

Program Structure Program: M.Sc. (Food Science and Technology) Program Code: SBR0413 Batch: 2021-23 Department of Life Sciences School of Basic Science & Research



1. Standard Structure of the Program at University Level

1.1 Vision, Mission and Core Values of the University

Vision of the University

To serve the society by being a global University of higher learning in pursuit of academic excellence, innovation and nurturing entrepreneurship.

Mission of the University

- 1. Transformative educational experience
- 2. Enrichment by educational initiatives that encourage global outlook
- **3.** Develop research, support disruptive innovations and accelerate entrepreneurship
- 4. Seeking beyond boundaries

Core Values

- Integrity
- Leadership
- Diversity
- Community



1.2 Vision and Mission of the School

Vision of the School

Achieving Excellence in the Realm of Basic and Applied Sciences to Address the Global Challenges of Evolving Society

Mission of the School

- 1. To equip the students with knowledge and skills in basic and applied sciences.
- 2. Capacity building through advanced training and academic flexibility.
- **3.** To establish centre of excellence for ecologically and socially innovative research.
- 4. To strengthen inter institutional and industrial collaboration for skill development and global employability.

Core Values

1. Passion

- 2. Perseverance
- 3. Scientific nature
- 4. Yearning for truth



Vision of the Department

To acquire and impart knowledge of biology and bio-techniques so as to build capacity for addressing current global challenges

Mission of the Department

- 1. To train and transform students into thinking researchers/ professionals who are able to integrate theoretical knowledge and analytical skills in diverse areas of Biotechnology.
- 2. To make students and faculties updated with advance techniques and to introduce the students to dynamic environment of bioscience
- 3. To conduct cutting-edge interdisciplinary research.
- 4. To introduce various skill development courses thereby enhancing the employability and providing opportunities for industry-academia collaboration.



1.3 Programme (Specilization in Food Science and Technology) Educational Objectives (PEO)

1.3.1 Writing Programme Educational Objectives (PEO)

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

- PEO1: Postgraduate will be able to integrate advanced Food Science and Technology concepts through theoretical knowledge and experimental techniques.
- PEO2: Postgraduate students to lay emphasis on new discoveries and interdisciplinary nature of research in the field of food technology so that students are motivated to take up research in the form of higher studies or industrial projects.
- PEO3: Postgraduate enhance the morden practical knowledge of the students by teaching them latest Food Quality analysis advanced techniques and to make them learn the use of these techniques for competitive examinations ,betterment of society and food safety.
- PEO4: Postgraduate students will be industry- or academia-ready by inculcating professional ethics, independent thinking, good communication and scientific skills in the students.
- PEO5: Postgraduate students strengthen the analytical skills and research aptitude of students through continuous learning and by assigning them presentation/ case studies and project work.



	1.3.2	2 Map	PEOs	with	School	Mission	Statements:
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PEO Statements	School Mission 1	School Mission 2	School Mission 3	School Mission 4
	3	2	2	1
PEO1:				
	2	2	3	2
PEO2:				
	2	3	3	1
PEO3:				
	2	2	2	3
PEO4:				
	1	1	2	1
PEO5:				

1.3.2.1 Map PEOs with Department Mission Statements:

PEO Statements	Department Mission 1	Department Mission 2	Department Mission 3	Department Mission 4
	3	2	2	2
PEO1:				
	3	2	3	2
PEO2:				
	2	3	2	3
PEO3:				
	2	1	1	2
PEO4:				
	2	1	2	2
PEO5:				



1.3.3. Program Outcomes (PO's)

- **PO1. Knowledge and Skill Set:** Students will become proficient in understanding various food preservation techniques and processes. The student will be skilled in latest interdisciplinary Industrial level technical knowledge which will be beneficial for their future research/ employment.
- **PO2. Research:** Students will be able to independently think and identify a research problem, design experimental protocols to address that problem and analyse statically the results or solutions emanating out of his/ her work.
- **PO3. Oral Communication and Scientific Writing:** Students will develop sound oral communication skills. They will be able to make and deliver effective presentations. The students will be able to comprehend and write project report/ reviews and / research articles through enhanced learning, reading and writing skills.
- **PO4. Food technology, Environment and Society:** Student will be able to understand the impact of Food technology on environment and society. Students will be capable of addressing different problems related to food safety and food preservation for food security. Students will be able to develop scientific data and could provide support for Industrial Research and Development with new innovations and techniques applied in food preservation.
- **PO5. Ethics:** The students will develop and understand the importance of professional ethics. Students will be able to understand the issue of plagiarism in research and importance of copyrights. Students will also gain knowledge about various ethical issues associated with Patent filling.

Mapping	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	3	2	2	3	2
PO2	2	3	2	2	3
PO3	1	1	1	3	2
PO4	2	2	3	1	2
PO5	2	2	1	3	1

1.3.4 Mapping of Program Outcome Vs Program Educational Objectives



1.3.5 Program Outcome Vs Courses Mapping Table:

1.3.5.1 COURSE ARTICULATION MATRIX

Cos	PO1	PO2	PO3	PO4	PO5
MFS 101	3	3	2	1	-
MFS 102	3	3	2	1	-
MFS 103	3	3	2	3	3
MFS 104	3	2	2	1	-
MFP 104	3	2	1	-	-
MFP 105	3	3	2	1	1
MFP106	3	3	2	2	1
MFS 105	3	3	2	1	-
MFS 106	3	3	2	3	3
MFS 152	3	3	2	3	2
MFS 153	3	2	2	2	-
CCU401	3	2	2	2	-
MFS 201	3	2	2	1	-
MFS 202	3	3	2	1	-
MFS 203	3	3	2	3	2
MFS 251	3	3	2	3	1
MFS 252	2	1	2	3	3
MFS 204	3	3	2	2	3
MFS 205	3	3	2	2	3
MFS 253	3	2	2	1	3



SUMMARY SHEET

Teaching Department: School: Programme: Life Science School of Basic Sciences and Research M.Sc. (Food Science and Technology)

Duration:

Two Years

Total number of Credits : 86



TERM: I	
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S.	Paper	Subject	Subjects	Teaching						
No.	ID	Code		Load		Credits				
				L	Т	Р				
THEORY SUBJE	ECTS									
1.	30055	MST 111	Biostatistics	2	0	0	2			
2.	30377	MFS 101	Nutrition Biochemistry	4	0	0	4			
3.	30378	MFS 102	Advanced Food Processing	4	0	0	4			
4.	30379	MFS 103	Advanced Food Chemistry	4	0	0	4			
5.	30604	MFS 104	Technology of Fruits Vegetables and Plantation Crops	4	0	0	4			
Practical/Viva-Voce/Jury										
6.	30473	MFP 104	Advanced Food Processing Lab	0	0	3	2			
7.	30474	MFP 105	Advanced Food Biochemistry Lab		0	3	2			
8.	30605	MFP 106	Food Preservation Lab	0	0	3	2			
		TOTAL CREDITS								

TERM: II

S.	Paper	Subject Code	Subjects	Teaching Load		oad	
No.	ID			L	Т	P	Credits
THE	ORY SUB	SJECTS					
1	30407	MSB121	Fermentation Technology	4	0	0	4
2	30410	MFS105	Advanced Food Safety and Toxicology	4	0	0	4
3	30411	MFS 106	Advanced Food Biotechnology	4	0	0	4
4	30268	MMB 204	Food Microbiology	4	0	0	4
5	30399	MSB 120	Bioinformatics	2	0	0	2
PRA	CTICALS	5		-			
6	30413	MFS153	Advanced Food Biotechnology Lab	0	0	3	2
7	30548	MFS154	Advanced Food Microbiology Lab	0	0	3	2
8	30661	MFS155	Advanced Food Safety and Toxicology Lab	0	0	3	2
]	TOTAL	24



TERM: III

S.	S. Paper Subject Subjects Teaching Load								
No.	ID	Code	L T P		Р	Credits			
THEORY SUBJECTS									
1.	30486	MFS 201	Food Quality and Assurance	4	0	0	4		
2.	30487	MFS 202	Technology of Meat, Poultry and Fish Products	4	0	0	4		
3.	30488	MFS 203	Waste Management in Food Industries	4	0	0	4		
4.	30846	MFS206	Techniques in Food Analysis	4	0	0	4		
Pract	tical/Viva	-Voce/Jury							
5.	30489	MFS 251	Dissertation - I	0	0	4	2		
6.	30490	MFS 252	Food Quality and Assurance Lab	0	0	2	2		
7.	30847	MFP202	Meat Technology Lab	0	0	2	2		
TOTAL CREDITS									

TERM: IV

S. No.	Paper ID	Subject Code	Subjects	Teaching Load		Credits	
				L	Т	Р	
THE	ORY SUB	JECTS					
1.	30545	MFS 204	Bakery, confectionary and extruded products	4	0	0	4
2.	30546	MFS 205	Technology of plant derived Foods	4	0	0	4
PRACTICALS							
3.	30547	MFS253	Dissertation II	0	0	16	8
			TOTAL				16



MST111: BIO-STATISTICS L-T-P: 2-0-0

School:	SBSR	Batch: 2021-23				
Program	n: M. Sc.	Current Academic Year: 2021 - 22				
Branch:	(Food Science and					
Technolo	ogy)	Semester: Odd (1 st)				
1	Course Code.	MST111				
2	Course Title	BIO-STATISTICS				
3	Credits	2				
4	Contact Hours (L-T-P)	2-0-0				
	Course status	Compulsory				
5	Course Objectives	To make students familiar with the concept of Probal emphasis on some standard probability distributions.	bility and Statistics with butions and sampling			
6	Course Outcomes Course Outcomes Course Outcomes Course Outcomes Course Course Outcomes Course Course Course Outcomes Course Cour					
7	Course Description					
8	Outline syllabus:					
UNIT 1	Introduction and	descriptive statistics.	CO Mapping			
А	Representation of tendency, mean, m	data: Frequency distribution, Measures of central nedian, mode and mean of combined data.	CO1			
В	Dispersion: mean	CO1				
С	Moments, Skewne	CO1				
UNIT 2	Probability.					
А	Random experiment, sample space, events. CO2					
В	Mutually exclusiv	e events, independent events, conditional probability.	CO2			
С	Baye's theorem.		CO2			
UNIT 3	Random variable	es and its Distribution.				
A	Random variables	, expectation and variance of a random variable.	CO3			



В	Binomial Distribution. CO3						
С	Normal Dis	tribution		CO3			
UNIT 4	Sampling I	Distribution					
A	Sampling d	istribution of sam	ple mean (Small Samp	le).	CO4		
В	Sampling Sample).	distribution of c	lifference of two sat	mple means (Small	CO4		
С	Sampling d means (larg	listribution of sar e samples).	nple means and differ	rence of two sample	CO4		
UNIT 5	Testing of	hypothesis.					
А	Testing of h	ypothesis: single	population mean for si	mall sample.	CO5		
В	Testing of hypothesis: difference of two population means for small CO5 sample.						
С	Testing of hypothesis: single population mean and difference of two CO5 population means for large sample.						
	Mode of Ex	amination	Theory	-			
	Weightage	distribution	CA	MTE	ETE		
	,, eightuge	ansurroution	25%	25%	50%		
	Text books	1. Gupta, S.C	C and Kapoor, V.K, "Fu	indamental of Mathem	natical Statistics".		
	Other references	 Daniel, Wayne W., "Biostatistics": Basic concept and Methodology for Health Science. Grewal, B.S, "Higher Engineering Mathematics". Probability and Statistics for Engineers and Scientists, Walpole R. E., Mayers R. H., S. I., Ye. K. 7th Edition, Pearson, 2002. Statistics for Biologists, Campbell R. C., Cambridge University Press 1988. The Principles of Scientific Research, Freedman P., Pergamon Press, New York. 					

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	2	2	2
CO5	3	2	2	2	2
CO6	3	2	2	2	2



MFS101: Nutrition Biochemistry L-T-P: 4-0-0

School: SBSR	Batch: 2021-23					
Program: M. Sc.	Current Acad	lemic Year: 2	2021-22			
Branch: (Food						
Science and	Semester: Od	$\mathbf{d} (1^{\mathrm{st}})$				
Technology						
	Course	MFS101				
1.	number	WITS101				
2	Course Title	Nutrition Bi	ochemistry			
3	Credits	4				
4	(L-T-P)	4-0-0				
5	Course Objective	From this co structure of enzymes and understand di	burse students will be able to learn about classification and carbohydrates, amino acids, proteins, metabolic pathways, its role in digestion, absorption, utilization and storage. To fferent role of nutrition in day today life.			
6	Course Outcomes	 After successfully completion of this course students will be able to: CO1. Identify different sources and types of carbohydrates, amino acids, proteins and their role in nutrition. CO2. To examine of the following: a) Omega – fatty acids b) Phospholipids c) Cholesterol in the body d)MUFA and PUFA CO3. To identify the role of metabolic pathways and enzymes in energy, digestion, absorption, utilization and storage. CO4. Compare different techniques used for identification of nutrition in health and their application. CO5. Review the future perspectives and importance of nutrition 				
7	Outline syllabus	5:	,			
7.01	XXXNNN.A	Unit A	Carbohydrates			
7.02	XXXNNN.A1	Unit A Topic 1	Classification and structure of carbohydrates			
7.03	XXXNNN.A2	Unit A Topic 2	Digestion, absorption, utilization and storage, sources of carbohydrates			
7.04	XXXNNN.A3	Unit A Topic 3	Role of fibre in lipid metabolism			
7.05	XXXNNN.B	Unit B	Lipids and Amino acids			
7.06	XXXNNN.B1	Unit B Topic 1	Classification, structure and functions of amino acids, lipids			
7.07	XXXNNN.B2	Unit B Topic 2	Identification of embryonic stem cells			
7.08	XXXNNN.B3	Unit B Topic 3	Properties of embryonic stem cells			
7.09	XXXNNN.C	Unit C	Metabolic Pathways and Enzymes			
7.10	XXXNNN.C1	Unit C Topic 1	Unit C Topic 1 Glycolysis and TCA cycle			
7.11	XXXNNN.C2	Unit C Topic 2	Meat tenderization-process parameters and enzymes linked			
7.12	XXXNNN.C3	Unit C Topic 3	Methods to enhance tenderization, Flatulence causing sugars.			



7.13	XXXNNN.D	Unit D	Nutrition in Health			
7 14	XXXNNN D1	Unit D Topic 1	Basal and Resting Metabolic rate and caloric needs			
7.15	XXXNNN.D2	Unit D Topic 2	Requirements and role of nutrients in human health, RDA for different age groups, Biological value of food			
7.16	XXXNNN.D3	Unit D Topic 3 Unit D				
8	Course Evaluat	Course Evaluation				
8.1	CA: 25% marks					
8.2	MTE	25%				
8.3	End-term exami	ination: 50%				
9	References					
		1.Tom Brody	"Nutritional Biochemistry" Second edition 2004, University of			
		California Ac	ademic Press			
9.1	Text book					
		1. Stryer L., "Biochemistry", W. H. Freeman, 2010.				
	Other	2. Christa	van Tellingen, M.D. 2001."B Biochemistry from a			
9.2	References	phenomeno	plogical point of view".			

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	2	2	2
CO5	3	2	2	2	2
CO6	3	2	2	2	2

MFS102: Advanced Food Processing (theory Subject) L-T-P: 4-0-0

School: SBSR	Batch: 2021-23	Batch: 2021-23			
Program: M. Sc.	Current Academ	nic Year: 2021 - 22			
Branch: (Food	Semester: Odd (1 st)			
Science and					
Technology					
1.	Course Code	MFS102			
2	Course Title	Advanced Food Processing			
3	Credits	4			



4	Contact Hours	4-0-0				
	(L-T-P)					
	Course Status	Compulsory				
5	Course	• To develop a sense of advanced for	d processing			
	Objectives	technologies of food products				
		• To use traditional methods to know about	type techniques			
		used in products packaging				
		• To have an overview of the various methods	involved in the			
		post- narvest technologies of food.	6 6 1 1.4			
		• To develop a working knowledge of the use	of food quality			
6	Course	CO1: Comprehend the advanced concept of Food Processing				
0	Outcomes	and Preservation	rood Processing			
	Outcomes	CO2: Develop the understanding for food conve	rsion			
		CO3: Understand the different methodology u	ised to preserve			
		the food.	ised to preserve			
		CO4: Develop knowledge for food packaging a	nd scope of food			
		processing.	1			
		CO5: Understand the industrial approach for for	d processing.			
7	Course	Food processing is an application of various techn	ologies employs			
	Description	on food manufacture Industries and in Food safet	ty application in			
		new product development. The types of hazards during processing				
		identification are beneficial in food preservation. In the future				
		Food processing could offer more depth k	nowledge with			
		toxicological studies of food. In this course, stu	dents will learn			
0		about the different methods in assessment of food	products.			
8			CO Mapping			
		Introduction Introduction to Ecod Processing Food row	C01,C05			
	A	mitoduction to Food Flocessing, Food law	01,005			
		properties				
	B	Cleaning of raw materials: cleaning methods and	CO1 CO5			
	D	contaminations	001,005			
	С	Principles of Preservation methods, fermentation	CO1.CO5			
		methods for preservation, and chemical	,			
		preservations of foods				
	Unit 2	Food Conversion	CO2,CO5			
	А	Mixing and emulsification	CO2,CO5			
	В	Filtration and membrane separation: principles,	CO2,CO5			
		design features and general applications,				
		Centrifugation methods principles and				
		applications				
	C	Solid-liquid extraction and expression methods.	CO2,CO5			
	Unit 3	Food Preservation	CO3,CO5			
	A	Food preservation by low temperature:	CO3,CO5			
		Retrigeration, freezing and freeze drying, Food				



		preservation	by heating:	drying, osmotic	
	.	denydration	•		
-	В	Blanching, o	canning paste	eurization, sterilization,	CO3,CO5
		extrusion co	oking		
	C	Non-therma	l preservation	n: Hydrostatic pressure,	CO3,CO5
		dielectric he	eating, micro	wave processing, hurdle	
		technology,	membrane te	echnology, irradiation	
	Unit 4	Food Pac	kaging an	d Scope of Food	CO4,CO5
		Processing			
	А	Food storag	e: storage co	onditions and packaging	CO4,CO5
		(materials,	filing, c	closing and sealing	
		equipment)			
	В	Microbiolog	CO4,CO5		
		processing,			
		containers.			
	С	Scope and importance of food processing:			CO4,CO5
		national and	l internationa	l perspectives.	
-	Mode of	Theory		• •	
	examination	-			
,	Weightage	CA	MTE	ETE	
	Distribution	25%	25%	50%	
,	Text book/s*	1. JG	Brenman, A	AS Grandison, Food	
		Proce	ssing Handb	ook 2011 Wiley YCH	
		Public	cations		
		2. Fellow	ws, P. and	Ellis H. 1990. Food	
		Proce	ssing Techn	ology: Principles and	
		Practi	ce, New Yor	k.	
	Other	1. Lewis	s, M.J. 1990.	. Physical Properties of	
	References	Food	Food and Food Processing Systems		
		2. Wood	lhead, UK. V	Wildey, R.C. Ed. 1994.	
		Minir	nally Proces	sed Refrigerated Fruits	
		and	Vegetables.	Chapman and Hall,	
		Londo	on.	- ,	

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	2	2	2



CO5	3	2	2	2	2
CO6	3	2	2	2	2

MFS103: Advanced Food Chemistry (theory Subject) L-T-P: 4-0-0

Scho	ool: SBSR	Batch : 2021-2023					
Prog	gram: M.Sc.	Current Academic Year: 2021-22					
Brai	nch: Food	Semester: Odd (1 st)					
Scie	nce and						
Tech	nnology						
1	Course Code	MFS103					
2	Course Title	Advanced Food Chemistry					
3	Credits	4	·				
4	Contact Hours $(I_{-}T_{-}P)$	4-0-0					
	(L-1-1) Course Status	Compulsory					
5	Course	1 To develop the scientific approach in students about t	the food chemistry				
5	Objectives	1. To develop the scientific approach in students about	the rood enemistry.				
	objectives	2. To develop the expertise for advances in food chemis	stry.				
			-				
6	Course	After successfully completion of this course students will be	able to:				
	Outcomes	CO1. Understand the importance of food chemistry, carbohyd	rates and				
		enzymatic browning.					
		CO2. Understand the chemistry of protein and lipids.					
		CO3. Understand the chemistry of vitamins, minerals and imp	portance of				
		water activity in food chemistry.					
		CO4. Understand the chemistry of food flavours and pigment	s with their				
		importance in food industry and their safety evaluation					
_	~	CO5. Understand the advances in food chemistry.					
1	Course	Advanced Food chemistry is the advanced study of ch	emical processes				
	Description	and interactions of the biological and nonbiological	components of				
		foods. It overlaps with biochemistry in that it deals with	n the components				
		of food such as carbohydrates, lipids, proteins, wate	er, vitamins, and				
		dietary minerals. In addition, it involves the study of fo	ood pigments and				
		flavour.					
8	Outline syllabus		CO Mapping				
	Unit 1	Introduction	CO1, CO5				
	А	Food chemistry-definition and importance.	CO1, CO5				
	В	Carbohydrates-chemical structure and properties, functional	CO1, CO5				
		properties of sugars and polysaccharides in foods.					
	С	Enzymatic browning-chemical reaction, industrial	CO1, CO5				
		application.					
	Unit 2	Proteins and Lipid chemistry	CO2, CO5				
	Α	Protein and amino acids: structure, classifications, sources,	CO2, CO5				



	denaturation a	roperties of proteins.			
В	Maillard browning. Lipids: classification, and use of lipids			CO2, CO5	
	in foods.		-		
С	Physical and c	chemical proper	ties, effects of processing on	CO2, CO5	
	functional pro	perties.			
Unit 3	Vitamins and	Minerals Che	emistry	CO3, CO5	
А	Vitamins and	Minerals-source	es, functions and deficiency	CO3, CO5	
	disorders, Effe	ect of processin	g on vitamins and minerals.		
В	Industrial appl	lications of enzy	ymes	CO3, CO5	
С	Water in food	CO3, CO5			
	classification	of food commo	dities on the basis of ease of		
	spoilage.	spoilage.			
Unit 4	Food Flavour	Food Flavours and Safety			
А	Natural food f	lavor-character	ization	CO4, CO5	
В	Pigments in f	food and their	industrial applications,	CO4, CO5	
С	Safety evaluat	tion of Food flat	vours and pigments.	CO4, CO5	
Mode of	Theory				
examination					
Weightage	CA	MTE	ETE		
Distribution	25%	25%	50%		
Text book/s*	1. Fenne	ema. Ed. 1976. l	Principles of Food Science:		
	PartI l	Food Chemistry	7. Marcel Dekker, New		
	York.	-			
	2 Potter	• N N 1978 Fc	ood Science 3rd Ed AVI		
	2. Totter Wostr				
 Other	vv esų	westport.			
Other	1. Westp	bort. Birch, G.G	., Cameron, A.G. and		
References	Spenc	er, M. 2005 Fo	od Science, 3rd Ed. Pergamon		
	Press,	New York.			

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	2	2	2
CO5	3	2	2	2	2
CO6	3	2	2	2	2



MFS104: Technology of Fruits, Vegetables and Plantation Crops

L-T-P: 4-0-0

Scho	ol: SBSR	Batch : 2021-2023			
Program: M. Sc		Current Academic Year: 2021-22			
Brar	ich: Food	Semester: Odd (1 st)			
Scier	nce and				
tech	nology				
1	Course Code	MFS104			
2	Course Title	Technology of Fruits, Vegetables and Plantation Crops			
3	Credits Contact Hours	4			
4	(L-T-P)	4-0-0			
	Course Status	Compulsory			
5	Course	The course is designed to prepare students with a basic un	nderstanding of food		
	Objective	processing and preservation techniques involved in food s	sciences. The course		
		provides a foundation for introduction of various import	rtant topics of food		
		sciences.	-		
6	Course	At the end of the course, students will be able to:			
	Outcomes	CO1.Explain the processing fruit and vegetable based produ	ucts.		
		CO2.Recognize the thermal and non-thermal methods of fo	ood processing.		
		CO3.Apply the use of dehydration techniques in food prese	rvation.		
		CO4.Review potential applications of Plantation crops	processing in food		
		technology.			
		CO5.Analayze the importance and role of packaging in foo	d products.		
		CO6.Decribe properties of different packaging materials u	sed in different food		
		products.			
7	Course	This course has been designed to make student understand the pr	ocessing technology		
	Description	used for preservation of fruits and vegetables.			
8	Outline syllabu	3	CO Mapping		
	Unit 1	Introduction			
	А	Importance of fruits and vegetable, history and need of	C01,C06		
		preservation, Reasons of spoilage, Method of preservation			
	D	(short & long term).			
	В	Selection of fruits and vegetables, process of canning, factors			
	C	Containers of positing lacquaring symposition beings for			
	C	canning, spoilage in canned foods			
	Unit 2	Processing of fruit and related products			
	•	Processing of fruit inicas (calentics inica extraction	<u>C02 C05</u>		
	А	dependence of the second secon	02,005		
		deaeration, straining, intration and clarification),			
		preservation of fruit juices (pasteurization, chemically			
		preserved with sugars, freezing, drying, sugars, tetra-			
		packing, carbonation), processing of squasnes, cordials,			
		nectars, concentrates and powder.			



В	Introduction, Jam: Constituents, selective technology Jelly, Essential constituents Theory of jelly, formation, Processing of jelly	CO1,CO3	
С	Marmalade : Types, processing & te		
Unit 3	Processing of vegetables and related	products	
А	Processing of pickles, chutneys and	CO1,C02,C03	
В	Causes of spoilage in pickling, pulping		
С	Processing of tomato juice, Tomato paste, ketchup, sauce and soup.	products, tomato puree,	
Unit 4	Dehydration of fruits and vegetab	les	
А	Sun drying & mechanical dehydratic fruits and vegetables.	CO3,CO5,CO6,CO4	
В	Packing		
С	Storage		
Unit 5	Technology of plantation crops		
А	Processing and properties of major and	minor spices,	CO4,CO5,CO6
A B	Processing and properties of major and Essential oils & oleoresins, adultera	minor spices, tion.	CO4,CO5,CO6
A B C	Processing and properties of major and Essential oils & oleoresins, adultera Tea, coffee and cocoa processing, va	minor spices, tion. ariety and products.	CO4,CO5,CO6
A B C Mode of	Processing and properties of major and Essential oils & oleoresins, adultera Tea, coffee and cocoa processing, va Theory	minor spices, tion. ariety and products.	CO4,CO5,CO6
 A B C Mode of examination	Processing and properties of major and Essential oils & oleoresins, adultera Tea, coffee and cocoa processing, va Theory	minor spices, tion. ariety and products.	CO4,CO5,CO6
 A B C Mode of examination Weightage	Processing and properties of major andEssential oils & oleoresins, adulteraTea, coffee and cocoa processing, variationTheoryCAMTE	minor spices, tion. ariety and products. ETE	CO4,CO5,CO6
 A B C Mode of examination Weightage Distribution	Processing and properties of major andEssential oils & oleoresins, adulteraTea, coffee and cocoa processing, vaTheoryCAMTE25%25%	minor spices, tion. ariety and products. ETE 50%	CO4,CO5,CO6
 A B C Mode of examination Weightage Distribution Text	Processing and properties of major and Essential oils & oleoresins, adultera Tea, coffee and cocoa processing, va Theory CA MTE 25% 25% 1. Arsdel W.B., Copley, M.J. and Morg	minor spices, tion. ariety and products. ETE 50% gen, A.I. 1973. Food	CO4,CO5,CO6
A B C Mode of examination Weightage Distribution Text book/s*	Processing and properties of major and Essential oils & oleoresins, adultera Tea, coffee and cocoa processing, variation Theory CA MTE 25% 25% 1. Arsdel W.B., Copley, M.J. and Morg Dehydration, 2nd Edn. (2 vol. Set). AV	minor spices, tion. ariety and products. ETE 50% gen, A.I. 1973. Food 'I, Westport.	CO4,CO5,CO6
A B C Mode of examination Weightage Distribution Text book/s* Other	Processing and properties of major andEssential oils & oleoresins, adulteraTea, coffee and cocoa processing, vaTheoryCAMTE25%25%1. Arsdel W.B., Copley, M.J. and MorgDehydration, 2nd Edn. (2 vol. Set). AV2. Bender, A.E. 1978. Food Processing	minor spices, tion. ariety and products. ETE 50% gen, A.I. 1973. Food I, Westport. and Nutrition. Academic	CO4,CO5,CO6
A B C Mode of examination Weightage Distribution Text book/s* Other References	Processing and properties of major and Essential oils & oleoresins, adultera Tea, coffee and cocoa processing, variation Theory CA MTE 25% 25% 1. Arsdel W.B., Copley, M.J. and Morg Dehydration, 2nd Edn. (2 vol. Set). AV 2. Bender, A.E. 1978. Food Processing Press, London. 3. Kadar, A. A. 1002. Postherwast Tach	minor spices, tion. ariety and products. ETE 50% gen, A.I. 1973. Food I, Westport. and Nutrition. Academic	CO4,CO5,CO6
A B C Mode of examination Weightage Distribution Text book/s* Other References	Processing and properties of major andEssential oils & oleoresins, adulteraTea, coffee and cocoa processing, vaTheoryCAMTE25%25%1. Arsdel W.B., Copley, M.J. and MorgDehydration, 2nd Edn. (2 vol. Set). AV2. Bender, A.E. 1978. Food ProcessingPress, London.3. Kadar, A. A. 1992. Postharvest TechCrops2nd Ed. University of California	minor spices, tion. ariety and products. ETE 50% gen, A.I. 1973. Food I, Westport. and Nutrition. Academic mology of Horticultural	CO4,CO5,CO6
A B C Mode of examination Weightage Distribution Text book/s* Other References	Processing and properties of major andEssential oils & oleoresins, adulteraTea, coffee and cocoa processing, vaTheoryCAMTE25%25%1. Arsdel W.B., Copley, M.J. and MorgDehydration, 2nd Edn. (2 vol. Set). AV2. Bender, A.E. 1978. Food ProcessingPress, London.3. Kadar, A. A. 1992. Postharvest TechCrops. 2nd Ed. University of California4. Srivastava R P. and Kumar S. 1998	minor spices, tion. ariety and products. ETE 50% gen, A.I. 1973. Food [], Westport. and Nutrition. Academic nology of Horticultural a. Fruit and Vegetable	CO4,CO5,CO6
A B C Mode of examination Weightage Distribution Text book/s* Other References	Processing and properties of major andEssential oils & oleoresins, adulteraTea, coffee and cocoa processing, vaTheoryCAMTE25%25%1. Arsdel W.B., Copley, M.J. and MorgDehydration, 2nd Edn. (2 vol. Set). AV2. Bender, A.E. 1978. Food ProcessingPress, London.3. Kadar, A. A. 1992. Postharvest TechCrops. 2nd Ed. University of California4. Srivastava, R.P. and Kumar, S. 1998Preservation: Principles and Practices.	minor spices, tion. ariety and products. ETE 50% gen, A.I. 1973. Food I, Westport. and Nutrition. Academic nology of Horticultural a. . Fruit and Vegetable 2nd Ed. International	CO4,CO5,CO6

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	2	2	2
CO5	3	2	2	2	2
CO6	3	2	2	2	2



MFP-104: Advanced Food Processing Lab

L-T-P: 0-0-2

Scho	ool: SBSR	Batch: 2021-2023			
Prog	gram: Life-	Current Academic Year: 2021-22			
Scie	nces				
Brai	nch: Food	Semester: Odd (1 st)			
Scie	nce and				
Tech	nnology				
1	Course Code	MFP-104			
2	Course Title	Advanced Food Processing Lab			
3	Credits	2			
4	Contact Hours	0-0-2			
	(L-T-P)				
	Course Status	Compulsory Course			
5	Course	• To develop a sense of advanced food processing to	echnologies of		
	Objective	food products	-		
		• To use traditional methods to know about type tech	niques used in		
		products packaging	-		
		• To have an overview of the various methods involved in the post			
		harvest technologies of food.			
		• To develop a working knowledge of the use of food quality in			
		different segments of technology applications.			
6	Course	CO1: Comprehend the basic concept of Food Processing			
	Outcomes	CO2: Develop idea for purpose of this in food preservation.			
		CO3: Different methodology used to identify various biologi	cal hazards and		
		their control measures in food processing			
		CO4: Various internal and external factors involved in of Fo	od Quality and		
		CO5: Recognize the importance and utility of techniques in F	ood quality and		
		in food Industry.	ood quanty and		
7	Course	Food processing is an application of various technologies en	nploys on food		
	Description	manufacture Industries and in Food safety application in	new product		
	P	development. The types of hazards during processing ide	entification are		
		beneficial in food preservation. In the future Food processing co	ould offer more		
		depth knowledge with toxicological studies of food. In this course, students will			
0		learn about the different methods in assessment of food products.	COM		
8	Outline syllabus		CO Mapping		
	Unit I	Practical based on Hurdle Technologies	CO1,CO2		
		Preservation of food using High temp (heating)			
		Preservation using Low temp (chilling/freezing)			
	TT	Preservation using Drying/Curing/use of additives	001 002		
	Unit 2	Practical related to Usmotic Technologies	01,003		
		Osmotic dehydration of fruits (Papaya/Guvava)			
		Evaluation of chemical properties of osmotic dehydrated			
		products			



	Evaluation of a	sensory propertie	es of osmotic dehydrated			
	products.					
Unit 3	Practical rela	ted to Rheolo	gy and Viscosity	CO1,CO3		
	Rheological pr	Rheological properties of flour				
	Rheological pr	Rheological properties of milk				
	Rheological pr	operties of semi-	-solid food product			
Unit 4	Practical rela	ted toEvaluat	ion to Biological Hazard	CO1,CO3		
	Estimation of	total plate count	using pour plate method			
	Estimation of	total plate count	using streak plate method			
	Estimation of	Yeast and mould	count in food sample			
Unit 5	Practical rela various met Industries	Practical related toImplementation of technologies in various methods of product development on Food Industries				
	Development	of Guavas jelly				
	Development	of tomato puree				
	Development	of tomato ketchu	р			
Mode of examination	Jury/Practical/	Viva	-			
Weightage	CA	Viva Voce	ETE			
Distribution	25%	25%	50%			
Text book/s*	1. Srivastava,	R.P. and Kuma	r, S. 1998. Fruit and Vegetable			
	Preservation: Principles and Practices. 2nd Ed. International					
	Book Distribu	ting Co. Luckno	W.			
Other	1. Desrosier, N	N.W. and Desros	ier, J.N. (1998). The Technology			
References	of Food Preser	vation. New Del	hi: CBS Publication			

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	2	2	2
CO5	3	2	2	2	2
CO6	3	2	2	2	2



MFP-105: Advanced Food Biochemistry Lab L-T-P: 0-0-2

School: SBSR	Batch: 2021-2023						
Program: Life- Sciences	Current Ac	cademic Year: 2021-2022					
Branch: Food Science	Semester: (Odd (1 st)					
1.	Course Code	MFP105					
2	Course Title	Advanced Food Biochemistry Lab					
3	Credits	2					
4	Contact	0-0-3					
	Hours						
	(L-T-P)						
6	Cours	CO1: Comprehend the basic concept of Food biochemistry and					
	e	microbiology					
	Outco	CO2: Gain knowledge of idea for techniques in Food					
	mes	Biochemistry					
		CO3: To gain knowledge of biochemistry of raw meat, poultry					
		CO4: To acquire the knowledge about biochemistry of milk constitutes					
		CO5: To visualize the growth of microbes in food samples with the					
		help of microscope.					
8	Outline syllab	ibus					
	Unit 1	An Introduction to Food Biochemistry Lab					
		Sub unit - a, b and c detailed in Instructional Plan					
	Unit 2	Analytical Techniques in Food Biochemistry					
		Sub unit - a, b and c detailed in Instructional Plan					
	Unit 3	Biochemistry of Raw Meat and Biochemistry of Raw Poultry					
		Sub unit - a, b and c detailed in Instructional Plan					
	Unit 4	Biochemistry of Milk Constituents and Biochemistry of Fruits					
		Sub unit - a, b and c detailed in Instructional Plan					
	Unit 5	Biochemistry and Probiotics					
		Sub unit - a, b and c detailed in Instructional Plan					
	Mode of	Jury/Practical/Viva					
	examination						
	Weightage	CA Viva Voce ETE					
	Distribution	25% 25% 50%					
	Text book/s*	Serna-Saldivar, S. O. (2012). Cereal grains: Laboratory					
		Reference and Procedures Manual. CRC Press.					
	Other	R. Saravanan, D. Dhachinamoorthi, CH. MM. Prasada					
	References	Rao					



CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	2	2	2
CO5	3	2	2	2	2
CO6	3	2	2	2	2

MFP-106: Food Preservation Lab L-T-P: 0-0-2

School: SBSR		Batch: 2021-2023				
Prog	ram: Life-Sciences	Current Academic Year: 2021-2022				
Brai	nch: Food Science	Semester: 1				
And '	Technology					
1	Course Code	MFP-106				
2	Course Title	Food Preservation Lab				
3	Credits	2				
4	Contact Hours	0-0-2				
	(L-T-P)					
	Course Status	Compulsory Course				
5	Course	• To develop a sense of food preservation of food products				
	Objective	• To use traditional methods to know about type preservation				
		methods used in products				
		• To have an overview of the various new methods involved in the				
		self-life extension in food.				
		• To develop a working knowledge of the use of new product				
		development of food.				
6	Course	CO1: Comprehend the basic concept of Food preservation.				
	Outcomes	CO2: Develop idea for purpose of this in food shelf-life				
		CO3: Different methodology used to identify various biological hazards and				
		their control measures in food processing				
		CO4: Various internal and external factors involved in of Food Quality and				
		self-life of products.				
		CO5: Recognize the importance and utility of waste as new product by Food				
7	Course	preservation techniques in food industry.				
/	Course	rood preservation is an application of various post-narvest technologies				
	Description	types of bazards during processing identification are baraficial in food				
		types of nazarus during processing identification are beneficial in 1000				



		preservation. I with shelf-life different metho	preservation. In the future Food Preservation could offer more depth knowledge with shelf-life studies of food. In this course, students will learn about the different methods in assessment of new food product development.				
8	Outline syllabus	3		A	CO Mapping		
	Unit 1	Practical bas	sed on basic p	reservation techniques.	CO1,CO2		
	А	Food preservation with sugar					
	В	Food preserva	ation with				
	С	Preservation	of food using the	hermal techniques			
	Unit 2	Practical rela	ated to –Post l	narvest Technologies	CO1,CO3		
		available					
	А	Canning of fr	anning of fruits/vegetables				
	В	Sorting and g	orting and grading of fruits/vegetables				
	С	Quality evalu	ation of package	ged food.			
	Unit 3	Practical rela	Practical related to Physical, Chemical Hazards				
		Evaluation	Evaluation				
	А	Identification	Identification of physical Hazard				
	В	Identification	Identification of Chemical Hazard				
	С	Detection of a	Detection of common adulterants food commodities				
	Unit 4	Practical relation	ated toNew	Product Development	CO1,CO3		
		Techniques					
	А	Preparation o	f fruit preserve	s (jam/jelly)			
	В	Preparation o	f vegetable pre	serves (pickle)			
	С	Fruit pulping	/ juice / bevera	age preparation			
	Unit 5	Practical relation	ated toImpl	ementation of Sensory	CO2,CO3		
		assessment 1	Methods on Fo	ood Products			
	А	Discriminativ	ve Test				
	В	Triangular Te	est/Duo-Trio T	ests/Paired Comparison Tests			
	С	Hedonic Rati	ng Scale				
	Mode of	Jury/Practical	l/Viva				
	examination		- 				
	Weightage	CA	Viva Voce	ETE			
	Distribution	25%	25%	50%			
	Text book/s*	- Food	Science				
	Other	Lab manual c	of sensory evaluation	uation			
	References		·				

CO/PO	PO1	PO2	PO3	PO4	PO5
C01	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2



CO4	3	2	2	2	2
CO5	3	2	2	2	2
CO6	3	2	2	2	2

MSB 121: Fermentation Technology

L-T-P: 3-1-0

School: SBSR		Batch : 2021-2023				
Prog	ram: MSc	Current Academic Year: 2021-22				
Bran	ch:Food Science	Semester: 2 (Even)				
and '	Technology					
1	Course Code	MSB 121				
2	Course Title	Fermentation Technology				
3	Credits	4				
4	Contact Hours	3-1-0				
	(L-T-P)					
	Course Status	Compulsory				
5	Course	1. To enable students bridge the gap between theoretical concep	ots and practical aspects in			
	Objective	fermentation technology.				
		2. To provide knowledge about the different processes being us	ed to prepare various			
		industrially important substances				
		3. To enable students to understand the bioreactor designs.				
		4. To provide insight of various industrial fermentation process				
6	Course	CO1: Understand the history of fermentation technology	and growth kinetics of			
0	Outcomes	microorganisms	and growth kineties of			
	Outcomes	CO^2 : Design bioreactors to achieve desired results (i.e. sn	ecified cell concentration			
		production rates, etc).	control con concentration,			
		CO3: Examine the mass transfer operation of various biochemic	al processes.			
		CO4: Apply scale-up methods for increasing yield. Justify the u	ise of different biochemical			
		strategies for the production of biologicals.				
7	Course					
	Description					
8	Outline syllabus		CO Mapping			
	Unit 1		CO1			
	А	History of fermentation industry, Introduction to submerged				
		and solid state fermentation				
	В	Microbial culture selection for fermentation processes,				
		Nutrient requirements for microbial growth				
	C	Growth kinetics of microbes, Sterilization of media and				
		equipments for fermentation				
	Unit 2					
	А	Operational design of Bioreactor, Types of Bioreactors-	CO2, CO3			
		CSTR, Airlift fermenter, Fluidized bed reactor, Packed bed				
		reactor, Immobilized cells and enzymes				
	В	Bio-reaction, Bio-separation				
	С	Fermentation processes- Batch, Continuous and Fed batch				
		mode				



Unit 3				CO2, CO3, CO4		
А	Measurement, m	onitoring and con	ntrol of chemical parameters			
	in a bioreactor					
В	Transport pheno	mena				
С	Rheology, Oxyg	en transfer				
Unit 4				CO2, CO3, CO4		
А	Aeration and ag	Aeration and agitation in bioreactors, Gassing requirements for bioreactor working				
В	Oxygen demand	measurement, M	easurements of dissolved			
	oxygen concentr	ation				
С	Scale up and sca	le down methods	for bioreactors			
Unit 5	_			CO3, CO4		
А	Cell suspensions	, Characteristics	of cell suspensions			
В	Design and hand	lling of plant cell	bioreactor, Design and			
	handling of anin	nal cell bioreactor	•			
С	Production of Pe	nicillin, citric aci	d and glutamic acid			
Mode of	Theory/Jury/Pra	ctical/Viva				
 examination						
Weightage	CA	MTE	ETE			
Distribution	25%	25%	50%			
Text book/s*	 McNeil B. and Harvey L., "Practical Fermentation Technology", Wiley, 2008. 					
Other	2. Doran	P.M., "Bioprocess	s Engineering Principles",			
References	Academ	nic Press, 2012.				
	3. Katoh S	5. and Yoshida F.	, "Biochemical			
	Engine	ering", Wiley-VC	СН, 2009.			

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	2	2	2
CO5	3	2	2	2	2
CO6	3	2	2	2	2



MFS105: Advanced Food Safety and Toxicology (Theory Subject) L-T-P: 3-1-0 Credits: 4

School: SBSR		Batch : 2021-2023				
Pro	gram: M. Sc	Current Academic Year: 2021-22				
Bra	nch: Food Science	Semester: ODD (2 nd)				
and	Technology					
1	Course Code	MFS-105				
2	Course Title	Advanced Food Safety and Toxicology				
3	Credits	4				
4	Contact Hours (L-	3-1-0				
	T-P)					
	Course Status	Compulsory				
5	Course Objective	1. Understanding about food laws and Acts.				
		2. Importance and need of food regulations.				
		4 Food Quality and Quality Assurance.				
		5. Food Toxicology and its related studies.				
		6. Codex; Food Packaging and labeling.				
		7. Food Additives; Food Adulteration, FSSAI, PFA, HACCP A	ND CCP			
6	Course Outcomes	After successfully completion of this course students will be able to:				
		CO1: Comprehend the basic concept of Food Laws and Regulations	in India.			
		CO2: Develop idea for purpose and action on food safety.				
		CO3: Different laws and Acts. Food Hazards and Toxicology. Var	ious hazards and			
		their control measures	ala in food Eood			
		CO4: Various terms of Food Quality and Quality assurance and its role in food. Food				
	Adulteration and Food Additives					
		COS: Recognize the importance and utility of Food safety norms in food industry.				
7	Course	Food safety is an application of various laws and regulations e	mploys on food			
,	Description	manufacture Industries. Food safety application in new product develo	pment. The types			
	2 comption	of hazards during processing identification are beneficial in food pre-	eservation. In the			
		future Food Toxicology could offer more depth knowledge with toxi	cological studies			
		of food. In this course, students will learn about the different regulator	y bodies national			
		and International dealing in manufacturing of food products.				
	Outline syllabus		CO Mapping			
8						
	Unit 1	INTRODUCTION	CO1,			
	Δ	Introduction Definition functions and General aspects of FOOD	CO1			
	11	SAFETY	001,			
	В	Various aspect of Food Quality and Quality Assurance :ISO	CO1.			
	C	Mandatory laws for food processing.	CO1			
	Unit 2	FOOD HAZARDS AND THEIR EVALUATION	CO2.			
	•					
	А	l ypes of food hazards: biological, chemical and physical, Risk	003			
	D	assessment	<u> </u>			
	D	Existing and emerging pathogens due to globalisation of 100d trade	CO3			
	Unit 2	DECHLATODY DODIES AND ACTS	C03			
	Unit 5	NEGULATUKI DUDILO AND AUTO	004			
	A	Salient features of Food Safety & Standards Act, 2006, Structure of	CO4			
		FSSAI.				
	В	PFA and ISO 22000 (Food Safety Management System)	CO4			
	С	Managing risks through the food chain via Traceability and Food	CO4			
		Recall.				



Unit 4	TOXICITY			CO5	
А	Intentional and u	Intentional and unintentional contaminants in food industry;			
	Common screen	ng methods.			
В	Toxicity due to r	nicrobial toxins in	ncluding botulinum and	CO5	
	staphylococcal to	oxins, mycotoxin	and due to other food pathogens.		
С	Food allergy a	and intolerance;	Causes, symptoms and novel	CO5	
	methods/product	methods/products to reduce the effect.			
Unit 5	PACKAGING	CO5,CO6			
А	Food Adulteration	on (Common adul	terants), Food Additives	CO5	
	(functional role,	safety issues)			
В	Food Packaging	& labeling (Pack	aging types, understanding	CO5	
	labelling rules &	Regulation).			
С	Labelling require	ements for pre-pa	ckaged food as per CODEX	CO6	
Mode of	Theory				
examination					
Weightage	CA	MTE	ETE		
Distribution	25%	25%	50%		
Text book/s*	1) FSSAI ACT	S AND LAWS			
Other References	2) EMERGING TECHNOLOGIES: FOOD PROCESS BY DA-				
	WEN, 2005 4.	FOOD SAFETY	by Laura K Egendorf, 2000 5.		
	International sta	andards of food	safety by Naomi Rees, David		
	Watson, 2000 6.	Codex alimentari	us by FAO & WHO, 2007		

CO/PO	PO1	PO2	PO3	PO4	PO5
C01	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	2	2	2
CO5	3	2	2	2	2
CO6	3	2	2	2	2

MFS106: Advanced Food Biotechnology

L-T-P: 4-0-0

School: SBSR	Batch : 2021-2023
Program: MSc.	Current Academic Year: 2021-22
Branch: Food	Semester: 2 (Even)
Science and	
Technology	



1	Course Code	MFS106				
2	Course Title	Advanced Food Biotechnology				
3	Credits	4				
4	Contact	4-0-0				
	Hours					
	(L-T-P)					
	Course Status	Compulsory				
5	Course	1. The general objective of this course is to give	students an			
	Objective	understanding of new advances in food biotechnology.				
		2.Develop students' knowledge, understanding and skills in	n food			
		biotechnology at an advanced level 3. Enhance students' ability to identify current and future research				
		3. Enhance students' ability to identify current and future research				
	~	directions in food biotechnology.				
6	Course	CO1: Principles of Gene technology and its applications				
	Outcomes	CO2: Microbial production of fermented food viz. cheese,	bread etc.			
		CO3: Food Preservation – Chemical Methods and Physical methods				
		CO4: Development of novel foods				
7	Cauraa	COS: Blosalety, GM foods	the study of			
/	Course	Definition of biotechnology, constraints, reasons for the study of				
	Description	food industry. The use of living organisms or biochemicals to carry out				
		defined chemical processes for food industry application. The goal of				
		this course is to give students an understanding of new advances in food				
		hiotechnology	vances in 1000			
8	Outline syllabu		CO Mapping			
	Unit 1	Introduction to Food Biotechnology	001100000			
	A	Fundamentals of Molecular Biology-Central dogma,				
		Introduction to prokaryotic and eukaryotic transcription,				
		Translation process in prokaryotes and eukaryotes				
	В	Basic principles of Gene technology and its application in	CO1			
		food industry, Food safety and biotechnology- Impact of				
		Biotechnology on foods				
	С	New challenges, Immunological methods, DNA based				
		methods in food authentication				
	Unit 2	Applications and importance of Food Biotechnology				
	А	Traditional applications of food biotechnology -				
		Fermented foods: eg. dairy products, alcoholic beverages				
		etc.				
	В	Types of fermented foods. Health benefits of fermented	CO2, CO4			
		toods and importance of food fermentation in food				
	G	preservation and nutritional enhancement				
	C	Development and formulation of novel products such as				
	II	Food Programmetice				
		rood preservation Application of Dadiction in faced pressonsing and starting	<u>CO2</u>			
	A	Application of Radiation in food processing and storage, Characteristics of Radiations of Interact in Food	CUS			
		Characteristics of Kadiations of Interest in Food				



	preservation		
В	Novel food packaging methods to enhance shelf life		
С	Radappertization, Radicidation, and Radurization of		
	Foods		
Unit 4	Scope of Food Biotechnology		
А	Consumer perspective and future of food biotechnology		
B Protein engineering in Food technology –objectives,			
	methods, limitations and applications (e.g. Lactobacillus,		
	β -galactosidase, nisin and Glucose isomerase)		
С	Introduction to Hurdle concept and Predictive		
	Microbiology		
Unit 5	Evaluation and Ethical Consideration		
А	Biosafety; risk assessment and risk management		
В	Ethical issues concerning GM foods	CO5	
С	Testing for GMOs, Labeling and traceability of GM		
	foods.		
Mode of	Theory		
examination			
Weightage	CA MTE ETE		
Distribution	25% 25% 50%		
Text book/s*	• Lee, B.H. Fundamentals of Food		
	Biotechnology.VCH. 2006.		
	• Food Microbiology: Fundamentals and		
	frontiers by MP Doyle LR Beuchat and		
	Thoma I Montville (2001) 2nd edition		
	A CM masse USA		
	ASM press, USA.		
Other	Food Science and Food Biotechnology by G.F.G. Lopez		
References	& G.V.B. Canovas		

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	2	2	2
CO5	3	2	2	2	2
CO6	3	2	2	2	2



MMB204: ADVANCED FOOD MICROBIOLOGY L-T-P: 4-0-0

Sch	ool: Basic	Batch : 2021-2023						
Sciences &								
Res	search							
Pro	gram: M. Sc.	Current Academic Year: 2021-22	Current Academic Year: 2021-22					
Bra	unch: Food	Semester:2 (Even)						
Sci	ence and							
Tec	chnology							
1	Course Code	MMB204	MMB204					
2	Course Title	Advanced Food Microbiology						
3	Credits	4						
4	Contact Hours	4-0-0						
	(L-T-P)							
	Course Status	Compulsory						
5	Course	The course is designed to prepare students wi	th a basic					
	Objective	understanding of the microbes involved in biologic	al processes					
		such as fermentation and spoilage. The course	provides a					
		foundation for careers in microbiology, food micro	obiology, or					
		research in all branches of food sciences.						
6	Course	After the successful completion of this course students will be able						
	Outcomes	to:						
		CO1.Recognize and describe the characteristics of important						
		pathogens and spoilage microorganisms in foods.						
		CO2. Understand the role and significance of intrinsic and extrinsic						
		factors on growth and response of microorganisms in foods.						
		CO3. Identify ways to control microorganisms in foods.						
		CO4. Identify the conditions under which the important pathogens						
		and spoilage microorganisms are commonly inactivated, killed or						
		made harmless in foods.						
		CO5. Utilize laboratory techniques to detect, quantify, and identify						
		microorganisms in foods.						
		CO6.Understand the role of fermentation and preservat	tion in food					
7	0		· · 1 C					
/	Course	The Food Microbiology course outlines the basic p	principles of					
	Description	Microbiology. This course also sneds light upon fermer	itation and is					
		designed to make student learn the preservation of to	od products.					
		The course also further encompasses the concept of 1	dentification					
0	Orathing 11.1	and quantification of microorganisms in foods.	CO					
ð	Outline synab	us	CU Monnina					
	Ilmit 1	Food and Microorganisms	mapping					
		roou and Microorganisms						
	A D	mistorical developments Miaroorganisms important for food, molds, voost and						
	Б	Nicroorganisms important for food- molds, yeast and						
bacteria- general characteristics and importance								



	С	Intrinsic and	Extrinsic fac	tors affecting growth of	CO1, CO2	
		microorganism	s, Hydrogen	ion conc., water activity,		
		oxidation reduc	nutrient content, inhibitory			
		substances and				
	Unit 2	Contamination	n and Spoilage	e of Foods		
	А	Spoilage of dif	ferent foods ty	ppes- Vegetables, fruits, and		
		its products	its products			
	В	Spoilage of mil	Spoilage of milk and its products			
	C C	Spoilage of meat and meat products poultry fish and sea				
	C	foods	at and mout pr	oddets, pouldy, fish and sea		
	Unit 3	Food Ferment	ation			
	A	1 000 1 01110110				
	<u> </u>	Production met	hods of bread	cheese fermented		
		vegetables and	dairy products	encese, remented	CO3 CO6	
	B	Production met	bods of vinega	r wine oriental fermented	005,000	
	D	foods on indust	rial scale	i, whic, oriental termented		
	C	Spoilage and d	ofacts of forma	ntad food products		
	Unit 1	Food Prosorvo	tion	nied 1000 products		
		General princir	Food Preservation			
	R P	Deneral princip	General principles of food preservation			
	D	products	Preservation of vegetables, fruits, cereals, sugar and its			
	C	Products,	products,			
	C	Preservation 0	Preservation of milk and its products, meat and meat			
		products, poun	ry, fish and sea	100ds.		
	Unit 5	Food Borne In	fections and I	ntovications		
		Bacterial and n	onbacterial inf	action with examples of		
	Λ			cetton with examples of		
		infective and to	oxic types, Brue	cella, Bacillus,	CO4,CO5,	
		Clostridium Es	cherichia Salm	onella	CO6	
		Clostriarani,Es	enerieina,9aini		-	
	В	Shigella,Staphy	lococcus,Vibr	io,Yersinia, fungi, viruses,		
		and nematodes	and emerging	food-borne pathogens;	-	
	С	Food-borne out	tbreaks, laborat	tory testing procedures and		
		preventive mea	sures, food sar	itation in manufacture and		
		retail trade				
	Mode of	Theory				
	examination					
	Weightage	CA	MTE	ETE		
	Distribution	25%	25%	50%		
	Text	1. Jay, J.M. (20	008) Modern Fo	ood Microbiology(Sixth		
	book/s*	Edition). Aspen Publishers, Inc. Gaithersburg, Marvland.				
	Other	2. Adams, M	I. R. and M	oss, M. O. (2005) Food		
	References	Microbiolo	gy (Second edi	tion). Royal Society of		
		Chemistry Pub	lication, Camb	ridge.		
		3. Rav. B. (2005) Fundar	mental food microbiology		
		(Third edit	ion). CRC Pre	ss, New York, Washington		
L		\ \	I			



D.C.4. Frazier, W. C. and West off, D. C. (2007) Food Microbiology. Tata McGraw Hill	
Publishing Company Ltd. New Delhi.5. Banwart G J. (1989). Basic Food Microbiology. AVI publication.	

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	2	2	2
CO5	3	2	2	2	2
CO6	3	2	2	2	2

MSB120: BIOINFORMATICS L-T-P: 4-0-0

Scho	ol: Basic Sciences	Batch : 2021-2023			
& R	esearch				
Prog	gram: M. Sc.	Current Academic Year: 2021-22			
Brai	nch: Food Science	Semester:2			
and	Technology				
1	Course Code	MSB120			
2	Course Title	Bioinformatics			
3	Credits	2			
4	Contact Hours	2-0-0			
	(L-T-P)				
	Course Status	Compulsory			
5	Course Objective	1. To acquire a fundamental knowledge of bioinformatics by studying			
		an overview of bioinformatics, fields and their scope. To have			
		introduction about database design and Biological database			
		2. To attain knowledge about data storage model, retrieval of			
		information and integration. To learn the procedure of sequence			



		alignment and phylogenetic analysis by using differ	ent online and			
		offline tool along with their algorithms.				
		3. To understand about gene organization, genome seq	uencing, gene			
		prection methods and motif search methods.				
		4 . To have a clear cut idea about bioinformatics scope	concepts and			
		major databases/tools/softwares with their algorith	hms used for			
		various applications	used for			
		various appreations.				
6	Course Outcomes	CO1: Understand about overview of bioinformatics scope and their disciplines. Generation of large scale data in the field of molecular biology				
		CO2: Review of database source, database manage Biological databases and their classification. Sequences specialized databases.	ement system, databases and			
		CO3: To attain knowledge about data storage model/format, retrieval				
		of information and integration.				
		CO4: Understanding about different sequence formats . Perform				
		sequence alignment and phylogenetic prediction with different				
		tools/softwares with algorithm.				
		CO5: To apply different techniques for gene prediction, motif search				
		and genome sequencing analysis.				
		CO6: Basic knowledge of various bioinformatics co	ncepts, scope,			
		with their algorithms	incation along			
7	Course	To acquire a fundamental knowledge of basic compute	tional biology			
,	Description	by studying, designing and analyzing <i>in-silico</i> experim	ents. To learn			
	r r	the procedure of sequence alignment and its application	n in molecular			
		phylogenetics. To understand different techniques u	ised for gene			
		prediction and creation of biological databases.	Γ			
8	Outline syllabus		CO Mapping			
	Unit 1	Introduction to Bioinformatics				
	A	Introduction to bioinformatics; Scope and importance	4			
	D	Large scale generation of molecular biology data	4			
			CO1, CO6			
	Unit 2	Biological Databases				
	Α	Introduction of Biological Databases	_			
	В	Nucleic acid databases, Protein databases				
	С	Specialized Genome databases, Structure databases	CO2, CO6			
	Unit 3	Data Storage and retrieval				



А	Controlled	vocabulary			
В	Introduction	n to Metadata;	File Storage		
С	Boolean Se	arch and Fuzzy	/ Search	CO3, CO6	
Unit 4	Sequence A	Sequence Alignments and Analysis			
А	Biological	Biological sequences and Alignment Methods			
В	Global and	l Local alignm	ent, Pairwise alignment and		
	Multiple se	quence alignm	ent	CO4, CO6	
С	Phlylogene	tic tree analysis	s and its importance		
Unit 5	Sequence p	oattern analys	is		
А	Structure of	of Prokaryotic	and Eukaryotic gene, DNA		
	sequencing				
В	Gene findi	Gene finding, composition based finding, sequence			
	motif-based	l finding			
С	Pattern Mat	tching, Regular	expression		
Mode of	Theory				
examination					
Weightage	CA	MTE	ETE		
Distribution	25%	25%	50%		
Text book/s*	1. Lesk	A., Introducti	on to Bioinformatics, 3 rd		
	Edition	. Oxford Unive	ersity Press (2008).		
	2. Dan I				
	Fundan				
	Edition	, Pearson Educ	ation (2009).		
Other References	3. 1. Xior	ng J., <i>Essentia</i>	<i>l Bioinformatics</i> . Cambridge		
	Univers	sity Press (2006	5).		

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	2	2	2
CO5	3	2	2	2	2
CO6	3	2	2	2	2



MFS153: Advanced Food Biotechnology Lab

L-T-P: 0-0-3

Sch	ool: SBSR	Batch: 2021-2023			
Prog	gram: MSc.	Current Academic Year: 2021-22			
Bra	nch: Food	Semester: 2 (Even)			
Scie	nce and				
Tecl	hnology				
1	Course Code	MFS153			
2	Course Title	Advanced Food Biotechnology Lab			
3	Credits	2			
4	Contact Hours	0-0-3			
	(L-T-P)				
	Course Status	Compulsory			
5	Course	1. The general objective of this course is to give	e students an		
	Objective	understanding of new advances in food biotechnology.			
		2.Develop students' knowledge, understanding and skills i	n food		
		biotechnology at an advanced level			
		3. Enhance students' ability to identify current and future 1	research		
		directions in food biotechnology.			
6	Course	CO1: Microbial production of fermented food viz. cheese,	bread etc.		
	Outcomes	CO2: Food Preservation – Chemical Methods and Physica	l methods		
		CO3: Development of novel foods			
		CO4: Determination of quality of foods			
		CO5: Design of biofermenter and its functioning			
7	Course	The use of living organisms or biochemicals to carr	y out defined		
	Description	chemical processes for food industry application. The goal	l of this course		
		is to give students an understanding of new adva	inces in food		
		biotechnology.			
8	Outline syllabus		CO Mapping		
	Unit 1	Practical based on biofermenter	CO5		
		Sub unit - a, b and c detailed in Instructional Plan			
	Unit 2	Practical related to solid state fermentation	CO2		
		Sub unit - a, b and c detailed in Instructional Plan			
	Unit 3	Practical quality determination of milk by MBRT	CO4		
		Sub unit - a, b and c detailed in Instructional Plan			
	Unit 4	Practical related to use of microorganisms in food	CO2		
		preservation			
		Sub unit - a, b and c detailed in Instructional Plan			
	Unit 5	Practical related touse of yeast for food production	CO1		
		Sub unit - a, b and c detailed in Instructional Plan			
	Mode of	Jury/Practical/Viva			
	examination				
	Weightage	CA Viva Voce ETE			



Distribution	25%	25%	50%	
Text book/s*	• Lee, B.	H. Fundamenta	als of Food Biotechnology.	
	VCH. 2006.			
	• Food Microbiology: Fundamentals and frontiers b		ndamentals and frontiers by	
	M.P. Doyle, L.R. Beuchat and Thoma J. Montville,			
	(2001), 2nd edition, ASM press, USA.			
Other	Food Science and Food Biotechnology by G.F.G. Lopez			
References	& G.V.B. Ca	novas		

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	2	2	2
CO5	3	2	2	2	2
CO6	3	2	2	2	2

MFS-154 Advanced Food Microbiology Lab

(L-T-P): 0-0-2

Scho	ool: SBSR	Batch: 2021-2023			
Prog	gram:	Current Academic Year: 2021-22			
Brai	nch:	Semester: 2 (Even)			
1	Course Code	MFS-154			
2	Course Title	Advanced Food Microbiology Lab			
3	Credits	2			
4	Contact Hours	0-0-2			
	(L-T-P)				
	Course Status	Compulsory Course			
5	Course	• To develop a sense of microbial quality assessment of food			
	Objective	products			
		• To use traditional methods to know about type biological hazards			
		in products			
		• To have an overview of the various microbiological methods			
		involved in the determination of contaminants in food.			
		• To develop a working knowledge of the use of food quality in			
		microbiological segment.			



6	Course	CO1: Comp	rehend the basic	concept of Food Microbiology.				
	Outcomes	CO2: Develo	op idea for purpo	ose of this in food safety.				
		CO3: Differ	ent methodology	v used to identify various biolog	ical hazards and			
		their	control measure	es in food processing				
		CO4: Various internal and external factors involved in of Food Quality and						
		self-	life of products.					
		CO5: Recog	gnize the import	ance and utility of microbial tes	t in Food safety			
	~	and	in food Industry.					
7	Course	Food microbio	logy is an applic	ation of various laws and regulat	ions employs on			
	Description	food manufac	ture Industries a	and in Food safety application	in new product			
		development.	The types of haza	ardsduring processing identification	on are beneficial			
		in food preser	vation. In the fu	ture Food Microbiology could o	offer more depth			
		knowledge wit	in toxicological s	studies of food. In this course, studies	idents will learn			
0	Outling gullabug	about the unite	Tent methods in a	assessment of food products.	CO Monning			
0	Utilitie synabus	Dere effect has						
	Unit I	Practical bas	sea on Microb	lai Quanty Assessment	01,002			
		Sub unit - a, t	Sub unit - a, b and c detailed in Instructional Plan					
	Unit 2	Practical rela	ated to –Physic	cal Hazards Evaluation	<u>CO1,CO3</u>			
		Sub unit - a, l	o and c detailed	in Instructional Plan				
	Unit 3	Practical rela	ated to Cher	nical Hazards Evaluation	CO1,CO3			
		Sub unit - a, b	o and c detailed	in Instructional Plan				
	Unit 4	Practical rela	ated toEvalu	ation to Biological Hazard	CO1,CO3			
		Sub unit - a, ł	o and c detailed	in Instructional Plan				
	Unit 5	Practical rela	ated toImple	ementation of Microbial	CO2,CO3			
		Methods on 2	Food Industrie	28				
		Sub unit - a, b	o and c detailed	in Instructional Plan				
	Mode of	Jury/Practical	/Viva					
	examination							
	Weightage	CA	Viva Voce	ETE				
	Distribution	25%	25%	50%				
	Text book/s*	- Manu	als of Food Mi	crobiology				
	Other	Lab Mannual	(NIN)					
	References							

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	2	2	2
CO5	3	2	2	2	2
CO6	3	2	2	2	2



MFS 155: Advanced Food Safety and Toxicology Lab L-T-P: 0-1-2

School: SBSR		Batch: 2021-2023				
Program: M.Sc.		Current Academic Year: 2021-22				
Bra	nch: Food	Semester: 2 (Even)				
Scie	nce and					
Tecl	nnology					
1	Course Code	MFS 155				
2	Course Title	Advanced Food Safety and Toxicology Lab				
3	Credits	2				
4	Contact Hours	0-1-2				
	(L-T-P)					
	Course Status	Compulsory Course				
5	Course	• To develop a sense of quality assessment of food pro	oducts			
	Objective	• To use traditional methods to know about type hazar	rds in products			
		• To have an overview of the various methods in	volved in the			
		determination of adulterants in food.				
		• To develop a working knowledge of the use of	f food quality			
		management system ISO 22000, ISO: 9000 and TQM.				
6	Course	CO1: Comprehend the basic concept of Food Laws and Regulations in India.				
	Outcomes	CO2: Develop idea for purpose and action on food safety.				
		CO3: Different laws and Acts. Food Hazards and Toxic	ology. Various			
		nazards and their control measures	and its role in			
		food Food Adulteration and Food Additives	and its fole in			
		CO5: Recognize the importance and utility of Food safety	norms in food			
		Industry.				
7	Course	Food safety is an application of various laws and regulations er	nploys on food			
	Description	manufacture Industries. Food safety application in new produc	et development.			
		The types of hazards during processing identification are ben	neficial in food			
		preservation. In the future Food Toxicology could offer more d	epth knowledge			
		different regulatory bodies national and International dealing in	manufacturing			
		of food products.	manuracturing			
8	Outline syllabus		CO Mapping			
	Unit 1	Practical based on Quality Assessment	CO1,CO2			
	А	Sub unit - a, b and c detailed in Instructional Plan				
	В	Sub unit - a, b and c detailed in Instructional Plan				
	С	Sub unit - a, b and c detailed in Instructional Plan				
	Unit 2	Practical related to –Physical Hazards Evaluation	CO1,CO3			
	A	Sub unit - a, b and c detailed in Instructional Plan				
	B	Sub unit - a, b and c detailed in Instructional Plan				
	С	Sub unit - a, b and c detailed in Instructional Plan				
	Unit 3	Practical related to Chemical Hazards Evaluation	CO1,CO3			



А	Sub unit - a, l	o and c detailed	l in Instructional Plan		
В	Sub unit - a, l	Sub unit - a, b and c detailed in Instructional Plan			
С	Sub unit - a, l	o and c detailed	l in Instructional Plan		
Unit 4	Practical rela	Practical related toEvaluation to Biological Hazard			
А	Sub unit - a, l	Sub unit - a, b and c detailed in Instructional Plan			
В	Sub unit - a, l	Sub unit - a, b and c detailed in Instructional Plan			
С	Sub unit - a, l	Sub unit - a, b and c detailed in Instructional Plan			
Unit 5	Practical rela	Practical related toImplementation of HACCP			
А	Sub unit - a, l	Sub unit - a, b and c detailed in Instructional Plan			
В	Sub unit - a, l	Sub unit - a, b and c detailed in Instructional Plan			
С	Sub unit - a, l	Sub unit - a, b and c detailed in Instructional Plan			
Mode of	Jury/Practical/Viva				
examination					
Weightage	CA	Viva Voce	ETE		
Distribution	25%	25%	50%		
Text book/s*	- Food	Quality Analys	is		
Other	Lab Mannual	(NIN)			
References					

CO/PO	PO1	PO2	PO3	PO4	PO5
C01	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	2	2	2
CO5	3	2	2	2	2
CO6	3	2	2	2	2

MFS 201: Food Quality and Assurance (Theory Subject) L-T-P: 4-0-0

School: SBSR		Batch : 2021-2023
Pro	gram: M. Sc	Current Academic Year: 2022-23
Branch: Food Science		Semester: 3 rd (Odd)
and Technology		
1	Course Code	MFS-201
2	Course Title	Food Quality and Assurance
3	Credits	4
4	Contact Hours (L-	4-0-0
	T-P)	



	Course Status	Compulsory			
5	Course Objective	8. Understanding about food laws and Acts.			
		9. Importance and need of food regulations.			
		10. Various hazards in food.			
		11. Food Quality and Quality Assurance.			
		13 Codex: Food Packaging and labeling			
		14. Food Additives; Food Adulteration			
		15. FSSAI,PFA,HACCP AND CCP			
6	Course Outcomes	After successfully completion of this course students will be able to:			
		CO1: Comprehend the basic concept of Food Laws and Regulations	in India.		
		CO2: Develop idea for purpose and action on food safety.			
		CO3: Different laws and Acts. Food Hazards and Toxicology. Van	ious hazards and		
		their control measures			
		CO4: Various terms of Food Quality and Quality assurance and its r	ole in food. Food		
		Adulteration and Food Additives			
		CO5: Recognize the importance and utility of Food safety norms in	food Industry.		
_		. CO6: Basic understanding with Codex	1 0 1		
1	Course	Food quality is an application of various laws and regulations en	nploys on food		
	Description	manufacture Industries. Food safety application in new product develo	pment. The types		
		of hazards during processing identification are beneficial in food pre	eservation. In the		
		future Food Toxicology could offer more depth knowledge with toxi	cological studies		
		of lood. In this course, students will learn about the different regulator	y bodies national		
8	Outling syllabus	and international dearing in manufacturing of food products.	CO Manning		
0	Unit 1	Canaral principles for food safety and hygiana			
		General principles for food safety and hygiche			
	А	Introduction, Definition, functions and General aspects of FOOD SAFETY	CO1,		
	В	Various aspect of Food Quality and Quality Assurance ;ISO	CO1,		
	С	Mandatory laws for food processing.	CO1		
	Unit 2	Implementation, documentation and record keeping	CO2,		
	А	Types of food hazards: biological, chemical and physical, Risk	CO3		
		assessment			
	В	Existing and emerging pathogens due to globalisation of food trade	CO3		
	C Newer systems of safety evaluation such as HACCP a		CO3		
	Unit 3	National standards	CO4		
	Δ	Solient features of Food Safety & Standards Act 2006 Structure of	<u>CO4</u>		
	A Salielit leadules of Food Salety & Standards Act, 2000, Structure of		04		
	B DEA and ISO 22000 (Eood Safaty Management System)		CO4		
	C Managing risks through the food chain via Traceability and Food		CO4		
	Recall.		001		
	Unit 4	International bodies dealing in standarization	CO5		
	А	Intentional and unintentional contaminants in food industry;	CO5		
		Common screening methods.			
	В	Toxicity due to microbial toxins including botulinum and	CO5		
		staphylococcal toxins, mycotoxin and due to other food pathogens.			
	C	Food allergy and intolerance; Causes, symptoms and novel	CO5		
		methods/products to reduce the effect.			
	Unit 5	Recent concerns	CO5,CO6		
	А	Food Adulteration (Common adulterants), Food Additives	CO5		
	D	(tunctional role, safety issues)			
	В	Food Packaging & labelling (Packaging types, understanding	005		
	<u> </u>	labelling rules & Regulation).			



Mode of	Theory				
 examination		[
Weightage	CA	MTE	ETE		
Distribution	25	25%	50%		
Text book/s*	1) FSSAI ACT) FSSAI ACTS AND LAWS			
Other References	2) EMERGING WEN, 2005 4. International sta) EMERGING TECHNOLOGIES; FOOD PROCESS BY DA- VEN, 2005 4. FOOD SAFETY by Laura K Egendorf, 2000 5. International standards of food safety by Naomi Rees, David			
	Watson, 2000 6.	Codex alimentari	us by FAO & WHO, 2007		

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	2	2	2
CO5	3	2	2	2	2
CO6	3	2	2	2	2

MFS 202: TECHNOLOGY OF MEAT, POULTRY AND SEA FOODS (Theory Subject) L-T-P 3-1-0

r		
Sch	ool: SBSR	Batch : 2021-2023
Pro	gram: M. Sc	Current Academic Year: 2022-23
Bra	nch: Food Science	Semester: 3 rd (Odd)
and	Technology	
1	Course Code	MFS-202
2	Course Title	TECHNOLOGY OF MEAT, POULTRY AND SEA FOODS
3	Credits	4
4	Contact Hours	3-1-0
	(L-T-P)	
	Course Status	Compulsory
5	Course Objective	1. Describe the structure and composition of meat
		2. Outline the post-harvest changes that occur in animal flesh after slaughter
		3. Describe major meat quality attributes, their measurement and processes used to
		ensure quality
		4. Describe the processes that should be followed to obtain quality meat from animals
		5. Develop skills in processing and preservation of meat, fish and poultry products
6	Course Outcomes	After completing this course students will get to know about the nutritional profile



		and processing methods meat, poultry, fish and egg.					
		CO1: Gain knowledge on the methods of grading					
		meat					
		CO2: Different techniques available to slaughter					
		animal					
		CO3: Different methods of tenderizing meat					
		Methods of preserving meat					
		CO4: Processing and preservation of egg and fish					
		CO5: Quality control and standardization of meat, fish and poultry					
		CO6: Poultry industry in India					
7	Course	This course deals with the technology involved in the processing and s	torage of the				
	Description	various food products originating from meat, fish, poultry and eggs. Ici	ing, freezing and				
		cold storage. Drying and smoking salt fish products. Fish protein cond	centrates.				
		Disposal of waste products of meat, fish and poultry processing. The sa	afety issues				
0		associated with these products will also be emphasised.					
8	Outline syllabus		CO Mapping				
	Unit I	INTRODUCTION	CO1, CO2,				
			C01 C02				
	A	Introduction	01,002				
	В	Livestock and poultry population in India	CO1, CO3				
	C	Development of meat and poultry industry in India and its need in	CO1				
		nation's economy Glossary of live market terms for animals and					
		birds	~~~~				
	Unit 2	Meat preservation and quality	CO2, CO3				
	А	Effects of feed, breed and environment on production of meat	CO2				
		animals and their quality					
	В	Meat Quality-color, flavor, texture, Water-Holding Capacity(WHC)	CO2				
	C	Refrigeration and freezing, thermal processing- canning of meat,	CO2				
		retort pouch, dehydration, irradiation, and RTE meat products, meat					
	TT '4 0	curing.					
	Unit 3	Slaughtering and Carcass Processing	CO3				
	А	Modern abattoirs, typical layout and features, Ante-mortem handling	CO3				
		and design of handling facilities					
	В	Hoisting rail and traveling pulley system; stunning methods; steps in	CO3				
	9	slaughtering and dressing; offal handling and inspection					
	C	Operational factors affecting meat quality; effects of processing on	CO3				
	TL	meat tenderization; abattoir equipment and utilities.	<u> </u>				
	Unit 4	Processing of Poultry Products	C04				
	А	Poultry industry in India; measuring the yields and quality	CO4				
		characteristics of poultry products, microbiology of poultry meat,					
	D	sponage factors	004				
	В	Lay-out and design of poultry processing plants, Plant sanitation;	C04				
		Poultry meat processing operations, equipment used – Deleathering,					
	C	Deckaging of poultry products, refrigered storage of poultry meet	CO4				
	C	hy products – eggs egg products. Whole egg powder Egg volk	04				
		products their manufacture nackaging and storage					
	Unit 5	Fish and other Marine Products Processing	CO5, CO6				
	A	Commercially important marine products from India: product export	CO5				
		and its sustenance: basic biochemistry and microbiology					
	В	Preservation of postharvest fish freshness: transportation in	CO5				
		refrigerated vehicles; deodorization of transport systems: design of					
		refrigerated and insulated trucks					
	С	Grading and preservation of shell fish; pickling and preparation of	CO6				
L							



	fish protein conc	sh protein concentrate, fish oil and other by-products.			
Mode of examination	Theory				
Weightage	CA	MTE	ETE		
Distribution	25%	25%	50%		
Text book/s*	1. Forrest JC. 1	975. Principles of	Meat Science. Freeman		
	2. Govindan Th	K. 1985. Fish Proc	essing Technology.		
	3. IBH. Hui Y	3. IBH. Hui YH. 2001. Meat Science and Applications. Marcel			
	Dekker.				
Other References					

MFS 203: WASTE MANAGEMENT IN FOOD INDUSTRIES (Theory Subject) L-T-P: 2-0-0

Sch	ool: SBSR	Batch : 2021-2023				
Pro	gram: M. Sc	Current Academic Year: 2022-23				
Bra	nch: Food Science	Semester: 3 rd (Odd)				
and	Technology					
1	Course Code	MFS-203				
2	Course Title	WASTE MANAGEMENT IN FOOD INDUSTRIES				
3	Credits	4				
4	Contact Hours (L-T-P)	3-1-0				
	Course Status	ompulsory				
5	Course Objective	 Understanding about food industry waste. Importance and need of management the industrial waste. Various treatment methods available for food waste. Types, availability and utilization of by-products from waste. Biomethanation and bio composting technology for utilization Industrial waste treatments and ways for waste disposal method Food Additives; Food Adulteration 	aste. r organic waste			
6	Course Outcomes	 After successfully completion of this course students will be able to: CO1: Comprehend the basic concept of waste and types. CO2: Waste Disposal method. Recognize the importance and utili food Industry CO3: Treatment of plant waste by physical, chemical and biological Effluent treatment plants, Use of waste and waste water. Varie their control measures. CO4: Types, availability and utilization of by-products of cere oilseeds, Utilization of by-products from food processing In CO5: Status and utilization of dairy by-products. Industrial waste ma CO6: Case study. 	ty of waste from methods, ous hazards and eals, legumes & ndustries. anagement			
7	Course Description	Food waste management is an application of utilization food waste. The types of treatment applied during processing identification are beneficial as by product recovery. In the future waste management could offer more depth knowledge with its applicable techniques. In this course, students will learn about the different treatments required in food manufacturing.				
8	Outline syllabus		CO Mapping			
	Unit 1	INTRODUCTION	CO1,			
1	1		1			



А	Waste and its co	CO1,			
В	Types of food pr	ocessing wastes &	k their present disposal methods.	CO1, CO2	
С	Identification of	waste.		CO1	
Unit 2	nit 2 TREATMENT OF PLANT WASTE Treatment of plant waste by physical, chemical and biological methods.			CO2, CO3	
А				CO2	
В	Solid and liquid	waste.		CO2	
С	Use of waste and	Use of waste and waste water.			
Unit 3	BYPRODUCTS	CO3			
А	Types, availabili	CO3			
В	Utilization of by industries	Utilization of by-products from fruits and vegetables processing industries			
С	Utilization of by brewery & distil	Utilization of by-products from sugar and agro based industries, and prewery & distillery waste			
Unit 4	UTILIZATION	OF DIFFEREN	T WASTE PRODUCTS	CO4	
А	Status and utiliza	Status and utilization of dairy by-products.			
В	Availability & u	tilization of by-pr	oducts of meat industry.	CO4	
С	Availability & u	tilization of by-p	coducts of poultry industry and fish	CO4	
 	processing units.				
Unit 5	TECHNIQUES	FOR WASTE U	UTILIZATION	CO5, CO6	
Α	Biomethanation utilization	Biomethanation and biocomposting technology for organic waste utilization			
В	Incineration & e	fficient combustion	on technology	CO5	
С	Integration of utilization. Case studies.	Integration of new and renewable energy sources for waste utilization. Case studies.			
Mode of examination	Theory				
Weightage	CA				
Distribution	25%	25%	50%		
Text book/s*	1) Beggs C. Energy Management and Conservation. Elsevier Publ. Chaturvedi P. 2000.				
Other References	 2) Energy Conservation through Waste Utilization. American Society of Mechanical Engineers, New York. Kreit F & Goswami DY. 2008. 3) Energy Management and Conservation Handbook. CRC Press. 4) Murphy WR &Mckay G. 1982. Energy Management. BS Publ. Patrick DP, 1082 				

CO/PO	PO1	PO2	PO3	PO4	PO5
C01	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	2	2	2



CO5	3	2	2	2	2
CO6	3	2	2	2	2

TECHNIQUES IN FOOD ANALYSIS (Theory subject): MFS206

School: SBSR	Batch: 2021-2023					
Program:	Current Acade	emic Year: 2022-23				
Masters						
Branch: Food	Semester: 3 rd (odd)				
Science and						
Technology						
1	Course Title	TECHNIQUES IN FOOD ANALYSIS				
2.	Course Code	MFS206				
3.	Credits	4				
4.	Contact Hours (L-T-P)	4-0-0				
	Course Status	Compulsory				
5	Course Objectives	 To develop industrial approach in students for Food Analysis To develop the expertise for new techniques for food Quality Assurance. 				
6	Course	After successfully completion of this course students will be able to:				
	Outcomes	CO1. Understand the food Quality Techniques for Quality Assurate				
		CO2. Understand the technology and manufacture of technical Instruemnts				
		CO3. Perform the analysis of various food Products				
		CO4.Understand the Science behind analytical technic	lues			
		CO5.Understand about application of Analytical Tech	niques.			
		CO6. Understand the implementation of new technique Assurance or Research and Development.	es in Quality			
7	Course Description	Today's life depends very much on safe foods and its quality assurance. This course demonstrates broad knowledge about quality analytical techniques applied on bakery, confectionary and extruded products development and machineries related to the products and other all food products prepared for consumers This course provides the knowledge about analytical Techniques This course will be helpful for joining industry as well as setting up one's own industry.				
8	Outline syllabus		CO Mapping			
	Unit 1	Introduction Food Analysis	CO1, CO6			
	A	Introduction to Sampling Techniques and their functions: Machines and instruments for Analysis	001,006			
	В	Methodology of Sample preparation. Significance in	CO1, CO6			



	Food Quality					
С	Calibration a	nd Standardiz	ation of different	CO1, CO6		
	Instruments.					
Unit 2	ANALYSIS	TECHNIQU	ES	CO2, CO6		
А	Technology	for Spectrosco	pic Techniques using	CO2, CO6		
	UV/Vis analy	ytical Techniq	ues			
В	Fluorescence	e, IR , FTIR, N	IR, NMR, Atomic	CO2, CO6		
	Absorption,	ICP,				
С	Quality const	ideration and J	parameters; Polarimetry,	CO2, CO6		
	referactrome	try, microscop	ic techniques in Food			
	Analysis (Lig	ght microscop	y, SEM,TEM, XRD,			
	particle size analysis, image analysis).					
Unit 3	CHROMAT	OGRAPHIC	TECHNIQUES	CO3, CO6		
А	Testing of Sa	amples from C	hromatographic	CO3, CO6		
	Techniques:	adsorption, co	lumn, partition, affinity,			
D	10n exchange					
B	Methods for	GC		CO3, CO6		
	GLC, HPLC,	, HPILC, GCI	MS, LCMS.	$\frac{C03,C06}{C04,C06}$		
Unit 4	SEPERATIO	UN IECHNI	QUES Summing Training in	CO4, CO6		
А	Food	acteristics and	Separation Techniques in	CO4, CO6		
В	Separation T	CO4, CO6				
	electrophores					
	Ultracentrifugation, Solid Phase extraction,					
C	Supercritical fluid extraction, isoelectric forces,			CO4, CO6		
	isotopic Tech	nniques, Mano	metric Techniques.			
Unit 5	IMMUNOA	SSAY TECH	INIQUES	CO5, CO6		
А	Importance a	and application	ns of Immunoassay	CO5, CO6		
	techniques	· ·	TT 1 1			
В	Special Tech	niques immun	loassay Techniques;	CO5, CO6		
	Isotopic, non	-isolopic and l	Enzyme Immunoassay;			
	Apolycic	sion, Enzyman	c methods of Food			
C	Thermal mot	hods in Food	analysis Differential	CO5 CO6		
	scanning col	orimetric and a	others techniques			
Mode of	Theory	sintenie und	and the second dest			
examination						
Weightage	CA	MTE	ETE			
Distribution	25%	25%	50%			
Text book/s*	1 Pomeranz,	Y and Meloar	n, C.E., 1994.Food			
	Analysis- Th	eory and Prac	tice, Springer US 3 rd			
	Edition.	-				
	2. Nielsen S.	(Eds).1994.In	troduction to Chemical			
	Analsis of Fo	ods. Jones and	d Bartlett.			
Other	1. Krik RS	& Sawer \overline{R} .	1991.Pearson's Chemical			
References	Analysis of	Foods.9 th Ed	ition Longman Scientific			
	&Technical		a a second			
	2. Leo ML., 2	2004. Handbo	ok of Food Analysis.2 nd			
	Ed. Vol I-III	Ed. Vol I-III				



CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	2	2	2
CO5	3	2	2	2	2
CO6	3	2	2	2	2

MFP-252: Food Quality and Assurance Lab L-T-P: 2-0-0

Scho	ool: SBSR	Batch: 2021-2023
Prog	gram: Masters	Current Academic Year: 2022-23
Brai	nch: Food	Semester: 3 rd (odd)
Scie	nce and	
Tech	nnology	
1	Course Code	MFP-252
2	Course Title	Food Quality and Assurance Lab
3	Credits	2
4	Contact Hours	0-0-2
	(L-T-P)	
	Course Status	Compulsory Course
5	Course	• To develop a sense of food quality assessment of food products
	Objective	• To use traditional methods to know about type biological hazards
		in products
		• To have an overview of the various microbiological methods involved in the determination of contaminants in food.
		• To develop a working knowledge of the use of food quality in
		nutritional segment.
6	Course	CO1: Comprehend the basic concept of Food adulteration.
	Outcomes	CO2: Develop idea for purpose of this in food safety.
		CO3: Different methodology used to identify various biological hazards and
		their control measures in food processing
		CO4: Various internal and external factors involved in of Food Quality and self-life of products.
		CO5: Recognize the importance and utility of microbial test in Food quality



	and in food Industry.						
7	Course	Food quality a	and Assurance is	s an application of various laws	and regulations		
	Description	employs on fo	od manufacture	Industries and in Food safety app	plication in new		
		product develo	product development. The types of hazards during processing identification are				
		beneficial in f	food preservation	n. In the future Food Microbiol	ogy could offer		
		more depth k	nowledge with	toxicological studies of food.	In this course,		
0		students will le	earn about the dif	terent methods in assessment of f	ood products.		
8	Outline syllabus				CO Mapping		
	Unit 1	Practical bas	Practical based on FSMS:22000 Quality Assessment				
		Sub unit - a, l	Sub unit - a, b and c detailed in Instructional Plan				
	Unit 2	Practical rela	Practical related to –HACCP Hazards Evaluation				
		Sub unit - a, l	Sub unit - a, b and c detailed in Instructional Plan				
	Unit 3	Practical rela	CO1,CO3				
		Evaluation					
		Sub unit - a, l	o and c detailed	in Instructional Plan			
	Unit 4	Practical rela	ated toEvalu	ation to Biological Hazard	CO1,CO3		
		Sub unit - a, l	o and c detailed	in Instructional Plan			
	Unit 5	Practical relation	ated toImple	ementation of Quality	CO2,CO3		
		assessment 1	Methods on Fo	ood Industries			
		Sub unit - a, l	and c detailed	in Instructional Plan			
	Mode of	Jury/Practical	/Viva				
	examination						
	Weightage	СА	Viva voce	ETE			
	Distribution	25%	25%	50%			
	Text book/s*	- Manu	als of Food Qu	ality Assurance			
	Other	Lab Mannual	(NIN)				
	References						

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	2	2	2
CO5	3	2	2	2	2
CO6	3	2	2	2	2



Meat Technology Lab: MFP202

L-T-P. 0-0-2

-T-P: 0-0-3	Credits: 2
School: SBSR	Batch: 2021-2023
Program:	Current Academic Year: 2022-23
Masters	
Branch: Food	Semester: 3 ^{ru} (odd)
Science and	
Technology	
202	Course litle: Meat Technology Lab
Course outcomes:	
After successful con	npletion of this course students will be able to:
• CO1: Identif	y the quality parameters of egg.
• CO2: Unders	stand basic techniques to preserve meat and meat products.
• CO3: Explai	n the importance of Crude fiber in daily life and how to analyses it from animal
feed.	
• CO4: Unders	stand how to prepare standard solution and able to explain normality and Molarity.
CO5: Analyz	ze the microbial quality of meat and milk.
CO6: Estima	tion of physical properties of the animal products and industrial visit.
Unit	Торіс
I	• Determination of external and internal quality of poultryegg.
	• To study the effect of time, temp on co-agulation properties of egg.
II	• Preparation of different types of meat products using different methods of
	preservation.
	Preservation and evaluation of different egg products
III	• Practical related to fibre content of meat Estimation oftotal fibre content
	of meat
	Practical related to solution preparation
IV	• Estimation of bacterial numbers in a given sample ofmeat
	• Estimation of yeast and mould numbers in a givensample of meat
	• Determination of microbiological quality of milk of MBR test.
	• Water holding capacity and colour of different meat type
V	 Moisture and protein content of different meat type

- 1) Lawrie R A, Lawrie's Meat Science, 5th Ed, Woodhead Publisher, England, 1998
- 2) Parkhurst & Mountney, Poultry Meat and Egg Production, CBS Publication, New Delhi, 1997
- 3) Pearson & Gillet Processed Meats, 3 Ed, CBS Publication, New Delhi, 1997
- 4) Shai Barbut, Poultry Products Processing, CRC Press 2005
- 5) Stadelman WJ, Owen J Cotterill Egg Science and Technology, 4th Ed. CBS Publication New Delhi,



CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	2	2	2
CO5	3	2	2	2	2
CO6	3	2	2	2	2

MFS251: Dissertation I

Sch	ool: SBSR	Batch : 2021-2023				
Pro	gram: M.Sc.	Current Academic Year: 2022-23				
Bra	inch: Food Science and	Semester: Odd (3 rd)				
Tec	hnology					
1	Credits	2				
2	Contact Hours(L-T-P)	0-0-3				
3	Course Status	Compulsory				
4	Course Objective	1. To learn independent study, formulate hypothesis				
5	Course Outcomes	After studying this course, students will be able to;				
		CO1: Develop understanding of research and				
		research methodologies				
		CO2: Undertake identification of problem and review	w of literature			
		CO3: Undertake R &D activities for the developmer	nt of			
		science/product				
		CO4: Interpretation of the outcome and results				
		CO5: Enhance presentation and interpretation skills.				
		CO6: Enhance the skill of scientific writing and dem	nonstration of			
		the research area.				
6	Course	The course comprises of features of independent proj	ject work			
	Description		r			
7	Outline syllabus					
	Unit 1	Define a problem				
		Sub unit - a, b and c detailed in Instructional Plan				
	Unit 2	Literature review				
		Sub unit - a, b and c detailed in Instructional Plan				
	Unit 3	Formulate hyothesis				
		Sub unit - a, b and c detailed in Instructional Plan				



	Unit 4	Project we	ork			
		Sub unit - a	Sub unit - a, b and c detailed in Instructional Plan			
	Unit 5	Presentati	ion			
		Sub unit - a	Sub unit - a, b and c detailed in Instructional Plan			
8.	Mode of examination	Practical				
9.	Weightage	CA	Viva Voce	ETE		
	Distribution	25%	25%	50%		
10.	Text book/s*	Research articles available on Google scholar, Science direct, Research methodology related books				
	Other References					

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	2	2	2
CO5	3	2	2	2	2
CO6	3	2	2	2	2

MFS205: Technology of Plant Derived Plants

L-T	C-P: 4-0-0	Credits 4
School: SBSR		Batch : 2021-23
Prog	gram: M.Sc	Current Academic Year: 2022-23
Bra	nch: Food	Semester:04 (Even)
Scie	nce and	
Tecl	hnology	
1	Course Code	MFS205
2	Course Title	Technology of Plant Derived Plants
3	Credits	4
4	Contact	3-1-0
	Hours	
	(L-T-P)	
	Course Status	Compulsory
5	Course Objective	The course is designed to equip students with a broad understanding of the milk and processed foods processing techniques. The course provides a foundation for careers in new product development, dairy industry, quality control or research in all branches of the



		food science.					
6	Course Outcomes	At the end of the course, students will be able to: CO1. Compare similarities and differences between value added and unprocessed foods. CO2 Analyze the effects of various heat treatments on milk and related products. CO3 Understand the processing of animal and plant derived oils. CO4 Discuss the role of probiotics as a functional food. CO5 Understand the processing of baby foods and ready to eat breakfast cereals. CO6 Examine the role of nutraceuticals in food industry. CO7 Analyze codex and its uses in food industry.					
7	Outline syllabi	us		¥	CO Mapping		
	Unit 1	Dairy Chemist	ry and Microbi	ology			
	А	Introduction, M physico-chemic	ilk - compositio al properties.	n, food and nutritive value,	CO1, CO2,CO	3	
	В	Buying and coll reception – con	lection of milk – taminants - Milk	transportation of milk – milk reception in dairies			
	С	Quality and Qu in dairy industry	antity tests at rea y	ception - Applications of enzymes			
	Unit 2	Milk Processin	ıg				
	A Milk Processing flow sheet – Filtration / clarification, Storage of milk, Standardization – simple problems in standardization, Homogenization,				CO1, CO2		
	В	Pasteurization -	CO1, CO3				
	С	Equipment's us Pasteurizers (He fillers, Milk Ch	,				
	Unit 3 Oil and Fat Processing						
	Unit 3	OII and Fat	Processing				
	A A	Processing of oid deodorization, f	Processing ils – Degummin fractionation; Py	g, refining, bleaching, rolysis of fats, toxicity of frying	CO3,CO5		
	A B	Processing of oi deodorization, f oil. Plastic fat – Wi esterification an	ractionation; Py nterization, hydr	g, refining, bleaching, rolysis of fats, toxicity of frying ogenation, esterification, inter-	CO3,CO5		
	A B C	Processing of oi deodorization, f oil. Plastic fat – Wi esterification an Application of cocoa butter rep	Processing ils – Degummin, ractionation; Py nterization, hydr id emulsification plastic fat in b blacers), shorteni	g, refining, bleaching, rolysis of fats, toxicity of frying rogenation, esterification, inter- akery, confectionary (including ngs, margarine processing	CO3,CO5		
	A B C Unit 4	Oil and Fat Processing of oil deodorization, f oil. Plastic fat – Wit esterification and Application of cocoa butter rep Value added plate	ractionation; Py nterization, hydr d emulsificatior plastic fat in b blacers), shorteni	g, refining, bleaching, rolysis of fats, toxicity of frying ogenation, esterification, inter- akery, confectionary (including ngs, margarine processing ucts	CO3,CO5		
	A B C Unit 4 A	Oil and Fat Processing of oil Plastic fat – Wite esterification and Application of cocoa butter rep Value added pl Breakfast and remixes;, ,	Processing ils – Degummin, fractionation; Py nterization, hydr ad emulsification plastic fat in b blacers), shorteni lant based prod eady to eat cerea	g, refining, bleaching, rolysis of fats, toxicity of frying rogenation, esterification, inter- akery, confectionary (including ngs, margarine processing ucts ls; Infant formulas; Protein	CO3,CO5		
	A B C Unit 4 A B	Oll and FatProcessing of oideodorization, foil.Plastic fat – Witeesterification andApplication ofcocoa butter repValue added plBreakfast and remixes;, ,Vegetable Mixeeincluding diet b	Processing ils – Degummin fractionation; Py nterization, hydr id emulsification plastic fat in b blacers), shorteni lant based prod eady to eat cerea	g, refining, bleaching, rolysis of fats, toxicity of frying ogenation, esterification, inter- akery, confectionary (including ngs, margarine processing ucts ls; Infant formulas; Protein t e.g. ice cream; Beverages	CO3,CO5 CO5,CO6		
	A B C Unit 4 A B C	Oil and FatProcessing of oildeodorization, foil.Plastic fat – Witesterification andApplication ofcocoa butter repValue added plBreakfast and redmixes;, ,Vegetable Mixedincluding diet bValue addition ipizza, wafers, red	Processing ils – Degummin fractionation; Py nterization, hydr id emulsification plastic fat in b placers), shorteni lant based prod eady to eat cerea es; Dairy produc everages) in processed foo plls buns, jam, je	g, refining, bleaching, rolysis of fats, toxicity of frying ogenation, esterification, inter- akery, confectionary (including ngs, margarine processing ucts ls; Infant formulas; Protein t e.g. ice cream; Beverages d products e.g. pasta, ice cream, elly, sauce, pickles, waffles	CO3,CO5 CO5,CO6		
	A B C Unit 4 A B C Unit 5	 Oil and Fat Processing of oideodorization, foil. Plastic fat – Witesterification and Application of cocoa butter rep Value added pl Breakfast and remixes;,, Vegetable Mixesincluding diet b Value addition in pizza, wafers, reference 	Processing ils – Degumming fractionation; Py nterization, hydr ad emulsification plastic fat in b placers), shorteni lant based prod eady to eat cerea es; Dairy product everages) in processed foo plls buns, jam, jam	g, refining, bleaching, rolysis of fats, toxicity of frying rogenation, esterification, inter- akery, confectionary (including ngs, margarine processing ucts ls; Infant formulas; Protein t e.g. ice cream; Beverages d products e.g. pasta, ice cream, elly, sauce, pickles, waffles	CO3,CO5 CO5,CO6		
	A B C Unit 4 A B C Unit 5 A	Oll and FatProcessing of or deodorization, f oil.Plastic fat – Wit esterification and Application of cocoa butter repValue added plBreakfast and remixes;, ,Vegetable Mixee including diet bValue addition in pizza, wafers, redPlant based fun Types of fun Nutraceuticals,	Processing ils – Degummin fractionation; Py Interization, hydr id emulsification plastic fat in b blacers), shorteni lant based prod eady to eat cerea es; Dairy produc everages) in processed foo olls buns, jam, ja nctional foods unctional foods	g, refining, bleaching, rolysis of fats, toxicity of frying ogenation, esterification, inter- akery, confectionary (including ngs, margarine processing ucts ls; Infant formulas; Protein t e.g. ice cream; Beverages d products e.g. pasta, ice cream, elly, sauce, pickles, waffles ls: Concepts of Probiotic,	CO3,CO5 CO5,CO6 CO4,CO6,CO7		
	A B C Unit 4 A B C Unit 5 A B	Oil and Fat Processing of oil Processing of oid deodorization, foil. Plastic fat – Wite esterification and Application of cocoa butter rep Value added pl Breakfast and remixes;, , Vegetable Mixed including diet b Value addition in pizza, wafers, removed function in Types of fin Nutraceuticals, Regulatory and	Processing ils – Degummin, fractionation; Py nterization, hydr id emulsification plastic fat in b placers), shorteni lant based prod eady to eat cerea es; Dairy produc everages) in processed foo plls buns, jam, je nctional foods unctional foods labelling issues	g, refining, bleaching, rolysis of fats, toxicity of frying rogenation, esterification, inter- akery, confectionary (including ngs, margarine processing ucts ls; Infant formulas; Protein t e.g. ice cream; Beverages d products e.g. pasta, ice cream, elly, sauce, pickles, waffles ls: Concepts of Probiotic,	CO3,CO5 CO5,CO6 CO4,CO6,CO7		
	A B C Unit 4 A B C Unit 5 A B C Unit 5 A B C	Oil and Fat Processing of oideodorization, foil. Plastic fat – Witesterification and Application of cocoa butter rep Value added pl Breakfast and remixes;, , Vegetable Mixes including diet b Value addition pizza, wafers, re Plant based fun Types of fit Nutraceuticals, Regulatory and CODEX	Processing ils – Degummin fractionation; Py nterization, hydr id emulsificatior plastic fat in b placers), shorteni ant based prod eady to eat cerea es; Dairy produc everages) in processed foo plls buns, jam, je nctional foods inctional foods labelling issues	g, refining, bleaching, rolysis of fats, toxicity of frying ogenation, esterification, inter- akery, confectionary (including ngs, margarine processing ucts ls; Infant formulas; Protein t e.g. ice cream; Beverages d products e.g. pasta, ice cream, elly, sauce, pickles, waffles ls: Concepts of Probiotic,	CO3,CO5 CO5,CO6 CO4,CO6,CO7		
	A B C Unit 4 A B C Unit 5 A B C Unit 5 A B C Mode of examination	Oll and FatProcessing of or deodorization, f oil.Plastic fat – Wit esterification and Application of cocoa butter repValue added plBreakfast and re mixes;, ,Vegetable Mixed including diet bValue addition in pizza, wafers, rePlant based fun Types of fit Nutraceuticals, Regulatory and CODEXCODEXTheory	Processing ils – Degummin fractionation; Py Interization, hydr id emulsification plastic fat in b placers), shorteni lant based prod eady to eat cerea es; Dairy produce everages) in processed foo plls buns, jam, jam inctional foods inctional foods labelling issues	g, refining, bleaching, rolysis of fats, toxicity of frying ogenation, esterification, inter- akery, confectionary (including ngs, margarine processing ucts ls; Infant formulas; Protein t e.g. ice cream; Beverages d products e.g. pasta, ice cream, elly, sauce, pickles, waffles ls: Concepts of Probiotic,	CO3,CO5 CO5,CO6 CO4,CO6,CO7		
	A B C Unit 4 A B C Unit 5 A B C Unit 5 A B C Mode of examination Weightage	Oll and FatProcessing of oideodorization, foil.Plastic fat – Witesterification and Application of cocoa butter repValue added plBreakfast and remixes;,,Vegetable Mixestincluding diet bValue addition in pizza, wafers, remixed function of fixed function of fixed function of pizza, wafers, remixed function of fixed functi	Processing ils – Degummin, fractionation; Py nterization, hydr id emulsification plastic fat in b placers), shorteni lant based prod eady to eat cerea es; Dairy produce everages) in processed foo plls buns, jam, je nctional foods inctional foods inctional foods mathematical labelling issues	g, refining, bleaching, rolysis of fats, toxicity of frying rogenation, esterification, inter- akery, confectionary (including ngs, margarine processing ucts ls; Infant formulas; Protein t e.g. ice cream; Beverages d products e.g. pasta, ice cream, elly, sauce, pickles, waffles ls: Concepts of Probiotic, ETE	CO3,CO5 CO5,CO6 CO4,CO6,CO7		
	A B C Unit 4 A B C Unit 5 A B C Unit 5 A B C Mode of examination Weightage Distribution	Oll and FatProcessing of or deodorization, f oil.Plastic fat – Wit esterification and Application of cocoa butter repValue added plBreakfast and remixes;, ,Vegetable Mixee including diet bValue addition in pizza, wafers, redPlant based fun Types of fit Nutraceuticals, Regulatory and CODEXCA 25%	Processing ils – Degummin fractionation; Py Interization, hydri id emulsification plastic fat in b placers), shorteni lant based prod eady to eat cerea es; Dairy produce everages) in processed foo plls buns, jam, jam netional foods inctional foods labelling issues MTE 25%	g, refining, bleaching, rolysis of fats, toxicity of frying ogenation, esterification, inter- akery, confectionary (including ngs, margarine processing ucts ls; Infant formulas; Protein t e.g. ice cream; Beverages d products e.g. pasta, ice cream, elly, sauce, pickles, waffles ls: Concepts of Probiotic, ETE 50%	CO3,CO5 CO5,CO6 CO4,CO6,CO7		



Other References	 Food Chemistry by L. H. Muyer, CBS PUBLISHERS & DISTRIBUTORS-NEW DELHI, 2004 Edition. Handbook of analysis and quality control for fruit and vegetable products by S.Ranganna Tata McGraw-Hill, c1986. 		
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CO/PO	PO1	PO2	PO3	PO4	PO5
C01	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	2	2	2
CO5	3	2	2	2	2
CO6	3	2	2	2	2

MFS204: Bakery, Confectionery and Extruded products (theory Subject) L-T-P: 4-0-0 Credits 4

Sch	ool: SBSR	Batch : 2021-2023				
Pro	gram: M.Sc.	Current Academic Year: 2022-23				
Bra	nch: Food	Semester: Even (4 th)				
Scie	nce and					
Tec	hnology					
1	Course Code	MFS204				
2	Course Title	Bakery, Confectionery and Extruded products				
3	Credits	4				
4	Contact Hours	4-0-0				
	(L-T-P)					
	Course Status	Compulsory				
5	Course	1. To develop industrial approach in students for bakery, chocolate				
	Objectives	and confectionary industry.				
		2. To develop the expertise for new techniques for snack food.				
6	Course	After successfully completion of this course students will be able to:				
Outcomes		CO1.Understand the functions of bakery ingredients, machineries and				
		various rheological testing of dough.				
		CO2. Understand the technology and manufacture of bakery products and				



		losses in bakery.					
		CO3. Perform the analysis of bakery ingredients and ma	nufacture various				
		bakery products and chocolate with maintaining sa	fety and hygiene				
		of hology glogate	areey and mygrene				
		of bakery plants.					
		CO4. Understand the technology and manufacture of confectionery products, with standards and regulations for confectionary					
		CO5.Understand about extrusion cooking, machineries	and products.				
		CO6.Understand the processing technology of bakery, c	confectionery				
		and extruded products.					
7	Course Description	Today's life depends very much upon not only bread and snack foods but also chocolates and confectionary. This course demonstrates broad knowledge about bakery, confectionary and extruded products development and machineries related to the products. Hygiene is also important factor for the same and this course provides the knowledge about bakery plant safety with hygiene. This course will be helpful for joining industry as well as setting up one's own industry					
8	Outline syllabus		CO Mapping				
	Unit 1	Introduction to baking	CO1, CO6				
	A	Introduction to baking; Bakery ingredients and their functions; Machines and equipment for batch and continuous processing of bakery products	CO1, CO6				
	В	Dough development; methods of dough mixing; dough chemistry	CO1, CO6				
	С	Rheological testing of dough-Farinograph, Mixograph, Extensograph, Amylograph / Rapid ViscoAnalyzer, Falling number, Hosney's dough stickiness tester	CO1, CO6				
	Unit 2	Manufacturing of bakery products	CO2, CO6				
	А	Technology for the manufacture of bakery products- bread, biscuits, cakes	CO2, CO6				
	В	Effect of variations in formulation and process parameters on the quality of the finished product	CO2, CO6				
	С	Quality consideration and parameters; Staling and losses in baking	CO2, CO6				
	Unit 3	Analysis of bakery products	CO3, CO6				
	A	Testing of flour; Cake icing techniques, wafer manufacture, cookies, crackers, dusting or breading	CO3, CO6				
	В	Manufacture of bread rolls, sweet yeast dough products, cake specialties, pies and pastries, doughnuts, chocolates and candies	CO3, CO6				
	С	Coating or enrobing of chocolate (including pan- coating); Maintenance, safety and hygiene of bakery plants.	CO3, CO6				



Unit 4	Quality char	acteristics of	confectionery ingredients	CO4, CO6		
А	Quality chara	acteristics of c	onfectionery ingredients;	CO4, CO6		
	technology for	technology for manufacture of flour, fruit, milk, sugar,				
	chocolate, an	d special conf	ectionery products			
В	Colour, flavo and regulatio	our and texture	of confectionery; standards	CO4, CO6		
С	Machineries	used in confec	tionery industry	CO4, CO6		
Unit 5	Extrusion			CO5, CO6		
А	Importance a	nd application	s of extrusion in food	CO5, CO6		
	processing; P	re and post ex	trusion treatments			
В	Manufacturin	ng process of e	extruded products	CO5, CO6		
С	Change of fu	unctional prop	perties of food components	CO5, CO6		
	during extrus	ion.	_			
Mode of	Theory					
examination						
Weightage	CA	MTE	ETE			
Distribution	25%	25%	50%			
Text book/s*	1. Extrusion	of Food, Vol	2; Harper JM; 1981, CRC			
	Press.					
Other	1. Bakery Te	chnology & E	ngineering; Matz SA; 1960;			
References	AVI Pub.	2.				
	2. Up to-date	e Bread Makir	ng; Fance WJ &Wrogg BH;			
	1968, Maclas	sen & Sons Lte	d.			

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2
CO4	3	2	2	2	2
CO5	3	2	2	2	2
CO6	3	2	2	2	2

MFS253: Dissertation II

School: SBSR	Batch : 2021-2023
Program: M.Sc.	Current Academic Year: 2022-23
Branch: Food Science and	Semester: Even (4)
Technology	



1	Credits	8					
2	Contact Hours(L-T-P)	0-0-16					
3	Course Status	Compulsory					
4	Course Objective	1. To learn independent study, formulate hypothesis					
5	Course Outcomes	After studying this course, students will be able to; CO1: Develop understanding of research and research methodologies CO2: Undertake identification of problem and review of literature CO3: Undertake R &D activities for the development of science/product CO4: Interpretation of the outcome and results CO5: Enhance presentation and interpretation skills. CO6: Enhance the skill of scientific writing and demonstration of the research area					
6	Course Description	The course comprises of features of independent project work					
7	Outline syllabus						
-	Unit 1	Define a problem					
		Sub unit - a. b and c detailed in Instructional Plan					
	Unit 2	Literature review					
		Sub unit - a, b and c detailed in Instructional Plan					
	Unit 3	Formulate hyothesis					
		Sub unit - a, b and c detailed in Instructional Plan					
	Unit 4	Project work					
		Sub unit - a, b and c detailed in Instructional Plan					
	Unit 5	Presentation					
		Sub unit - a, b and c detailed in Instructional Plan					
8.	Mode of examination	Practical					
9.	Weightage	CA Viva Voce ETE					
	Distribution	25% 25% 50%					
10.	Text book/s*	Research articles available on Google scholar, Science direct, Research methodology related books					
	Other References						

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	1
CO2	3	2	3	3	2
CO3	3	2	3	3	2



CO4	3	2	2	2	2
CO5	3	2	2	2	2
CO6	3	2	2	2	2