

(Established as University of Technology in the State of Maharashtra)

(Under Maharashtra Act No. XXIX of 2014)

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**PROPOSED COURSE STRUCTURE FOR UNDERGRADUATE DEGREE
PROGRAMME
B.TECH.IN**

Food Technology

With effect from AY 2021-22

Basic Science Course(BSC)			Humanities and Social Science Including Management Courses (HSSMC)			Engineering Science Course(ESC)		
BTB S101	Engineering Mathematics –I	(3-1-0)4	BTHM 104	Communication Skills	(2-0-0)2	BTES103	Engineering Graphics	(2-0-0)2
BTB S102	Engineering Physics	(3-1-0)4	BTHM 109L	Communication Skills Lab	(0-0-2)1	BTES105	Energy and Environment Engineering	(2-0-0)2
BTB S107 L	Engineering Physics Lab	(0-0-2)1	BTHM 703	Food Plant Organization Management and Marketing	(3-0-0)3	BTES106	Basic Civil & Mechanical Engineering	(2-0-0) Audit
BTB S201	Engineering Mathematics–II	(3-1-0)4	BTHM 707	Essence of Indian Traditional Knowledge Foreign Language Studies Indian Constitution	Audit	BTES108 L	Engineering Graphics Lab	(0-0-4)2
BTB S202	Engineering Chemistry	(3-1-0)4	Professional Core Course(PCC)			BTES203	Engineering Mechanics	(2-1-0)3
BTB S207 L	Engineering Chemistry Lab	(0-0-2)1	BTFT C301	Principles of Food Science and Engineering	(3-1-0)4	BTES204	Computer Programming	(3-0-0)3
BTB S303	Engineering Mathematics-III	(3-1-0)4	BTFT C302	Food Microbiology	(3-1-0)4	BTES205	Basic Electrical and Electronics Engineering	(2-0-0)Audit
BTFT BS 305	Food Biochemistry and Nutrition	(3-0-0)3	BTFT C 307L	Food Microbiology & Food Biochemistry and Nutrition Lab 02	(0-0-6)3	BTES206 L	Workshop Practice	(0-0-4)2
Professional Elective Course(PEC)			BTFT C401	Food Additives & Preservation Techniques	(3-1-0)4	BTES208 L	Engineering Mechanics Lab	(0-0-2)1
BTFTPE 403A	Nutraceuticals and Diet Therapy	(3-0-0)3	BTFT C402	Processing Technology of Flesh Food	(3-1-0)4	BTFTES 304	Fluid Mechanics	(3-0-0)3

BTFTPE60 4D	Food Plant Layout and Design.	(3-0-0)3	BTFT C702	Food Packaging Technology	(3-1-0)4	BTFTOE 605C	Marketing Research	(3-0-0)3
BTFTPE70 4A	Biostatistics and Research Methodology	(3-0-0)3	Seminar/Mini Project/Internship			BTFTOE 605D	Computer Aided Design and Manufacturing	(3-0-0)3
BTFTPE70 4B	Food Product Rheology and Texture	(3-0-0)3	BTES2 09S	Seminar-1	(0-0-2)1	BTMIOE 705A	Recent Trends In Food Packaging	(3-0-0)3
BTFTPE70 4C	Cane Sugar Technology	(3-0-0)3	BTES2 10P	Internship–1Evaluation	(0-0-0)1	BTMIOE 705B	Food Biotechnology and Bioinformatics	(3-0-0)3
BTFTPE70 4D	Processing of Oils & Fats	(3-0-0)3	BTFT4 07S	SeminarII	(0-0-2)1	BTMIOE 705C	Information & Cyber Security	(3-0-0)3
			BTFT4 08P	Field Training /Internship/Industrial Training(m inimum of 4 weeks)	_____	BTMIOE 705D	Entrepreneurship Development	(3-0-0)3
			BTFT M507	Mini Project–I	(0-0-2)1	BTMIOE70 5L	Open Elective III(A-D)Lab- VI	(0-0-6)3
			BTFT4 08	Internship– 2 Evaluation	(0-0-0)1	Project(MP)		
			BTFT6 07M	Mini Project–II	(0-0-2)1	BTFTP8 01/	Project work/	(0-0-24) 12
			BTFT6 08P	Field Training /Internship/Industrial Training(minimum of 4 weeks)	_____	BTFTP8 01	Internship	_____
			BTFT M708	Mini Project – III	(0-0-2)2			
			BTFT6 08	Internship–3 Evaluation	(0-0-0)1			

Number of Courses	Semester							
	I	II	III	IV	V	VI	VII	VIII
1	BTBS101 Engineering Mathematics-I	BTBS201 Engineering Mathematics-II	BTFTC301 Principles of Food Science and Engineering	BTFTC401 Food Additives & Preservation Techniques	BTFTC501 Processing Technology Of Cereals & Legumes	BTFTC601 Processing Technology of Bakery & Confectionary Products	BTFTC701 Food Quality, Safety Standards and Certification	BTFTP801 /BTFTP801 ProjectWork/ Internship
2	BTBS102 Engineering Physics	BTBS202 Engineering Chemistry	BTFTC302 Food Microbiology	BTFTC402 Processing Technology of Flesh Food	BTFTC502 Processing Technology of Dairy Products	BTFTC602 Technology Of Fermented Food Products	BTFTC702 Food Packaging Technology	—
3	BTES103 Engineering Graphics	BTES203 Engineering Mechanics	BTBS303 Engineering Mathematics-III	BTFTPE 403 Elective –I	BTFTC503 Processing Technology of Fruits and Vegetables	BTFTC603 Food Analysis	BTHM703 Food Plant Organization Management and Marketing	—
4	BTHM104 Communication Skills	BTES204 Computer Programming	BTFTES 304 Fluid Mechanics	BTFTC404 Unit Operation and Formulation of food Products	BTFTPE504(A-D) Elective–II	BTFTPE604 (A-D) Elective–III	BTFTPE704 (A-D) Elective–IV	
5	BTES105 Energy and Environment Engineering	BTES205 Basic Electrical and Electronics Engineering	BTFTBS 305 Food Biochemistry and Nutrition	BTFTES405 Heat & Mass Transfer	BTFTOE505 (A-D) Open Elective –I	BTFTOE605 (A-D) Open Elective –II	BTFTOE705(A-D) Open Elective–III	—
6	BTES106 Basic Civil and Mechanical Engineering	BTES206L Workshop Practice	BTFTES 306L Fluid Mechanics Lab-1	BTFTES406L Lab III-HMT & UOFP	BTFTC506L Lab-IV- Processing Technology Of Cereals, Dairy Products & FVT	BTFTC606L Lab –V-Food Analysis, Bakery & Fermented Products	BTFTOE706L (A-D) Open Elective–III Lab–VI	—
	BTBS107L Engineering	BTBS207L Engineering Ch	BTFTC 307L Food	BTFT407S Seminar II	BTFTM507 Mini Project–I	BTFT607M Mini Project–	BTHM 707 D. Essence	—

7	gPhysicsLab	emistryLab	Microbiology & Food Biochemistry and Nutrition Lab 02			II	of Indian Traditional Knowledge E. Foreign Language Studies F. Indian Constitution	
8	BTES108L Engineering Graphics Lab	BTES208L Engineering Mechanics Lab	BTFT 210P Internship-1 Evaluation	BTFT408P Field Training /Internship/Industrial Training (minimum of 4 weeks)	BTFT408 Internship-2 Evaluation	BTFT608P Field Training /Internship/Industrial Training (minimum of 4 weeks)	BTFTM708 Mini Project – III	—
9	BTHM109L Communication Skills Lab	BTES209S Seminar I	—	—	—	—	BTFT608 Internship-3 Evaluation	—
10	--	BTES210P (Internship - 1)	—	—	—	—	—	—

B. Tech in Food Technology Program Educational Objectives and Outcomes

A. Program Educational Objectives(PEOs)

Graduates will be able to—

1. Graduates should excel in engineering positions in industry and other organizations that emphasize design and implementation of engineering systems and devices.
2. Graduates should excel in best post-graduate engineering institutes, reaching advanced degrees in engineering and related discipline.
3. Within several years from graduation, alumni should have established a successful career in an engineering-related multidisciplinary field, leading or participating effectively in interdisciplinary engineering projects, as well as continuously adapting to changing technologies.
4. Graduates are expected to continue personal development through professional study and self-learning.
5. Graduates are expected to be good citizens and cultured human beings, with full appreciation of the importance of professional, ethical and societal responsibilities.

B. Program Outcomes

Engineering Graduate will be able to—

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **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.
4. **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.
5. **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.
6. **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.

7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for, sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **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.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

C. Program Specific Outcomes (PSOs)

1. Apply knowledge of mathematics, science and engineering to analyze, design and evaluate mechanical components and systems using state-of-the-art IT tools
2. Analyze problems of production engineering including manufacturing and industrial systems to formulate design requirements
3. Design, implement and evaluate production systems and processes considering public health, safety, cultural, societal and environmental issues
4. Design and conduct experiments using domain knowledge and analyze data to arrive at valid conclusions.
5. Apply current techniques, skills, knowledge and computer based methods and tools to develop production systems.
6. Analyze the local and global impact of modern technologies on individual organizations, society and culture.
7. Apply knowledge of contemporary issues to investigate and solve problems with a concern for sustainability and eco-friendly environment.
8. Exhibit responsibility in professional, ethical, legal, security and social issues.
9. Function effectively in teams, in diverse and multidisciplinary areas to accomplish common goals.
10. Communicate effectively in diverse groups and exhibit leadership qualities.
11. Apply management principles to manage projects in multidisciplinary environment.
12. Pursue life-long learning as a means to enhance knowledge and skills.

Course Structure for Semester III (Starting from 2021-2022)

B.Tech.in Food Technology

Semester-III										
Course Category	Course Code	Course Title	Teaching Scheme			Evaluation Scheme				Credit
			L	T	P	CA	MSE	ESE	Total	
PCC1	BTFTC301	Principles of Food Science and Engineering	3	1	-	20	20	60	100	4
PCC2	BTFTC302	Food Microbiology	3	1	-	20	20	60	100	4
BSC7	BTBS303	Engineering Mathematics-III	3	1	-	20	20	60	100	4
ESC10	BTFTES 304	Fluid Mechanics	3	-	-	20	20	60	100	3
BSC8	BTFTBS 305	Food Biochemistry and Nutrition	3	-	-	20	20	60	100	3
ESC11	BTFTES 306L	Fluid Mechanics Lab-1	-	-	2	60	-	40	100	1
PCC3	BTFTC 307L	Food Microbiology & Food Biochemistry and Nutrition Lab 02	-	-	6	60	-	40	100	3
PROJ-1 EV	BTFT 210P	Internship-1 Evaluation			-	-	-	100	100	1
Total			15	3	8	220	100	480	800	23

BSC = Basic Science Course, ESC = Engineering Science Course, PCC = Professional Core Course, PEC = Professional Elective Course, OEC = Open Elective Course, LC = Laboratory Course, HSSMC= Humanities and Social Science including Management Courses

Course Structure for Semester IV (Starting from 2021-2022)

B.Tech.in Food Technology

Semester-IV										
Course Category	Course Code	Course Title	Teaching Scheme			Evaluation Scheme				Credit
			L	T	P	CA	MSE	ESE	Total	
PCC4	BTFTC401	Food Additives & Preservation Techniques	3	1	-	20	20	60	100	4
PCC5	BTFTC402	Processing Technology of Flesh Food	3	1	-	20	20	60	100	4
PEC1	BTFTPE 403	Elective –I	3	-	-	20	20	60	100	3
PCC6	BTFTC404	Unit Operation and Formulation of food Products	3	1	-	20	20	60	100	4
ESC12	BTFES405	Heat & Mass Transfer	3	-	-	20	20	60	100	3
ESC13	BTFTES406L	LabIII-HMT & UOFP	-	-	6	60	-	40	100	3
PROJ-3	BTFT407S	Seminar II	-	-	2	60	-	40	100	1
PROJ-4	BTFT408P	Field Training /Internship/Industrial Training(minimum of 4 weeks)	-	-	-	-	-	-	-	Credits to be evaluated in SemV
Total			15	3	8	220	100	380	700	22

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Elective-I

BTFTPE 403A	Nutraceuticals and Diet Therapy
BTFTPE 403B	Fumigation & Pest Control
BTFTPE 403C	Waste Management In Food Processing
BTFTPE 403D	Industrial Electronics Devices & Instrument

Course Structure for Semester V (Starting from 2021-2022)

B.Tech.in Food Technology

Semester-V										
Course Category	Course Code	Course Title	Teaching Scheme			Evaluation Scheme				Credit
			L	T	P	CA	MSE	ESE	Total	
PCC7	BTFTC501	Processing Technology Of Cereals & Legumes	3	1	-	20	20	60	100	4
PCC8	BTFTC502	Processing Technology of Dairy Products	3	1	-	20	20	60	100	4
PCC9	BTFTC503	Processing Technology of Fruits and Vegetables	3	1	-	20	20	60	100	4
PEC2	BTFTPE504 (A-D)	Elective-II	3	-	-	20	20	60	100	3
OEC1	BTFTOE505 (A-D)	Open Elective -I	3	-	-	20	20	60	100	3
PCC10	BTFTC506L	Lab-IV- Processing Technology Of Cereals, Dairy Products & FVT	-	-	6	60	-	40	100	2
PROJ-5	BTFTM507	Mini Project-I	-	-	2	60	-	40	100	1
PROJ-4 EV	BTFT408	Internship- 2 Evaluation	-	-	-	-	-	100	100	1
Total			15	3	8	220	100	480	800	22

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Elective-II

BTFTPE504A	Food Extrusion Technology
BTFTPE504B	Plant Maintenance, Safety & Hygiene
BTFTPE504C	Spices & Flavor Technology
BTFTPE504D	New Product Development

Open Elective-I

BTFTOE505A	Food Refrigeration and Cold Chain
BTFTOE505B	Industrial Electronics Automation
BTFTOE505C	Environmental Studies
BTFTOE505D	ICT Application in Food Industries

Course Structure for Semester VI (Starting from 2021-2022)
B.Tech.in Food Technology

Semester-IV										
Course Category	Course Code	Course Title	Teaching Scheme			Evaluation Scheme				Credit
			L	T	P	CA	MSE	ESE	Total	
PCC11	BTFTC601	Processing Technology of Bakery & Confectionary Products	3	1	-	20	20	60	100	4
PCC12	BTFTC602	Technology Of Fermented Food Products	3	1	-	20	20	60	100	4
PCC13	BTFTC603	Food Analysis	3	1	-	20	20	60	100	4
PEC3	BTFTPE604 (A-D)	Elective-III	3	-	-	20	20	60	100	3
OEC2	BTFTOE605 (A-D)	Open Elective-II	3	-	-	20	20	60	100	3
PCC14	BTFTC606L	Lab -V-Food Analysis, Bakery& Fermented Products	-	-	6	60	-	40	100	3
PROJ-6	BTFT607M	Mini Project-II	-	-	2	60	-	40	100	1
PROJ-7	BTFT608P	Field Training /Internship/Industrial Training(minimum of 4 weeks)	-	-	-	-	-	-	-	Credits to be evaluated in Sem VI
Total			15	3	8	220	100	380	700	22

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Elective-III

BTFTPE604A	Fortified Food Products
BTFTPE604B	Emerging Non-Thermal Method Of Food Preservation
BTFTPE604C	Beverage Technology
BTFTPE604D	Food Plant Layout and Design.

Open Elective-II

BTFTOE605A	Biomedical Instrumentation
BTFTOE605B	Renewable Energy Resources
BTFTOE605C	Marketing Research
BTFTOE605D	Computer Aided Design and Manufacturing

Course Structure for Semester VII (Starting from 2021-2022)

B.Tech.in Food Technology

Semester-VII										
Course Category	Course Code	Course Title	Teaching Scheme			Evaluation Scheme				Credit
			L	T	P	CA	MSE	ESE	Total	
PCC15	BTFTC701	Food Quality, Safety Standards and Certification	3	-	-	20	20	60	100	3
PCC16	BTFTC702	Food Packaging Technology	3	1	-	20	20	60	100	4
HSSMC 3	BTHM703	Food Plant Organization Management and Marketing	3	-	-	20	20	60	100	3
PEC4	BTFTPE704 (A-D)	Elective-IV	3	-	-	20	20	60	100	3
OEC3	BTFTOE705(A-D)	Open Elective-III	3	-	-	20	20	60	100	3
OEC4	BTFTOE706 L (A-D)	Open Elective-III Lab-VI	-	-	6	60	-	40	100	3
HSSMC 4	BTHM 707	D. Essence of Indian Traditional Knowledge E. Foreign Language Studies F. Indian Constitution	2	-	-	-	-	-	-	Audit
PROJ-8	BTFTM708	Mini Project – III	-	-	2	60	-	40	100	2
PROJ-7EV	BTFT608	Internship-3 Evaluation	-	-	-	-	-	100	100	1
Total			17	1	8	220	100	480	800	22

BSC = Basic Science Course, ESC = Engineering Science Course, PCC = Professional Core Course PEC = Professional Elective Course, OEC = Open Elective Course, LC = Laboratory Course, HSSMC= Humanities and Social Science including Management Courses

Elective-IV

BTFTPE704A	Biostatistics and Research Methodology
BTFTPE704B	Food Product Rheology and Texture
BTFTPE704C	Cane Sugar Technology
BTFTPE704D	Processing of Oils & Fats

Open Elective-III

BTMIOE705A	Recent Trends In Food Packaging
BTMIOE705B	Food Biotechnology and Bioinformatics
BTMIOE705C	Information & Cyber Security
BTMIOE705D	Entrepreneurship Development

Course Structure for Semester VIII (Starting from 2021-2022)

B.Tech.in Food Technology

Semester – VIII										
Course Category	Course Code	Course Title	Teaching Scheme			Evaluation Scheme				Credit
			L	T	P	CA	MSE	ESE	Total	
PROJ-9	BTFTP801 /BTFTP801	Project Work/ Internship	-	-	24	60	-	40	100	12
Total			-	-	24	60	-	40	100	12

BSC = Basic Science Course, ESC = Engineering Science Course, PCC = Professional Core Course PEC=Professional Elective Course,
OEC= Open Elective Course, LC= Laboratory Course, HSSMC=Humanities and Social Science including Management Courses

Total Credits: 160

Course Structure for Semester VIII (Starting from 2021-2022)

B.Tech.in Food Technology

Course Code	Type of Course	Course Title	Weekly Teaching Scheme			Evaluation Scheme ^{\$}				Credits
			L	T	P	CA	MSE	ESE	Total	
BTFTSS801A	(Self-Study Course) [#]	<i>Presently, no SWAYAM Courses offered for Food Technology. Have to identify from different online platforms.</i>	03**	--	--	20	20	60	100	3
BTFTSS801B										
BTFTSS801C										
BTFTSS801D										
BTFTSS801E										
BTFTSS802A	(Self-Study Course) [#]	<i>Presently, no SWAYAM Courses offered for Food Technology. Have to identify from different online platforms..</i>	03**	--	--	20	20	60	100	3
BTFTSS802B										
BTFTSS802C										
BTFTSS802D										
BTFTSS802E										
BTFTP803	Project	Project Stage-II or Internship and Project in Industry*	--	--	30	60	--	40	100	6
Total			04	--	30	100	40	160	300	12

The subjects are to be studied on self-study mode using SWAYAM/NPTEL/any other online source approved by the University.

Student who opt for Major in Mining Engineering are not eligible to take same course from self study course list mentioned above. He/She has to take any other course from the self study course listed above.

****If required Coordinator may be appointed for each Self study course and an administrative load of 03 hours per week may be considered for monitoring and assisting the students, and to conduct examination (if required), evaluation and preparation of result.**

§If the examination schedule for the online Self study course chosen by student do not match with the University's Academic Schedule, the University/Institute have to conduct exam for such courses.

*** Six months of Internship and Project in the Industry. For this one Faculty guide from the Institute and one Mentor from Industry should be identified to monitor the progress of work. During the Project/Internship period of work, a review of work should be taken twice followed by a final presentation at the end of Project period.**