



MGM UNIVERSITY, CHH. SAMBAJINAGAR

INSTITUTE OF BIOSCIENCES AND TECHNOLOGY

CHOICE BASED CREDIT SYSTEM (CBCS)

SEMESTER PATTERN

Faculty of Sciences

Post Graduate (PG) programme

Food Technology - CURRICULUM

w. e. f. Academic Year 2023-24

M.Sc. Food Technology

CURRICULUM

**Prepared By
Dr. R. R. Patil**

**Submitted By
Dr. G. W. Narkhede**

**Approved By
Board of Studies**

Illustrative Credit distribution structure for Two Years/ One Year PG									
M.Sc. Post Graduation Programme (M.Sc. Food Technology)									
Year	Level	Sem.	Major		RM	OJT/ FP	RP	Cum. Cr.	Degree
			Mandatory	Electives					
I	6	I	14 (4*3 + 2)	4	4			22	PG Diploma (after 3 Yr Degree)
		II	14 (4*3 +2)	4		4		22	
Cum. Cr. For PG Diploma			28	8	4	4	-	44	
Exit option: PG Diploma (44 Credits) after Three Year UG Degree									
II	6.5	III	12 (3*4)	4			4	20	
		IV	10 (1*10)	4			8	22	
Cum. Cr. for 1 Yr PG Degree			22	8	4		12	42	PG Degree After 3-Yr UG Or
Cum. Cr. for 2 Yr PG Degree			50	16	4	4	12	86	PG Degree after 4-Yr UG
2 Years-4 Sem. PG Degree (86-credits) after Three Year UG Degree or 1 Year - 2 Sem PG Degree (42- credits) after Four Year UG Degree									

Appendix-2023

PROGRAMME: M.Sc. Food Technology

Semester I

Level	Course Code	Course Title	Type	Course Type	Teaching Scheme		Credit	Evaluation Scheme							Minimum Passing					
					L	P		Internal				External			Internal			External		
								CA-I	MSE	CA-II	TW	ESE	PR	Total	Internal	ESE	PR	Total		
6.0	MFMML101	Food Chemistry and Nutrition	Theory	Major Mandatory	3	-	3	20	20	20	-	40	-	100	-	16	-	40		
	MFMML102	Food Preservation Technology	Theory	Major Mandatory	4	-	3	20	20	20	-	40	-	100	-	16	-	40		
	MFMML103	Food Engineering	Theory	Major Mandatory	3	-	3	20	20	20	-	40	-	100	-	16	-	40		
	MFMML104	Food Packaging Technology	Theory	Major Mandatory	3	-	3	20	20	20	-	40	-	100	-	16	-	40		
	MFMMJ105	Mini Project	Practical	Major Mandatory	-	4	2	-	-	-	30		20	50	-	-	8	20		
	MFMEP106	1. Product Innovation -I Lab (Practical)	Practical	Major Elective	-	4	2	-	-	-	30	0	20	50	-	-	8	20		
	MFMEP107	2. Lab In Food Product Development and International Trade																		
	MFMEP108	1. Food science Lab	Practical	Major Elective	-	4	2	-	-	-	30		20	50	-	-	8	20		
	MFMEP109	2. Pre and Post Harvest Technology of Fruits and Vegetable																		
		Research Methodology	Theory	RM	4	-	4	20	20	20	-	40	-	100	-	16	-	40		
		Total (L- P) Hrs / week = 28			16	12	22	90	90	90	90	180	60	600		72	24	240		

Semester II (M.Sc. FT)																		
Level	Course Code	Course Title	Type	Course Type	Teaching Scheme		Credit	Evaluation Scheme							Minimum Passing			
					L	P		CA-I	MSE	CA-II	TW	ESE	PR	Total	Internal	ESE	PR	Total
6.0	MFMML110	Beverages Technology	Theory	Major Mandatory	3	-	3	20	20	20	-	40	-	100	-	16	-	40
	MFMML111	Food Commodities	Theory	Major Mandatory	3	-	3	20	20	20	-	40	-	100	-	16	-	40
	MFMML112	Food Microbiology & Toxicology	Theory	Major Mandatory	3	-	3	20	20	20	-	40	-	100	-	16	-	40
	MFMML113	Food Quality System and Food Analysis	Theory	Major Mandatory	3	-	3	20	20	20	-	40	-	100	-	16	-	40
	MFMEP114	1. Lab In Nutraceuticals and health Food	Practical	Major Elective	-	4	2	-	-	-	30	-	20	50	-	-	8	20
	MFMEP115	2. Lab In Entrepreneurship and Business Management																
	MFMEP116	1. Processing Lab	Practical	Major Elective	-	4	2	-	-	-	30	-	20	50	-	-	8	20
	MFMEP117	2. Food Additives, Adulteration and Toxicology																
	MFMMJ118	Micro Project	Practical	Major Mandatory	-	4	2	-	-	-	30	-	20	50	-	-	8	20
MFPPJ119	Field Project	Practical	FP	-	8	4	-	-	-	60	-	40	100	-	-	16	40	
		Total (L- P) Hrs / week = 32			12	20	22	80	80	80	150	160	100	650		64	40	260

Level 6.0 Award of PG Diploma (44 Credits) after Three Year UG Degree

Semester III (M.Sc. FT)

Level	Course code*	Course Title	Type	Course Type	Teaching Scheme		Credit	Evaluation Scheme							Minimum Passing			
					L	P		Internal				External		Total	External			
								CA-I	MSE	CA-II	TW	ESE	PR		Internal	ESE	PR	Total
6.5	MFMML201	Food Product Development	Theory	Major Mandatory	4	-	4	20	20	20	-	40	-	100	-	16	-	40
	MFMML202	Food Safety and Regulations	Theory	Major Mandatory	4	-	4	20	20	20	-	40	-	100	-	16	-	40
	MFMML203	Food Nanotechnology	Theory	Major Mandatory	4	-	4	20	20	20	-	40	-	100	-	16	-	40
	MFMEP204	1. Bakery Technology Lab	Practical	Major Elective	-	8	4	-	-	-	60	-	40	100	-	-	16	40
	MFMEP205	2. Snack Technology			-	-	-	60	-	40	100	-	-	16	40			
	MFRPJ206	Major Project	Practical	RP	-	8	4	-	-	-	60	-	40	100	-	-	16	40
		Total (L- P) Hrs / week = 28			12	16	20	60	60	60	120	120	80	500	-	48	32	200

Semester IV (M.Sc. FT)																		
Level	Course code*	Course Title	Type	Category	Teaching Scheme		Credit	Evaluation Scheme							Minimum Passing			
					L	P		Internal				External		Total	Internal	External		Total
								CA-I	MSE	CA-II	TW	ESE	PR			ESE	PR	
6.5	MFME206	1. Ethics/ Biosafety/ IPR	Theory	Major Elective	4	-	4	20	20	20	-	40	-	100	-	16	-	40
	MFME207	2. Entrepreneurship and Business Management																
	MFJT208	On Job Training	OJT	Major Mandatory	-	20	10	-	-	-	200	-	50	250	-	-	20	50
	MFRPJ209	Research Project	RP	RP	-	16	8	-	-	-	150	-	50	200	-	-	20	50
		Total (L- P) Hrs / week = 40				4	36	22	20	20	20	350	40	100	550	-	16	40

Level 6.5 Award of PG Degree after Three Years UG Degree with 86 credits OR Four Years UG Degree with 42 credits

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FOOD TECHNOLOGY - CURRICULUM

w. e. f. Academic Year 2023-24

M.Sc. Food Technology

CURRICULUM:

Semester I

Appendix-2023

PROGRAMME: M.Sc. Food Technology

Semester I

Level	Course Code	Course Title	Type	Course Type	Teaching Scheme		Credit	Evaluation Scheme							Minimum Passing					
					L	P		Internal				External			Internal			External		
								CA-I	MSE	CA-II	TW	ESE	PR	Total	Internal	ESE	PR	Total		
6.0	MFMML101	Food Chemistry and Nutrition	Theory	Major Mandatory	3	-	3	20	20	20	-	40	-	100	-	16	-	40		
	MFMML102	Food Preservation Technology	Theory	Major Mandatory	4	-	3	20	20	20	-	40	-	100	-	16	-	40		
	MFMML103	Food Engineering	Theory	Major Mandatory	3	-	3	20	20	20	-	40	-	100	-	16	-	40		
	MFMML104	Food Packaging Technology	Theory	Major Mandatory	3	-	3	20	20	20	-	40	-	100	-	16	-	40		
	MFMMJ105	Mini Project	Practical	Major Mandatory	-	4	2	-	-	-	30		20	50	-	-	8	20		
	MFMEP106	1. Product Innovation -I Lab (Practical)	Practical	Major Elective	-	4	2	-	-	-	30	0	20	50	-	-	8	20		
	MFMEP107	2. Lab In Food Product Development and International Trade																		
	MFMEP108	1. Food science Lab	Practical	Major Elective	-	4	2	-	-	-	30		20	50	-	-	8	20		
	MFMEP109	2. Pre and Post Harvest Technology of Fruits and Vegetable																		
		Research Methodology	Theory	RM	4	-	4	20	20	20	-	40	-	100	-	16	-	40		
		Total (L- P) Hrs / week = 28			16	12	22	90	90	90	90	180	60	600		72	24	240		

FOOD CHEMISTRY & NUTRITION

University: MGM University, CHH. SAMBHAJINAGAR	Faculty: Basic & Applied Science
Institute: Institute of Biosciences and Tech.	Degree: M.Sc. Food Technology(PG)
CourseUnitCode: MFMML101	Course Unit Title: Food Chemistry & Nutrition
Credits allocated: 3+0 (3 Theory+0 Practical)	Level of Study: PG

Mode of delivery, planned learning activities and teaching method: Lecture 3hrs weekly

Recommended Year/Semester: Food Tech. & Processing Master's of Science, Year1/Semester1

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidate should pass in under graduate life science.

LEARNING OUTCOME :

Upon successful completion, students will have the knowledge and skills to:

A thorough explaining of the -The subject imparts basic knowledge of Food chemistry & Nutrition process. This information will make the student competent in Food chemistry & nutrition process

OBJECTIVE:

- To acquaint with properties and role of various constituents in foods, interaction and changes during processing.
- To acquaint with importance of various foods and nutrients in human nutrition.

DETAILED SYLLABUS

Total Lectures = 45

THEORY

Unit -I Introduction of food chemistry – (8 Lectures)

Food chemistry- definition, scope and importance; water in food, water activity and shelf life of food; chemistry and stability of water and fat soluble vitamins; chemical properties of minerals and their bioavailability, enrichment and fortification.

UNIT-II Carbohydrates Proteins and Lipids – (10 Lectures)

Carbohydrates, proteins and lipids: classification, physical, chemical, nutritional, and functional properties and their structural correlations; auto-oxidation of lipids and rancidity

UNIT-III Minor constituents in food– (9 Lectures)

Properties of minerals, vitamins, pigments, anti-oxidants, flavour components, allergens, toxins and anti-nutritional factors in foods; Interaction of constituents in food systems; Changes during storage and processing; Browning reactions in foods.

UNIT-IV Food groups and their typical composition– (10 Lectures)

Food groups and their typical composition; essential nutrients- sources, functions, deficiency diseases; requirements and recommended dietary allowances; digestion, absorption, transport and metabolism of nutrients in human system; protein quality evaluation.

UNIT- V Enzymes– (8 Lectures)

Enzyme: Classification, Nomenclature, application of enzyme in food industry.

Suggested Reading/Reference Books/Text Books :

1. Bamji MS, Rao NA & Reddy V. 2003. Textbook of Human Nutrition. Oxford & IBH.
2. Belitz HD. 1999. Food Chemistry. Springer Verlag.
3. De Man JM. 1976. Principles of Food Chemistry. AVI.
4. Meyer LH. 1987. Food Chemistry. CBS.
5. Alias C. and Lindeu G (1991) Food Biochemistry, Ellis Horwood, New York

6. Pomeranz, Y and Meloan, R. (1995) Food Analysis: Theory and Practice, Westport, An AVI Publication, New York, Sydney, Toronto.
7. Fennema, R.O (1997) Food Chemistry, Second Edition, Food Science & Technology series, Marcel Dekker, INC., New York

FOOD PRESERVATION TECHNOLOGY

University: MGM University, CHH. SAMBHAJINAGAR	Faculty: Basic & Applied Science
Institute: Institute of Biosciences and Tech.	Degree: M.Sc. Food Technology(PG)
Course UnitCode: MFMML102	Course Unit Title: Food Preservation Technology
Credits allocated: 3+0 (3 Theory+0 Practical)	Level of Study: PG

Mode of delivery planned learning activities and teaching method: Lecture 3hrs weekly

Recommended Year/Semester: Food Tech & Processing – Masters of Science, Year 1st / Semester I

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidate should pass in under graduate life science.

LEARNING OUTCOME:

Upon successful completion, students will have the knowledge and skills to: A thorough explaining of the -historical developments, principles & Scope of food processing; Use and application of enzymes and microorganisms in processing and preservation of foods

OBJECTIVE

To acquaint with principles of different techniques used in processing and preservation of foods.

DETAILED SYLLABUS

Total Lectures = 45

THEORY

UNII-I Food Processing and Preservation -(8 Lectures)

Scope of food processing; historical developments; principles of food processing and preservation.

UNIT- II Preservation of Food by Heat -(10 Lectures)

Processing and preservation by heat – blanching, pasteurization, sterilization and UHT processing,

canning, extrusion cooking, dielectric heating, microwave heating, baking, roasting and frying, etc

UNIT- III Preservation by low-temperature -(9 Lectures)

Introduction to processing and preservation by low-temperature- refrigeration, freezing, CA,MA and dehydro-freezing.

UNIT –IV Processing and preservation by drying (9 Lectures)

Introduction to Processing and preservation by drying, concentration and evaporation- types of dryers and their suitability for different food products; ultra-filtration, reverse osmosis.

UNIT – V Processing and preservation by non-thermal methods (9 Lectures)

Introduction to Processing and preservation by non-thermal methods, irradiation, high pressure, pulsed electric field, hurdle technology.

Suggested Reading/Reference Books/Text Books

1. Arsdel WB, Copley MJ & Morgan AI. 1973. Food Dehydration. 2nd Ed. Vols. I, II. AVI Publ.
2. Desrosier NW & James N. 1977. Technology of Food Preservation. 4th Ed. AVI. Publ.
3. Fellows PJ. 2005. Food Processing Technology: Principle and Practice. 2nd Ed. CRC.
4. Jelen P. 1985. Introduction to Food Processing. Prentice Hall.
5. Potter NN & Hotchkiss 1997. Food Science. 5th Ed. CBS.
6. Potty VH & Mulky MJ. 1993. Food Processing. Oxford & IBH.
7. Ramaswamy H & Marcotte M. 2006. Food Processing: Principles and applications. Taylor & Francis.

FOOD ENGINEERING

University: MGM University, CHH. SAMBHAJINAGAR	Faculty: Basic & Applied Science
Institute: Institute of Biosciences and Tech.	Degree: M.Sc. Food Technology(PG)
Course Unit Code: MFMML103	Course Unit Title: Food Engineering
Credits allocated: 3+0 (3 Theory+0 Practical)	Level of Study: PG

Mode of delivery, planned learning activities and teaching method: Lecture 3hrs weekly

Recommended Year /Semester: Food Tech. & Processing -Master's of Science, Year 1 /Semester1

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidate should pass in under graduate life science.

LEARNING OUTCOME :

Upon successful completion, students will have the knowledge and skills to: The main purpose of the subject is to understand basic principle of Food Engineering and its Processes. Introduction to food engineering & processes, Kinetics of biological reactions, Method for thermal process evaluation, Food chilling and freezing, Process Heat Transfer

OBJECTIVE :

To acquaint with basic principle of Food Engineering and its Processes, with importance of various foods process and their evaluation

DETAILED SYLLABUS

Total Lectures = 45

THEORY

UNIT – I Introduction to food engineering & processes (8 Lectures)

Introduction to food engineering & processes: principles of thermodynamics and heat transfer applied to food engineering; fundamentals of heat and analogy to mass transfer in food processing.

UNIT- II Method for thermal process evaluation (10 Lectures)

Method for thermal process evaluation - Commercial sterility, pasteurization and sterilization methods based on slowest heating region, heat exchangers; general introduction to aseptic canning process, hydrostatic sterilizer and aseptic packaging practices and design problems.

UNIT – III Food chilling and freezing (10 Lectures)

Food chilling and freezing – Pre-cooling and cold storage; CA and MA; Properties of frozen foods; freezing point depression; general introduction to enthalpy change during freezing; Plank's equation for predicting rates of product freezing; Cryogenic freezing and IQF; design of food freezing equipment such as air blast freezers, plate freezers and immersion freezers.

UNIT-IV Heat Transfer (9 Lectures)

Process Heat Transfer - Modes of heat transfer and overall heat transfer; thermal properties of foods such as specific heat and thermal conductivity; Fourier's law, steady state and unsteady state conduction; heat exchange equipment; energy balances; rate of heat transfer;

UNIT-V Mass Transfer -(8 Lectures)

Introduction about mass transfer, important process in mass transfer, application of mass transfer in food industry.

Suggested Reading/ Reference Books/ Text Books :

1. Brennan JG, Butter JR, Corell ND & Lilly AVE. 1990. Food Engineering Operations. Elsevier.
2. Charm SE, McCabe WL, Smith JC & Harriott P. 1993. Unit Operations of Chemical Engineering. McGraw Hills.
3. Earle RL. 1985. Unit Operations in Food Processing. Pergamon Press.
4. Fellows P. 1988. Food Processing Technology. VCH Ellis Horwood.
5. Heldman DR & Singh RP. 1995. Food Process Engineering. AVI Publ.
6. McCabe WL & Smith JC. 1971. Fundamental of Food Engineering. AVI Publ.
7. Sahay KM & Singh KK. 1994. Unit Operation of Agricultural Processing. Vikas Publ. House.
8. Singh RP & Heldman DR. 1993. Introduction to Food Engineering. Academic Press.

FOOD PACKAGING TECHNOLOGY

University: MGM University, CHH. SAMBHAJINAGAR	Faculty: Basic & Applied Science
Institute: Institute of Biosciences and Tech.	Degree: M.Sc. Food Technology(PG)
Course Unit Code: MFMML104	Course Unit Title: Food Packaging Technology
Credits allocated: 3+0 (3 Theory+0 Practical)	Level of Study: PG

Mode of delivery, planned learning activities and teaching method: Lecture 3hrs weekly

Recommended Year/Semester: Food Tech. & Processing-Master's of Science, Year1/Semester I

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidate should pass in under graduate life science.

LEARNING OUTCOME

Upon successful completion, students will have the knowledge and skills to: Active and intelligent packaging, Non-migratory bioactive polymers (NMBP) in food packaging, Time- temperature indicators, Packaging-flavor interactions Course designed to impart advanced knowledge and skills required to learn various aspects of food packaging technology at food industries

OBJECTIVE

To provide knowledge about selected trends and development in food packaging technologies and materials aiming at assuring the safety and quality of foodstuffs in order to design an optimized package which satisfies all legislative, marketing and functional requirements sufficiently, and fulfils environmental, cost and consumer demands as well as possible.

DETAILED SYLLABUS

THEORY

UNIT I Introduction of food Packaging and Type (9 Lectures)

Active and intelligent packaging, Active packaging techniques, Intelligent packaging techniques, Current use of novel packaging techniques, Oxygen, ethylene and other scavengers, Oxygen

scavenging technology, Ethylene scavenging technology, Carbon dioxide and other scavengers, Antimicrobial food packaging: Constructing an antimicrobial packaging system, Factors affecting the effectiveness of antimicrobial packaging.

UNIT II Non-migratory bioactive polymers (8 Lectures)

Non-migratory bioactive polymers (NMBP) in food packaging, Advantages of NMBP,

limitations, inherently bioactive synthetic polymers: types and applications, Polymers with immobilized bioactive compounds.

UNIT III Important Parameter in food packaging (9 Lectures)

Time-temperature indicators (TTIs), Defining and classifying TTIs, Requirements for TTIs, The development of TTIs, Current TTI systems, Maximizing the effectiveness of TTIs, Using TTIs to monitor shelf-life during distribution, Using TTIs to optimize distribution and stock rotation.

UNIT IV Innovative Packaging (9 Lectures)

Packaging-flavour interactions, Factors affecting flavour absorption, role of the food matrix, role of differing packaging materials, Case study: packaging and lipid oxidation, Modeling flavour absorption, Packaging– flavour interactions and active packaging, Novel MAP applications for fresh-prepared produce, Novel MAP gases, Testing novel MAP applications, Applying high O₂ MAP.

UNIT V Materials and Application of food packaging (10 Lectures)

Modern packaging systems: Green plastics for food packaging, The problem of plastic packaging waste, The range of biopolymers, Developing novel biodegradable materials, Legislative issues, Current applications, Integrating intelligent packaging, role of packaging in the supply chain, Creating integrated packaging, storage and distribution: alarm systems and TTIs, Traceability: radio frequency identification, Recycling packaging materials: The recyclability of packaging plastics, Improving the recyclability of plastics packaging, Testing the safety and quality of recycled material, Using recycled plastics in packaging.

Suggested Reading/ Reference Books/ Text Books

1. Ahvenainen R. 2001. Novel Food Packaging Techniques. CRC.
2. Crosby NT. 1981. Food Packaging Materials. App. Sci. Publ.
3. Mahadeviah M & Gowramma RV. 1996. Food Packaging Materials. Tata McGraw Hill.
4. Painsy FA. 1992. A Handbook of Food Packaging. Blackie.
5. Palling SJ. 1980. Developments in Food Packaging. App. Sci. Publ.
6. Rooney ML. 1988. Active Food Packaging. Chapman & Hall.
7. Sacharow S & Griffin RC. 1980. Principles of Food Packaging. AVI Publ.
8. Stanley S & Roger CG. 1998. Food Packaging. AVI Publ.

MINI PROJECT

University: MGM University, CHH.
SAMBHAJINAGAR

Faculty: Basic & Applied Science

Institute: Institute of Biosciences and Tech.

Degree: M.Sc. Food Technology(PG)

Course Unit Code: MFMMJ105

Course Unit Title: Mini Project

Credits allocated: 0+2

Level of Study: PG

Mode of delivery planned learning activities and teaching method: Practical 4 hrs / weekly

Recommended Year /Semester : Food Tech. & Processing-Master's of Science, Year1/Semester I

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidates should pass in undergraduate Life Science.

Course Outcomes:

1. Students will be able to practice acquired knowledge within the chosen area of technology for project development.
2. Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach.

PROCEDURE

SN	Activities	Responsibilities
1	PG students are decide on thire team members for their semester project with their proposed project domain and title	Project head, PG students
2	Director shall allocate the project guide based on their area of expertise (ot more than 3 batches to a guide)	Director
3	Ensuring that students have regular discussion meetings with their project guides.	Project guide Project head
4	Synopsis preparation and submission	Project head
5	Verification of student project log book	Project guide Project head

6	Approval of PPT : Abstract,existing, proposed system.30% of proposed work. 80% of proposed work. 100% of proposed work.	Project guide
7	Preparation and submission of progress report during project	Students Project head
8	Preparaing list for Redo students (insufficient content, plagiarism, poor presentation, genuiene absentees.	Project head
9	Submission of hard copy of project report	Project head
10	Evaluation of project report	External examiner
11	Organizing final project viva-voce	Project heads
12	Ensuring that if a candidate fails to submit the project reporton or before the specified deadline , he/she is deemed to have failed in the project work and shall re – enroll for the same	Project head Project guide Director

PRODUCT INNOVATION -I LAB

University: MGM University, CHH.
SAMBHAJINAGAR

Faculty: Basic & Applied Science

Institute: Institute of Biosciences and Tech.

Degree: M.Sc. Food Technology(PG)

Course Unit Code: MFMEP106

Course Unit Title: Product Innovation -I Lab

Credits allocated: 0+2

Level of Study: PG

Mode of delivery planned learning activities and teaching method: Practical 4 hrs / weekly

Recommended Year /Semester: Food Tech. & Processing-Master's of Science,
Year1/Semester I

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidates should pass in undergraduate Life Science.

PRACTICAL

1. Study of heat transfer analysis by conduction
2. Determination of thermal conductivity of solid food products
3. Study of centrifugal separation (cream separation from milk)
4. Study of Reynolds number apparatus to predict the type of flow
5. Measurement of thickness of paper and paper board
6. Study of food packaging
7. Study and Importance of vacuum packaging
8. Study of edible food packaging
9. Study of freeze drying process
10. Formulation of protein energy rich product
11. Preparation of low calorie food product
12. Fortification of iron in daily used products
13. Development of infant or weaning food
14. Development of geriatric food
15. Preparation of new product development for athletes
16. Preparation of specialty food using locally available food crop, fruit and vegetable
17. Preparation of low sodium food product
18. Preparation of fibre enriched convenience food
19. Preparation of flour based confectionary
20. Isolation and purification of pectin from organic waste

LAB IN FOOD PRODUCT DEVELOPMENT AND INTERNATIONAL TRADE

University: MGM University,

CHH. SAMBAJINAGAR

Faculty: Basic & Applied Science

Institute: Institute of Biosciences and Tech. Degree: M.Sc. Food Technology(PG)

Course Unit Code: MFMEP107

Course Unit Title: Lab In Food Product

Development and International Trade

Credits allocated: 0+2

Level of Study: PG

Mode of delivery planned learning activities and teaching method: Practical 4 hrs / weekly

PRE-REQUISITES	The student should have basic understanding of business and marketing
OBJECTIVES	<ol style="list-style-type: none">1. To guide students towards developing a new food product2. To enable students develop marketing strategies for a new food product
CONTENT	24 hours
1.1	Formulating a New Food Product
1.2	Preparing the New Food Product
1.3	Marketing the New Food Product
1.4	Managing the Export of the New Product
PEDAGOGY	Experiments in the Laboratory and Reports
LEARNING OUTCOMES	<ol style="list-style-type: none">1. The student will be able to develop their own food products2. The student will gain knowledge in marketing and managing the sale of their product

FOOD SCIENCE LAB

University: MGM University,

CHH. SAMBHAJINAGAR

Institute: Institute of Biosciences and Tech.

Course Unit Code: MFMEP108

Credits allocated: 0+2

Faculty: Basic & Applied Science

Degree: M.Sc. Food Technology(PG)

Course Unit Title: Food Science Lab

Level of Study: PG

Mode of delivery planned learning activities and teaching method: Practical 4 hrs / weekly

Recommended Year /Semester: Food Tech. & Processing -Master's of Science, Year1/SemesterII

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidates should pass in undergraduate Life Science.

PRACTICAL

1. Physical-tests on wheat and rice; Physicochemical and rheological properties.
2. Determination of gluten content in wheat flour.
3. Conditioning of wheat; Milling of wheat and rice by laboratory mill.
4. Parboiling of rice.
5. Quality tests of rice.
6. Amylose content determination in rice.
7. Malting of barley, puffing and popping of grains.
8. Experimental parboiling and assessment of degree of polishing.
9. Preparation of protein concentrates and isolates and their evaluation for protein content and solubility.
10. Extraction of oil using expeller and solvent extraction methods.
11. Testing and evaluation of quality attributes of raw and processed foods.
12. Detection and estimation of food additives and adulterants.
13. Quality assurance procedure, GMP, GAP documentation.
14. Preparation of quality policy & documentation.
15. Application of HACCP to products.

PRE AND POST HARVEST TECHNOLOGY OF FRUITS AND VEGETABLE

University: MGM University,

CHH. SAMBHAJINAGAR

Institute: Institute of Biosciences and Tech.

Course Unit Code: MFMEP109

Faculty: Basic & Applied Science

Degree: M.Sc. Food Technology(PG)

Course Unit Title: Pre and Post
Harvest Technology of Fruits and
Vegetable

Credits allocated: 0+2

Level of Study: PG

Mode of delivery planned learning activities and teaching method: Practical 4 hrs /
weekly

PRE-REQUISITES	The student should have knowledge of food chemistry
OBJECTIVES	<ol style="list-style-type: none">1. To practically acquaint students with fundamental fruit and vegetable processing techniques2. To familiarize students with quality control tests specific to the horticulture industry
CONTENT	24 hours
1.1	Preparation of Vegetable Products
1.2	Preparation of Fruit Products
1.3	Preparation of Dehydrated Vegetables
1.4	Preparation of Banana and Potato Wafers
1.5	Preparation of Dried Figs and Raisins
1.6	Vegetable and Fruit Maturity Index Determination and Calculation
1.7	Quality Standard Measurements of Vegetable and Fruit Products
PEDAGOGY	Experiments in the Laboratory
LEARNING OUTCOMES	<ol style="list-style-type: none">1. The student will be able to prepare processed vegetable and fruit products2. The student will gain an understanding of determining quality characteristics and acceptability parameters of horticulture produce

Research Methodology

University: MGM University, CHH.
SAMBHAJINAGAR

Faculty: Basic & Applied Science

Institute: Institute of Biosciences and Tech.

Degree: M.Sc. Food Technology(PG)

Course Unit Code:

Course Unit Title: Research
Methodology

Credits allocated: 4+0

Level of Study: PG

Mode of delivery planned learning activities and teaching method: Practical

4 hrs /weekly

Recommended Year /Semester: M.Sc. Plant Breeding & Molecular Genetics

Year I/Semester I

Objectives:

- To get introduced to research philosophy and process in general
- To be able to formulate the problem statement and research plan for the problem under investigation
- To be able to apply various numerical/ quantitative techniques for data analysis
- To be able to communicate the research findings effectively

COURSE CONTENTS

THEORY (Total Lectures = 60)

Unit I: (12 Lectures)

Research Methodology: Introduction, Meaning of Research, Objectives of Research, Types of Research, Research Approaches, Significance of Research, Research Methods versus Methodology, Research and Scientific Method, Research Process, Criteria of Good Research, Problems Encountered by Researchers in India. Defining the Research Problem: Research Problem, Selecting the Problem, Necessity of Defining the Problem, Technique Involved in Defining a Problem, An Illustration.

Unit II: (12 Lectures)

Reviewing the literature: Place of the literature review in research, Bringing clarity and focus to research problem, Improving research methodology, Broadening knowledge base in research area, Enabling contextual findings, Review of the literature, searching the existing literature, reviewing the selected literature, Developing a theoretical framework, Developing a conceptual framework, Writing about the literature reviewed. Research Design: Meaning of Research Design, Need for Research Design, Features of a Good Design, Important Concepts Relating to Research Design, Different Research

Designs, Basic Principles of Experimental Designs, Important Experimental Designs.

Unit III: (12 Lectures)

Design of Sample Surveys: Design of Sampling: Introduction, Sample Design, Sampling and Non-sampling Errors, Sample Survey versus Census Survey, Types of Sampling Designs. Measurement and Scaling: Qualitative and Quantitative Data, Classifications of Measurement Scales, Goodness of Measurement Scales, Sources of Error in Measurement, Techniques of Developing Measurement Tools, Scaling, Scale Classification Bases, Scaling Technics, Multidimensional Scaling, Deciding the Scale. Data Collection: Introduction, Experimental and Surveys, Collection of Primary Data, Collection of Secondary Data, Selection of Appropriate Method for Data Collection, Case Study Method.

Unit IV: (12 Lectures)

Testing of Hypotheses: Hypothesis, Basic Concepts Concerning Testing of Hypotheses, Testing of Hypothesis, Test Statistics and Critical Region, Critical Value and Decision Rule, Procedure for Hypothesis Testing, Hypothesis Testing for Mean, Proportion, Variance, for Difference of Two Mean, for Difference of Two Proportions, for Difference of Two Variances, P-Value approach, Power of Test, Limitations of the Tests of Hypothesis. Chi-square Test: Test of Difference of more than Two Proportions, Test of Independence of Attributes, Test of Goodness of Fit, Cautions in Using Chi Square Tests.

Unit V: (12 Lectures)

Interpretation and Report Writing: Meaning of Interpretation, Technique of Interpretation, Precaution in Interpretation, Significance of Report Writing, Different Steps in Writing Report, Layout of the Research Report, Types of Reports, Oral Presentation, Mechanics of Writing a Research Report, Precautions for Writing Research Reports.

Suggested Readings

1. 'Management Research Methodology' by K.N. Krishnaswamy, Appa Iyer Sivakumar & M. Mathirajan, Person Education.
2. 'Research Methodology. G.C. Ramamurthy, Dream Tech Press, New Delhi
3. 'Research Methodology: A Step by Step Guide for Beginners' by Ranjit Kumar, 2nd Edition
4. 'Research Methodology: An Introduction for Science and Engineering Students', by Stuart Melville and Wayne Goddard
5. 'Research Methodology: An Introduction' by Wayne Goddard and Stuart Melville

**'Research Methodology: Methods and Techniques', by Dr. C.R. Kothari, New
Age International Publisher**

MGM UNIVERSITY, CHH. SAMBAJINAGAR
INSTITUTE OF BIOSCIENCES AND TECHNOLOGY
CHOICE BASED CREDIT SYSTEM (CBCS)

SEMESTER PATTERN

Faculty of Sciences

Post Graduate (PG) programme

FOOD TECHNOLOGY - CURRICULUM

w. e. f. Academic Year 2023-24

M.Sc. Food Technology

SEMESTER-II

CURRICULUM

Semester II (M.Sc. FT)																		
Level	Course Code	Course Title	Type	Course Type	Teaching Scheme		Credit	Evaluation Scheme							Minimum Passing			
					L	P		CA-I	MSE	CA-II	TW	ESE	PR	Total	Internal	ESE	PR	Total
6.0	MFMML110	Beverages Technology	Theory	Major Mandatory	3	-	3	20	20	20	-	40	-	100	-	16	-	40
	MFMML111	Food Commodities	Theory	Major Mandatory	3	-	3	20	20	20	-	40	-	100	-	16	-	40
	MFMML112	Food Microbiology & Toxicology	Theory	Major Mandatory	3	-	3	20	20	20	-	40	-	100	-	16	-	40
	MFMML113	Food Quality System and Food Analysis	Theory	Major Mandatory	3	-	3	20	20	20	-	40	-	100	-	16	-	40
	MFMEP114	1. Lab In Nutraceuticals and health Food	Practical	Major Elective	-	4	2	-	-	-	30	-	20	50	-	-	8	20
	MFMEP115	2. Lab In Entrepreneurship and Business Management																
	MFMEP116	1. Processing Lab	Practical	Major Elective	-	4	2	-	-	-	30	-	20	50	-	-	8	20
	MFMEP117	2. Food Additives, Adulteration and Toxicology																
	MFMMJ118	Micro Project	Practical	Major Mandatory	-	4	2	-	-	-	30	-	20	50	-	-	8	20
MFPPJ119	Field Project	Practical	FP	-	8	4	-	-	-	60	-	40	100	-	-	16	40	
		Total (L- P) Hrs / week = 32			12	20	22	80	80	80	150	160	100	650		64	40	260

Level 6.0 Award of PG Diploma (44 Credits) after Three Year UG Degree

BEVERAGES TECHNOLOGY

University: MGM University, CHH.
SAMBHAJINAGAR

Faculty: Basic & Applied Science

Institute: Institute of Biosciences and Tech.

Degree: M.Sc. Food Technology(PG)

Course Unit Code: MFMML110

Course Unit Title: Beverages Technology

Credits allocated: 3+0 (3Theory+0 Practical)

Level of Study: PG

Mode of delivery, planned learning activities and teaching method: Lecture 3 hrs weekly

Recommended Year/Semester: Food Tech. & Processing-Master's of Science, Year1/Semester II

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the Principal. The approved courses must be mentioned in the roster form.

LEARNING OUTCOME:

Upon successful completion, students will have the knowledge and skills to: This subject is designed to impart basic knowledge on the area of beverages technologies. Types of beverages, Specialty beverages, Alcoholic beverages.

OBJECTIVE:

To provide a technical view of beverages and a full discussion of manufacturing processes in the context of technology and its related chemistry as well as a more fundamental appraisal of the underlying science.

DETAILED SYLLABUS

THEORY

Unit-I Beverages and types of beverages (8 Lectures)

Introduction to Beverages, Importance of beverages and status of beverage industry, Classification of beverages, Processing of beverages. FSSAI specifications for beverages. Type of beverages: fruit juices, fermented and non-fermented beverages, synthetic beverages, carbonated and non- carbonated beverages. Low-calorie and dry beverages. Isotonic and sports beverage.

Unit-II Processing of beverages (9 Lectures)

Different process: Juice extraction, clarification, preservation, packaging, concentration and drying. Various beverages from fruit juices, their preparation and preservation: Fruit juice, RTS, Squash, Nectar, cordial, crush, syrup, fruit juice concentrate, fruit juice powder

Unit-III Classification of beverages (10 Lectures)

Non carbonated and carbonated synthetic beverages: Ingredients, source of carbon dioxide, chemical and physical properties of carbon dioxide, carbonating process, packaging of carbonating beverages. Specialty beverages based on tea, coffee, cocoa, spices, nuts, dairy and imitation dairy- based beverages.

Unit -IV Alcoholic beverages (9 Lectures)

Alcoholic Beverages: Non-Distilled Beverages: Beer and Wine Distilled Beverages: Vodka, Rum, Gin, Whisky, Toddy, Brandy, the role of yeast in beer and other alcoholic beverages.

Unit-V Water for beverages (9 Lectures)

Water for beverages: Types of water required for beverages, treatment of water. Additives for beverages: Natural and synthetic sweeteners and colours, acids, emulsifiers, preservatives, flavours and flavour enhancers.

Suggested Reading/ Reference Books/ Text Books:

1. Hardwick WA.1995.Handbook of Brewing.Marcel Dekker.
2. Hui YH.et al2004.Handbook of FoodandBeverageFermentationTechnology.MarcelDekker.
3. PriestFG&StewartGG.2006.HandbookofBrewing.2ndEd.CRC.
4. RichardPVine.1981.CommercialWineMaking-ProcessingandControls.AVIPubl.
5. VarnamAH&SutherlandJP.1994.Beverages:Technology, Chemistry and Microbiology. Chapman & Hall.
7. WoodroofJG&PhillipsGF.1974.Beverages:CarbonatedandNonCarbonated. AVIPubl.

FOOD COMMODITIES

University: MGM University, CHH.
SAMBHAJINAGAR

Faculty: Basic & Applied Science

Institute: Institute of Biosciences and Tech.

Degree: M.Sc. Food Technology(PG)

Course Unit Code: MFMML111

Course Unit Title: Food Commodities

Credits allocated: 3+0 (3 Theory+0 Practical) **Level of Study:** PG

Mode of delivery, planned learning activities and teaching method: Lecture 3 hrs weekly

Recommended Year/Semester: Food Tech. & Processing-Master's of Science, Year1/Semester II

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the Principal. The approved courses must be mentioned in the roster form

Objective: Learn basics of To study various processing methods for various food materials like fruits & vegetables, dairy products, cereals, meat, poultry, fish and bakery products. To study various innovative food processing techniques.

Learning Outcomes: Upon successful completion the students will be able to:

1. Understand the basics of food processing.
2. Know the various processing technologies involved in fruits and vegetables, dairy, cereals,meat, fish, egg and plantation products.
3. Learn the basics on microbiology of food products.
4. Describe the process of manufacture of various food products.
5. Recognize various methods of preservation of food.

DETAILED SYLLABUS

THEORY

Total Lectures = 45

UNIT I: Cereal, Pulses and Oil Seeds Technology (9 Lectures)

Rice milling, Pulse milling, Wheat milling - Oil extraction - Methods of manufacture of Bread

- different processes of manufacture - types of breads - buns, biscuits, cakes and cookies-Pasta products-Tortilla-Method of manufacture.

UNIT II :Fruits and Vegetable Processing (8 Lectures)

Production of Fruits and vegetables in India, Cause for heavy losses, preservation treatments - Basics of Canning, Minimal processing and Hurdle technology as applied to Vegetable and Fruit processing, Processing of fruit juices, Dehydration, Aseptic processing.

UNIT III: Dairy Processing (10 Lectures)

Basic dairy terminology, composition, General tests at reception, Dairy Processing - Method of manufacture of Standardized, toned and double toned milk, milk powder - Equipments- Pasteurizers, homogenizers and pumps-Method of manufacture of dairy products-Ice-cream, Cheese, Paneer, Yoghurt-Pasteurization and microorganisms involved in spoilage of milk.

UNIT IV: Meat, Poultry and Fish Processing (8 Lectures)

Meat composition from different sources, Definitions and measurements, Carcass Processing, Meat Products, Processing of Poultry Products, Fish and other Marine Products Processing .

UNIT V:Plantation Product Technology (10 lectures)

Processing of Tea, Coffee and Cocoa - Outline of the methods of manufacture of -green tea, black tea, instant tea, Instant coffee, Cocoa and Chocolate. Outline of the methods of processing of Pepper, cardamom, ginger, vanilla and turmeric.

Reference books/Text Books

1. Srivastava,R.P.andKumar,S.:FruitandVegetablePreservation:PrinciplesandPractices.InternationalBookDistributing Co.Lucknow (2ndEdition 1998).
2. Chakraverty, A., Mujumdar A. S., Raghavan G. S. Vand Ramaswamy H. S. Handbook of Post-harvest Technology: Marcel Dekker Press, USA(2001)
3. James Harper W. andCarl W. Hall: Dairy Technology and Engineering

AVIPublishing, Westport, USA(1976)

4. Karel Kulpan and Joseph P Pante: Hand Book Of Cereal Science and Technology
Mercel Dekkar USA (2000)
5. Samuel Matz: The Chemistry and Technology of Cereals as Food and Feed,
Chapman & Hall (1992)

FOOD MICROBIOLOGY & TOXICOLOGY

University: MGM University, CHH.
SAMBHAJINAGAR

Faculty: Basic & Applied Science

Institute: Institute of Biosciences and Tech.

Degree: M.Sc. Food Technology(PG)

Course Unit Code: MFMML112

Course Unit Title: Food Microbiology &
Toxicology

Credits allocated: 3+0 (3 Theory+0 Practical)

Level of Study: PG

Mode of delivery, planned learning activities and teaching method: Lecture 3 hrs
weekly

Recommended Year/Semester: Food Tech. & Processing-Master's of Science,
Year1/Semester II

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the Principal. The approved courses must be mentioned in the roster form

LEARNING OUTCOME:

Upon successful completion, students will have the knowledge and skills to: A thorough explaining of the -Growth and survival of microorganisms in foods, Biochemical changes caused by microorganisms, Food hygiene and sanitation, Food Fermentations. This subject is designed to impart a fundamental knowledge on the principles and food microbiology techniques.

OBJECTIVES:

To acquaint with different groups of micro-organisms associated with food, their activities, destruction and detection in food.

DETAILED SYLLABUS

THEORY

UNIT-I Growth and survival of microorganisms in foods (8 Lectures)

Growth and survival of microorganisms in foods; spoilage organisms of milk, fruits, vegetables, grains and oil seeds, meat and poultry;

Physical and chemical methods to control microorganisms.

UNIT-II Microbial spoilage of foods Factors affecting kinds (9 Lectures)

Microbial spoilage of foods Factors affecting kinds, numbers, growth and survival of microorganisms in foods, Intrinsic factors; pH, water activity, nutrients etc and Extrinsic factors:

Relative humidity, temperature and gaseous atmosphere.

UNIT-III Role of microorganisms in food (10 Lectures)

Role of micro organisms in food : all factors affecting growth and destruction of microbes- aerobes and anaerobes, psychrophiles, psychrotrophs, mesophiles, thermophilic, thermophiles, halophiles, osmophiles and sporeformers.

UNIT-IV Definition scope and general principles of food toxicology (9 Lectures)

Definition scope and general principles of food toxicology; food contamination (physical, chemical and microbial) classification of food toxicants; factors affecting toxicity of compounds.

UNIT-V Toxicants and allergens in foods derived from plants, animals (9 Lectures)

Toxicants and allergens in foods derived from plants, animals; Microbial toxins; Food Poisoning; Food borne infections and disease; Derived Food toxicants- Processing & Packaging. **Suggested Reading/ Reference**

Books/ Text Books

1. Abdulla, M., Vohora, S. and Athar, M. 1995. Trace and toxic elements in nutrition and health. Jamia Hamdard New Delhi and Wiley Eastern Ltd.
2. John N. Hathcock. 1989. Nutritional Toxicology. Academic Press, Inc. Vol. III.
3. Klara Miller. 1987. Toxicological Aspects of Food. Elsevier Applied Publishers LTD.
4. [Michael J. Pelczar JR, E. C. S. Chan, Noel R. Krieg. 2021. Microbiology. Kindle Edition.](#)

FOOD QUALITY SYSTEM AND FOOD ANALYSIS

University: MGM University, CHH.
SAMBHAJINAGAR

Faculty: Basic & Applied Science

Institute: Institute of Biosciences and Tech.

Degree: M.Sc. Food Technology(PG)

Course Unit Code: MFMML113

Course Unit Title: Food Quality System and
Food Analysis

Credits allocated: 3+0

Level of Study: PG

Mode of delivery, planned learning activities and teaching method: Lecture 3 hrs weekly

Recommended Year /Semester: Food Tech. & Processing -Master's of Science, Year1/SemesterII

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the Principal. The approved courses must be mentioned in the roster form

LEARNING OUTCOME:

Upon successful completion, students will have the knowledge and skills to: Concept of quality, quality management, Quality assurance, Concept of quality, Concepts of quality management, Quality assurance and Management.

OBJECTIVES

To acquaint with food quality parameters and control systems, food standards, regulations, specifications.

DETAILED SYLLABUS

THEORY

UNIT-I Food quality and its role in food industry (9 Lectures)

Food quality and its role in food industry; need of quality control, factors affecting quality control, Quality attributes: physical, chemical, nutritional, microbial, and sensory; their measurement and evaluation, dominant and hidden attributes Color, Viscosity, Consistency, Size and shape, Texture, Taste. Defect in the food.

UNIT-II Concepts of quality management (8 Lectures)

Concepts of quality management: Objectives, importance and functions of quality control; Quality management systems in India; Sampling procedures and plans

UNIT-III Food Safety and Standards Act (10 Lectures)

Food Safety and Standards Act,2006. International food standards, Total Quality Management; GMP, GAP; Sanitary and hygienic practices; HACCP; Indian & International quality systems and standards like ISO and Food Codex; Applications in different food industries; Food adulteration and food safety.

UNIT-IV Sampling techniques (9 Lectures)

Sampling techniques; Wateractivity, its measurements and significance in food quality; Calibration and standardization of different instruments.

UNIT-V Different analytical techniques used in food analysis (9 Lectures)

Different analytical techniques used in food analysis. Different separation technique used for food. Microscopic techniques in food analysis.

Suggested Reading/ Reference Books/ Text Books :

1. Amerine MA,PangbornRM&RosslosEB.1965.PrinciplesofSensoryEvaluationofFood.AcademicPress.
2. EarlyR.1995.GuidetoQualityManagementSystemsforFoodIndustries.BlackieAcademic.
3. FuriaTE.1980.RegulatorystatusofDirectFoodAdditives.CRCPress.
4. JellinekG.1985.SensoryEvaluationofFood-TheoryandPractice.EllisHorwood.

LAB IN NUTRACEUTICALS AND HEALTH FOOD

University: MGM University, CHH.
SAMBHAJINAGAR

Faculty: Basic & Applied Science

Institute: Institute of Biosciences and Tech.

Degree: M.Sc. Food Technology(PG)

Course Unit Code: MFMEP114

Course Unit Title: Lab In
Nutraceuticals and health Food

Credits allocated: 0+2

Level of Study: PG

Mode of delivery, planned learning activities and teaching method: Practical 4 hrs / weekly

PRE-REQUISITES	The student should have knowledge of food chemistry
OBJECTIVES	<ol style="list-style-type: none"> 1. To acquaint students with extraction procedures of nutrients and functional components from foods 2. To develop food labelling knowledge and competency in students
CONTENT	24 hours
1.1	Market Survey and Classification of Health Foods and Nutraceuticals
1.2	Extraction and Estimation of Vitamin C from Fruits
1.3	Extraction and Estimation of Folic Acid from Vegetables
1.4	Extraction and Estimation of β -carotene from Carrots
1.5	Extraction and Estimation of Lycopene from Tomatoes
1.6	Extraction and Estimation of Astaxanthene from Grapes
1.7	Development of Labels for Health Foods
1.8	Estimation of Tannins in Cashew Apple
PEDAGOGY	Experiments in the Laboratory
LEARNING OUTCOMES	<ol style="list-style-type: none"> 1. The student will be able to estimate the nutrient content of fruits and vegetables 2. The student will be able to grade foods in terms of its nutritional Quality

LAB IN ENTREPRENEURSHIP AND BUSINESS MANAGEMENT

University: MGM University, CHH.
SAMBHAJINAGAR

Faculty: Basic & Applied Science

Institute: Institute of Biosciences and Tech.

Degree: M.Sc. Food Technology(PG)

Course Unit Code: MFMEP115

Course Unit Title: Lab In
Entrepreneurship and Business
Management

Credits allocated: 0+2

Level of Study: PG

Mode of delivery, planned learning activities and teaching method: Practical 4 hrs / weekly

PRE-REQUISITES	The student should have basic understanding of business and marketing
OBJECTIVES	<ol style="list-style-type: none">1. To familiarize students with the practical development of a business model2. To make students competent in marketing a business idea
CONTENT	24 hours
1.1	Conceptualizing a Business Idea
1.2	Designing a Business Model
1.3	Creating Advertisements for the Proposed Business
1.4	Marketing the proposed Business
PEDAGOGY	Reports
LEARNING OUTCOMES	<ol style="list-style-type: none">1. The student will gain ability to design a business model2. The student will gain the ability to advertise and market their business

PROCESSING LAB

University: MGM University, CHH.
SAMBHAJINAGAR

Faculty: Basic & Applied Science

Institute: Institute of Biosciences and Tech.

Degree: M.Sc. Food Technology(PG)

Course Unit Code: MFMEP116

Course Unit Title: Processing Lab

Credits allocated: 0+2

Level of Study: PG

Mode of delivery, planned learning activities and teaching method: Practical 4 hrs / weekly

Recommended Year /Semester: Food Tech. & Processing -Master's of Science, Year1/SemesterII

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidates should pass in undergraduate Life Science.

PRACTICAL

1. Chemical and microbiological analysis of raw water quality.
2. Preparation of regional fruit juices.
3. Preparation of whey-based beverages.
4. preparation of iced and flavoured tea beverage.
5. Preparation of carbonated and non- carbonated soft drinks.
6. Preparation of wine and beer.
7. Preparation of soy milk.
8. fruitmilkshakes, herbal beverages.
9. visit to relevant processing units.
10. Microscopic examination of bacteria, and yeast and molds.
11. Standard plate count; Yeast and mould count, Spore count.
12. Detection and enumeration of pathogenic and indicator organisms in food.
13. MPN of coli forms.
14. Enumeration of physiological groups- psychrophile, thermotolerants, osmophiles and halophiles.
15. Evaluation of microbiological quality of commonly consumed street foods

FOOD ADDITIVES, ADULTERATION AND TOXICOLOGY

University: MGM University, CHH.
SAMBHAJINAGAR

Faculty: Basic & Applied Science

Institute: Institute of Biosciences and Tech.

Degree: M.Sc. Food Technology(PG)

Course Unit Code: MFMEP117

Course Unit Title: Food Additives,
Adulteration and Toxicology

Credits allocated: 0+2

Level of Study: PG

Mode of delivery, planned learning activities and teaching method: Practical 4 hrs / weekly

PRE-REQUISITES	The student should have knowledge of types of foods, chemistry, and microbiology
OBJECTIVES	<ol style="list-style-type: none">1. To familiarize students with isolation of various biopolymers from foodresources2. To acquaint students with the practical aspects of toxin-free foods
CONTENT	24 hours
1.1	Estimation of Preservatives in Foods
1.2	Estimation of Colours in Foods
1.3	Isolation of Native and Modified Proteins, Starches and Lipids in Foods
1.4	Protocol for Detection and Quantification of Toxins in Food
1.5	Olfactory Analysis of Food Products
1.6	Demonstration for the Detection of Pesticide Residues in Food
1.7	Demonstration for the Detection of Antibiotic Residues/ Hormones/ Veterinary Drugs, and Heavy Metals in Foods
1.8	Analysis of Microbial and Plant Toxins
PEDAGOGY	Experiments in the Laboratory
LEARNING OUTCOMES	<ol style="list-style-type: none">1. The student will be able to practically analyse the presence of additives in foods2. The student will be able to practically determine the presence of adulterants in foods

MICRO PROJECT

University: MGM University, CHH.
SAMBHAJINAGAR

Faculty: Basic & Applied Science

Institute: Institute of Biosciences and Tech.

Degree: M.Sc. Food Technology(PG)

Course Unit Code: MFMMJ118

Course Unit Title: Mini Project

Credits allocated: 0+2

Level of Study: PG

Mode of delivery, planned learning activities and teaching method: Practical 4 hrs / weekly

Recommended Year /Semester: Food Tech. & Processing -Master's of Science, Year1/SemesterII

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidates should pass in undergraduate Life Science.

Course Outcomes:

1. Students will be able to practice acquired knowledge within the chosen area of technology for project development.
2. Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach.

PROCEDURE

Sr. No	Activities	Responsibilities
1	PG students are decide on thire team members for their semester project with their proposed project domain and title	Project head, PG students
2	Director shall allocate the project guide based on their area of expertise (ot more than 3 batches to a guide)	Director
3	Ensuring that students have regular discussion meetings with their project guides.	Project guide Project head
4	Synopsis preparation and submission	Project head
5	Verification of student project log book	Project guide Project head

6	Approval of PPT : Abstract,existing, proposed system.30% of proposed work. 80% of proposed work. 100% of proposed work.	Project guide
7	Preparation and submission of progress report duringproject	Students Project head
8	Preparaing list for Redo students (insufficient content,plagiarism, poor presentation, genuiene absentees.	Project head
9	Submission of hard copy of project report	Project head
10	Evaluation of project report	External examiner
11	Organizing final project viva-voce	Project heads
12	Ensuring that if a candidate fails to submit the project reporton or before the specified deadline , he/she is deemed to have failed in the project work and shall re –enroll for the same	Project head Project guide Director

FIELD PROJECT

University: MGM University, CHH.
SAMBHAJINAGAR

Institute: Institute of Biosciences and Tech.

Course Unit Code: MFFPJ119

Credits allocated: 0+4 (Practical)

Faculty: Basic & Applied Science

Degree: M.Sc. Food Technology(PG)

Course Unit Title: Field Project

Level of Study: PG

Mode of delivery, planned learning activities and teaching method: Practical 4 hrs / weekly

Recommended Year /Semester: Food Tech. & Processing -Master's of Science, Year1/SemesterIII

Prerequisites for registration: Registration of a student in various courses in consultation with the respective course teacher and Adviser and acceptance by the principal. The approved courses must be mentioned in the roster form.

Candidates should pass in undergraduate Life Science.

Course Outcomes:

1. Students will be able to practice acquired knowledge within the chosen area of technologyforproject development.
2. Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach.