Perspectives in Nutrition, Sixth Edition. Mosby.

Chadha R and Mathur P (eds). Nutrition: A Lifecycle Approach. Orient Blackswan, Delhi. 2015

Suggested online link:

Suggested online link:

1. You tube
2. Web resources
3. Hot articles
4. Science Direct
5. SciFinder, Scopus

Google scholar

This course can be opted as an elective by the students of following subjects: NA

Suggested equivalent online courses (MOOCs) for credit transfer: NA

PROGRAMME: M.Sc	**YEAR: 2023**	**SEMESTER: 4th**
PROGRAMME: FOOD AND NUTRITION PROGRAMME: 1117		
COURSE CODE: MFN -119	**COURSE TITLE: NUTRITION IN EMERGENCIES AND DISASTER**	
COURSE OBJECTIVES: **T**his course is designed to- ❖ Familiarize students with various natural and man- made emergencies and disasters having an impact on nutritional and health status. ❖ Understand the special nutritional concerns arising out of the situations. ❖ Understand Strategies for nutritional rehabilitation management of the health of emergency affected populations.		
COURSE OUTCOMES: ❖ CO1: Learners will be able to be family arise students with various natural and manmade emergencies and disaster having an impact on nutrition and health status. ❖ CO2: Learners will be understanding the special nutritional concerns arising out of these situations the. ❖ CO3: Learners will be able to understand strategies for nutritional rehabilitation management of the health of emergency affected populations.		
CREDITS: 4		**TYPE OF COURSE: Core**
MAXIMUM MARKS :100		**MINIMUM MARKS: 36**
BLOCK-I Disasters Resulting in Emergency Situations, Nutritional Problems and Communicable Diseases:		
Unit-I	**Natural/Manmade Disasters Resulting in Emergency Situations:** • Famine, drought, flood, earthquake, cyclone, war, civil and political emergencies. • Factors giving rise to emergency situation in these disasters. • Illustration using case studies from Indian subcontinent.	
Unit-II	**Nutritional Problems in Emergencies in Vulnerable Groups:** • Causes of malnutrition in emergency situations. • Major deficiency diseases in emergencies. • Protein – Energy Malnutrition. • Specific deficiencies	
Unit-III	**Communicable Diseases: Surveillance and Treatment:** • Control of communicable diseases and emergencies • Role of immunization and sanitation.	
BLOCK-II Assessment and Surveillance of Nutritional status and Nutritional Relief and Rehabilitation:		
Unit-IV	**Assessment and Surveillance of Nutritional Status in Emergency Affected Population:** • Scope of assessment of malnutrition in emergencies.	

	• Indicators of malnutrition. Clinical signs for screening acute malnutrition. • Anthropometric assessment of nutritional status. Indicators and cut-offs indicating seriously abnormal nutrition situation: Weight-for – height based indices, MUAC, social indicators. • Organization of nutritional surveillance and individual screening.
Unit-V	**Nutritional Relief and Rehabilitation:** • Assessment of food needs in emergency situations. • Food distribution strategy • Identifying and reaching the vulnerable group Targeting Food Aid. • Mass and Supplementary Feeding • Therapeutic Feeding • Special foods/rations for nutritional relief • Local production of special foods • Local foods in rehabilitation • Organization of mass feeding/general food distribution. • Feeding centers • Transportation and food storage • Sanitation and hygiene • Evaluation of feeding programmes. • Household food security and nutrition in emergencies
Suggested Text Book Readings: • Swaminathan Research Foundation. Swaminathan, M. (1998). The First five Years. Sage Publications. • Sethi Mohini (2005) Institution Food Management New Age International Publishers • Gopalan C, Rama Sastri BV, Balasubramanian SC (1989) Nutritive Value of Indian Foods. National Institute of Nutrition, ICMR, Hyderabad. • ICMR (2020) Recommended Dietary Allowances for Indians .Published by National Institute of Nutrition, Hyderabad. • Khanna K, Gupta S, Seth R, Mahna R, Rekhi T (2004). The Art and Science of Cooking: A Practical Manual, Revised Edition. Elite Publishing House Pvt Ltd. • Raina U, Kashyap S, Narula V, Thomas S, Suvira, Vir S, Chopra S (2010). Basic Food Preparation: A Complete Manual, Fourth Edition. Orient Black Swan Ltd. • Bamji MS, Krishnaswamy K, Brahmam GNV (2009). Textbook of Human Nutrition, 3rd edition. Oxford and IBH Publishing Co. Pvt. Ltd. • Srilakshmi (2007). Food Science, 4th Edition. New Age International Ltd. • Wardlaw and Insel MG, Insel PM (2004). Perspectives in Nutrition, Sixth Edition. Mosby. Chadha R and Mathur P (eds). Nutrition: A Lifecycle Approach. Orient Blackswan, Delhi. 2015	
Suggested online link: **Suggested online link:** 1. You tube 2. Web resources	

3. Hot articles 4. Science Direct 5. SciFinder, Scopus Google scholar
This course can be opted as an elective by the students of following subjects: NA
Suggested equivalent online courses (MOOCs) for credit transfer: NA

Practical works:

MFN-104 (P)	**Lab work based on MFN - 101,102,103**
MFN-108 (P)	**Lab work based on MFN -105,106,107**
MFN-112 (P)	**Lab work based on MFN -109,110**
MFN-116 (P)	**Lab work based on MFN - 113,114,115**
MFN-120 (P)	**Lab work based on MFN - 117,118,119**
Note: The topic of practical will be selected form relevant theory paper as per suggestion of relevant faculty members of study center.	

COMPULSORY PAPERS: MFN-121 DISSERTATION

MFN-121	DISSERTATION

Course Objective:

Project and Dissertation In second year (fourth semester) of Masters the main objective of the exposure of students' dissertation/Industrial training/ Internship is to elevate their understanding into the practical and experimental aspects of some targeted areas of food and nutrition. This course will develop their analytical ability and it will provide them an apt exposure to work in any research group and will motivate them to execute research in the area of their interest in food and nutritional sciences.

Course Outcome:

- CO-1. Students will be able to plan and strategize a scientific problem, and implement it within a reasonable time frame.
- CO-2. It is expected that after completing this project dissertation, students will learn to work independently and how to keep accurate/readable record of assigned project.
- CO-3. In addition, students will be able to know biochemical data analysis and their interpretation that will be very helpful for food and nutritional research work.
- CO-4. Also, students will be able to become as expert in field of other related fields of food and nutrition.
- CO-5. Subsequently, the students should be able to critically examine research articles, and improve their scientific writing/communication skills and power point presentation.

For project work and dissertation, the area of the work would be to be decided by the advisor/mentor.

On completion of the project work, students have to submit the work in the form of a dissertation followed by oral presentation in the presence of faculty members.

APPENDIX-II:

DISSERTATION GUIDLINE: [Guidelines for preparing Research Project is available at link:…www.uprtou.ac.in….
http://14.139.237.190/upload_pdf/01_02_2023_Guidlines_for_Project_Lit_Survey_Dissertation.pdf
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APPENDIX-III

Internship Policy: Guidelines and Procedures

(With Effect from Academic Year 2023-24)

Is available at link:

http://14.139.237.190/upload_pdf/01_02_2023_Guidlines_for_Internship.pdf……
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APPENDIX-IV

Common Guideline for Literature Review (With Effect from Academic Year 2023-24)

http://14.139.237.190/upload_pdf/01_02_2023_Common_Guidlines_forc_Literature_Review.pdf……..