



SU/BOS/Science/09

Date: 02/01/2024

To,

The Principal, All Concerned Affiliated Colleges/Institutions Shivaji University, Kolhapur	The Head/Co-ordinator/Director All Concerned Department (Science) Shivaji University, Kolhapur.
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Subject: Regarding syllabi of M.Sc. Part-II (Sem. III & IV) as per NEP-2020 (1.0) degree programme under the Faculty of Science and Technology.

Sir/Madam,

With reference to the subject mentioned above, I am directed to inform you that the university authorities have accepted and granted approval to the revised syllabi, nature of question paper and equivalence of M.Sc. Part-II (Sem. III & IV) as per NEP-2020 (1.0) degree programme under the Faculty of Science and Technology.

M.Sc.Part-II (Sem. III & IV) as per NEP-2020 (1.0)			
1.	Computer Science	7.	Biochemistry (HM)
2.	Data Science	8.	Biotechnology (HM)
3.	Information Technology (Entire)	9.	Biotechnology
4.	M.C.A.	10.	Medical Information Management
5.	Food Science & Nutrition	11.	Environmental Science
6.	Food Science & Technology	12.	

This syllabus, nature of question and equivalence shall be implemented from the academic year 2024-2025 onwards. A soft copy containing the syllabus is attached herewith and it is also available on university website www.unishivaji.ac.in NEP-2020 (Online Syllabus)

The question papers on the pre-revised syllabi of above-mentioned course will be set for the examinations to be held in October /November 2024 & March/April 2025. These chances are available for repeater students, if any.

You are, therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

Dy Registrar
Dr. S. M. Kubal

Copy to:

1	The Dean, Faculty of Science & Technology	8	P.G. Admission/Seminar Section
2	Director, Board of Examinations and Evaluation	9	Computer Centre/ Eligibility Section
3	The Chairman, Respective Board of Studies	10	Affiliation Section (U.G.) (P.G.)
4	B.Sc. Exam/ Appointment Section	11	Centre for Distance Education

SHIVAJI UNIVERSITY, KOLHAPUR



Established: 1962

A⁺⁺ Accredited by NAAC (2021) with CGPA 3.52

Structure and Syllabus in Accordance with

National Education Policy - 2020

with Multiple Entry and Multiple Exit

Master of Science (Food Science and Nutrition)

under

Faculty of Science and Technology

M.Sc. (Food Science and Nutrition) Part II

(To Be Implemented From Academic Year 2024-25)

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1. Preamble

The Master's programme of Food Science and Nutrition provides professional education for those who wish to develop a career in Food Industry, New Product Development, Clinical Nutrition, Public Health Nutrition and Research. It focuses on the interface between food science and human nutrition and area of increasing importance to educators, health departments, consumers, government and food industry. It builds on major concepts of nutritional biochemistry, nutrition and food science to discuss the roles of all nutrients, nutritional contents of food and diet in health and disease. The programme includes all the units of study to ensure the students reach competence including public health, clinical nutrition, communication, research and evaluation. Shivaji University Kolhapur, Faculty of Science and Technology is offering M.Sc. degree in Food Science and Nutrition since inception with modifications in scheme and syllabus from time to time as needed to keep abreast with largest knowledge in the field. Since the subject has grown tremendously, there is a need to specialize within the subject and train students specifically for the job market.

The proposed M.Sc. Programme under NEP scheme has a total of 88 credits consisting of MMT, MMPR, and MET.

2. Duration

M.Sc. (FSN) is a two years full time Post graduation degree programme and the curriculum is as per the provisions of NEP 2020 subject to completion of 88 credits in four semesters to earn Master's Degree in Food Science and Nutrition. There is provision of exit option after completion of first year (Semester I & II) on completion of 44 Credits to earn PG Diploma in Food Science and Nutrition subject to completion of On Job Training (OJT) of 4 credits after end of semester II i.e. during summer vacation. PG Diploma (FSN) students can re-enter the programme for completion of second year (Semester III & IV) to earn Master's Degree within a time span of five years from the date of admission to first year.

3. Eligibility for Admission

Minimum percentage is 55% or equivalent grade who have the following degrees- B.Sc. Food Technology and Management, Bachelor of Food Technology and Management, B.Sc. Food Technology, B.Sc. Food Science and Quality Control, B.Sc. Food Processing and Packaging, B.Sc. Foods and Nutrition, B.Sc. Food Science and Nutrition, B.Sc. Clinical Nutrition and Dietetics/ Nutrition and Dietetics, B.Sc. Public Health and Nutrition, B.Sc. Applied Nutrition, B.Sc. Home Science, B. Voc. Food Processing and Management (with 12th Science), B. Sc. Life Sciences/ Biochemistry/ Biotechnology / Microbiology/ Zoology/Molecular Biology/ Botany/ Chemistry or equivalent.

4. Medium of Instruction

The medium of instruction for M.Sc. Food Science and Nutrition is in English.

5. Programme Structure

Structure in Accordance with National Education Policy - 2020 With Multiple Entry and Multiple Exit Options M.Sc. (Food Science and Nutrition) Part – I (Level-6.0)

	Course Code	Title of Course	Teaching Scheme			Examination Scheme					
			Theory and Practical			University Assessment (UA)			Internal Assessment (IA)		
			Lectures + Tutorial/ (Hours / week)	Practical (Hours / week)	Credit	Maximum Marks	Minimum Marks	Exam. Hours	Maximum Marks	Minimum Marks	Exam. Hours
	Semester-I										
Major Mandatory	MMT-101	Human Physiology	4	--	4	80	32	3	20	8	1
	MMT -102	Advances in Food Chemistry	4	--	4	80	32	3	20	8	1
	MMPR -103	Laboratory Course I	2	8	4	100	40	3	--	--	--
	MMT-104	Food Preservation Techniques	2	--	2	40	16	2	10	4	0.5
Major Elective	MET-105	Advances in Nutrition Science OR Nutrition Through Life Cycle	4	--	4	80	32	3	20	8	1
Research Methodology	RM-106	Research Methodology	4	--	4	80	32	3	20	8	1
	Total				22	460			90		
	Semester-II										
Major Mandatory	MMT-201	Advances in Food Microbiology	4	--	4	80	32	3	20	8	1
	MMT -202	Processing of Cereal, Legumes and Oilseeds	4	--	4	80	32	3	20	8	1
	MMPR -203	Laboratory Course II	2	8	4	100	40	3	--	--	--
	MMT-204	Nutritional Biochemistry	2	--	2	40	16	2	10	4	0.5
Major Elective	MET-205	Dietetics and Diet Counselling OR Clinical Nutrition	4	--	4	80	32	3	20	8	1
OJT/FP	OJT-206	On Job Training			4	100	40				
	Total				22	480			70		
	Total (Sem I + Sem II)				44						

<ul style="list-style-type: none"> • MMT – Major Mandatory Theory • MMPR – Major Mandatory Practical • MET – Major Elective Theory • MEPR – Major Elective Practical • RM - Research Methodology • OJT/FP- On Job Training/ Field Project 	<ul style="list-style-type: none"> • Total Marks for M.Sc.-I : 1100
	<ul style="list-style-type: none"> • Total Credits for M.Sc.-I (Semester I & II) : 44
	<ul style="list-style-type: none"> • <i>Separate passing is mandatory for University and Internal Examinations</i>
*Evaluation scheme for OJT/FP shall be decided by concerned BOS	
<ul style="list-style-type: none"> • Requirement for Entry at Level 6.0:if he / she completes the courses equivalent to minimum of 108 to 120 credits 	
<ul style="list-style-type: none"> • Requirement for Exit after Level 6.0: Students can exit after completion of Level 6.0 with Post Graduate Diploma in Food Science and Nutrition 	
<ul style="list-style-type: none"> • Requirement for Entry at Level 6.5: if he/she completes the courses equivalent to minimum of 44 credits. 	

Structure in Accordance with National Education Policy - 2020
With Multiple Entry and Multiple Exit Options
M.Sc. (Food Science and Nutrition) Part – II (Level-6.5)

	Course Code	Title of Course	Teaching Scheme			Examination Scheme					
			Theory and Practical			University Assessment (UA)			Internal Assessment (IA)		
			Lectures + Tutorial (Per week)	Hours (Per week)	Credit	Maximum Marks	Minimum Marks	Exam. Hours	Maximum Marks	Minimum Marks	Exam. Hours
			Semester-III								
Major Mandatory	MMT-301	Processing of Fruits and Vegetables	4	--	4	80	32	3	20	8	1
	MMT -302	Processing of Milk and Milk Products	4	--	4	80	32	3	20	8	1
	MMPR - 303	Laboratory Course III	2	8	4	100	40	3	--	--	--
	MMT-304	Food Additives, Contaminants, and Toxicology	2	--	2	40	16	2	10	4	0.5
Major Elective	MET-305	Nutritional Epidemiology OR Diet Management for Sports and Fitness	4	--	4	80	32	3	20	8	1
Research Project	RP-306	Research Project			4	100#	40	-	--	--	--
	Total				22	480			70		
			Semester-IV								
Major Mandatory	MMT-401	Processing of Animal Foods	4	--	4	80	32	3	20	8	1
	MMT -402	Food Product Development and Packaging	4	--	4	80	32	3	20	8	1
	MMPR - 403	Laboratory Course III	2	8	4	100	40	3	--	--	--
Major Elective	MET-404	Public Health Nutrition OR Ayurvedic Nutrition	4	--	4	80	32	3	20	8	1
Research Project	RP-405	Research Project			6	100##	40	--	50	20	--
	Total				22	440			110		
	Total (Sem III + Sem IV)				44						

<ul style="list-style-type: none"> • MMT – Major Mandatory Theory • MMPR – Major Mandatory Practical • MET – Major Elective Theory • MEPR – Major Elective Practical • RP- Research Project 	<ul style="list-style-type: none"> • Total Marks for M.Sc.-II : 1100
	<ul style="list-style-type: none"> • Total Credits for M.Sc.-II (Semester III & IV) : 44
	<ul style="list-style-type: none"> • <i>Separate passing is mandatory for University and Internal Examinations</i>
# Evaluation scheme for Research Project shall be decided by concerned BOS	
## Evaluation scheme for Research Project shall be decided by concerned BOS	
<ul style="list-style-type: none"> • Requirement for Exit after Level 6.5: Students can exit after completion of Level 6.5 with Post Graduate in Food Science and Nutrition. 	

	M.Sc.-I	M.Sc.-II	Total
Marks	1100	1100	2200
Credits	44	44	88

6. Programme Outcomes (POs)

- ❖ Utilize knowledge from the physical and biological sciences as a basis for understanding the role of food and nutrients in health and disease processes. Students will be able to prepare and deliver effective presentations of technical information to food science and nutrition professionals and to the general public.
- ❖ Students/ learners will gain a broad knowledge of food science focusing on chemistry, biochemistry, whilst giving them the necessary understanding of food processing, preservation techniques, quality, safety and new product development to excel in the field.
- ❖ Students/ learners will develop an in-depth understanding of the principles that underpin the relationships between diet, human health and wellbeing.
- ❖ Ability development of Students/ learners to critically appraise the effects of food processing on the nutritional quality of foods and the role of processed foods in the diet.

7. Course Codes

M.Sc. Semester - I		
Sr. No.	Major Mandatory	
1	Human Physiology (4 credit)	MSU0325MML916G1
2	Advances in Food Chemistry (4 credit)	MSU0325MML916G2
3	Laboratory Course - I (4 credit)	MSU0325MMP916G1
4	Food Preservation Techniques (2 credit)	MSU0325MML916G3
5	Research Methodology (4 credit)	MSU0325RML916G
6	Major Elective	
	Advances in Nutrition Science (4 credit)	MSU0325MEL916G1
	Nutrition Through Life Cycle (4 credit)	MSU0325MEL916G2
M.Sc. Semester - II		
	Major Mandatory	
1	Advances in Food Microbiology (4 credit)	MSU0325MML916H1
2	Processing of Cereal, Legumes and Oilseeds (4 credit)	MSU0325MML916H2
3	Laboratory Course - II (4 credit)	MSU0325MMP916H1
4	Nutritional Biochemistry (2 credit)	MSU0325MML916H3
5	On Job Training (4 credit)	MSU0325OJP916H
6	Major Elective	
	Dietetics and Diet Counselling (4 credit)	MSU0325MEL916H1
	Clinical Nutrition (4 credit)	MSU0325MEL916H2
M.Sc. Semester - III		
	Major Mandatory	
1	Processing of Fruits & Vegetables (4 credit)	MSU0325MML916I1
2	Processing of Milk and Milk Products (4 credit)	MSU0325MML916I2
3	Laboratory Course III (4 credit)	MSU0325MMP916I1
4	Food Additives, Contaminants & Toxicology (2 credit)	MSU0325MML916I3
5	Research Project (4 credit)	MSU0325RPP916I
5	Major Elective	
	Nutritional Epidemiology (4 credit)	MSU0325MEL916I1
	Diet Management for Sports and Fitness (4 credit)	MSU0325MEL916I2
M.Sc. Semester IV		
	Major Mandatory	
1	Processing of Animal Foods (4 credit)	MSU0325MML916J1
2	Food Product Development & Packaging (4 credit)	MSU0325MML916J2
3	Laboratory Course IV (4 credit)	MSU0325MMP916J1
4	Research Project (6 credit)	MSU0325RPP916J
5	Major Elective	
	Public Health Nutrition (4 credit)	MSU0325MEL916J1
	Ayurvedic Nutrition (4 credit)	MSU0325MEL916J2

8. Syllabus

M. Sc. Food Science and Nutrition (Part II) (Level- 6.5) (Semester III)
(NEP-2020)
(Introduced from Academic Year 2024-25)

Title of Course: Processing of Fruits & Vegetables

Course Code: MSU0325MML916I1

Total Credits: 04

Course Outcomes: Upon successful completion of this course, the student will be able to:

1. Students will be able to know the application of food processing and preservation principles and technologies in the processing.
2. Students will be able to know preservation, extension of shelf life and value addition of fruit and vegetable products.
3. Students will gain knowledge and understanding of the basic post-harvest biological, chemical, physiological and metabolic processes and changes in fruits and vegetables.

Unit I: Indian and global scenario on production and processing of fruits and vegetable; Quality requirements of raw materials for processing; sourcing and receiving at processing plants; primary processing: grading, sorting, cleaning, washing, peeling, slicing and blanching; minimal processing.

15 Lectures

Unit II: Processing for pulp, puree and concentrates, especially from mango, tomato, guava, papaya, apple, pineapple, pomegranate, grapes etc. using aseptic packaging, canning, IQF and frozen fruits and vegetables for peas, mango pulps etc. Potato processing, Mushroom Processing.

15

Lectures

Unit III: Technology for processed products like pickles, chutneys, sauces particularly from raw mango, lime and other regional fruits and vegetables of importance. Fruit and Vegetable Juices, Fruit Syrups, Cordials and Nectars. Fruit preserve, Candies, Crystallized fruits and vegetables. Jams, Jellies, Marmalades, Pickles, Chutney, Sauces and Ketchup.

15 Lectures

Unit IV: Processing of fruits for candies, bars, toffees, jams and jellies, squashes and syrups using locally available fruits like papaya, mango, aonla and other under-utilized fruits. Dehydration of fruits and vegetables using various drying technologies like sun drying, solar drying (natural and forced convection), osmotic, tunnel drying, fluidized bed drying, freeze drying, convectional and adiabatic drying; applications to raisins, dried figs, vegetables, intermediate moisture fruits and vegetables. Fruit powders using spray drying

15

Lectures

Reference Books:

1. R.P. Srivastava, and S. Kumar, Fruit and Vegetable Preservation: Principles and Practices, 3rd Edition, CBS Publishers & Distributors Pvt. Ltd, 1998.
2. D.K. Salunkhe and S.S. Kadam, Handbook of Fruit Science and Technology: Production, Composition and Processing, CRC Press 1995.

3. L.R. Verma & V.K. Joshi, Postharvest Technology of Fruits and Vegetables: General concepts and principles., Vol I and II Indus Publications, 2000.
4. G.Lal, G. Siddappa and G. L. Tondon, Preservation of Fruits and Vegetables, Indian Council of Agri. Research, New Delhi, 1986.
5. N. S Rathore, G. K Mathur and S. S. Chasta, Post-Harvest Management and Processing of Fruits and Vegetables, Energy and Resources Institute, Indian Council of Agricultural Research, New Delhi, 2012.
6. W. V. Crusee, Commercial Fruit and Vegetable Products, Agrobios, India, 2009.
7. S. Rajarathnam and R. S. Ramteke, Advances in Preservation and Processing Technologies of Fruits and Vegetables, NIPA, New Delhi, 2011.
8. NIIR Board of Consultants & Engineers, The Complete Technology Book on Processing, Dehydration, Canning, Preservation of Fruits & Vegetables, NIIR Project Consultancy Services, 2019.
9. H.W.V. Loesecke, Drying & Dehydration of Foods, Agrobios India, 2005.
10. N. P. Singh Fruit and Vegetable Preservation, Oxford Book Company, 2007.
11. R. K. Narang, Fruit and Vegetable Preservation Techniques, A P H Publishing Corporation, New Delhi, 2017.

M. Sc. Food Science and Nutrition (Part II) (Level- 6.5) (Semester III)
(NEP-2020)
(Introduced from Academic Year 2024-25)

Title of Course: Processing of Milk And Milk Products

Course Code: MSU0325MML916I2

Total Credits: 04

Course Outcomes: Upon successful completion of this course, the student will be able to:

1. Students will be able to understand the technology behind the production of various dairy products.
2. Students impart skills in the application of biological, chemical, biochemical, physical and engineering sciences in processing and preservation of milk and milk products.
3. Students will get acquainted with techniques and technologies of testing and processing milk by products.

Unit–I: Status of Dairy Industry, MMPO, Milk cooperative system, NDDB, Definition, Sources, Composition, Nutritive Value, and Procurement of Milk Collection, chilling, transportation, cream separation, standardization, pasteurization, sterilization, UHT, homogenization, packaging, storage and distribution of fluid milk.

15 Lectures

Unit–II: Principles and practices of manufacture, packaging, storage and marketing of Cheese, processed cheese, Dahi, yoghurt, Shrikhand, etc. Sanitary aspects: sanitation of dairy plant building, equipment and their maintenance. Effluent treatment plant.

15 Lectures

Unit–III: Classification, manufacture, packaging, storage and marketing of Ice-cream, ices, sherbets etc. Defects of frozen products and their control. Technology of indigenous milk: products: Principles and practices of manufacture, packaging, storage and marketing of butter, ghee, khoa, Paneer channa and milk based foods.

15 Lectures

Unit–IV: Manufacture of evaporated milk and milk powders. Packaging storage, defects and their control. Technology of Dairy by-products: Utilization of skim milk, buttermilk and way for the manufacture of casein, lactose etc.

15 Lectures

Reference Book:

1. S.De, Outline of Dairy Technology, Oxford University press, 1997.
2. T. M. Cogan, Dairy Starter Cultures, VCH publishers, 1995.
3. P. Gangasagare, Textbook of Traditional Dairy Products, Oxford Book Company, 2018.
4. B.K. Mishra, Dairy and Food Product Technology, Biotech Books, 2016.
5. M. Kango, Milk & Milk Products, RBSA publishers, 2006.
6. R. K. Robinson, Modern Dairy Technology Vol. I and II: Advances in Milk, Springer Science Business Media.
7. D. D. Patange, Textbook on Milk and Milk Products, Jaya Publishing House, 2005.
8. S. K. Singh, Analysis of Milk Chemistry, Oxford Book Company, Jaipur, 2016.
9. A.R. Johnson, B.H. Webb, Fundamentals of Dairy Chemistry, CBS Publishers & Distributors, New Delhi, 1987.
10. C.H. Eckles, W.B. Combs, Milk & Milk Products, Tata McGraw Hill Publishing Company, 1997.
11. P. Gangasagare, Processing of Milk, Agrotech Press, Jaipur, 2016.

**M. Sc. Food Science and Nutrition (Part II) (Level- 6.5) (Semester III)
(NEP-2020)**

(Introduced from Academic Year 2024-25)

Title of Course: Laboratory Course III

Course Code: MSU0325MMP916I1

Total Credits: 04

Group A

Preparation and Analysis of Fruit Juice and RTS

Preparation and analysis of Nectar, squash and cordial

Preparation and analysis of Jam, Jelly and Marmalade

Canning of vegetables

Preparation of tutti fruity

Preparation and Analysis of Tomato sauce

Preparation of Hard-boiled candy

Preparation of Potato chips

Group B

Platform tests in milk

Estimation of fat and SNF from milk

Preparation and evaluation of flavoured milk

Preparation and evaluation of lassi

Preparation and evaluation of paneer and Channa

Preparation and evaluation of khoa and gulabjamun

Preparation and evaluation of chakka and Shrikhand

Determination of titrable acidity and specific gravity of milk

Group C

Diet for Male Athlete

Diet for Female Athlete

Diet for Adolescent male Athlete

Diet for Adolescent female Athlete

M. Sc. Food Science and Nutrition (Part II) (Level- 6.5) (Semester III)
(NEP-2020)
(Introduced from Academic Year 2024-25)

Title of Course: Food Additives, Contaminants and Toxicology

Course Code: MSU0325MML916I3

Total Credits: 02

Course Outcomes: Upon successful completion of this course, the student will be able to:

1. Students will be able to understand that additives are relevant to processed food industry for shelf-life extension, processing aids and sensory appeal.
2. Students will get acquainted to develop an understanding of isolation of various biopolymers from food resources and their relevant application.
3. After completing the course students, a known – how on food additive legislation & understands the chemical & technological properties of the most relevant food additives used as food improvement agents.

Unit-I: Food additives- definitions, classification and functions, Preservatives, antioxidants, colors and flavors (synthetic and natural), emulsifiers, sequestrants, humectants, hydrocolloids, sweeteners, acidulants, buffering salts, anticaking agents, etc. - chemistry, food uses and functions in formulations; indirect food additives; toxicological evaluation of food additives. Proteins, starches and lipids as functional ingredient; isolation, modification, specifications, functional properties and applications in foods and as nutraceuticals.

15 Lectures

Unit – II: Definition scope and general principles of food toxicology; manifestation of toxic effects; classification of food toxicants; factors affecting toxicity of compounds; methods used in safety evaluation-risk assessments. Food contaminants, physical, chemical, microbial and other contaminants; food toxicants. Derived Food toxicants- Processing & Packaging; Toxicants generated during food processing such as nitrosamines, acrylamide, benzene, dioxins and furans; persistent organic pollutants.

15 Lectures

Suggested Readings:

1. S. Manay, Foods Facts and Principles (3rd Edition), New Age International Publishers, 2015.
2. S. N. Mahindru Food Additives-Characteristics, Detection and Estimation, APH Publishing Corporation, 2017.
3. A.L. Branen, P.M. Davidson & S. Salminen, Food Additives, 2nd Edition, 2001.
4. D.L. Madhavi, S.S. Deshpande & D.K. Salunkhe, Food Antioxidants: Technological, Toxicological and Health Perspective. Marcel Dekker, 1996.
5. P. V. Patil, Food Contamination, Aavishkar Publishers, Distributors, 2013.
6. A.B. George, Encyclopedia of Food and Color Additives, Vol. III. CRC Press, 1996.
7. A.B. George, Fenaroli's Handbook of Flavor Ingredients. 5th Ed. CRC Press, 2004.
8. V. Nambiar, A textbook on Food Contamination and Safety, Anmol Publications PVT. LTD. New Delhi, 2004.
9. A.M. Stephen, Food Polysaccharides and Their Applications, 2006.
10. J.N. Hathcock, Nutritional Toxicology. Vol. I. Academic Press, 1982.
11. S.N. Mahindru, Food Contaminants-Origin, Propagation & Analysis, APH Publishing Corporation, 2017

M. Sc. Food Science and Nutrition (Part II) (Level- 6.5) (Semester III)
(NEP-2020)
(Introduced from Academic Year 2024-25)

Title of Course: Nutritional Epidemiology

Course Code: MSU0325MEL916I1

Total Credits: 04

Course Outcomes: Upon successful completion of this course, the student will be able to:

1. To make students focus on the promotion of good health through nutrition and the primary prevention of nutrition-related problems.
2. To enable students to deal with Nutritional Epidemiology.
3. To make students understand public policies relevant to nutrition.

Unit I: Introduction to Epidemiology and Community Nutrition: Definition, Importance, Scope, Future Projections; Deficiency Diseases- Severe Acute Malnutrition, Epidemiology and Classification of SAM; Micronutrient Initiatives- Vitamin A Deficiency, Vitamin D deficiency, Iodine deficiency, Anaemia; Prevalence of Malnutrition and Non-Communicable Diseases, The Human Development Index, Undernutrition in Children, Other Parameters of Malnutrition, Malnutrition in Adults, Cost of Micronutrient Malnutrition, Ecology of Malnutrition, Prevalence of Non-Communicable Diseases, Malnutrition and COVID-19. **15 Lectures**

Unit II: Food and Nutrition Security- National Food Security Act, 2013; Interventions to improve Food and Nutritional Security, Improving Food Production, Reducing Post Harvest Losses, Empowering Women; Assessment of Nutritional Status- Anthropometric assessment, Clinical Examination, Biophysical or radiological measurement, Laboratory and Biochemical Assessment, Dietary Assessment, Vital Health Statistics, Growth Charts, Indicators of Nutrition; Nutrition Education- Methods Used, Mass Approach, Teaching Aids in Nutrition Education, Nutrition Education through institutes, Computers as tools; Role of International Agencies in Combating Malnutrition- World Health Organization, Food and Agricultural Organization, United Nation Children's Fund, CARE, GAIN. **15**

Lectures

Unit III: Global Nutrition Report 2020- The Global Burden of Malnutrition, Tracking Injustice in Food and Health Systems, Investment to improve Nutrition Outcomes, Critical Actions to Achieve Nutrition Equity; Nutrition Coordination, Financing, and Accountability; Role of National Agencies in Combating Malnutrition- Indian Council of Medical Research, Indian Council of Agricultural Research, National Institute of Nutrition, Food and Nutrition Board, Central Food Technological Research Institute, National Nutrition Monitoring Bureau, Child Survival and Safe Motherhood Programme, Central Social Welfare Board, Nutrition Society of India, Defence Food Research Laboratory, Mysore. **15 Lectures**

Unit IV: Nutrition Related Policies and Programmes of India- Sustainable Development Goals, NetProFan FSSAI, Eat Right India Movement 2019, Poshan Abhiyan, Public Distribution System and Targeted Public Distribution System, Antyodaya Anna Yojana, Annapurna Scheme, Mahatma Gandhi Employment Guarantee Scheme, Pradhan Manti Garib Kalyan Anna Yojana , National Food for Work Programme; Nutritional Programmes for Different Age Groups- Feeding Programmes for 1-6 years, Complementary Food, School Lunch Programme, National Programme for Adolescents, Nutritional Programme for Pregnant and Lactating Mothers, National Programme for Healthcare of the Elders (NPHCE); Population, Hunger and Malnutrition- Demographic Transition and Demographic Cycle,

Reference Books:

1. B. Srilakshmi, V. Suganthi, Community Nutrition, First Edition, New Age International Publishers, New Delhi, India, 2023.
2. S. Vir, Public Health Nutrition in Developing Countries Part 1 and 2; Woodhead Publishing India Pvt. Ltd, New Delhi, India, 2012.
3. K. Park, Preventive and Social Medicine, 26th Edition, Bhanot Publication, India, 2015.
4. S. Eldelstein, Nutrition in Public Health; Jones and Bartlett Publishers, United States, 2012.
5. Swaminathan, Food and Nutrition, Volume I and II, The Bangalore Press, India, 1995.
6. J. Buttriss, A. Welch, J. Kearney, Public Health Nutrition, John Willey Publisher, London, 2017.
7. B. Sabarwal, Public Health and Nutritional Care, Arjun Publishing House, India, 2018.
8. M. Schneider, Introduction to Public Health, Jones and Bartlett Publisher, United States, 2013.

M. Sc. Food Science and Nutrition (Part II) (Level- 6.5) (Semester III)
(NEP-2020)
(Introduced from Academic Year 2024-25)

Title of Course: Diet Management for Sports & Fitness

Course Code: MSU0325MEL916I2

Total Credits: 04

Course Outcomes: Upon successful completion of this course, the student will be able to:

1. Students will learn about physical activity, energy production and physical fitness.
2. Students will gain knowledge of sports nutrition applied for various athletes and their RDA.
3. Students will gain knowledge on various supplements available in the market and its applications.

Unit I: Muscle physiology for performance and fitness: Skeletal muscle, types of muscle fiber, principles of exercise training; Skeletal system: division, structure and composition of bone, bone and joint disorders; Cardiopulmonary system and its response to exercise; Pulmonary system- pulmonary volume and capacities; Physiologic testing for fitness and performance: physiologic components of assessment, Assessment of - cardiorespiratory endurance or aerobic capacity, maximal oxygen uptake, anaerobic power, muscular strength, flexibility, muscle endurance; Energy production and physical activity: energy exchange, transfer, conversion, production and utilization, anaerobic energy systems, phosphagen system, lactic acid system, aerobic energy system.

15 Lectures

Unit II: Physical Fitness: types, factors affecting, components, fundamental training principles, practical applications, training methods, alternative training and exercise; Physical activity: types, determinants, benefits, exercises for diseases; Exercise: classification, health benefits, exercise machines and equipment; Nutrition assessment and weight management of athletes: somatotype, dietary assessment, body composition, biochemical and clinical assessment, body composition and sports performance, weight management in athletes.

15

Lectures

Unit III: Introduction to sports nutrition: history, organizations, importance; Recommended Dietary Allowances and Energy Requirements of Athletes; Macro nutrients for athletes carbohydrates: classification, functions, digestion and absorption, metabolism, GI, GL, carbohydrate loading, training, resynthesis, sources, supplements; Proteins and lipids: proteins, classification, function, metabolism, RDA, sources, protein supplements; Lipids functions, classification, digestion and absorption, function, metabolism, RDA, sources; Minerals and vitamins for athletes; Fluid and electrolyte for athletes: distribution, fluid balance and thermoregulation, requirements, effects of dehydration, measuring hydration status, sports drink.

15 Lectures

Unit IV: Balanced diet for athletes: determinants for food choice, vegetarian diet, diets for athletes and junior athletes, ageing athletes, recommendations by NIN and SAI; Diet for competition: diet before competition, diet on the day, nutrient timing. Pre event meals, diet for different age group and different sports; Diet related problem of athletes: female athlete triad, weight control, travelling athletes, diabetic athletes, disabled athletes, GI stressed athletes, cramp and stitches; Supplements- sports foods: creatine, BCCA, whey protein, soya protein, casein, spirulina, hormonal supplements, antioxidants, minerals, energy gels, protein supplements, Meal Replacement Products (MRP), World Anti Doping Agency (WADA).

15 Lectures

Reference Books:

1. B. Shrilaxmi, V. Suganthi, C. Kalaivani Ashok, Exercise Physiology Fitness and Sports Nutrition, New Age International (P) Limited, Publishers, 2017.
2. Bean, Sports Nutrition, Bloomsbury Publishing, 2017.
3. M. Lamprecht, Antioxidants in Sport Nutrition, CRS Press, 2019.
4. I. Campbell, Sports Nutrition Enhancing Athletic Performance, CRS Press, 2019.

M. Sc. Food Science and Nutrition (Part II) (Level- 6.5) (Semester III)
(NEP-2020)
(Introduced from Academic Year 2024-25)

Title of Course: RESEARCH PROJECT

Course Code: MSU0325RPP916I

Total Credits: 04

A student should undergo a total of 60 hrs of Research Project for 4 credit course during the third semester of the program which is mandatory for every student. Research Project can be carried in various Food and Nutrition related aspects.

M. Sc. Food Science and Nutrition (Part II) (Level- 6.5) (Semester IV)
(NEP-2020)
(Introduced from Academic Year 2024-25)

Title of Course: Processing of Animal Foods

Course Code: MSU0325MML916J1

Total Credits: 04

Course Outcomes: Upon successful completion of this course, the student will be able to:

1. Student will be able to understand the importance of meat, preservation and processing into different products.
2. Students provide insight into the functions and areas of responsibility of meat inspection.
3. Students will get acquainted with an understanding of the technology for handling, processing, preservation and bi-product utilization of meat, poultry and fish products processing.
4. Combination of theoretical & practical sessions consisting of the analysis of case studies, laboratory work, use of computer software & technical visits.

Unit–I: Slaughter and census of meat animals. Components of carcass viz. muscles, postmortem glycolysis. Conversion of muscle of meat, pre and post slaughter factors affecting quality of meat, color, texture, WHC, organoleptic characteristics, PSE and DFD conditions. Preservation of meat and meat products, Meat analogue and their processing. Effect of processing parameters on product constituents, viz. lipid, protein, carbohydrates and flavor, sensory evaluation, guidelines, different tests, hedonic testing etc. **15 Lectures**

Unit–II: Status of poultry industry in India and abroad. Pre slaughter care, ante mortem examination, slaughter, dressing and postmortem. Composition and chemistry of chicken muscle, pre and post slaughter factors affecting poultry meat quality, Chilling and freezing of poultry meat; packaging and grading of poultry meat. Preparation of poultry products: cured, smoked, canned barbecue and curried poultry.

15 Lectures

Unit–III: Structure, composition and nutritive value of egg, egg proteins and functional properties of eggwhite and yolk. Factor affecting egg quality and their measurements. Industrial uses of eggs Collection, grading, cleaning, washing, packaging and transportation of eggs, preparation of egg products. Preservation of shell egg. Microbial spoilage of egg and egg; products. Preparation poultry products.

15 Lectures

Unit –IV: Muscle structure, composition, nutritive value, processing operations, Post- mortem chemistry of marine foods, Microbiology & safety of marine foods, grading of marine foods, Storage and preservation techniques, Marine food products, By- product utilization.

15 Lectures

Reference Books:

1. P.Sinha, Fish processing & preservation, APH Publishing Corporation, 2018.
2. M.P. Kumar, Handbook of Meat Science, Stadium Press India Pvt Ltd, 2018.

3. A.L. Winton, K.B. Winton, The structure & composition of animal products, Agro botanical Publishers, 1993.
4. N. N. Potter and J. H. Hotchkiss, Food Science, Fifth Edition NewYork, 1986.
5. S. Manay, Foods Facts and Principles (3rd Edition), New Age International Publishers, 2015.
6. H.W.Ockerman, C. L.Hansen, Animal By-Product Processing & Utilization , CRC press, Delhi, 2000.
7. J C.Forrest, Principles of Meat Science, Freeman, 1975.
8. J.Kerry, Meat Processing, Woodhead Publication, CRC Press, Delhi 2002.
9. N. N. Potter, J. Hotchkiss, Food Science, CBS Publishers & distributors, 1996.

M. Sc. Food Science and Nutrition (Part II) (Level- 6.5) (Semester IV)
(NEP-2020)
(Introduced from Academic Year 2024-25)

Title of Course: Food Product Development & Packaging

Course Code: MSU0325MML916J2

Total Credits: 04

Course Outcomes: Upon successful completion of this course, the student will be able to:

1. Student will be able to understand the need for packaging food, understand the various functions of food packages as influenced by their characteristics, understand the health implications of food-package interactions.
2. Students will be able to understand different functions performed by packaging material.
3. Students will be able to understand health implications of food-package interactions.
4. Students learn about packaging requirement for fresh and processed food for local and international markets.

Unit I: Definition & need for product development, classes & characteristics of New food products, ethics in food product development, stages/ phases of new product development- idea generation, screening, feasibility studies, consumer research, financial review, product design & formulation, process development- recipe development & scale up, consumer trials, market testing, quality assessment of new developed products- sensory evaluation, shelf life testing, costing/ pricing & economic evaluation of the product.

15 Lectures

Unit II: Functions & objectives of packaging, forms of packaging- rigid, semi- rigid, flexible, packaging closures & sealing systems, packaging requirements & selection of packaging materials, Types of packaging materials: Paper: pulping, fibrillation and beating, types of papers and their testing methods; Glass: composition, properties, types of closures, methods of bottle making; Metals: Tinplate containers, tinning process, components of tinplate, tin free steel (TFS), types of cans, aluminum containers, lacquers; Plastics: types of plastic films, laminated plastic materials, co-extrusion, edible films, biodegradable plastics.

15 Lectures

Unit III : Properties of materials such as tensile strength, bursting strength, tearing resistance, puncture resistance, impact strength, tear strength, their methods of testing and evaluation; Barrier properties of packaging materials: Theory of permeability, factors affecting permeability, permeability coefficient, gas transmission rate (GTR) and its measurement, water vapour transmission rate (WVTR) and its measurement, prediction of shelf life of foods, selection and design of packaging material for different foods.

15 Lectures

Unit IV: Packaging equipment and machinery: Vacuum, CA and MA packaging machine; gas packaging machine; seal and shrink packaging machine; form and fill sealing machine; Aseptic packaging systems; bottling machines; carton making machines. **15 Lectures**

Reference Books:

1. A. Sharma, Food Product Development, CBS Publishers and Distributors, 2018.
2. G.W. Fuller, New Food Product Development: From Concept to Market place, CRC Press, New York, 1994.
3. C.M.D Man , A.A. Jomes, Shelf life Evaluation of Foods. Blackie Academic and Professional, London, 1994.
4. J. K.Olickle, New Product Development and value added, Food Development Division, Agriculture, Canada, 1990.
5. E. Graf and I.S. Saguy, Food Product Development, From concept to the Market Place Van Nostrand Reinhold New York, 1991.
6. J.H Beckley, M. M. Foley, E. J. Topp & J. C. Huang, P. Witoon Accelerating New Food Product Design and Development,Blackwell Publishing Company, IFT Press, USA, 2007.
7. H. R. Moskowitz , I. S. Saguy & T. Straus, An Integrated Approach to New Food Product Development, Taylor and Francis Group, LLC, USA, 2009.

M. Sc. Food Science and Nutrition (Part II) (Level- 6.5) (Semester IV)
(NEP-2020)
(Introduced from Academic Year 2024-25)

Title of Course: LABORATORY COURSE IV

Course Code: MSU0325MMP916J1

Total Credits: 04

Group A

Inspection and grading of eggs

Development and preparation of Meat products

Development and preparation of poultry food products

Preparation of Fresh water and marine food products

Preparation of preserved meat, poultry and marine food products

Group B

Identification of Packaging materials

Determination of GSM of Packaging materials

Determination of bursting strength

Determination of tearing strength

Study the working drop strength tester

Study of shrink packaging for food packaging material

Study of vacuum packaging for food packaging material

Determination of Tin coating by Clarke`s test

Group C

Anthropometric assessments of different age groups

Biochemical assessments of different age groups

Clinical assessments of different age groups

Dietary assessments of different age groups

OR

Ayurvedic diet for pregnant women

Ayurvedic diet for lactating mother

Ayurvedic diet for Adolescents

Ayurvedic diet for PCOD/PCOS

Ayurvedic diet for thyroid disorders

M. Sc. Food Science and Nutrition (Part II) (Level- 6.5) (Semester IV)
(NEP-2020)
(Introduced from Academic Year 2024-25)

Title of Course: Public Health Nutrition

Course Code: MSU0325MEL916J1

Total Credits: 04

Course Outcomes: Upon successful completion of this course, the student will be able to:

1. Students will focus on promotion of good health through nutrition and the primary prevention of nutrition related problems.
2. Students will deal with nutritional epidemiology and also will understand public policies relevant to nutrition.

Unit I: Principles of epidemiology and epidemiologic methods, Nutrition Epidemiology in developing countries, Under-nutrition in children. **15 Lectures**

Unit II: Dual nutrition burden in women: causes, consequences and control measures, Measuring under-nutrition and over-nutrition in children. **15 Lectures**

Unit III: Essential newborn care and child survival, Integrating breastfeeding in public health programming, complementary feeding of infants and young children, Prevention and Management of Protein Energy Malnutrition. **15 Lectures**

Unit IV: Nutritional Deficiency Disorders Control Programmes in India, Food and Nutrition Security in India, Monitoring and Evaluation of Public Health Nutrition programs, Nutrition-Health education, Integrated Child Development Services Scheme (ICDS), National Rural Health Mission. **15 Lectures**

Reference Books:

1. S.Vir, Public Health Nutrition in Developing Countries Part 1, Woodhead Publishing India Pvt. Ltd, New Delhi, India, 2012.
- 2.K. Park, Preventive and Social Medicine, 26th Edition, Bhanot Publication, India, 2015.
3. S. Eldelstein, Nutrition in Public Health, Jones and Bartlett Publishers, United States, 2012.
4. Swaminthan, Food and Nutrition Volume I and II, The Bangalore Press, India, 1995.
5. J.Buttriss, A.Welch, J.Kearney, Public Health Nutrition, John Willey Publisher, London, 2017.
6. B. Sabarwal, Public Health and Nutritional Care, Arjun Publishing House, India, 2018.
7. M. Schneider, Introduction to Public Health, Jones and Bartlett Publisher, United States, 2013.

M. Sc. Food Science and Nutrition (Part II) (Level- 6.5) (Semester IV)
(NEP-2020)
(Introduced from Academic Year 2024-25)

Title of Course: Ayurvedic Nutrition

Course Code: MSU0325MEL916J2

Total Credits: 04

Course Outcomes: Upon successful completion of this course, the student will be able to:

1. To gain knowledge about Ayurvedic Nutrition in Disease Prevention and Treatment.
2. To understand Ayurvedic Concepts behind Diet and its relationship with health.
3. To study Ayurvedic Food Science and its role in the planning of diet.

Unit I: Introduction to Ayurveda Science- Indian System of Medicine, A brief History, Definitions Ayurveda, Ayurveda as a science of life, Ayurveda as a Preventive Medicine; Importance of Ahaar and Vihaar in Ayurveda- Concept behind Dincharya and Rutuchrya, History and Importance of Indian Ahaar Shastra: Vedic and Madhyayug in Diet and its process, Ayurvedic Composition, Ayurvedic Components.

15 Lectures

Unit II: Basic Principles of Ayurveda- Dosh, Dhatu, Agni, Prakriti; Difference between Prakruti and Vikruti, Definition of Swasthya; Doshvidnyana; Dhatuvidnyana- Tissue/ Cell Metabolism; Malavidnyana- Excretion; Strotovidnyana- Systemic circulation, Dhatushstra- Cell Replenishing, Prakruti- Constitution, Doshdhatumalvidnyana- The importance of diet in physiological processes; Lokpirushsamyak, Karyakaran Siddhanta; Samanya Vishesh Siddhant, Panchmahabhuta Siddhanta, Swabhavoparmvada Siddhanta- Relation with the diet and its importance.

15 Lectures

Unit III: Concept of Preventive Ayurvedic Diet; Definition of Swasthya (Health), Deha (Body), Prevention and Maintenance of Health through Diet; Bhojana Vidhi, Importance of Dinchrya (Daily Regimen) and Rutuchrya (Seasonal conduct)- Applied aspect, BMI, BMR, Jalpana, Langan Therapy; Basics of Drvyaguna- Dravya, Guna, Veerya, Karma, Rasa, Vipaka, Prabhav.

15

Lectures

Unit IV: Ayurvedic Food Science- Introduction, Concept; Krutanna Varga and Sanskar VicharManda, Peya, Vilepi, Yavagu; Anukta Varga- Tea, Coffee, Preserved Food, Ice Cream, Bakery Products; Varga Vichar- Shukvarga, Shimbivarga, Shakavarga, Lavanavarga, Mansavarga, Tailavarga, Phalavarga, Madhuvarga, Jalavarg.

15 Lectures

Reference Books:

1. Charak Samhita and its Commentaries
2. Sushrut Samhita and its Commentaries
3. Ashtanga Hridiya and its Commentaries
4. Ashtanga Sangraha and its Commentaries

5. Bhavprakash Nighantu
6. Yogratnakar
7. Bhojanakutuhāl
8. Bruhan nighanturatnakar
9. Kshemkutuhāl
- 10 . Madhav Drayguna- Priyavrat Sharma

M. Sc. Food Science and Nutrition (Part II) (Level- 6.5) (Semester IV)
(NEP-2020)
(Introduced from Academic Year 2024-25)

Title of Course: RESEARCH PROJECT

Course Code: MSU0325RPP916J

Total Credits: 06

A student should undergo a total of 90 hrs of Research Project for 6 credit course during the fourth semester of the program which is mandatory for every student. Research Project can be carried in various Food and Nutrition related aspects.

9. Scheme of Teaching

The teaching scheme includes conducting theory lectures, practical's, group discussions, demonstrating videos, class tests, assignments, and open book test etc.

10. Examination Pattern

Theory:

1. There shall be 100 marks for each course (paper). For each course 80:20 pattern shall be applicable, wherein 80 marks shall be for University assessment (UA) and 20 marks for Internal assessment (IA).
2. There shall be separate passing for theory as well as internal examinations. Minimum 32 marks out of 80 required for passing UA and minimum 8 marks out of 20 required for passing IA.

Practical:

1. The Major Mandatory Practical (MMPR) examination shall be conducted semester wise with individual heads of passing with minimum 40 % marks.
2. There shall be a separate head of passing for Theory and Practical Examination.

On Job Training:

A student will be assessed by the following points:

1. Seminar based on OJT.
2. Submission of report based on OJT
3. Attendance (minimum 80%) and Certificate of student.

Research Project:

The research project for semester III will be of 100 marks and for semester IV will be of 150 marks which include submission of the Thesis, presentation based on the project report and attendance of student.

11. Nature of Question Paper and Scheme of Marking

Theory Examination:

A. University Assessment for 80 Marks

**M. Sc. (Part - ____) (Semester - ____) Examination
Food Science and Nutrition**

Course Name (Course Code)

Day & Date:

Total Marks: 80

Time:

Instructions: i. All questions carry equal marks
ii. Question No 1 is compulsory
iii. Attempt any 4 questions from Q 2 to Q7
iv. Figures to right indicates full marks

- | | |
|--|-----------|
| Q 1. Answer the following | 16 Marks |
| <i>There will be 16 question, of 1 Mark Each</i> | |
| <i>This may include Multiple Choice Questions with 4 options and/or Fill in Blanks</i> | |
| <hr/> | |
| Q. 2 One Long Answer Question | 16 Marks |
| Q. 3 One Long Answer Question | 16 Marks |
| Q. 4 Two Long Note Type Question of 8 Marks Each | 16 Marks |
| a. _____ | (8 Marks) |
| b. _____ | (8 Marks) |
| Q. 5 Two Long Note Type Question of 8 Marks Each | 16 Marks |
| a. _____ | (8 Marks) |
| b. _____ | (8 Marks) |
| Q. 6 Four Short Note Type Questions of 4 Marks Each | 16 Marks |
| a. _____ | (4 Marks) |
| b. _____ | (4 Marks) |
| c. _____ | (4 Marks) |
| d. _____ | (4 Marks) |
| Q. 7 Four Short Note Type Questions of 4 Marks Each | 16 Marks |
| a. _____ | (4 Marks) |
| b. _____ | (4 Marks) |
| c. _____ | (4 Marks) |
| d. _____ | (4 Marks) |

B. University Assessment for 40 Marks

M. Sc. (Part - ____) (Semester - ____) Examination Food Science and Nutrition

Course Name (Course Code)

Day & Date:

Total Marks: 40

Time:

Instructions: i. All questions carry equal marks
ii. Question No 1 is compulsory
iii. Attempt any 4 questions from Q 2 to Q7
iv. Figures to right indicates full marks

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|--|-----------|
| Q 1. Answer the following | 08 Marks |
| <i>There will be 8 question, of 1 Mark Each</i> | |
| <i>This may include Multiple Choice Questions with 4 options and/or Fill in Blanks</i> | |
| Q. 2 One Long Answer Question | 08 Marks |
| Q. 3 One Long Answer Question | 08 Marks |
| Q. 4 One Long Answer Question | 08 Marks |
| Q. 5 Two Short Note Type Question of 4 Marks Each | 08 Marks |
| a. _____ | (4 Marks) |
| b. _____ | (4 Marks) |
| Q. 6 Two Short Note Type Question of 4 Marks Each | 08 Marks |
| a. _____ | (4 Marks) |
| b. _____ | (4 Marks) |
| Q. 7 Two Short Note Type Question of 4 Marks Each | 08 Marks |
| a. _____ | (4 Marks) |
| b. _____ | (4 Marks) |

C. Internal Assessment for 20 Marks

M. Sc. (Part - ____) (Semester - ____) Examination
Food Science and Nutrition
Internal Examination

Course Name:**Course Code:****Date:****Time:****Seat No.:****Total Marks: ____/20**

Instructions: i. All questions are compulsory
ii. Each question carries one mark

Q 1. Answer the following

20 Marks

*There will be 20 question, of 1 Mark Each**This may include Multiple Choice Questions with 4 options and/or Fill in Blanks***D. Internal Assessment for 10 Marks**

M. Sc. (Part - ____) (Semester - ____) Examination
Food Science and Nutrition
Internal Examination

Course Name:**Course Code:****Date:****Time:****Seat No.:****Total Marks: ____/10**

Instructions: i. All questions are compulsory
ii. Each question carries one mark

Q 1. Answer the following

10 Marks

*There will be 10 question, of 1 Mark Each**This may include Multiple Choice Questions with 4 options and/or Fill in Blanks***Practical Examination:****University Assessment for 100 Marks**

M. Sc. (Part - ____) (Semester - ____)
Food Science and Nutrition
Practical Examination

Course Name:**Course Code:****Date:****Time:****Seat No.:****Signature:**

Q. 1. Principle Writing

20 Marks

Q. 2. Performance of Experiment

25 Marks

Q. 3. Performance of Experiment

25 Marks

Q. 4. Journal

10 Marks

Q. 5. Viva-voce

10 Marks

Q. 6. Seminar

10 Marks

12. Equivalence of courses

M. Sc. Part II (Semester III and IV)

Old Course				Equivalent Course			
Sem No.	Course Code	Title of Old Course	Credit	Course Code	Title of New Course	Credit	Remark
III	CC-301	Research Methodology & Biostatistics	04	RM-106	Research Methodology	04	Interchange between Sem III to Sem I with change in Subject name and Content
III	CC-302	Processing of Milk & Milk Products	04	MMT-302	Processing of Milk & Milk Products	04	No Change
III	CC-303	Food Additives, Contaminants & Toxicology	04	MMT-304	Food Additives, Contaminants & Toxicology	02	Reduction in syllabus content
III	DSE-304	Clinical Nutrition	04	MET-205	Clinical Nutrition	04	Interchange between Sem III to Sem II
III	-	-	-	MMT-301	Processing of Fruits and Vegetables	04	Addition of New subject
III	-	-	-	MET-305	Nutritional Epidemiology	04	Addition of New subject
III	-	-	-	MET-305	Diet Management for Sports & Fitness	04	Addition of New subject
III	CCPR-305	Laboratory Course III	04	MMPR-303	Laboratory Course III	04	No Change
III	CCPR-305	Research Project I	04	RP-406	Research Project	04	No Change
IV	CC-401	Food Product Development and Packaging	04	MMT-402	Food Product Development and Packaging	04	No Change
IV	CC-402	Processing of Animal Foods	04	MMT-401	Processing of Animal Foods	04	No Change
IV	CC-404	Public Health Nutrition	04	MET-404	Public Health Nutrition	04	No Change
IV	CCPR-205	Laboratory Course IV	04	MMPR-403	Laboratory Course IV	04	No Change
IV	CC-405	Research Project II	04	RP-405	Research Project	06	No Change
IV	CC-403	Functional Foods and Nutraceuticals	04	-	-	-	This subject is removed
IV	-	-	-	MET-404	Ayurvedic Nutrition	04	Addition of New subject