



Programme outcome :

The programme outcome of M.Sc. (Home Science) is to instill professional, practical and entrepreneurship skills for improvement in the quality of life of family and community.





Course specific outcomes (Food Biotechnology):

- To familiarize the students with the fundamentals of Biotechnology, Industrial Microbiology, Food Biosciences and Nutritional Biotechnology.
- To impart knowledge related to Food and Nutritional Security using the biotechnological approach.
- To impart theoretical and practical knowledge related to food quality assurance.
- To acquire skills to undertake systematic and independent research in the area of Food Biotechnology.





SARDAR PATEL UNIVERSITY
Programme – MSC
(Under Choice Based Credit Scheme) Semester – IV
Syllabus with effect from: 2022-23
M. Sc. H.Sc. Food Biotechnology



Sr. No.	C*	Course No	Title	T/P	Credit	Contact hrs/ week	Exam Duration in hrs	Marks		
								Internal	External	Total
Core Course										
1	C	PH04CFBT51	Nutritional Biotechnology	T	4	4	3	30/10	70/28	100/40
2	C	PH04CFBT52	Food Bioscience	T	4	4	3	30/10	70/28	100/40
3	C	PH04CFBT53	Dissertation & Viva Voce*	--	14	21	-	100	250 (150** +100***)	350
4	C	PH04CFBT54	Seminar	--	2	4	-	50	-	50
Viva Group										
5	C	PH04CFBT55	Comprehensive Viva Voce	--	1	2	-	25	-	25
			Total		25	35	-	235	390	625

*One contact hour per week per student

**150 – Dissertation Evaluation

***100 – Viva Voce





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Vallabh Vidyanagar, Gujarat
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Syllabus with effect from the Academic Year 2021-2022

(Master of Science - Home Science) (Food Biotechnology)
(M.Sc. - H.Sc.) (Food Biotechnology) Semester (IV)

Course Code	PH04CFBT51	Title of the Course	Nutritional Biotechnology
Total Credits of the Course	04	Hours per Week	04

Course Objective:	1. To understand how biotechnology can be utilized for improving the nutrient content of foods
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Course Content		
Unit	Description	Weightage (%)
1.	Principles and methods of plant tissue culture, development of transgenic plants	25
2.	Enhancing the nutritional quality of foods- manipulation of sucrose and starch content: manipulation of fatty acid composition of oils, enriching with protein content, increasing the content of methionine and lysine in feed storage proteins, increasing the levels of vitamins and minerals	25
3.	Removal or minimization of the antinutritional factors and toxic molecules from foods - phytate, oxalic acid, neurotoxins etc., decreasing the contents of pesticides, herbicides	25
4.	(a) Increasing the shelf life of fruits (b) Development of food value metabolites-food colors, food flavours, food additives, sweeteners etc (c) Animal biotechnology for increasing meat quality and meat production	25

Teaching-Learning Methodology	Classroom lectures (Blackboard/Power Point Presentations), Discussion on recent updates with related examples.
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Viva-voce, Quizzes, Seminars,	15%





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	Assignments, Attendance (As per CBCS R.6.8.3)	
3.	University Examination	70%

Course Outcome: Having completed this course, the learner will be able to:

Apply biotechnological techniques for improving the nutritional quality of different plant-based and animal-based food sources.

Suggested References:

Sr. No.	References
1.	Ruth, S.K. (2009). <i>Food and Nutritional Biotechnology</i> . Navyug Publishers & Distributors.
2.	Rai, R.V. (2015). <i>Advances in Food Biotechnology</i> . (1 st Edition). Wiley-Blackwell.
3.	Bills, D. D. and Kung, S. (1992). <i>Biotechnology and Nutrition: Proceedings of the Third International Symposium</i> . Butterworth-Heinemann.

On-line resources to be used if available as reference material

On-line resources

<https://epgp.inflibnet.ac.in/>

Animal Biotechnology, [Taylor & Francis Online](#)

Plant Biotechnology Journal - Wiley Online Library

Food Science and Biotechnology, Home - Springer

Food Biotechnology, [Taylor & Francis Online](#)





(Master of Science - Home Science) (Food Biotechnology)
 (M.Sc. - H.Sc.) (Food Biotechnology) Semester (IV)

Course Code	PH04CFBT52	Title of the Course	Food Biosciences
Total Credits of the Course	04	Hours per Week	04

Course Objectives:	<ul style="list-style-type: none"> • To understand the various bio-processes taking place in foods • To get sensitized and motivated towards the application of biology and related sciences to food-based issues
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Course Content		
Unit	Description	Weightage (%)
1.	Bioprocesses (a) Significance of microorganisms in foods – Nutrient requirements and physiology of microorganisms (b) Factors influencing microbial growth, survival, and destruction of pathogenic and beneficial microorganisms (c) Spoilage organisms in milk, fruits, vegetables, grains, cereals, oilseeds, meat and poultry (d) Physical and chemical methods of controlling microbes	25
2.	Immobilization (a) Immobilization- basics, applications, methods (b) Immobilized reactors (c) Immobilization in food processing (d) Microencapsulation - basics and applications in food processing	25
3.	(a) Enzymes in food processing: fermentative production of enzymes (amylases, proteases, cellulases, pectinases, xylanases, lipases) used in food industry and their downstream processing (b) Enzymes for the production of protein hydrolysates and bioactive peptides, maltodextrins and corn syrup solids (liquefaction, saccharification, dextrinization, isomerization for the production of high-fructose-corn- syrup), fructose and fructooligosaccharides (c) Bacitracin - a probiotic trait (d) Enzymes as processing aids: Role of enzymes in cheese making and whey processing; fruit juices (cell wall degrading enzymes for liquefaction, clarification, peeling, debittering, decolourization of very dark coloured juices such as anthocyanases); baking (fungal α -amylases for bread making; maltogenic α -amylases for anti-staling; xylanases and pentosanases as dough conditioners; lipases for dough conditioning	25





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4.	(a) Bioinformatics: Basics and application in food science. (b) Molecular techniques in the detection of food pathogens and GM foods (c) Biosensors in foods (d) Manufacture of beer, wine, vinegar, cheese, and mold-modified foods	25
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Teaching-Learning Methodology	Classroom lectures (Blackboard/Power Point Presentations), Discussion on recent updates with related examples.
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcome: Having completed this course, the learner will be able to:	
1.	Use bioprocesses for increasing the functionality and nutraceutical properties of foods.
2.	Use immobilization techniques and encapsulation methods for the processing of foods.
3.	Use microbial enzymes for the processing of foods.

Suggested References:	
Sr. No.	References
1.	<i>Enzymes in Food Processing: Fundamentals and Potential applications</i> . (2010). (Editors – P. S. Panesar, S.S. Marwaha, H.K. Chopra). I K International Publishing House Pvt. Ltd.
2.	<i>Food Biotechnology Principle and Practices</i> . (2013). (Editors - V. K. Joshi and R. S. Singh). I K International Publishing House Pvt. Ltd.
On-line resources to be used if available as reference material	
Journal of Biosciences, Indian Academy of Sciences	
Journal of Biosciences, Springer	
https://www.researchgate.net/publication/286327834_BIOINFORMATICS_APPROACHES_IN_FOOD_INDUSTRY_AN_OVERVIEW	





Food Biotechnology, Springer

(Master of Science –Home Science) (Food Biotechnology)
 (M.Sc.-H.Sc.) (Food Biotechnology) Semester (IV)

Course Code	PH04CFBT53	Title of the Course	Dissertation & Viva Voce
Total Credits of the Course	14	Hours per Week	21

Course Objective:	To develop research skills in the student.
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Course Content		
	Description	Weightage (%)
	Review the related literature, carryout the laboratory work to fulfill the objectives of the research plan, apply the relevant statistical tools, write a detailed thesis and finally to defend the research work in a viva voce examination.	100

Teaching-Learning Methodology	Literature search, demonstration and then actual performance by students, discussion on recent update with related examples, discussion of results.
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Continuous Assessment in the form of Practical, Attendance (As per CBCS R.6.8.3)	30%
2.	University Examination in the form of thesis of appraisal and viva voce	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Identify research areas of his or her own interest pertaining to the latest developments in the field food biotechnology.





2.	Explore the research area in depth.
3.	Conduct the research project after identifying the appropriate research tool.
4.	Apply appropriate statistical analysis to the data collected.
5.	Write a scientific report (dissertation) after the completion of the work.
6.	Face an examination in the form of a viva-voce and defend the research work conducted.

Suggested References:	
Sr. No.	References
1.	Kothari, C.K. (1990). <i>Research Methodology: Methods and Techniques</i> . New Delhi: Wiley Eastern Ltd.
2.	Sarangi, P.(2010). <i>Taxman's Research Methodology</i> . New Delhi: Taxman Publications (P) Ltd.
3.	Oliver, P. (2008). <i>Writing your Thesis</i> . Delhi: Sage Publication.
4.	Hart, C. (2005). <i>Doing your Master's Dissertation</i> . New Delhi: Vistaar Publications.
On-line resources to be used if available as reference material	
On-line Resources	
Journal of Biosciences, Indian Academy of Sciences	
<i>Journal of Biosciences, Springer</i>	
<i>Food Biotechnology, Springer</i>	
Food Science and Biotechnology, Home - Springer	
Food Biotechnology, Taylor & Francis Online	
SPSS:20	





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Course Code	PH04CFBT54	Title of the Course	Seminar
Total Credits of the Course	02	Hours per Week	04

Course Objective:	To expose students to the scientific literature available through online and offline resources in order to appreciate the current research going on in the field of food biotechnology.
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Course Content		
	Description	Weightage (%)
1.	Student will select a current research topic related to food biotechnology	25
2.	Student will review research papers related to the selected topic and make a presentation	75

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal continuous Assessment in the form of seminar presentation and attendance (As per CBCS R.6.8.3)	100%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Improve his/her ability in the critical assessment of the available scientific literature.
2.	Use various resources to locate and extract information using offline and online tools.
3.	Obtain experience in the preparation and presentation of scientific papers.





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Course Code	PH04CFBT55	Title of the Course	Comprehensive viva-voce
Total Credits of the Course	01	Hours per Week	02

Course Objectives:	<p>7. To assess the student's ability to communicate the knowledge he has gained.</p> <p>8. To assess the student's understanding of the concepts and the depth of knowledge of the various courses he/she has studied.</p>
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Course Content		
	Description	Weightage (%)
	At the end of the semester the student will appear for a viva voce based on the course content covered in all the theory and practicals of all the four semesters.	100

Teaching-Learning Methodology	Literature search, lectures, practicals
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal viva voce (As per CBCS R.6.8.3)	100%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Gain confidence in communicating the knowledge he/she has learnt.
2.	Strengthen the understanding of the concepts he/she has studied.





UGC-MOOC COURSES IN THE SUBJECT OF HOME SCIENCE FOOD BIOTECHNOLOGY

Sr. No.	Title of MOOC
1	Food Microbiology and Food Safety
2	Research Methodology
3	Biostatistics
4	Analytical techniques
5	Communication research
6	Functional Foods and Nutraceuticals
7	Academic Writing
8	Biomolecules: Structure, Function in Health and Disease



