

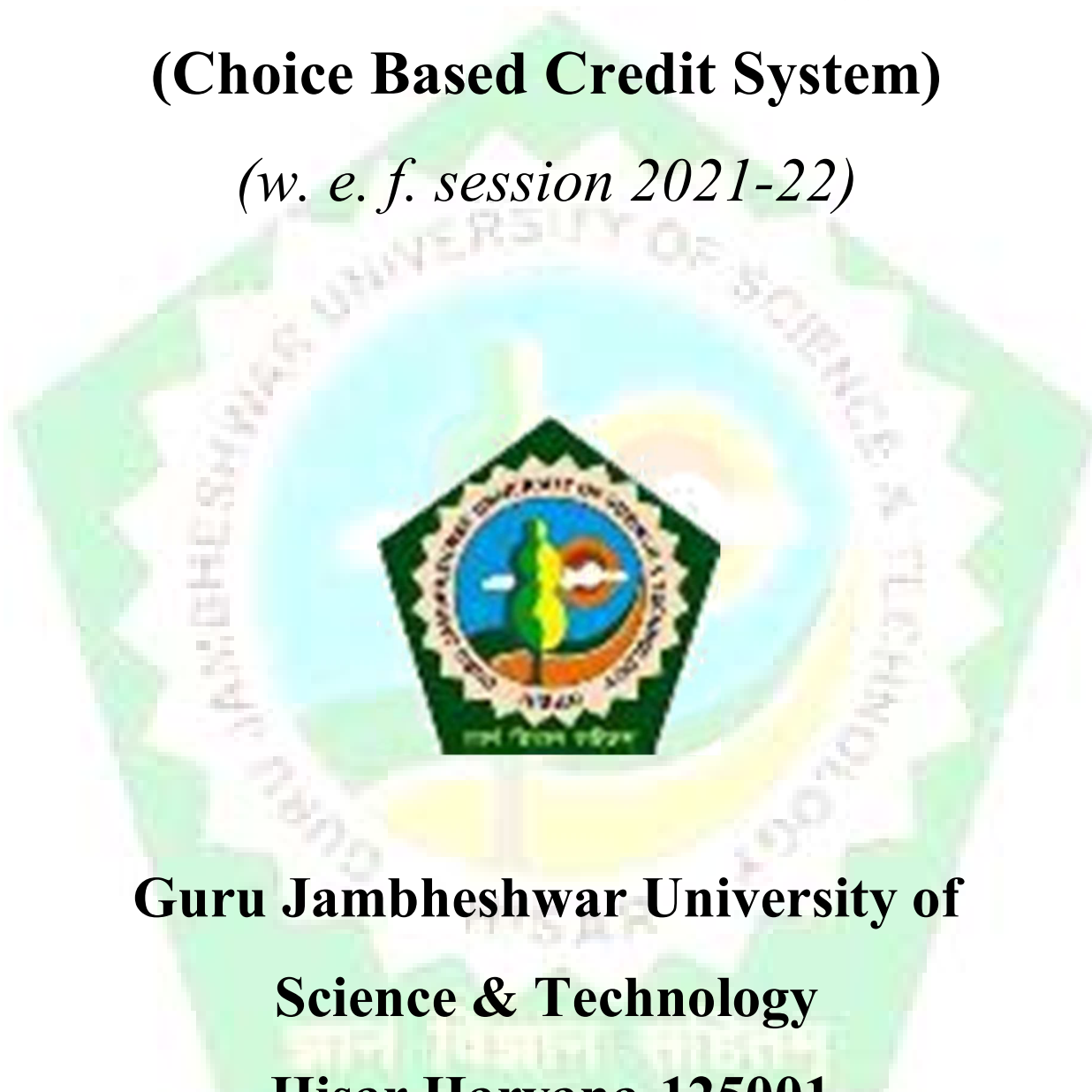
Department of Food Technology

Scheme & Syllabi

B.Tech. (Food Technology)

(Choice Based Credit System)

(w. e. f. session 2021-22)



Guru Jambheshwar University of

Science & Technology

Hisar Haryana-125001

Department of Food Technology

VISION

- To become a model department for scientific industrial research in the area of food science and technology
- To become an advanced centre for Food Analysis aiming to provide guidance to food industries with regard to physical, chemical, sensory and microbiological qualities of raw and processed food products

MISSION

- To assist and promote the growth of food industry of the region through technology and technical services
- To add value and utility to agro- resources through R&D
- To develop human resource for the industry

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

- To groom the students into knowledgeable, efficient and ethical professionals to be employed in the food and allied industries.
- To train the students for taking up leadership roles for establishing viable start-ups in food sector.
- To motivate the students for taking up postgraduate studies and research in the area of food engineering, food science and technology, and allied areas in the institutes of higher education.

Programme Outcomes (POs)

PO1	Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem Analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics, responsibilities, and norms of the engineering practice.
PO9	Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
P10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society. Some of them are, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Lifelong Learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

Programme Specific Outcomes (PSOs)

PSO1:	Familiarize students with major and minor food components, analytical techniques, instrumentation and changes resulting from processing of foods for addressing technical and engineering challenges in food industries.
PSO2:	Understand the engineering and technology of handling, storage, processing, packaging, waste management, environmental impact and preservation of foods.
PSO 3:	Enhance capability of students to solve real problems related to food with regards to its overall quality, safety, society and environment.





Guru Jambheshwar University of Science & Technology

Curriculum for First Year

Undergraduate Degree Courses in Engineering & Technology

(w. e. f. session 2021-22)

General, Course structure & Theme & Semester-wise credit distribution

A. Definition of Credit: -

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1 Hr. Practical (P) per week	0.5 credits
2 Hours Practical (Lab)/week	1 credit

B. Range of credits: -

A range of credits from 150 to 160 for a student to be eligible to get Under Graduate degree in Engineering. A student will be eligible to get Under Graduate degree with Honours or additional Minor Engineering, if he/she completes an additional 20 credits. These could be acquired through MOOCs.

C. AICTE Structure of Undergraduate Engineering program: -

For all semesters

Sr. No.	Category	Suggested Breakup of Credits (Total 160)
1	Humanities and Social Sciences including Management courses	12*
2	Basic Science courses	25*
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc	24*
4	Professional core courses	48*
5	Professional Elective courses relevant to chosen specialization/branch	18*
6	Open subjects – Electives from other technical and /or emerging subjects	18*
7	Project work, seminar and internship in industry or elsewhere	15*
8	Mandatory Courses [Induction training, Environmental Sciences, Indian Constitution, Essence of Indian Traditional Knowledge]	(non-credit)
	Total	160*

**Minor variation is allowed as per need of the respective disciplines.*

GJUS&T Curriculum for First Year Undergraduate degree courses in Engineering & Technology (w.e.f. session 2021-22)

For First year

S. No.	Category	Credits
1	Humanities and Social Sciences courses	03
2	Basic Science courses	19
3	Engineering Science courses	16
4	Mandatory Courses	00
	Total	38

D. Credit distribution in the First year of Undergraduate Engineering Program: -

	Lecture (L)	Tutorial (T)	Laboratory/Practical (P)	Total credits (C)
Physics	3	1	3	5.5
Chemistry	3	1	3	5.5
Maths-I	3	1	0	4
Maths –II	3	1	0	4
Programming for Problem solving	3	0	4	5
English	2	0	2	3
Engineering Graphics & Design	1	0	4	3
Workshop/Manufacturing Practices	1	0	4	3
Basic Electrical Engg.	3	1	2	5
Total				38

E. Course code and definition: -

Course code	Definitions
L	Lecture
T	Tutorial
P	Practical
C	Credits
BSC	Basic Science Courses
ESC	Engineering Science Courses
HSMC	Humanities and Social Sciences including Management courses
PCC	Professional Core Courses
PEC	Professional Elective Courses

OEC	Open Elective Courses
MC	Mandatory courses
PROJ.	Project

F. Category of Courses: -

BASIC SCIENCE COURSES

(FIRST YEAR)

Sr. No.	Course Code	Course Title	Hours per week			Credits
			L	T	P	
1	BSC101	Physics	3	1	3	5.5
2	BSC102	Chemistry	3	1	3	5.5
3	BSC103	Maths –I	3	1	0	4
4	BSC104	Maths –II	3	1	0	4

ENGINEERING SCIENCE COURSES

(FIRST YEAR)

Sr. No.	Course Code	Course Title	Hours per week			Credits
			L	T	P	
1	ESC101	Basic Electrical Engineering	3	1	2	5
2	ESC102	Engineering Graphics & Design	1	0	4	3
3	ESC103	Programming for Problem Solving	3	0	4	5
4	ESC104	Workshop/Manufacturing Practices	1	0	4	3

HUMANITIES & SOCIAL SCIENCES INCLUDING MANAGEMENT COURSES

(FIRST YEAR)

Sr. No.	Course Code	Course Title	Hours per week			Credits
			L	T	P	
1	HSMC101	English	2	0	2	3

MANDATORY COURSES

(FIRST YEAR)

Sr. No.	Course Code	Course Title	Hours per week			Credits
			L	T	P	
1	MC 101	Induction Training	3 weeks			0.0
2	MC102	Environmental Sciences	3	0	0	0.0
3	MC103	Indian Constitution	3	0	0	0.0

G. Structure of curriculum

Mandatory Induction Training (3 weeks duration)

- Physical activity
- Creative Arts
- Universal Human Values
- Literary
- Proficiency Modules
- Lectures by Eminent People
- Visits to local Areas
- Familiarization to Dept./Branch & Innovation



Department of Food Technology
Guru Jambheshwar University of Science & Technology
Hisar, Haryana

Choice Based Credit System Scheme and Syllabi

(w. e. f. session 2021-22)

B.TECH. (FOOD TECHNOLOGY)

Semester	I	II	III	IV	V	VI	VII	VIII	Total
Discipline									
Humanities and Social Sciences including Management Courses (HSMC)		3	0		2	2			7
Basic Science Courses (BSC)	9.5	9.5	4			3			26
Engineering Science Courses (ESC)	8	8	7	3					26
Professional Core Courses (PCC)			7	17	16	9	6	4	59
Professional Elective Courses (PEC)						6	6	6	18
Open Elective Courses (OEC)					3	3	3		9
Internship in Industry/ In-Plant Training/ Project-1 and Project- 2/ Seminar					1		4+4	6	15
Non-Credit Mandatory Courses (MC)	0	0	0		0				
Total	17.5	20.5	18	20	22	23	23	16	160

SEMESTER III

Sr. No.	Category	Course Code	Course Title	Hours per week			Credits	Marks Distribution	
				L	T	P		Internal	External
1	Mandatory Course	MC102-T	Environmental Sciences	3	0	0	0	30	70
2	Humanities and Social Sciences including Management Course	HSMC201-P	Human Values and Personality Development	0	0	3	0	100	--
3	Basic Science Course	BSC-FT201-T	Introduction to Biology and Microbiology	2	0	0	2	30	70
4	Basic Science Course	BSC-FT201-P	Introduction to Biology and Microbiology Lab	0	0	4	2	50	50
5	Professional Core Course	PCC-FT201-T	Food Composition and Analysis	3	0	0	3	30	70
6	Professional Core Course	PCC-FT201-P	Food Composition and Analysis Lab	0	0	4	2	50	50
7	Professional Core Course	PCC-FT203-T	Introduction to Nutrition and Health	2	0	0	2	30	70
8	Engineering Science Course	ESC-FT201-T	Engineering Properties of Foods	3	0	0	3	30	70
9	Engineering Science Course	ESC-FT203-T	Thermodynamics	3	1	0	4	30	70
Total							18		

SEMESTER IV

Sr. No.	Category	Course Code	Course Title	Hours per week			Credits	Marks Distribution	
				L	T	P		Internal	External
1	Professional Core Course	PCC-FT202-T	Food Biochemistry	3	0	0	3	30	70
2	Professional Core Course	PCC-FT204-T	Principles and Methods of Food Processing	3	0	0	3	30	70
3	Professional Core Course	PCC-FT204-P	Principles and Methods of Food Processing Lab	0	0	4	2	50	50
4	Professional Core Course	PCC-FT206-T	Food Engineering	3	1	0	4	30	70
5	Professional Core Course	PCC-FT208-T	Food Microbiology	3	0	0	3	30	70
6	Professional Core Course	PCC-FT208-P	Food Microbiology Lab	0	0	4	2	50	50

7	Engineering Science Course	ESC-FT202-T	Heat and Mass Transfer	3	0	0	3	30	70
Total							20		

Students are required to do summer internship/training of 4-6weeks during break following 4th semester which will be evaluated during 5th semester.

SEMESTER V

Sr. No.	Category	Course Code	Course Title	Hours per week			Credits	Marks Distribution	
				L	T	P		Internal	External
1	Humanities and Social Sciences including Management Course	HSMC301-T	Economics for Engineers	2	0	0	2	30	70
2	Mandatory Course	MC104-T	Essence of Indian Traditional Knowledge	3	0	0	0	30	70
3	Professional Core Course	PCC-FT301-T	Processing of Grains	3	0	0	3	30	70
4	Professional Core Course	PCC-FT301-P	Processing of Grains Lab	0	0	4	2	50	50
5	Professional Core Course	PCC-FT303-T	Fruits and Vegetables Processing	3	0	0	3	30	70
6	Professional Core Course	PCC-FT303-P	Fruits and Vegetables Processing Lab	0	0	4	2	50	50
7	Professional Core Course	PCC-FT305-T	Food Safety, Quality and Regulations	3	0	0	3	30	70
8	Professional Core Course	PCC-FT307-T	Food Refrigeration and Cold Storage Construction	3	0	0	3	30	70
9	OPEN ELECTIVE COURSE-I		Open Elective-I (from any other Department)	3	0	0	3	30	70
10	In-Plant Training	FTIT-1	In-Plant Training-I				1	100	--
Total							22		
	Open Elective Course	OE-FT-391-T	Open Elective-I (for the students of other teaching departments) Processing and Preservation of Foods	3	0	0	3	30	70

SEMESTER VI

Sr. No.	Category	Course Code	Course Title	Hours per week			Credits	Marks Distribution	
				L	T	P		Internal	External
1	Humanities and Social Sciences including Management Course	HSMC302-T	Fundamentals of Management for Engineers	2	0	0	2	30	70
2	Basic Sciences Courses	BSC-FT302-T	Statistics for Food Technologists	2	1	0	3	30	70
3	Professional Core Course	PCC-FT302-T	Technology of Milk and Milk Products	3	0	0	3	30	70
4	Professional Core Course	PCC-FT302-P	Technology of Milk and Milk Products Lab	0	0	4	2	50	50
	Professional Core Course	PCC-FT304-T	Fermentation Technology	3	0	0	3	30	70
	Professional Core Course	PCC-FT304-P	Fermentation Technology Lab	0	0	2	1	50	50
5	Professional Elective Course		Professional Elective – I	3	0	0	3	30	70
		PEC-FT302-T(i)	Bioprocess Engineering						
		PEC-FT302-T(ii)	Technology of Beverages						
		PEC-FT302-T(iii)	Specialty Foods						
Any one MOOC course- Not Studied (or to be studied) till now of 3 credits									
6	Professional Elective Course		Professional Elective – II	3	0	0	3	30	70
		PEC-FT304-T(i)	Technology of Pulses and Oilseeds						
		PEC-FT304-T(ii)	Technology of Spices and Herbs						
		PEC-FT304-T(iii)	Dairy Process Engineering						
Any one MOOC course- Not Studied (or to be studied) till now of 3 credits									
8	OPEN ELECTIVE COURSE-II		Open Elective-II (from any other Department)	3	0	0	3	30	70
Total							23		
	Open Elective Course	OE-FT-392-T	Open Elective-II (for the students of other teaching departments) Food Safety, Quality and Regulations	3	0	0	3	30	70

Students are required to do summer internship/training of 4-6weeks during break following 6th semester which will be evaluated during 7th semester.

SEMESTER VII

Sr. No.	Category	Course Code	Course Title	Hours per week			Credits	Marks Distribution	
				L	T	P		Internal	External
1	Professional Core Course	PCC-FT401-T	Instrumental Analysis of Foods	2	0	0	2	30	70
2	Professional Core Course	PCC-FT401-P	Instrumental Analysis of Foods Lab	0	0	2	1	50	50
3	Professional Core Course	PCC-FT403-T	Waste Management and Effluent Treatment	2	0	0	2	30	70
4	Professional Core Course	PCC-FT403-P	Waste Management and Effluent Treatment Lab	0	0	2	1	50	50
5	Project	PROJ-FT1	Project - 1	0	0	8	4	100	--
6	Professional Elective Course		Professional Elective- III	3	0	0	3	30	70
		PEC-FT401-T(i)	Food Plant Design and Layout						
		PEC-FT401-T(ii)	Introduction to Agri-Business Management						
		PEC-FT401-T(iii)	Food Flavours and Colours						
		Any one MOOC course- Not Studied (or to be studied) till now of 3 credits							
7	Professional Elective Course		Professional Elective-IV	3	0	0	3	30	70
		PEC-FT403-T(i)	Technology of Frozen Foods						
		PEC-FT403-T(ii)	Meat, Fish and Poultry Processing						
		PEC-FT403-T(iii)	Food Product Development and Sensory Evaluation						
		Any one MOOC course- Not Studied (or to be studied) till now of 3 credits							
8	In-Plant Training	FTIT-2	In-Plant Training-II				4	100	--
9	OPEN ELECTIVE COURSE-III		Open Elective –III (from any other department)	3	0	0	3	30	70
				Total			23		
	Open Elective Course	OE-FT-491-T	Open Elective –III (for the students of other teaching departments) Instrumental Analysis of Foods	3	0	0	3	30	70

SEMESTER VIII

Sr. No.	Category	Course Code	Course Title	Hours per week			Credits	Marks Distribution	
				L	T	P		Internal	External
1	Professional Core Course	PCC-FT402-T	Food Packaging	3	0	0	3	30	70
2	Professional Core Course	PCC-FT402-P	Food Packaging Lab	0	0	2	1	50	50
3	Professional Elective Course		Professional Elective –V	3	0	0	3	30	70
		PEC-FT402-T(i)	Baking and Confectionary Technology						
		PEC-FT402-T(ii)	Technology of Fats and Oils						
		PEC-FT402-T(iii)	Snack Food Technology						
			Any one MOOC course- Not Studied (or to be studied) till now of 3 credits						
4	Professional Elective Course		Professional Elective –VI	3	0	0	3	30	70
		PEC-FT404-T(i)	Introduction to Food Additives						
		PEC-FT404-T(ii)	Technology of Traditional Foods						
		PEC-FT404-T(iii)	Functional Foods and Nutraceuticals						
			Any one MOOC course- Not Studied (or to be studied) till now of 3 credits						
5	Project	PROJ-FT2	Project-2	0	0	12	6		100
Total							16		
OR									
1	In-Plant Training	FTIT-3	In-Plant Training-III	(4-6 Months)			10		*
2	Two courses each of 03 credit (MOOCs through NPTEL/SWAYAM platform or from core/elective courses offered in 8 th semester)						6		*
Total							16		

*Evaluation will be done as per evaluation guidelines for training/internship during 8th semester issued vide letter no. Acad./AC-III/Fac-1/2022/346-354 dated 20/01/2022 (Attached as Annexure-I)

IMPORTANT NOTES:

1. The minimum credit requirement for B.Tech. (Food Technology) is 160. Each semester will be of approximately 16-23 credits and 24-31 contact hours per week.
2. Each theory examination will be of 3 hours duration and practical examination will be of 2 to 4 hours duration. One laboratory hour per week per semester will be assigned half credit. No elective course will be run unless the number of students registered for the elective course is five or more.
3. For theory subject internal assessment (30 marks), three minor tests, each of 20 marks, will be conducted. The third minor will be conducted in open book mode by the Course Coordinator. No date sheet will be issued for the third minor at the level of the Departments. For the purpose of internal assessment, the average of the highest marks obtained by a student in any of the two minor examinations will be considered. All the minor examination question papers will be prepared and evaluated by following the Outcome Based Education framework. Class Performance (10 marks) will be measured through percentage of lectures attended (4 marks) Assignments (4 marks) and class performance (2 marks).
4. The course coordinator/Internal Examiners/External Examiners will maintain and submit the bifurcation of marks obtained by the students in internal as well as external evaluations in the prescribed proformas to the respective departments in addition to submitting and uploading of overall marks on the university portal as per the requirement of the result branch. The laboratory course coordinator will also conduct laboratory course exit survey and, compute and submit the attainment levels of the course outcomes of the laboratory course based on direct and indirect evaluation components and submit it to the Chairperson office along with the internal assessment marks.
5. The student is required to register for one “Open Elective Course” paper in Semester 5th, 6th and 7th of his/her choice from any department, other than the parent department.
6. At the end of 2nd and 3rd year each student will undergo 4–6-weeks training/ internship (FTIT-1 and FTIT-2 respectively) in an industry /research institute/organization and it will be evaluated by a 3-member committee constituted by the chairperson including supervisor and two faculty members in the beginning of 5th and 7th semester respectively. The students need to present a seminar on conducted training in front of evaluation committee for In-Plant Training-I while they need to submit a report along with seminar presentation for In-Plant Training-II.
7. A. The students are required to undertake a Project-1 (PROJ-FT1) of 04 credit during 7th semester on a topic approved by the Supervisor.
The student shall be required to conduct a research project during this semester which will be evaluated by a 3-member committee

