Department of Food Technology

Scheme & Syllabi

for B.Tech.

(Food Technology)

(w. e. f. session 2018-19)

Guru Jambheshwar University
of
Science and 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 provide quality education to the students to groom them in a way that they become capable and efficient techno managers in the area of Food Technology
- To impart the knowledge of basic principles and techniques with respect to various aspects of food
- To convert the students into industry professionals with high professional ethics and efficiency to meet the growing demands of modern Food Industries globally

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 techniques for addressing technical and engineering challenges in raw and processed foods.
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 product development with regards to its overall quality, safety, society and environment.
PSO4:	Strengthen the foundation of students to build up career in industry, pursue higher studies in food as well as interdisciplinary areas and to build up the knowledge of current issues in addition to encouraging the students to start-up their own business ventures.

Guru Jambheshwar University of Science and Technology

Curriculum for First Year

Undergraduate Degree Courses in Engineering & Technology

(w. e. f. session 2018-19)

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.

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 2018-19)

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)

Sl. 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

(FIRST YEAR)

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

MANDATORY COURSES

(FIRST YEAR)

Sl. No.	Course Code	Course Title	Hours per week			Credits
			L	T	P	
1	MC 101	Induction Training	0	0	3	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 and Technology

Hisar, Haryana

Choice Based Credit System Scheme and Syllabi

(w. e. f. session 2018-19)

B.TECH (FOOD TECHNOLOGY)

Semester / **Discipline**	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**Total**
Humanities and Social Sciences including Management Courses (HSMC)		3			2	2	3		10
Basic Sciences Courses (BSC)	9.5	9.5	4			3			26
Engineering Sciences Course (ESC)	8	8	7	3					26
Professional Core Course (PCC)			7	17	16	9	6	4	59
Professional Elective Course (PEC)						6	6	6	18
Open Elective Course (OEC)					3	3	3		9
Internship in Industry/ In-Plant Training/ Project-1and Project- 2/ Seminar					1		1+4	6	12
Non Credit Mandatory Courses (MC)	0	0	0		0				
Total	17.5	20.5	18	20	22	23	23	16	160

Scheme (First year)

Common for all branches of UG Engineering & Technology

Semester I

S. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	
1	Basic Science Courses	BSC 102	Chemistry	3	1	3	5.5
2	Basic Science Courses	BSC103	Mathematics –I	3	1	0	4.0
3	Engineering Science Courses	ESC103	Programming for Problem Solving	3	0	4	5.0
4	Engineering Science Courses	ESC102	Engineering Graphics & Design	1	0	4	3.0
5	Mandatory Courses	MC 101	Induction Training	0	0	3	0.0
Total							**17.5**

Semester II

S. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	
1	Basic Science Courses	BSC101	Physics	3	1	3	5.5
2	Basic Science Courses	BSC104	Mathematics–II	3	1	0	4.0
3	Engineering Science Courses	ESC101	Basic Electrical Engineering	3	1	2	5.0
4	Engineering Science Courses	ESC104	Workshop/Manufacturing Practices	1	0	4	3.0
5	Humanities and Social Sciences including Management Courses	HSMC101	English	2	0	2	3.0
6	Mandatory Courses	MC103	Indian Constitution	3	0	0	0.0
Total							**20.5**

SEMESTER III

Sr. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	
1	Mandatory Course	MC104-T	Environmental Science	3	0	0	0
2	Basic Science Course	BSC-FT201-T	Introduction to Biology and Microbiology	2	0	0	2
3	Basic Science Course	BSC-FT201-P	Introduction to Biology and Microbiology Lab	0	0	4	2
4	Professional Core Course	PCC-FT201-T	Food Composition and Analysis	3	0	0	3
5	Professional Core Course	PCC-FT201-P	Food Composition and Analysis Lab	0	0	4	2
1	Professional Core Course	PCC-FT203-T	Introduction to Nutrition and Health	2	0	0	2
6	Engineering Science Course	ESC-FT201-T	Engineering Properties of Food	3	0	0	3
7	Engineering Science Course	ESC-FT203-T	Thermodynamics	3	1	0	4
Total							**18**

SEMESTER IV

Sr. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	
1	Professional Core Course	PCC-FT202-T	Food Biochemistry	3	0	0	3
2	Professional Core Course	PCC-FT204-T	Principles and Methods of Food Processing	3	0	0	3
3	Professional Core Course	PCC-FT204-P	Principles and Methods of Food Processing Lab	0	0	4	2
4	Professional Core Course	PCC-FT206-T	Food Engineering	3	1	0	4
5	Professional Core Course	PCC-FT208-T	Food Microbiology	3	0	0	3
6	Professional Core Course	PCC-FT208-P	Food Microbiology Lab	0	0	4	2
7	Engineering Science Course	ESC-FT202-T	Heat and Mass Transfer	3	0	0	3
Total							**20**

Students are required to do summer internship/training of 4-6week 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
				L	T	P	
1	Humanities and Social Sciences including Management Courses	HSMC301-T	Economics for Engineers	2	0	0	2
2	Mandatory Course	MC104-T	Essence of Indian Traditional Knowledge	3	0	0	0
3	Professional Core Course	PCC-FT301-T	Processing of Grains	3	0	0	3
4	Professional Core Course	PCC-FT301-P	Processing of Grains Lab	0	0	4	2
5	Professional Core Course	PCC-FT303-T	Fruits and Vegetables Processing	3	0	0	3
6	Professional Core Course	PCC-FT303-P	Fruits and Vegetables Processing Lab	0	0	4	2
7	Professional Core Course	PCC-FT305-T	Food Safety, Quality and Regulations	3	0	0	3
8	Professional Core Course	PCC-FT307-T	Food Refrigeration and Cold Storage Construction	3	0	0	3
9	OPEN ELECTIVE COURSE-I		**Open Elective-I** (from any other Department)	3	0	0	3
10	**In-Plant Training**	**FTIT-1**	In Plant Training Seminar	**4-6 weeks**			**1**
Total							**22**
	Open Elective Course		**Open Elective-I (for the students of other teaching departments)** Processing and preservation of food	3	0	0	3

SEMESTER VI

Sr. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	
1	Humanities and Social Sciences including Management Courses	HSMC302-T	Fundamentals of Management for Engineers	2	0	0	2
2	Basic Sciences Courses	BSC-FT302-T	Statistics for Food Technologists	2	1	0	3
3	Professional Core Course	PCC-FT302-T	Technology of Milk and Milk Products	3	0	0	3
4	Professional Core Course	PCC-FT302-P	Technology of Milk and Milk Products Lab	0	0	4	2
	Professional Core Course	PCC-FT304-T	Fermentation Technology	3	0	0	3
	Professional Core Course	PCC-FT304-P	Fermentation Technology Lab.	0	0	2	1
5	Professional Elective Course		**Professional Elective – I**	3	0	0	3
		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
		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
Total							**23**
	Open Elective Course		**Open Elective-II (for the students of other teaching departments)** Food Safety, Quality and Regulations	3	0	0	3

Students are required to do summer internship/training of 4-6week 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
				L	T	P	
1	Humanities and Social Sciences including Management Courses	HSMC401-T	Personality Development	3	0	0	3
2	Professional Core Course	PCC-FT401-T	Instrumental Analysis of Foods	2	0	0	2
3	Professional Core Course	PCC-FT401-P	Instrumental Analysis of Foods Lab.	0	0	2	1
	Professional Core Course	PCC-FT403-T	Waste Management and Effluent Treatment	2	0	0	2
	Professional Core Course	PCC-FT403-P	Waste Management and Effluent Treatment Lab.	0	0	2	1
4	Project	**PROJ-FT1**	**Project - 1**	0	0	2	1
5	Professional Elective Course		**Professional Elective- III**	3	0	0	3
		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				
6	Professional Elective Course		**Professional Elective-IV**	3	0	0	3
		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				
7	**In-Plant Training**	**FTIT-2**	In Plant Training Seminar+ Report	**4-6 weeks**			**4**
8	OPEN ELECTIVE COURSE-III		**Open Elective –III** (from any other department)	3	0	0	3
Total							**23**
	Open Elective Course		**Open Elective –III (for the students of other teaching departments)** Instrumental Analysis of Foods	3	0	0	3

SEMESTER VIII

Sr. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	
1	Professional Core Course	PCC-FT402-T	Food Packaging	3	0	0	3
2	Professional Core Course	PCC-FT402-P	Food Packaging Lab.	0	0	2	1
3	Professional Elective Course		**Professional Elective –V**	3	0	0	3
		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
		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**	(6-8 weeks)			6
Total							**16**
OR							
1	**In-Plant Training**	**FTIT-3**	In Plant Training Seminar+ Report+ Viva	(4-6 Months)			10
2	Project	**PROJ-FT2**	**Project-2**	(6-8 weeks)			6
Total							**16**

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. 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.

4. At the end of 2nd and 3rd year each student will undergo 4-6 week training/ internship in an industry /research institute/organization and it will be evaluated by a 3 member committee constituted by the chairperson including supervisor in the 5th and 7th semester respectively.

5. A. The students are required to undertake a **Project-1** of 01 credit during 7th semester on a topic approved by the Supervisor. The student shall be required to conduct research project during this semester which will be evaluated by a 3 member committee constituted by the chairperson including supervisor at the semester end.

B. Student will be required to submit an offer letter to the department for In-Plant Training at-least 15 days before the commencement of 8th semester. During 8th semester a student may opt In-Plant Training of 4-6 of months along with **Project-2** or the courses offered by the department along with the **Project-2**. The In-Plant Training and **Project-2** will be evaluated by a committee comprising an external expert, supervisor and chairperson of the department.

C. Supervisor will get half credit per student per week for the Project-1 & 2.