Part B: Departmental Information

Department of Food Engineering and Technology

1. State the Vision and Mission of the Department

Vision of Department

To establish a center of excellence to provide demand driven, value based and quality technical education to make India a developed country through socio-economic transformation.

Mission of Department

1. To improve food especially Indian traditional food in terms of nutrition, safety and functionality employing fundamental and applied sciences.
2. To produce trained personnel of highest standards for the benefit of the industry and society in the field of Food Engineering & Technology and Food Biotechnology.
3. To provide leadership qualities in areas of education, research, innovations and solutions in food and biotech sciences, technology, and engineering in order to direct overall activity towards economic growth of India.

2. Justification of consistency of the Department Vision and Mission with the Institute Vision and Mission

Vision of the Institution:

We shall perennially strive to be a vibrant institute with continuously evolving curricula to brighten the future of the chemical, biological, materials and energy industries of the nation, and rank amongst the very best in the world through active participation and scholarship of our faculty, students and alumni. We shall be creators of sprouting knowledge and design cutting-edge technologies that will have the greatest impact on society and benefit mankind at large.

Mission of the Institution:

We shall generate and sustain an atmosphere conducive to germinating new knowledge at every available opportunity. The education we shall impart will enable our students to devise new solutions to meet the needs of all segments of society with regard to material and energy, while protecting the

environment and conserving the natural resources. Our endeavours, while extending well beyond the confines of the classroom, will aim to enhance public welfare and our attempts to disseminate knowledge will spread to a greater multi- and cross-disciplinary platform to conduct research, discovery, technology development, service to industry and entrepreneurship, in consonance with India's aspirations to be a welfare state. We will team scientists and engineers with professionals in other disciplines to arrive at better solutions. We will provide all our students with a strong foundation to encourage them to be our ambassadors in the professional activities that they choose to undertake in service of society at national and international levels. Through our vision, we will serve the profession and society and strive to reach the summit as a team, and ultimately serve as role models to the younger generation.

The consistency between Department Vision and Mission with the Institute Vision and Mission has been justified in Fig. B1. The three missions of the department are well connected to specific components of mission components for the institute as shown below.

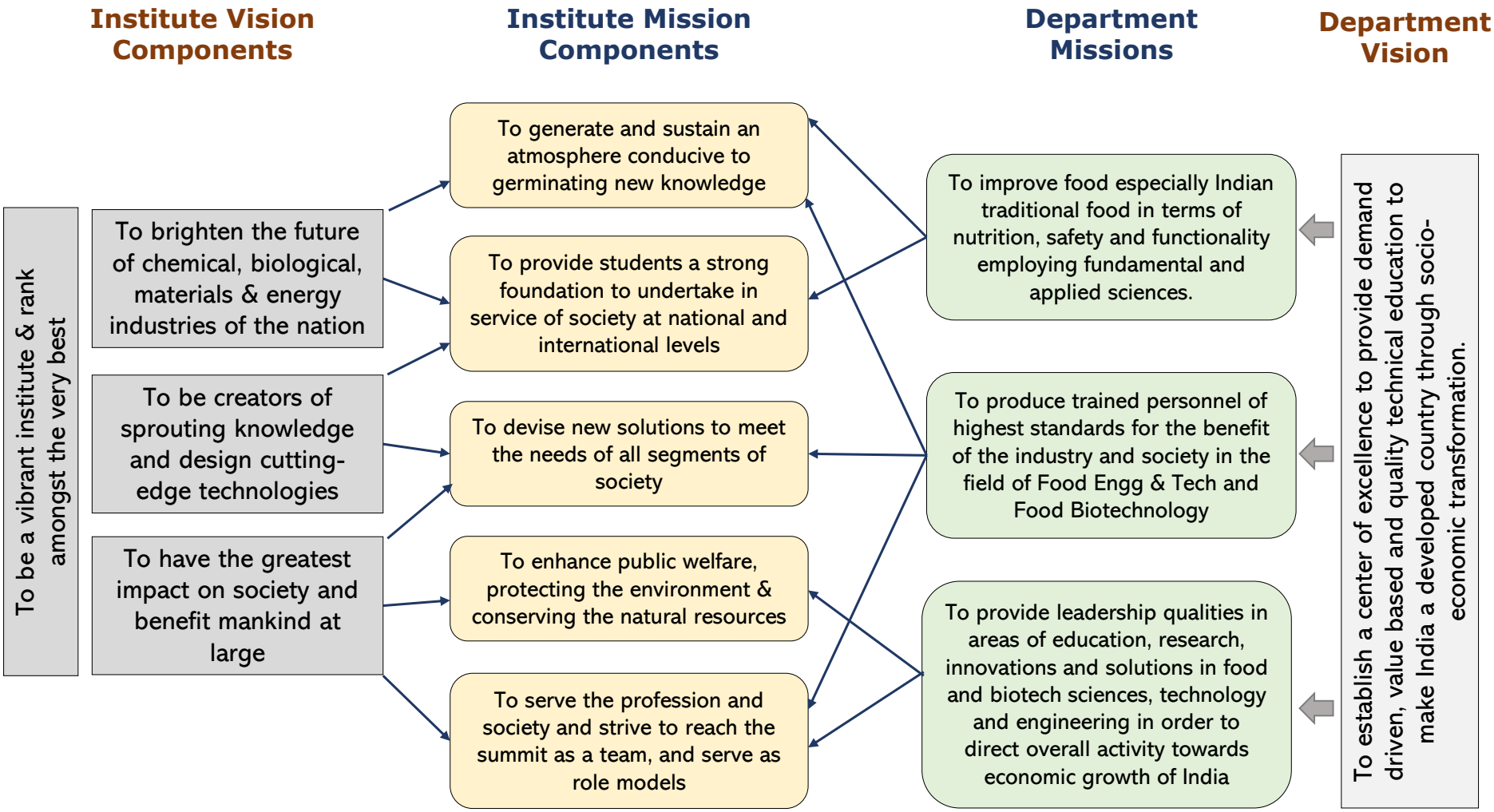


Fig. B1: The justification of the consistency between Department Vision and Mission with the Institute Vision and Mission

3. Details of all UG & PG Programs offered by the department.

S. No.	Program Name	Corresponding UG Program Name	Current Year Sanctioned Intake	Current year Admission (in Nos.)
1	Master of Technology in Food Engineering and Technology	Bachelor of Technology in Food Engineering and Technology	18	18
2	Master of Technology in Food Biotechnology	-	10	9

4. State the Program Educational Objectives (PEOs) for the PG program(s) under consideration for accreditation.

Program under Consideration

Master of Technology in Food Biotechnology

Program Educational Objectives (PEOs)

1. The M. Tech. in Food Biotechnology interdisciplinary course has been initiated to impart education in a new area of specialization viz., Food Biotechnology to enable students to work in areas such as food fermentations, applications of enzymes in food processing, food product development, nutraceuticals, nutritional and functional foods, nutrigenomics etc. and to help them formulate solutions to meet the needs of the consumers and the industry.
2. The interdisciplinary nature of the course prompts intake of students from mixed disciplines creating the need to bring students from varying academic backgrounds to a common platform of understanding through courses structured to meet this need.

3. To provide a strong base of knowledge to students in this interdisciplinary field to transform them into good professionals who can function with confidence in their chosen workplace and contribute to the growth of the organization employing them.
4. To motivate and enable students to opt for higher levels of learning viz. doctoral programs by research in this interdisciplinary field with the view of developing highly skilled professionals to work in Industry and academia.

CRITERION 1	Program Curriculum and Teaching – Learning Processes	125

1.1 Program Curriculum (35)

1.1.1 State the process for designing the program curriculum (10)

The curriculum for M. Tech. in Food Biotechnology is developed by taking into consideration:

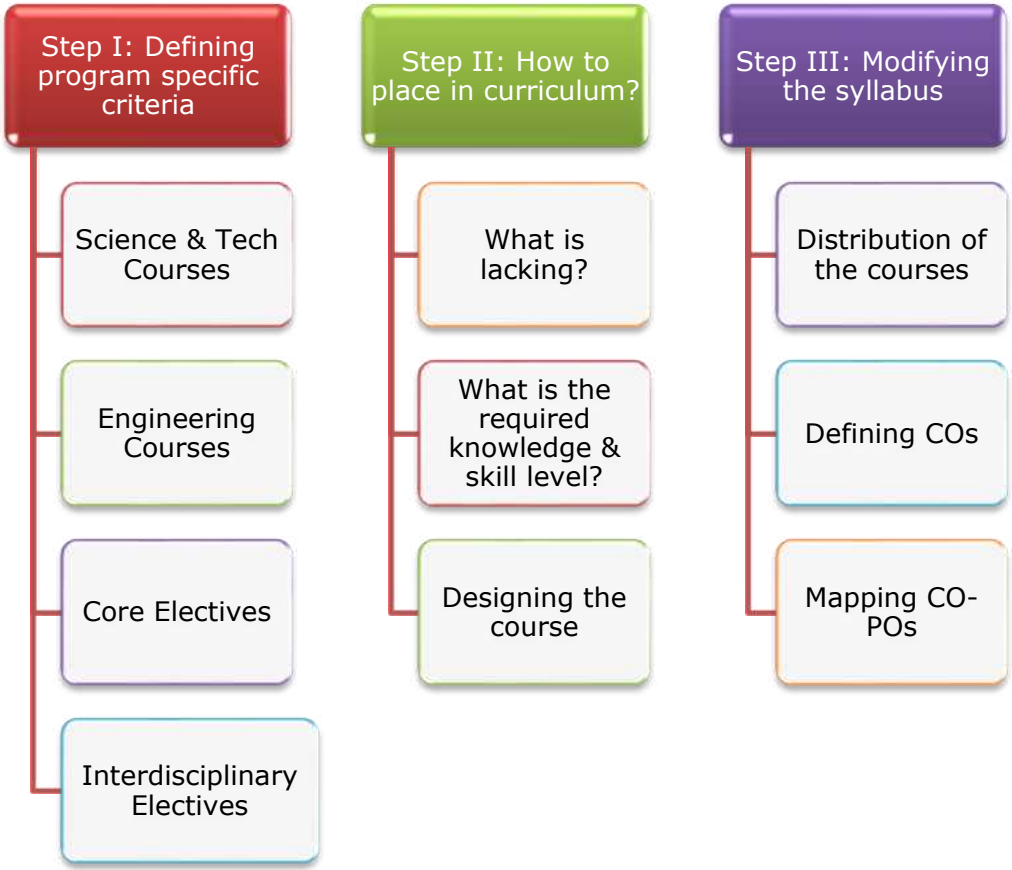
1. The needs of the learner while they are in master's degree in this field.
2. The content in terms of M. Tech. in Food Biotechnology
3. Instructional methodology for learning master level courses

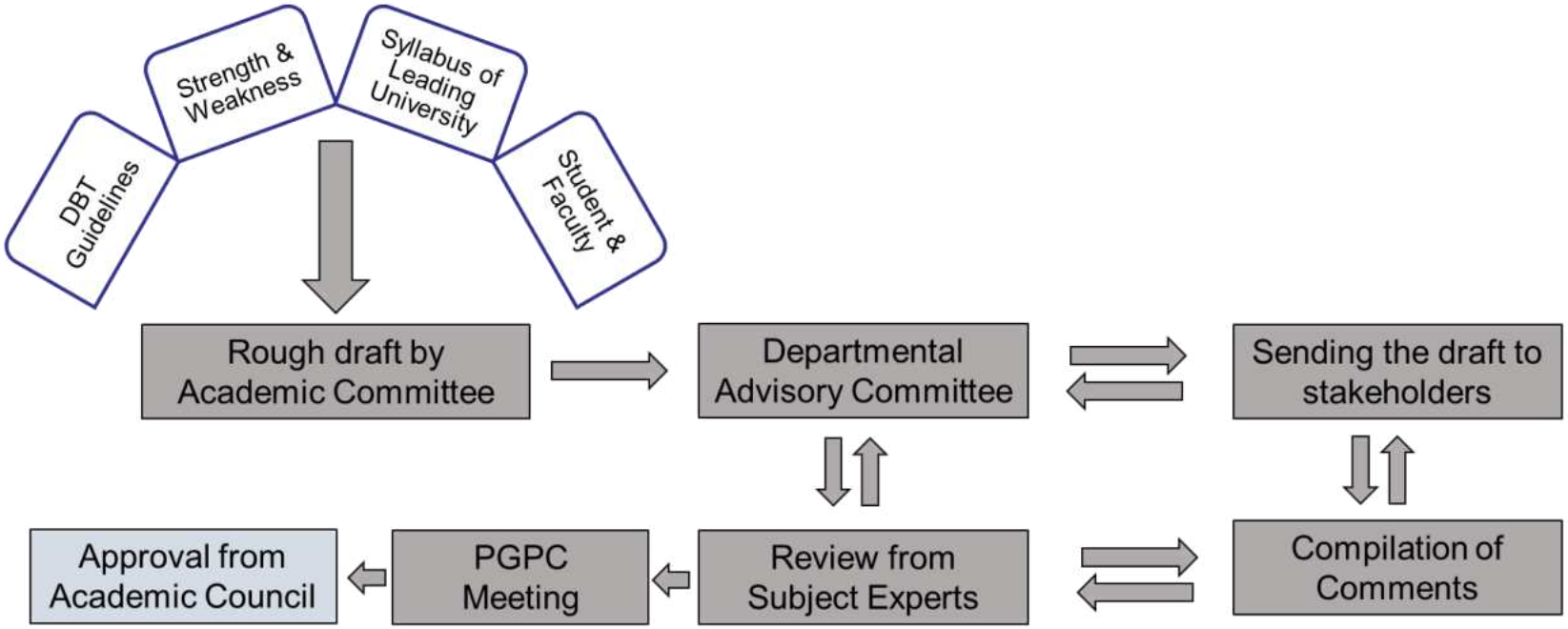
The criteria for defining curriculum are:

1. Should satisfy Program Specific Criteria
2. Basic knowledge in science and technology
3. Basic and core knowledge in Food Biotechnology to level of design experience
4. In depth and broad knowledge in Biotechnology
5. Balance between theory, practical and tutorial
6. Total credits, distribution of credit for different components and domains
7. Literature study, seminar, internship, presentation, and research project
8. Should meet the requirements of Program Outcomes (POs)

The steps for developing curriculum are given below:

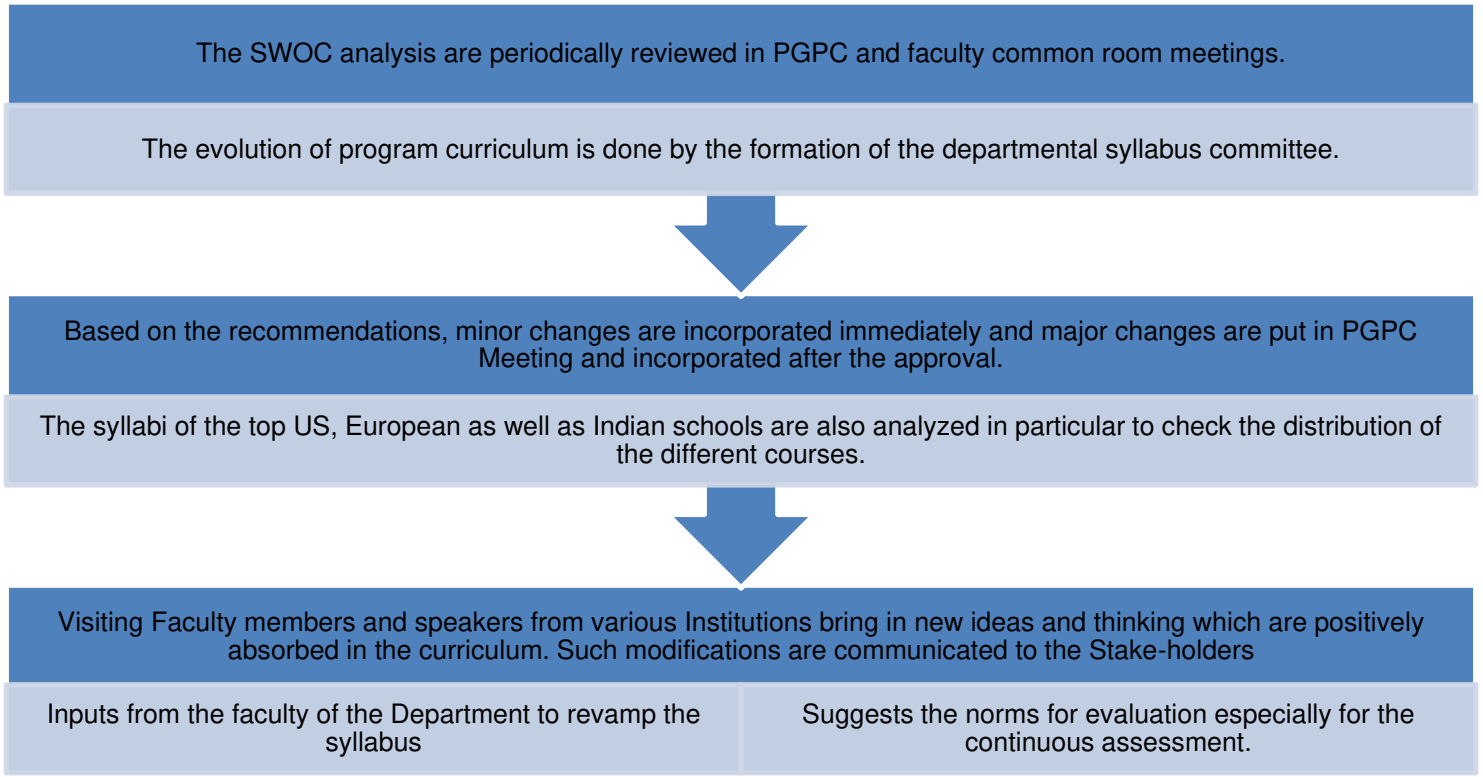
ASSESSEMENT TOOLS

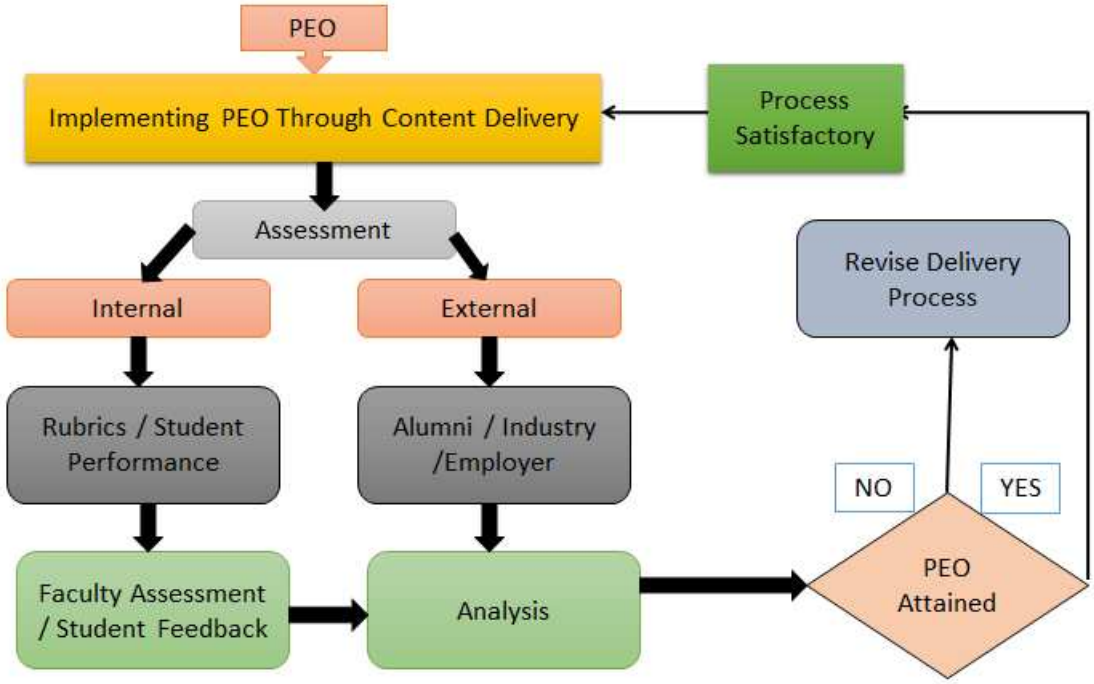




Programme Curriculum is revised on the basis of:

- Changing needs related to developments in the field.
- Improvements based on feedback from students, alumni.
- Feedback from industry based on their requirements.
- SWOC analysis from faculty members, experts from Industry and Experts from other institutes/universities.
- Based on PO attainment and analysis


The SWOC analysis are periodically reviewed in PGPC and faculty common room meetings.
The evolution of program curriculum is done by the formation of the departmental syllabus committee.
Based on the recommendations, minor changes are incorporated immediately and major changes are put in PGPC Meeting and incorporated after the approval.
The syllabi of the top US, European as well as Indian schools are also analyzed in particular to check the distribution of the different courses.
Visiting Faculty members and speakers from various Institutions bring in new ideas and thinking which are positively absorbed in the curriculum. Such modifications are communicated to the Stake-holders
Inputs from the faculty of the Department to revamp the syllabus
Suggests the norms for evaluation especially for the continuous assessment.



Following the above decision-making loop, appropriate changes are incorporated.

- Course improvements are made every five years.
- Based on lacunae in the previous implementation the course structure is revised.
- New subject modules are introduced to ensure the syllabus is state of art.
- Laboratory courses are designed based on current happenings in the field.
- Suggestions from existing students, different course teachers, passed-out students and industry people are taken.

1.1.2. Structure of Curriculum (5)

ID	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Total Hours	Theory Credits	Practical Credits	Total Credits
1	FDT 2056	Introduction to Food Science and Technology	2	1	0	3	3	0	3
2	FDT 2008	Comprehensive techniques in Food Analysis	2	1	0	3	3	0	3
3	FDT 2053	Fundamentals of Food Process Engineering	2	1	0	3	3	0	3
4	FDT 2023	Food Packaging Science and Technology	2	1	0	3	3	0	3
5	FDT 2021	Food Standards and Safety Regulations	2	1	0	3	3	0	3
6	FDP 2067	Food Analysis and Processing Lab	0	0	6	6	0	3	3
7	FDP 2066	Seminar and Critical Review of Research Paper	0	0	6	6	0	3	3
8	FDP 2068	Research I	0	0	12	12	0	6	6
9	FDT 2057	Fundamentals of Food Biotechnology, Genetics, and Cell Culture Technology	2	1	0	3	3	0	3
10	FDT 2055	Biotechnology of Fermented Foods	2	1	0	3	3	0	3
11	FDT 2058	Bioprocess Engineering and Technology	2	1	0	3	3	0	3
12	FDT 2075	Elective I: Basics of Human Nutrition	2	1	0	3	3	0	3

13	FDT 2002	Elective II: Food Safety and Toxicology	2	1	0	3	3	0	3
14	FDP 2052	Food Biotechnology Laboratory	0	0	6	6	0	3	3
15	FDP 2069	Research II	0	0	18	18	0	9	9
16	FDP 2070	Industrial training	0	0	40	40	0	30	30
17	FDP 2071	Research III	0	0	40	40	0	30	30
		Total	20	10	128	158	30	84	114

1.1.3. State the components of curriculum (10)

Program curriculum grouping based on course components.

Course component	Curriculum content (% of total number of credits of the program)	Total number of contact hours	Total number of credits
Program core	21.1	450	24
Program electives	5.3	90	6
Open electives	5.3	90	6
Mini Projects	0	0	0
Internship /Seminar	28.9	730	33
Major project	39.5	1050	45
Any other	0	0	0
Total number of Credits			114

1.1.4 Overall quality and level of program curriculum (10)

Benchmark considered for developing the curriculum is summarized below.

Course component	**Curriculum content (% of total number of credits of the program)**			
Institute	**ICT Mumbai**	**SRM Kharagpur**	**SRU Gujrat**	**UFU Russia**
Stream	**Food Biotechnology**	**Food & Nutrition Biotechnology**	**Food Biotechnology**	**Food Biotechnology**
Program core	15.8	20	32	53
Electives	10.6	16	28	14
Practical	5.3	10	22	-
Seminar	2.6	2	4	-
Internship	26.3	-	4.5	12
Optional	-	-	-	-
Major project	39.5	52	18	20
Total credit	114	92	130	83

Assessment is based on improvement in terms of ranks/score in JNU CEEB entrance examination.

JNU CEEB Score	2019-20	2018-19	2017-18
Highest Score	53	56	52
Minimum Score	40	37.75	35.25

1.2 Teaching learning Process (90)

1.2.1 Quality of end semester examination, internal semester question papers, assignments and evaluation (20)

The weightages of different modes of assessments are:

	In-Semester		End-Semester-Exam	Components of continuous mode
	Continuous mode	Mid Semester - Exam		
Theory	20%	30%	50%	Quizzes, presentations, class tests (open or closed book), home assignments, group assignments, *viva-voce* assignments, discussions
Practical	50%	-	50%	Attendance, *viva -voce*, journal, assignments, project, experiments, tests
Seminar/Research Project	-	-	100%	Continuous evaluation not applicable, End semester evaluation will be based on written report evaluation and presentation in front of the seminar/ research guide and internal/ external examiner

Continuous Evaluation

- The continuous evaluation is conducted at least two times for each subject, typically for total of 10 marks for a 50-mark subject (3-credits).
- The types of continuous evaluation include quizzes, presentations, class tests, home assignments, group assignments etc.
- The continuous evaluation encompasses each of course outcomes for the subject.

Samples Continuous Assessment Test Paper

Institute of Chemical Technology
M Tech FBT (Sem I)
CAT Test (January 7, 2021)
Introduction to Food Science and Technology

Date: January 7, 2021 **Total Marks: 10**
Time: 3.00 - 3.30 pm

Answer the following questions. The numbers in parenthesis indicates the marks assigned

1. Write the systemic and trivial names of two saturated and unsaturated fatty acids (1 M)

2. Which ones are example of synthtic antioxidants that are used in foodstuffs? (01 M)
   a) BHA b) lutein c) Xanthan d) TBHQ

3. What are the changes in fats/oils during deep frying operations? (01 M)
   a) Decrease in iodine number b) degration of higher molecular weight compounds
   b) Decrease in viscosity d) formation of volatile/non volatile/non volatile compounds

4. Define any 4 of the following (04 M)
   a) Antioxidants b) Free Radical c) Rancidity
   d)Saponification number e) Iodine number

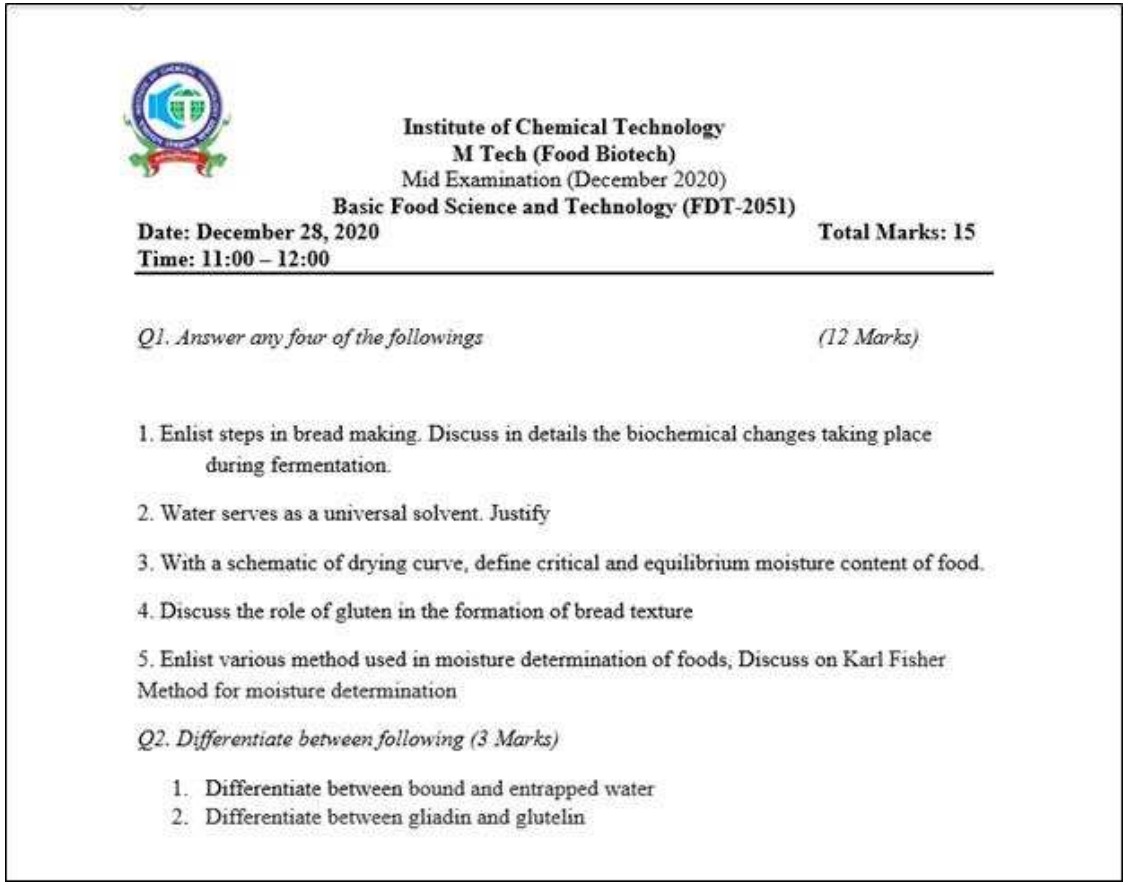
5. Decide which fatty acid is more stable ….
   a) oleic acid or b) stearic acid? Why/Why not? (01 M)

6. Write the trivial and systematic names of the following fatty acids indicating the omega ones (02 M)
   - Having 16 C and no double bond
   - Having 18 C and no double bond
   - Having 18 C and three double bonds
   - Having 18 C and two double bonds

Mid Semester Examination

- The Mid semester is one theory examination conducted once in the semester for each subject, typically for 15 marks for a 50-mark subject (3-credits).
- The Mid semester question paper encompasses each of course outcomes for the subject.

Sample Mid-semester examination paper



Institute of Chemical Technology
M Tech (Food Biotech)
Mid Examination (December 2020)
Basic Food Science and Technology (FDT-2051)

Date: December 28, 2020 **Total Marks: 15**
Time: 11:00 – 12:00

Q1. Answer any four of the followings *(12 Marks)*

1. Enlist steps in bread making. Discuss in details the biochemical changes taking place during fermentation.
2. Water serves as a universal solvent. Justify
3. With a schematic of drying curve, define critical and equilibrium moisture content of food.
4. Discuss the role of gluten in the formation of bread texture
5. Enlist various method used in moisture determination of foods, Discuss on Karl Fisher Method for moisture determination

Q2. Differentiate between following (3 Marks)

1. Differentiate between bound and entrapped water
2. Differentiate between gliadin and glutelin

End Semester Examination

- The End semester is one theory examination conducted once in the semester for each subject, typically for 25 marks for a 50-mark subject (3-credits).
- The End semester question paper encompasses each of course outcomes for the subject.

Sample End Semester Examination Paper

INSTITUTE OF CHEMICAL TECHNOLOGY

(University under Section – 3 of UGC Act 1956)(formerly UDCT/UICT, Mumbai)
Elite Status and Centre of Excellence- Govt. of Maharashtra
NBA Accredited; 'A' Grade by MHRD; UNIVERCITY PAR EXCELLENCE
Matunga, Mumbai – 400019, India

M.TECH (SEM – I) E – EXAMINATION FEBRUARY 2021

FDT2053 – FUNDAMENTALS OF FOOD PROCESS ENGINEERING (FBT)

DATE : FEBRUARY 23, 2021 **TIME : 11:00 A.M TO 1:15 P.M**
DAY : TUESDAY **MARKS : 25**

Note: Students to ignore CO no. Answer all the questions.

Make realistic assumption where necessary.

Q	CO	Question	Mark
Q1	CO1 CO2 CO3 CO4 CO5	*Answer the following in brief* a) What is the physical significance of Biot number in transient heat transfer? b) State the significance of LMTD correction factor in heat transfer. c) From the definition, comment on the values of fanning friction factor for laminar and turbulent flow. d) 'There is no sharp freezing point in foods, but they freeze over a range of temperature'. Comment. e) Comment on the excess heat of sorption during grain drying as a function of its water activity.	5
Q2	CO1 CO2 CO3	a) A drop in a spray dryer evaporates in 50 °C hot air. The nozzles spray liquid droplet of 0.4 mm initial diameter in which the vapor pressure is 3.84 kPa. Given the liquid density 900 $kg \cdot m^{-3}$; molar mass 92 kg/kg mol; mass diffusivity 8.6 × 10^{-6} $m^2 \cdot s^{-1}$. Calculate the time required for complete evaporation of the droplet. b) With the help of force balance, derive the velocity profile expression for a Newtonian fluid flowing through a pipe.	3+2
Q3	CO2 CO3 CO5	a) A refrigerant is used to cool the milk kept in a large vat and it flows inside the steel tube covered up by ice layer. Derive the expression for U as a function of k, h, d_i and d_o. What should be the critical thickness of ice layer for the maximum heat transfer? b) With a schematic, discuss the principle of a high-pressure processing for liquid food system.	3+2
Q4	CO1 CO3 CO4	Consider that you have to set up a commercial tomato paste producing plant (capacity 1 ton per day). You intend to pack the tomato paste with TSS of 32° brix in 1 kg cans. (a) List out the ingredients required. List out the operational steps and draw a block diagram to produce canned tomato paste. Assume that after pulping tomato juice has TSS 7° brix. Assume suitable data like wastage at steps like inspection, pulping etc. in order to complete material balance and hence the block diagram. (b) Identify utilities required at various unit operations of the plant. (c) Draw process flow sheet for your plant and mention critical control points (d) Draw plant layout (L shape layout).	4+ 1+ 3+ 2

Course Outcomes (students will be able to ...)

1. To comprehend the principles mass and energy balance of food processing (K3)
2. To apply the concept of transport phenomenon in food related operations (K3)
3. To solve the problems related to design of food processing operations (K3)
4. To analyze the concept of thermal processing of foods (K3)
5. To explain the principles of cooling, drying technology & non-thermal processing of foods (K2)

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1.2.2. Quality of student projects (30)

- All the student research projects are relevant to the needs of the food biotechnology program.
- A student research project is evaluated in Semester I, II and IV.
- Research I include Literature Survey, Planning and Preliminary Trials
- Research II includes further Experimental work with proper design and Data analysis.
- Research III is completion of planned research work with Thesis Submission and Open Defense
- A typical thesis consists of six chapters viz. Introduction, Literature Review, Materials and Methods, Results and Discussion, Summary and Conclusion, and Future scope.
- The Thesis is evaluated by External Examiner and the students defend their thesis in an open defense forum.
- The thesis is evaluated out of 500 marks and the **Rubrics** for evaluation is given below.

Details	**Max. Marks**	**Internal Examiner**	**External Examiner**
Understanding of Research Area	60		
Problem formulation/Experimental design/Mathematical Modelling	60		
Quality of Work done	70		
Analysis and Interpretation of Results	70		
Quality of Thesis Submitted	70		
Quality of Presentation	60		
Answer to Question raised during Open Defence	60		
Total	**450**		

Recommendation

The MTech thesis submitted by candidate is:

- Acceptable, may be regarded as final in present form.
- Acceptable, but with minor revisions.

FDP 2071: Research III – Thesis Submission and Open Defense

Course Outcomes (students will be able to…)

1. Perform experiments systematically to accomplish the set objectives (K3)
2. Evaluate critically the experimental data and draw meaningful inferences (K5)
3. Develop skills to defend own research effectively (K6)
4. Develop skills for writing scientific documents (K6)

CO-PO Mapping

		PO1	**PO2**	**PO3**	**PO4**	**PO5**
		K5	K6	K5	K5	K4
CO1	K3	2	2	2	2	3
CO2	K5	3	3	3	3	3
CO3	K6	3	3	3	3	3
CO4	K6	3	3	3	3	3
Course	**K6**	**3**	**3**	**3**	**3**	**3**

3, 2, 1 represent strong, moderate and weak correlation; '-' refers to no correlation.

Quality

- The student research projects are conducted in a planned and methodical manner.
- Their objectives are well defined and appropriate technical terms have been indicated in the projects. The projects are clearly designed to set a plan for the experiments to be conducted. Good quality literature survey has been done and cited. The projects are well presented along with valid justification of the results obtained.

Sample Thesis Evaluation Sheet

Institute Of Chemical Technology

(Deemed-to-be University - Under the UGC Act 1956)
Elite Status and Centre of Excellence - Govt. of Maharashtra
N.M.Parekh Marg, Matunga, Mumbai 400019 India.
Ph: +91-22-33611111/2222, Fax: +91-22-33611020, www.ictmumbai.edu.in

M.Tech - Food Biotechnology

Final Stage Evaluation of Thesis : Evaluation by the Internal and External Examiner

Date of Open Defence Examination:	**Mar 02,2020**
Name of the student:	Sneha Anand Kamble
Name of the Research Supervisor:	Dr. Jyoti Sagar Sontakke Gokhale
Degree:	M.Tech - Food Biotechnology
Title of the Project:	Utilization of Jackfruit Seeds as a Cocoa Substitute
Department:	Department of Food Engineering and Technology

Sr. No.	Assessment Criterion	Marks
1	Understanding of Research Area	55/60
2	Problems Formulation / Experimental Design/ Mathematical Modelling	55/60
3	Quality of Work Done	65/70
4	Analysis and Interpretation of results	63/70
5	Quality of Thesis Submitted	64/70
6	Quality of presentation	57/60
7	Answer to questions raised during Open Defence	55/60
	Total marks (out of 459):-	414/459

Outstanding: 100%-90%; Excellent: 89.99%-80%; Very Good: 79.99%-70%; Good: 69.99%-60%; Reasonable: 59.99%-50% (these are only guidelines)

Recommendation :

The M.Tech - Food Biotechnology Thesis submitted by the candidate is

1. Acceptable, and may be regarded as final in the present form.
2. Acceptable with minor revisions. The revisions have been indicated to the student during open defence examination.

Signature of External Examiner Name of External Examiner Dr. Bhanu Iyer	Signature of Research Supervisor Name of Research Supervisor Dr. Jyoti Sagar Sontakke Gokhale	Signature of Chairperson Name of Chairperson Dr. Laxmi Ananthanarayan, IIBT HOD

Mumbai - 400019
Date : Mar 02,2020

The list of research projects for the M. Tech. Food Biotechnology students.

Batch 2016-2018

Sr No.	Roll no.	Student name	Research Project	Guide
1	16FBT201	Alisha Sukhija	Studies on fermentative production of mead from honey	U. S. Annapure
2	16FBT202	Harsha Bharwani	Influence of processing on anti-nutritional factors and allergens of white peas and development of rapid immunoassay for cross reactivity studies against peanuts.	S. S. Arya
3	16FBT203	Mukesh Patel	Fermentative production of dextran from *Leuconostoc mesentroides* using pineapple waste.	S. Chakraborty
4	16FBT204	Nitin Sangle	Development of functional food product using fermented Sangri seed flour	J. S. Gokhale
5	16FBT205	Prabhat Chauhan	Screening of prebiotics for *S. boulardii* and development of delivery system.	U. S. Annapure
6	16FBT206	Sana Shaikh	Development of *Idli* premix for accelerated fermentation.	L. Ananthanarayan
7	16FBT207	Lubna Shaik	Studies on fruit wines	S. S. Lele
8	16FBT208	Shraddha Srinivasan	Influence of dietary factors on hangover	R. S. Singhal
9	16FBT209	Shubham Gaikwad	Bioactives from fish waste	S. S. Arya
10	16FBT210	Sumita Kumari	Study of *Cajanus cajan and Lathyrus sativus* using molecular biology techniques.	L. Ananthanarayan

Batch 2017-2019

Sr. No.	Roll no.	Student Name	Research Project	Guide
1	17FBT201	Abdur Rehman Khan	Production of Microbial lipopeptide and its food application	S. Chakraborty
2	17FBT203	Bishal Prasher	Process intensification in the form of fruity flavor esters using supercritical carbon-dioxide based enzymatic process	G. D. Yadav
3	17FBT204	Deep Dave	Probiotcs to Paraprobiotics: Enumeration, Inactivation Kinetics and	R. S. Singhal

			Bioactivity	
4	17FBT205	Lathika G. V.	Bacterial cellulose from fruits and vegetables and strain isolation	S. S. Lele
5	17FBT206	Shreyasi Phatak	Cashew apple wine and study of functional molecules in cashew apple.	S. S. Lele
6	17FBT207	Shriya Das	Gluten free sour dough bread development.	S. S. Arya
7	17FBT208	Sneha Kamble	Studies on utilization of selected fruit seed waste	J. S. Gokhale
8	17FBT209	Stuti Agarwal	Utilization of industrial waste for the production of value-added products	U. S. Annapure
9	17FBT210	Sudharshini B.	Extraction of pigments (Carotenoids) from natural sources	L. Ananthanarayan

Batch 2018-2020

Sr. No.	**Roll no.**	**Name of the student**	**Research Project**	**Guide**
1	18FBT201	Aayushi Pal	Study of bioactive compounds and complete utilization of pineapple	J. S. Gokhale
2	18FBT202	Chirag Anandi	Process technology of vegan milk and its food application	S. Chakraborty
3	18FBT203	Logesh V. N.	Extraction and characterization of gums from Sangri seeds	J. S. Gokhale
4	18FBT204	Mohammad Shahrukh	Time temperature indicator (TTI) for smart packaging using natural pigments from plant sources	L. Ananthanarayan
5	18FBT205	Mona Kokwar	Fermented probiotic multigrain drink	S. S. Arya
6	18FBT206	Shruthy Seshadrinathan	Saccharification of agricultural lignocellulosic waste for different food applications	S. Chakraborty
7	18FBT207	Srutee Rout	Animal tissue culture and its application in clean meat	U. S. Annapure
8	18FBT208	Varad Bende	Limoninase: CLEAs for food applications	R. S. Singhal
9	18FBT209	Zumismita Kalita	Microwave assisted enzyme catalysis in transesterification of p-anisyl alcohol	G. D. Yadav

Batch 2019-2021

Sr. No.	Roll no.	Name of the student	Research Project	Guide
1	20FBT201	Aadya Vinay Sathe	Pectin-based edible coating for extension of shelf life of fresh fruits and vegetables	Dr. Jyoti Gokhale
2	20FBT202	Abhinaya T U	Cold plasma treatment for the improvement in ethanol production	Dr. Uday Annapure
3	20FBT203	Akalya Sendrayakannan	Studies on Bovine Milk Oligosaccharides	Dr.Prashant Kharkar
4	20FBT207	Jaya Chendrayan K	Inhibition of invertase and polyphenol oxidase in sugarcane juice	Dr. Rekha Singhal
5	20FBT208	Lakshmi I J	Formulation of synbiotic gummies as a health supplement	Dr.Ratnesh Jain
6	20FBT209	Nirkayani Balamurugan	Extraction of banana peel bioactives using novel green techniques	Dr. Shalini Arya
7	20FBT211	Priyanka Anand	Protein hydrolysates from microalgae as a functional ingredient to be used in food products	Dr. Gunjan Prakash
8	20FBT212	Garusha Jain	Extraction of Bioactives from tropical fruit waste	Dr. Jyoti Gokhale
9	20FBT213	Pooja Vilas Parab	Effect of pH on microbial inactivation during non-thermal treatment of fruit juice	Dr. Snehasis chakraborty

1.2.3. Initiatives related to industry interaction including industry internship/summer training (10)

A. Industry supported laboratories

Sr No.	Laboratory name	Industry Sponsor	Amount received (Rs)
1	Prof. D. V. Rege Laboratory	HiMedia Lab., India	58,00,000
2	Food Analysis lab	Goodwill Industries Ltd., India	8,00,000
3	PTC Research Lab	Goodwill Industries Ltd., India	5,00,000
4	Fermentation Lab	Fine Organics Ltd., India	15,00,000
5	Smart Classroom	Fine Organics Ltd., India	38,00,000
6	Research Lab 283	Morde Foods	48,00,000
7	Food Processing Lab	Dr. Shrikhande	10000 USD

B. Industry involvement in the program design and Curriculum

The program curriculum has been designed considering the feedback from industry personnel such as

1. **Dr. Nakul Phase**, Senior General Manager, Praj Industries Ltd., Pune
2. **Dr. Parag Saudagar**, Director, S. K. BioBiz, Nasik
3. **Dr. Girish Mahajan**, VP, Microbiology Division, HiMedia, Mumbai
4. **Dr. Abhishek Gupta**, Senior Scientist I, General Mills India Pvt Ltd., Mumbai
5. **Dr. Anil Kumar**, Head, Tata Chemicals, Pune

C. Industry involvement in partial delivery of any regular courses for students

In each academic year of MTech Food Biotechnology, visiting faculty from industry take some part of the courses.

AY 2016-17

Sr No	Name of Visiting faculty	Subject	Hour/wk
1	**Dr. Joseph Lewis** Food Consultant	FDT2021: Food Standards, Safety & Regulations	3
2	**Dr. Jayant Bandekar** Ex-BARC	FDT 2002: Food Safety & Toxicology	1
3	**Dr. Veena Yardi** Associate Professor, Nirmala Niketan, Mumbai	FDT 2075: Basics of Human Nutrition	1

AY 2017-18

Sr No	Name of Visiting faculty	Subject	Hour/wk
1	**Dr. Subha Nishtala** Director In-charge, ITC-FSAN	FDT2021: Food Standards, Safety & Regulations	2
2	**Dr. Joseph Lewis** Food Consultant	FDT2021: Food Standards, Safety & Regulations	1
3	**Dr. Jyoti Baliga**	FDT2023: Food Packaging Science &	1

	Ex-Professor and Additional Director, IIP Mumbai	Technology	
4	**Dr. Jayant Bandekar** Ex-BARC	FDT 2002: Food Safety & Toxicology	1
5	**Dr. Veena Yardi** Associate Professor, Nirmala Niketan, Mumbai	FDT 2075: Basics of Human Nutrition	1
6	**Dr. Lambert Rodrigues** Retired Faculty, ICT Mumbai	FDT2055: Biotechnology of Fermented Foods	1
7	**Dr. Shantanu Samant** Associate Director, RDQ, Mondelez International, Thane	FDT2008: Comprehensive Techniques in Food Analysis	1
8	**Dr. Shruti Kakodkar** Assistant Professor, V. G. Vaze College, Mumbai	FDT2057: Fundamentals of Food Biotechnology, Genetics and Cell Culture Technology	2

AY 2018-19

Sr No	Name of Visiting faculty	Subject	Hour/wk
1	**Dr. Subha Nishtala** Director In-charge, ITC-FSAN	FDT2021: Food Standards, Safety & Regulations	3
2	**Dr. Jyoti Baliga** Ex-Professor and Additional Director, IIP Mumbai	FDT2023: Food Packaging Science & Technology	1
3	**Dr. Shantanu Samant** Associate Director, RDQ, Mondelez International, Thane	FDT2055: Biotechnology of Fermented Foods	1
4	**Dr. Veena Yardi** Associate Professor, Nirmala Niketan, Mumbai	FDT 2075: Basics of Human Nutrition	1

5	**Dr. Shruti Kakodkar** Assistant Professor, V. G. Vaze College, Mumbai	FDT2057: Fundamentals of Food Biotechnology, Genetics and Cell Culture Technology	2
6	**Dr. Ninad Pandit** Assistant Manager, R&D, Zytex Biotech Pvt. Ltd., Mumbai	FDT2058: Bioprocess Engineering and Technology	1

AY 2019-20

Sr No	Name of Visiting faculty	Subject	Hour/wk
1	**Dr. Subha Nishtala** Director In-charge, ITC-FSAN	FDT2021: Food Standards, Safety & Regulations	3
2	**Dr. Veena Yardi** Associate Professor, Nirmala Niketan, Mumbai	FDT 2075: Basics of Human Nutrition	1
3	**Dr. Shantanu Samant** Associate Director, RDQ, Mondelez International, Thane	FDT2055: Biotechnology of Fermented Foods	1
4	**Dr. Jyoti Baliga** Ex-Professor and Additional Director, IIP Mumbai	FDT2023: Food Packaging Science & Technology	1
5	**Dr. Jyoti Baliga** Ex-Professor and Additional Director, IIP Mumbai	FDT2008: Comprehensive Techniques in Food Analysis	1
6	**Dr. Sagar Gokhale** Co-founder and Partner, Ojman Foodbio, Pune	FDT2053: Fundamentals of Food Process Engineering	1
7	**Dr. Shruti Kakodkar** Assistant Professor, V. G. Vaze College, Mumbai	FDT2057: Fundamentals of Food Biotechnology, Genetics and Cell Culture Technology	2
8	**Dr. Ninad Pandit** Assistant Manager, R&D,	FDT2058: Bioprocess Engineering and Technology	1

	Zytex Biotech Pvt. Ltd., Mumbai		

AY 2020-21

Sr No	Name of Visiting faculty	Subject	Hour/wk
1	**Dr. Subha Nishtala** Director In-charge, ITC-FSAN	FDT2021: Food Standards, Safety & Regulations	3
2	**Dr. Veena Yardi** Associate Professor, Nirmala Niketan, Mumbai	FDT 2075: Basics of Human Nutrition	1
3	**Dr. Shantanu Samant** Associate Director, RDQ, Mondelez International, Thane	FDT2055: Biotechnology of Fermented Foods	1
4	**Dr. Jyoti Baliga** Ex-Professor and Additional Director, IIP Mumbai	FDT2023: Food Packaging Science & Technology	1
5	**Dr. Jyoti Baliga** Ex-Professor and Additional Director, IIP Mumbai	FDT2008: Comprehensive Techniques in Food Analysis	1
6	**Dr. Sagar Gokhale** Co-founder and Partner, Ojman Foodbio, Pune	FDT2053: Fundamentals of Food Process Engineering	1
7	**Dr. Shruti Kakodkar** Assistant Professor, V. G. Vaze College, Mumbai	FDT2057: Fundamentals of Food Biotechnology, Genetics and Cell Culture Technology	2

D. Industrial training/tours for students

Coca Cola, Wada, Maharashtra (Batch 2017-19)

E. Industrial training of 4-6 months and post training Assessment

The list of Internship Industry for the M. Tech. Food Biotechnology students

Batch 2016-18

Sr No.	Roll no.	Name of the student	Internship Industry
1	16FBT201	Alisha Sukhija	Mondelez, Mumbai
2	16FBT202	Harsha Bharwani	Nestle, Goa
3	16FBT203	Mukesh Patel	OmniActive Health Technologies Limited. Pune
4	16FBT204	Nitin Sangle	Mondelez, Mumbai
5	16FBT205	Prabhat Chauhan	ITC, Bengaluru
6	16FBT206	Sana Shaikh	Tata Chemicals, Pune
7	16FBT207	Lubna Shaik	Marico Industries, Mumbai
8	16FBT208	Shraddha Srinivasan	ITC, Bengaluru
9	16FBT209	Shubham Gaikwad	Nestle, Goa
10	16FBT210	Sumita Kumari	VKL Spices, Mumbai

Batch 2017-19

Sr. No.	Roll no.	Name of the student	Internship Industry
1	17FBT201	Abdur Rehman Khan	HiMedia, Mumbai
2	17FBT203	Bishal Prasher	Mondelez, Mumbai
3	17FBT204	Deep Dave	VKL, Mumbai
4	17FBT205	Lathika G. V.	AAK Kamani, Mumbai
5	17FBT206	Shreyasi Phatak	Inovantus Technologies, Mumbai
6	17FBT207	Shriya Das	Inovantus Technologies, Mumbai
7	17FBT208	Sneha Kamble	Diageo, Bengaluru
8	17FBT209	Stuti Agarwal	Diageo, Bengaluru
9	17FBT210	Sudharshini B.	Diageo, Bengaluru

Batch 2018-20

Sr. No.	Roll no.	Name of the student	Internship Industry
1	18FBT201	Aayushi Pal	Merino India, New Delhi
2	18FBT202	Chirag Anandi	Equinox Labs, Navi Mumbai
3	18FBT203	Logesh V. N.	Equinox Labs, Navi Mumbai
4	18FBT204	Mohammad Shahrukh	Tata chemicals, Pune
5	18FBT205	Mona Kokwar	Equinox Labs, Navi Mumbai
6	18FBT206	Shruthy Seshadrinathan	Novozymes, Bengaluru
7	18FBT207	Srutee Rout	Himedia, Mumbai
8	18FBT208	Varad Bende	ITC, Bengaluru
9	18FBT209	Zumismita Kalita	Tata chemicals, Pune

Batch 2019-21: No IPT due to pandemic

Batch 2020-22

Sr. No.	Roll no.	Name of the student	Internship Industry
1	20FBT201	Aadya Sathe	SK Biobiz Pvt Ltd
2	20FBT202	Abhinaya TU	SK Biobiz Pvt Ltd
3	20FBT203	Akalya S	VR Foodtech
4	20FBT207	Jayachendrayan K	Ojman FoodBio
5	20FBT208	Lakshmi I J	Ojman FoodBio
6	20FBT209	Nirkayani B	Fudtekey Solutions
7	20FBT211	Priyanka Anand	TISS
8	20FBT212	Garusha Jain	Shaivaa Algaetech LLP
9	20FBT213	Pooja Parab	TISS

F. Impact analysis of industrial training

The industrial training is being evaluated for 30 credits (450 Marks) in Semester III of MTech in Food Biotechnology. The rubrics is given below.

Criteria	Details	Max. Marks
Attendance	- Attendance certificate duly signed - Regularity and Punctuality - Attentiveness and responsiveness - Communication, networking, personal grooming and professional conduct	50
Work done (based on presentation)	- Work done in various domains such as production, QA, inventory management, waste management etc	50
	- Work done in R and D, process or product or package improvement or development	50
	- Marketing - Regulatory aspects and labelling - Understanding of business and finance	50
	- Overall Involvement and initiative taken - Analytical methods performed, instruments/ equipment used - Innovation/ contribution to Industry	50
Learning (based on presentation)	- Based on questions asked# and answers given during presentation	50
Presentation	- Quality of slides (format, aesthetics) - Technical content and correctness of slides - Oral delivery - Time management	50
Report	- Representation of all given assessment criteria of IPT (as specified above) - Correctness of the document (spelling, grammar, punctuations, format etc)	50
	- Technical content of report - Overall learning through IPT inferred and recommendations/ suggestions given in the conclusion	50

Sample marksheet of IPT evaluation

INSTITUTE OF CHEMICAL TECHNOLOGY
(University under Section -3 of the UGC Act 1956)

Elite Status and Centre of Excellence – Govt. of Maharashtra

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M.Tech - Food Biotechnology

Evaluation of Industrial Training (in Plant Training) by the Internal and External Examiner

Date of Presentation:	**Jun 24,2020**
Name of the student:	Logesh V N
Name of the Research Supervisor:	Dr. Jyoti Sagar Sontakke Gokhale
Degree:	M.Tech - Food Biotechnology
Title of the Project:	Extraction and Characterization of Gums from Prosopis cineraria seeds
Department:	Department of Food Engineering and Technology

Sr No.	Assessment Criterion	Marks (Total 450)
1	Background of Project	72/25
2	Experiment performed/Mathematical modelling if any/Design/Techno-economic feasibility/Analysis of data	115/125
3	Conclusion	26/30
4	Writing Skills including formating as per given instruction	26/30
5	Presentation based on the work perform and its analysis/Presentation Skills	83/90
6	Marks Given by Industry Mentor	130/150
	Total marks (out of 450) :	402/450
Outstanding: 100%-90%; Excellent: 89.99%-80%; Very Good: 79.99%-70%; : 69.99%-60%; Reasonable: 59.99%-50% (these are only guidelines)		

Recommendation (please choose ONE):

The report submitted (Industrial Training (in Plant Training)) by the candidate is:

1. Acceptable, and may be regarded as final in the present form.
2. Acceptable with minor revisions. The revisions have been indicated to the student during the presentation.

J S Gokhale

Signature of Research Supervisor
Name of Research Supervisor
Dr. Jyoti Sagar Sontakke Gokhale

Snehasis Chakraborty

Signature of Internal Examiner
Name of Internal Examinar
Dr. Snehasis Chakraborty

Mumbai - 400019
Date : Jun 24,2020

1.2.4. Participation of Industry professionals in curriculum development, as examiners, in major projects (10)

Industry personnel as a member of advisory committee participate in offering suggestions in curriculum development. Details are given below.

Sr No.	Name	Industry
1	Dr. Parag Saudagar	Managing Director, SK BioBiz Pvt. Ltd.
2	Dr. Girish Mahajan	VP, Microbiology Division, HiMedia Laboratories Pvt. Ltd., Mumbai
3	Dr. Nakul Phase	Senior General Manager, Praj Industries Ltd. Pune
4	Dr. Abhishek Gupta	Senior Scientist I, General Mills India Pvt Ltd., Mumbai
5	Dr. Anil Kumar	Head, Tata Chemicals, Pune

The list of Examiners for M. Tech. Food Biotechnology students

Graduating Year: 2018

Sr. No.	Roll No.	Student name	Research topic	Research guide	Name of external examiner
1.	16FBT201	Alisha Sukhija	Studies on fermentative production of mead from honey	U. S. Annapure	**Dr. Rahul Warke** Director, R & D HiMedia Laboratories Pvt. Ltd. Mumbai
2.	16FBT202	Harsha Bharwani	Influence of processing on antinutritional factors and allergens of white peas (*Pisum sativum*) and development of rapid immunoassay for analysing its cross reactivity against peanuts (*Arachis hypogea*)	S. S. Arya	**Dr. Pratap Bade** Principal Investigator, Syngene International Ltd., Bengaluru
3.	16FBT203	Mukesh Patel	Fermentative production of dextran by *L. mesenteriodes* using pineapple waste	S. Chakraborty	**Rohit Upadhyay** Scientist II, General Mills India Pvt. Ltd. Mumbai
4.	16FBT204	Nitin Sangle	Development of functional food product	J. S. Gokhale	**Dr. Kiran Desai**

			using fermented sangri seed flour		Senior Scientist II, General Mills India Private Limited, Mumbai
5.	16FBT205	Prabhat Chauhan	Screening of prebiotics for *S. boulardii* and development of delivery system	U. S. Annapure	**Dr. Rahul Warke** Director, R & D MicrobiologyDiv, HiMedia Laboratories Pvt. Ltd. Mumbai
6.	16FBT206	Sana Shaikh	Development of *Idli* premix with accelerated fermentation	L. Ananthanarayan	**Ashlesha Parchure** Director, VR Food Tech Pvt. Ltd., Mumbai
7.	16FBT207	Lubna Shaikh	Studies on fruit wines from plant material	S. S. Lele	**Dr. Nagaraj Rao** Managing Director, Rane Rao Reshamia Laboratories Pvt. Ltd., Mumbai
8.	16FBT208	Shraddha Srinivasan	Influence of dietary factors on hangover	R. S. Singhal	**Dr. Sumit Gupta** Scientific Officer, Food Technology Div, Bhabha Atomic Research Centre, Mumbai
9.	16FBT209	Shubham Gaikwad	Bioactives from fish waste	S. S. Arya	NA
10.	16FBT210	Sumita Kumari	Study of *Cajanus cajan* and *Lathyrus sativus* using molecular biology techniques	L. Ananthanarayan	**Dr. Ashwini Tilak** Assistant Professor, VPM's B.N. Bandodkar College of Science, Thane

Graduating Year: 2019

Sr. No.	Roll No.	Student name	Research topic	Research guide	Name of external examiner
1.	17FBT201	Abdur Rehman Khan	Fermentative Production of Lipopeptide Biosurfactant using waste sunflower oil	S. Chakraborty	**Parag Saudagar** Managing Director, SK BioBiz Pvt. Ltd.
2.	17FBT203	Bishal Prasher	Microwave synthesis of 1,4 -butanediol diacetate catalysed by immobilized lipase	G. D. Yadav	**Dr. Mukund V Deshpande** Director, Greenvention Biotech Pvt. Ltd. Uruli-Kanchan 412202
3.	17FBT204	Deep Dave	Probiotic to paraprobiotic: Enumeration, Inactivation Kinetics & bioactivity	R. S. Singhal	**Amit Arora** Associate Professor Indian Institute of Technology, Mumbai
4.	17FBT205	Lathika G. V.	Isolation of indigenous yeasts from jackfruit and its application in food products	S. S. Lele	**Dr. Shubhada Nayak** HOD, Department of Biotechnology, Karmaveer Bhaurao Patil College
5.	17FBT206	Shreyasi Phatak	Product and process development of cashew apple and study of bioactive compounds	S. S. Lele	**V.G. Pendse** Food Consultant
6.	17FBT207	Shriya Das	Development of multigrain sourdough bread using minor millets	S. S. Arya	**Dr. Saurav Ghosh** Assistant Professor, D. Y. Patil College, Navi Mumbai
7.	17FBT208	Sneha Kamble	Utilization of jackfruit seeds as a cocoa substitute	J. S. Gokhale	**Dr. Bharati Iyer** Senior scientist II at General Mills Pvt. Ltd., Mumbai

8.	17FBT209	Stuti Agarwal	Utilisation of industrial waste for the production of value-added product	U. S. Annapure	**Dr. A.K. Sahoo** Head, Department of Food Science and Technology, Shivaji University, Kolhapur
9.	17FBT210	Sudharshini B.	Extraction of Carotenoids from *Cucurbita moschata* peels and its application in food products	L. Ananthanarayan	**Dr. Malathy Venkatesan** Senior Scientist, Innovation Centre, Tata Chemicals, Pune

Graduating Year: 2020

Sr. No.	Roll No.	Name of the student	Research topic	Name of research guide	Name of external examiner
1	18FBT201	Aayushi Pal	Study of Bioactive Compounds and Complete Utilization of Pineapple	J. S. Gokhale	N. A.
2	18FBT202	Chirag Anandi	Vegan milk and milk products using Mung Beans	S. Chakraborthy	**Rohit Upadhyay** R&D Specialist Nestle Inida, Delhi
3	18FBT203	Logesh V. N.	Extraction and Characterization of Gums from *Prosopis cineraria* seeds	J. S. Gokhale	**Dr. Abhishek Gupta** Marico Ltd. Mumbai
4	18FBT204	Shahrukh Mohammad	Development of Time Temperature Indicator and pH Indicator for intelligent food packaging using natural pigment from plant source	L. Ananthanarayan	**Dr. Kiran Desai** Senior Scientist II, General Mills India Private
5	18FBT205	Mona Kokwar	Functional multigrain probiotic drink	S. S. Arya	**Dr. Yogesh Gath** Assistant Professor, Lovely University, Punjab
6	18FBT206	Shruthy Seshadrinathan	Fermentative production of erythritol from molasses using *Candida magnolia*	S. Chakraborthy	**Dr. Rohit Upadhyay** Senior Scientist, Nestle India Pvt. Ltd.

					Delhi
7	18FBT207	Srutee Rout	Studies on effect of Cold Plasma treatment in combination of enzyme on cellulose	U. S. Annapure	**Dr. A. K. Sahoo** Professor and Head, Shivaji University, Maharashta
8	18FBT208	Varad Bende	Studies on Extraction of Limonin from Citrus Waste	R. S. Singhal	**Dr. Ninad Pandit** Assistant Manager, Zytex Biotech Pvt Ltd., Mumbai
9	18FBT209	Zumismita Kalita	Microwave assisted enzyme catalysis in transesterification of 4-Methoxybenzyl alcohol	G. D. Yadav	**Dr. Ganesh Ramachandran** Associate Director, Biocon Ltd., Bengaluru

N. A.: Not applicable (Thesis not submitted/ defended yet)

1.2.5. Quality of laboratory work given (20)

The experiments to be conducted in the laboratory have been well defined and the lab manuals have been provided to the students. The students are grouped in pairs to conduct the experiment which allows them to learn independently. The results are discussed in the class.

FDP 2067 Food analysis and processing lab

No.	Syllabus	Facility required
1	Analysis of milk	Gerber's centrifuge, Gerber's tubes, Oven, Muffle furnace, Silica crucibles, Water Bath
2	Analysis of wheat flour and determination of damaged starch	Weighing balance, Water Bath, Drying oven, Planetary Mixer-Kneader, Crucibles, Muffle Furnace, Crucibles, Desiccators
3	Analysis of tea and coffee	Muffle Furnace, Crucibles, Reflux Air Condenser, Water bath, Desiccator, Weighing balance
4	Analysis of alcoholic beverages	pH meter, Water Bath, Pycnometer flask, Distillation unit,

		Hot Air oven, Desiccator
5	Estimation of food bioactives (phenolics, pigments etc)	Orbital Shaker, Centrifuge, Separatory funnel, Eppendorf tubes, Spectrophotometer
6	Detection of Food adulteration	Spectrophotometer, colorimeter
7	Sensory analysis of Foods	-
8	Development of premixes and study of traditional food	Mixer-Grinder, Hammer Mill, Water Activity Meter, Tray Drier Homogeniser, Sieves
9	Fruit and vegetable processing: Dehydration and Product Development	Tray dryer, Weighing balance, Abbe's Refractometer, pH meter Water Activity meter

FDP 2052 Food Biotechnology Lab

No.	**Syllabus**	**Facility required**
1	Ammonium sulphate precipitation of proteins	Centrifuge
2	Discontinuous native and SDS PAGE	Casting tray, SDS PAGE unit, Geldoc
3	Isolation of genomic DNA and 2D gel electrophoresis demo	Centrifuge, 2D Gel electrophoresis unit
4	Agarose gel electrophoresis and 2D gel electrophoresis demo	Agarose electrophoresis unit
5	DNA amplification by PCR and Real Time PCR demo	PCR unit
6	Restriction digestion profiling of genomic DNA	Geldoc
7	HPLC and HPTLC separation demo	HPLC, HPTLC
8	Demo of Gel Filtration Chromatography/ IEC	Gel-filtration unit
9	Enzyme assay and factors affecting with kinetic study	Spectrophotometer

10	Application of enzyme in Fruit processing, and inactivation of enzyme by blanching	Water bath, Spectrophotometer
11	Preparation of media, sterilization, serial dilution, plating, enumeration, Gram staining	Laminar air flow unit, autoclave, incubator, Microscope, Haemocytometer, Spectrophotometer
12	Estimation of antioxidant value by ABTS/ FRAP	Spectrophotometer

Specific Features of Lab Experiments

- Each practical is performed in a group of two students and the data generated is analysed.
- The students maintain lab notebook in which they record each experiment.
- For each experiment students write: Background/ Relevance, experimental design, observations, results, and inference.

CRITERION 2	Program Outcomes	75

2.1. Establish the connect between the courses and the POs (15)

No.	PROGRAM OUTCOMES (POS)	Courses
1	An ability to independently carry out research or investigation and development work to solve practical problems	FDP 2066: Seminar & Critical Review of one research publication; FDP 2067: Practical I: Food Analysis and Processing Laboratory; FDP 2068: Research I; FDT 2058: Bioprocess Engineering and Technology; FDP 2052: Practical II: Food Biotechnology Laboratory; FDP 206: Research II FDP 2070: Industrial Training FDP 2071: Research III
2	An ability to write and present a substantial technical report or document	FDP 2066: Seminar & Critical Review of one research publication; FDP 2068: Research I; FDP 2069: Research II; FDP 2070: Industrial Training; FDP 2071: Research III
3	An ability to demonstrate a degree of mastery over the area of food biotechnology	FDT 2056: Introduction to Food Science and Technology; FDT 2008: Comprehensive Techniques in Food Analysis; FDT 2053: Fundamentals of Food Process Engineering FDT 2023: Food Packaging Science and Technology; FDT 2021: Food Standards and Safety Regulations; FDT 2057: Fundamentals of Food Biotechnology, Genetics and Cell Culture Technology; FDT 2055: Biotechnology of Fermented Foods; FDT 2058: Bioprocess Engineering and Technology FDT 2075: Basics of Human Nutrition; FDT 2002: Food Safety and Toxicology
4	An ability to use and evaluate modern techniques or tools applied in food biotechnology for product and process development and for analysis	FDT 2008: Comprehensive Techniques in Food Analysis; FDP 2067: Practical I: Food Analysis and Processing Laboratory; FDP 2052 Practical II: Food Biotechnology Laboratory
5	An ability to analyse problems and offer solutions related to food science, nutrition, food safety and packaging	FDT 2056: Introduction to Food Science and Technology;

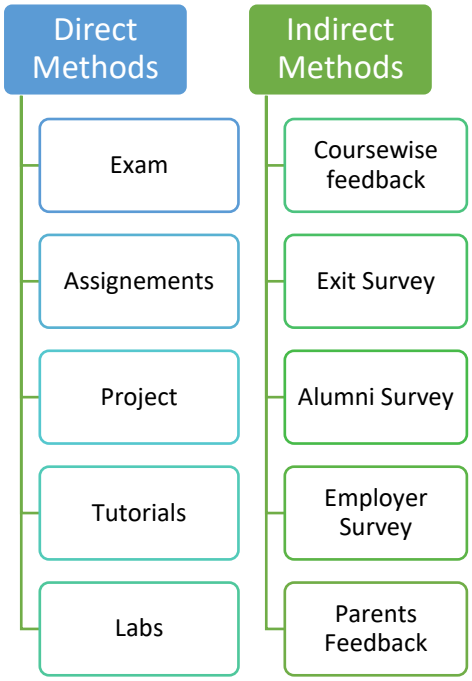
		FDT 2023: Food Packaging Science and Technology; FDT 2021: Food Standards and Safety Regulations; FDT 2057: Fundamentals of Food Biotechnology, Genetics and Cell Culture Technology; FDT 2055: Biotechnology of Fermented Foods; FDT 2075: Basics of Human Nutrition

2.2. Attainment of Program Outcomes (60)

2.2.1. Describe the assessment tools and process used to gather the data upon which the evaluation of Program Outcome is based (20)

Calculation of Course Outcome (CO)

Assessment Tools



Assessment tools used to measure the student learning and Course Outcomes:

End Semester exam: End Semester Score (25 M)

Continuous Evaluation: Score for Continuous (10 M) and Mid sem Examination (15 M)

The process adopted to map the assess the course outcomes

The assessment of the course outcomes (COs) has been performed by subject specialists. The corresponding steps have been discussed below.

Step I: Percentage weightage (W) has been given to each of the COs of a course corresponding to each question asked in end semester question paper.

Step II: Matrix showing Question wise marks for each student.

Step III: Calculation of CO wise score from Question wise marks. It is calculated as follows

$$S_{CO_{ij}} = \sum_{i=1}^{5}\sum_{j=1}^{10}\sum_{k=1}^{5} S_{Q_{kj}} \times W_{iQk}$$
$$= S_{Q_{1j}} \times W_{iQ1} + S_{Q_{2j}} \times W_{iQ2} + S_{Q_{3j}} \times W_{iQ3} + S_{Q_{4j}} \times W_{iQ4} + S_{Q_{5j}} \times W_{iQ5}$$

$$s_{CO_i} = \frac{1}{j}\left(\sum_{j=1}^{10} S_{CO_{ij}}\right)$$

Where, W_{iQk}=percent weightage given to i^{th} CO corresponding to k^{th} question (Q_k);

S_{Qkj} = Score obtained by j^{th} student corresponding to k^{th} question (Q_k)

S_{COij} = Score obtained by j^{th} student corresponding to i^{th} CO

s_{COi}=Average of S_{COij} obtained for the entire class corresponding to CO_i

Step IV: Counting % of students (m) scoring at least class average score of corresponding to CO_i.

If % of student scoring at least class average (m)	Attainment assigned to a_i
m > 60%	3
59% ≤ m ≤ 50%	2
m < 50%	1

Step V: Steps I to IV are followed for Continuous evaluation and Mid Semester marks.

Step VI: Calculation of Attainment of CO, as given below.

$$A_{CO_i} = a_{iES} \times w_{ES} + a_{iCA} \times w_{CA}$$

Where, a_{iES}=Attainment assigned to i^{th} CO from End Semester Marks;

w_{ES}=Weightage of Attainment from End Semester marks = 0.8;

a_{iCA}=Attainment assigned to i^{th} CO from Continuous + Mid Semester Marks;

w_{CA}=Weightage of Attainment from Continuous + Mid Semester Marks = 0.2;

Step VII: Calculation of Attainment of Course (A_{course}), as given below.

$$A_{course} = \frac{A_{CO1} + A_{CO2} + A_{CO3} + A_{CO4} + A_{CO5}}{5}$$

One sample calculation has been shown below:

AY 2017-19: Semester I

Course: FDT2056 INTRODUCTION TO FOOD SCIENCE AND TECHNOLOGY

Number of COs: **6;** Total number of students: **9**

Step I: End Semester: CO-Question Mapping

Question No.	Max Marks	CO1	CO2	CO3	CO4	CO5	CO6
Q.1	6	10%	10%	40%	20%	-	20%
Q.2	6	10%	20%	-	20%	20%	30%
Q.3	5	10%	30%	20%	-	30%	10%
Q.4	8	20%	10%	10%	20%	20%	20%

The contribution from each CO in Continuous Evaluation + Mid Semester is assumed to be equal.

Question No.	Marks	CO1	CO2	CO3	CO4	CO5	CO6
Continuous Evaluation	10	16.6%	16.6%	16.6%	16.6%	16.6%	16.6%
Mid semester	15	16.6%	16.6%	16.6%	16.6%	16.6%	16.6%

Step II: Students marks obtained

ROLL NO	End Semester Mark (25)				Continuous Evaluation (10)	Mid Semester (15)
	Q1	Q2	Q3	Q4		
17FBT201	1	3	0	4	8	8
17FBT203	3	4	2.5	6.5	9	12
17FBT204	3	4.5	3.5	8	9	11
17FBT205	6	3.5	3.5	6.5	9	14
17FBT206	3.5	3.5	4	7	9	14
17FBT207	4	4.5	1	5.5	9	10
17FBT208	3.5	4	0	5.5	9	12
17FBT209	3.5	3.5	4	6	9	14
17FBT210	4.5	3.5	2.5	5.5	8	11

Step III: Conversion from question wise mark to CO wise mark (End Semester)

ROLL NO	**CO wise marks**					
	CO1	CO2	CO3	CO4	CO5	CO6
17FBT201	1.20	1.10	0.80	1.60	1.40	1.90
17FBT203	2.25	1.10	2.35	2.70	2.85	3.35
17FBT204	2.70	2.50	2.70	3.10	3.55	3.90
17FBT205	2.60	3.05	3.75	3.20	3.05	3.90
17FBT206	2.50	3.00	2.90	2.80	3.30	3.55
17FBT207	2.05	2.95	2.35	2.80	2.30	3.35
17FBT208	1.85	2.15	1.95	2.60	1.90	3.00
17FBT209	2.30	1.70	2.80	2.60	3.10	3.35
17FBT210	2.15	2.85	2.85	2.70	2.55	3.30

The conversion formula is

$$S_{CO_{ij}} = S_{Q_{1j}} \times W_{Q1k} + S_{Q_{2j}} \times W_{Q2k} + S_{Q_{3j}} \times W_{Q3k} + S_{Q_{4j}} \times W_{Q4k} + S_{Q_{5j}} \times W_{Q5k}$$

In this sense, for Student 1 (17FBT201) the score corresponding to CO2 is 1.10. This has been calculated as shown below.

$SCO_{21} = 0.1*1+0.2*3+0.3*0+0.1*4 = 1.10$

For the same student 3 (17FBT204) the score corresponding to CO2 is 2.50. This has been calculated as shown below.

$SCO_{23} = 0.1*3+0.2*4+0.3*2.5+0.1*6.5 = 2.50$

Step IV : Calculation of Attainment of Course Outcome (a_i)

ROLL NO	CO wise marks					
	CO1	CO2	CO3	CO4	CO5	CO6
17FBT201	1.20	1.10	0.80	1.60	1.40	1.90
17FBT203	2.25	1.10	2.35	2.70	2.85	3.35
17FBT204	2.70	2.50	2.70	3.10	3.55	3.90
17FBT205	2.60	3.05	3.75	3.20	3.05	3.90
17FBT206	2.50	3.00	2.90	2.80	3.30	3.55
17FBT207	2.05	2.95	2.35	2.80	2.30	3.35
17FBT208	1.85	2.15	1.95	2.60	1.90	3.00
17FBT209	2.30	1.70	2.80	2.60	3.10	3.35
17FBT210	2.15	2.85	2.85	2.70	2.55	3.30
Class average (s_{COi})	2.18	2.27	2.49	2.68	2.67	3.29
No of students scoring at least class average	5	5	5	6	5	6
Total no of student	9	9	9	9	9	9
% of students (m) scoring at least class average	55	55	55	66	55	66

If % of student scoring at least class average (m)	Attainment assigned to a_i
m > 60%	3
59% ≤ m ≤ 50%	2
m < 50%	1

Step V - VI : Calculation of Attainment of Course (A_{course})

	CO1	CO2	CO3	CO4	CO5	CO6
CO Attainment from End Semester (a_{iES})	2	2	2	3	2	3
CO Attainment from Cont Evaluation + Mid Semester (a_{iCA})	2	2	2	2	2	2
Attainment of CO	2x0.8+2x0.2	2x0.8+2x0.2	2x0.8+2x0.2	3x0.8+2x0.2	2x0.8+2x0.2	3x0.8+2x0.2
Attainment of CO (A_{COi})	2	2	2	2.8	2	2.8
Attainment of Course	(2+2+2+2+2.8+2+2.8)/6 = **2.27**					

(A_{course})	

Calculation of Program Outcome (PO)

One sample calculation for PO1 has been shown below

Step I: Assessment tools for Direct measurement: The attainment values for POs have been calculated with respect to attainment of Course (A_{course}) and their corresponding correlation with PO.

The working formula for calculating direct attainment has been presented below:

$$\text{Direct PO attainment } (PO_D) = \frac{\sum_{p=1}^{n}\left([A_{course}]_p \times C_p\right)}{\sum_{p=1}^{n} C_p}$$

Where, n= number of Courses correlated to corresponding PO

A_{course} = Obtained attainment for p^{th} course (0 to 3 scale)

C_p = Correlation of p^{th} course to corresponding PO in (0 to 3 scale), where, 3, 2, 1 stands for strong, medium, and weak correlation, respectively.

Direct Attainment of PO1 (For 18FBT BATCH)

Code	Course	Level	Correlation	Attainment
FDT2056	Introduction to food science and technology	K5	3	2.13
FDT2008	Comprehensive techniques in food analysis	K5	3	2.40
FDT2053	Fundamentals of food process engineering	K5	3	2.20
FDP2067	Food analysis and processing laboratory	K5	3	3.00
FDP2066	Seminar & Critical Review of one research Publication	K6	3	3.00
FDP2068	Research I	K6	3	2.00
FDT2058	Bioprocess engineering and technology	K5	3	1.80
FDT2055	Biotechnology of fermented foods	K4	3	2.67
FDT2002	Food saftey and toxicology	K5	3	1.60
FDP2052	Food Biotech Lab	K5	3	2.00
FDP2069	Research II	K5	3	1.00
FDP2070	IN- PLANT TRAINING	K6	3	2.00
FDP 2071	Research III	K6	3	2.00
FDT2057	Fundamentals of food biotechnology, genetics and cell culture technology	K5	3	3.00
FDT2021	Food standard and safety regulations	K5	3	2.16
FDT2023	Food packaging science and technology	K5	3	1.60
FDT2075	Basics of human nutrition	K5	3	2.67
			sum = 51	
Direct PO1 Attainment = (3x2.13+3x2.40+3x2.00+…..+3x2.53)/ 51 =				**2.19**

Step II: Assessment tools for Indirect measurement: The attainment values for POs have been calculated with respect to two surveys viz. (i) Student exit feedback (ii) Feedback from Examiner or Industry Mentor or Alumni.

For both the surveys, the working formula has been presented below:

$$a_{\mathrm{IPO}_i} = \frac{3}{5N}\sum_{j=1}^{N}\sum_{k=1}^{9} S_{QF_{kj}} \times W_{iQF_k}$$

$$= \frac{3}{5N}\left[S_{QF_{1j}} \times W_{iQF1} + S_{QF_{2j}} \times W_{iQF2} + \ldots + S_{QF_{9j}} \times W_{iQF9} \right]$$

Where, N= number of students giving Student exit feedback

a_{IPO1}= Indirect PO attainment of i^{th} PO from Feedback 1

S_{QF} = Score obtained from student exit feedback in the scale of 5

Q= number of questionaries' in feedback

W_{iQF} = weightage of k^{th} feedback question for i^{th} PO

Survey I: Student Exit Feedback

Details of Ability	Connected with PO	Weightage	Feedback Scores (S_{QF} out of 5)								
			S1	S2	S3	S4	S5	S6	S7	S8	S9
Q1	PO1	0.5	5	4	5	5	5	4	5	5	5
Q2	PO1	0.5	4	5	4	3	4	5	5	5	5
Q3	PO2	0.5	4	4	4	4	5	4	5	4	5
Q4	PO2	0.5	5	5	5	4	5	4	5	4	5
Q5	PO4	0.3	5	5	5	4	4	5	5	4	5
Q6	PO4	0.3	4	5	5	5	4	4	5	5	5
Q7	PO5	1	5	4	5	5	5	4	5	5	5
Q8	PO4	0.5	5	5	4	4	5	2	4	4	4
Q9	PO3	0.5	4	5	5	4	5	4	5	5	4

Survey II: Examiners and/or Alumni feedback

Details of Ability	Connected with PO	Weightage	Feedback Scores (S_{QF} out of 5)								
			S1	S2	S3	S4	S5	S6	S7	S8	S9
Q1	PO1	0.5	4	5	5	4	5	4	5	4	5
Q2	PO1	0.5	5	4	4	5	4	5	4	4	4
Q3	PO2	0.5	4	5	4	4	5	4	3	3	3
Q4	PO2	0.5	5	4	4	5	3	4	4	4	4
Q5	PO4	0.3	3	5	4	5	5	5	4	5	5
Q6	PO4	0.3	4	5	4	5	4	4	5	4	4
Q7	PO5	1	4	5	5	4	4	4	5	5	4
Q8	PO4	0.5	4	4	5	4	5	3	5	3	3
Q9	PO3	0.5	5	5	4	5	4	5	4	5	5

Step III: Average of two feedback scores is assigned to indirect PO attainment (PO_I).

$$\text{Indirect PO attainment } (\text{PO}_I) = \frac{a_{IPO1} + a_{IPO2}}{2}$$

a_{IPO1}= Indirect PO attainment of i^{th} PO from Feedback 1

The term a_{IPOi} is converted from a 5-point scale to 3-point scale.

Attainment of PO_I

	Indirect Attainment (out of 3)		
PO	**a_{IPO1}**	**a_{IPO2}**	**PO_I**
PO1	2.77	2.67	2.72
PO2	2.70	2.40	2.55
PO3	2.73	2.80	2.77
PO4	2.91	2.80	2.86
PO5	2.87	2.67	2.77

Step IV: Calculation of Attainment of PO, as given below.

$$\text{A}_{\text{PO}} = PO_D \times w_D + PO_I \times w_I$$

Where, w_D=Weightage of Direct Attainment of PO = 0.8;
w_I=Weightage of Indirect Attainment of PO = 0.2;

Overall Attainment of PO1

Direct PO1 Attainment				2.19
Indirect PO1 Attainment	Survey I	Student Feedback	2.77	2.72
	Survey II	Alumni Feedback	2.67	
Overall Attainment of PO1 (A_{PO1})		= 2.19x0.8+2.72x0.2		2.30

2.2.2. POs attainment levels with observations (40)

Batch 16FBT

Course	Level	PO1		PO2		PO3		PO4		PO5	
		Wt	A_{course}	W	Acourse	W	Acourse	W	Acourse	W	Acourse
FDT2051	K5	3	1.47	3	1.47	3	1.47	3	1.47	3	1.47
FDT2075	K5	3	1.67	3	1.67	3	1.67	3	1.67	3	1.67
FDT2002	K5	3	2.27	3	2.27	3	2.27	3	2.27	3	2.27
FDT2052	K5	3	2.47	3	2.47	3	2.47	3	2.47	3	2.47
FDP2062	K6	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDP2061	K5	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDT2053	K5	3	1.80	3	1.80	3	1.80	3	1.80	3	1.80
FDT2021	K5	3	2.40	3	2.40	3	2.40	3	2.40	3	2.40
FDP2063	K5	3	3.00	3	3.00	3	3.00	3	3.00	3	3.00
FDT2054	K5	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDP2052	K5	3	1.00	3	1.00	3	1.00	3	1.00	3	1.00
FDP2070	K5	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDP2071	K5	3	3.00	3	3.00	3	3.00	3	3.00	3	3.00
FDP2006	K6	3	2.13	3	2.13	3	2.13	3	2.13	3	2.13
FDT2055	K4	3	1.80	2	1.80	3	1.80	3	1.80	3	1.80
Direct Attainment			2.07		2.06		2.07		2.07		2.07
Indirect-Survey I			2.55		2.28		2.22		2.47		2.22
Indirect-Survey II			2.58		2.82		2.70		2.61		2.58
Final Attainment		PO1	2.17	PO2	2.17	PO3	2.15	PO4	2.16	PO5	2.13
%Attainment		**PO1**	72.2	**PO2**	72.3	**PO3**	71.5	**PO4**	72.1	**PO5**	71.1

Wt, connection with PO; A_{course}, course attainment

Batch 17FBT

Course	Level	PO1		PO2		PO3		PO4		PO5	
		Wt	A_{course}	Wt	Acourse	Wt	Acourse	Wt	Acourse	Wt	Acourse
FDT2053	K5	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDT2056	K5	3	2.27	3	2.27	3	2.27	3	2.27	3	2.27
FDP2068	K6	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDP2066	K5	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDT2008	K5	3	1.88	3	1.88	3	1.88	3	1.88	3	1.88
FDP2067	K6	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDT2055	K4	3	2.47	2	2.47	3	2.47	3	2.47	3	2.47
FDT2002	K5	3	1.93	3	1.93	3	1.93	3	1.93	3	1.93
FDT2058	K5	3	2.47	3	2.47	3	2.47	3	2.47	3	2.47
FDP2069	K5	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDP2052	K5	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDP2070	K6	3	3.00	3	3.00	3	3.00	3	3.00	3	3.00
FDP2071	K6	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDT2057	K5	3	2.13	3	2.13	3	2.13	3	2.13	3	2.13
FDT2021	K5	3	2.32	3	2.32	3	2.32	3	2.32	3	2.32
FDT2023	K5	3	1.75	3	1.75	3	1.75	3	1.75	3	1.75
FDT2075	K5	3	2.80	3	2.80	3	2.80	3	2.80	3	2.80
Direct Attainment			2.18		2.17		2.18		2.18		2.18
Indirect-Survey I			2.7		2.3		2.4		2.5		1.9
Indirect-Survey II			2.5		2.8		2.9		2.6		2.5
Final Attainment		PO1	2.26	PO2	2.25	PO3	2.27	PO4	2.25	PO5	2.18
%Attainment		**PO1**	75.4	**PO2**	74.9	**PO3**	75.7	**PO4**	75.1	**PO5**	72.7

Wt, connection with PO; A_{course}, course attainment

Batch 18FBT

Course	Level	PO1		PO2		PO3		PO4		PO5	
		Wt	A_{course}	Wt	A_{course}	Wt	A_{course}	Wt	A_{course}	Wt	A_{course}
FDT2056	K5	3	2.13	3	2.13	3	2.13	3	2.13	3	2.13
FDT2008	K5	3	2.40	3	2.40	3	2.40	3	2.40	3	2.40
FDT2053	K5	3	2.20	3	2.20	3	2.20	3	2.20	3	2.20
FDP2067	K5	3	3.00	3	3.00	3	3.00	3	3.00	3	3.00
FDP2066	K6	3	3.00	3	3.00	3	3.00	3	3.00	3	3.00
FDP2068	K6	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDT2058	K5	3	1.80	3	1.80	3	1.80	3	1.80	3	1.80
FDT2055	K4	3	2.67	2	2.67	3	2.67	3	2.67	3	2.67
FDT2002	K5	3	1.60	3	1.60	3	1.60	3	1.60	3	1.60
FDP2052	K5	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDP2069	K5	3	1.00	3	1.00	3	1.00	3	1.00	3	1.00
FDP2070	K6	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDP2071	K6	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDT2057	K5	3	3.00	3	3.00	3	3.00	3	3.00	3	3.00
FDT2021	K5	3	2.16	3	2.16	3	2.16	3	2.16	3	2.16
FDT2023	K5	3	1.60	3	1.60	3	1.60	3	1.60	3	1.60
FDT2075	K5	3	2.67	3	2.67	3	2.67	3	2.67	3	2.67
Direct Attainment			2.19		2.18		2.19		2.19		2.19
Indirect-Survey I			2.8		2.70		2.73		2.91		2.87
Indirect-Survey II			2.7		2.40		2.80		2.80		2.67
Final Attainment		PO1	2.3	PO2	2.25	PO3	2.31	PO4	2.32	PO5	2.31
%Attainment		**PO1**	76.2	**PO2**	75.1	**PO3**	76.8	**PO4**	77.4	**PO5**	76.8

Wt, connection with PO; A_{course}, course attainment

Batch 19FBT

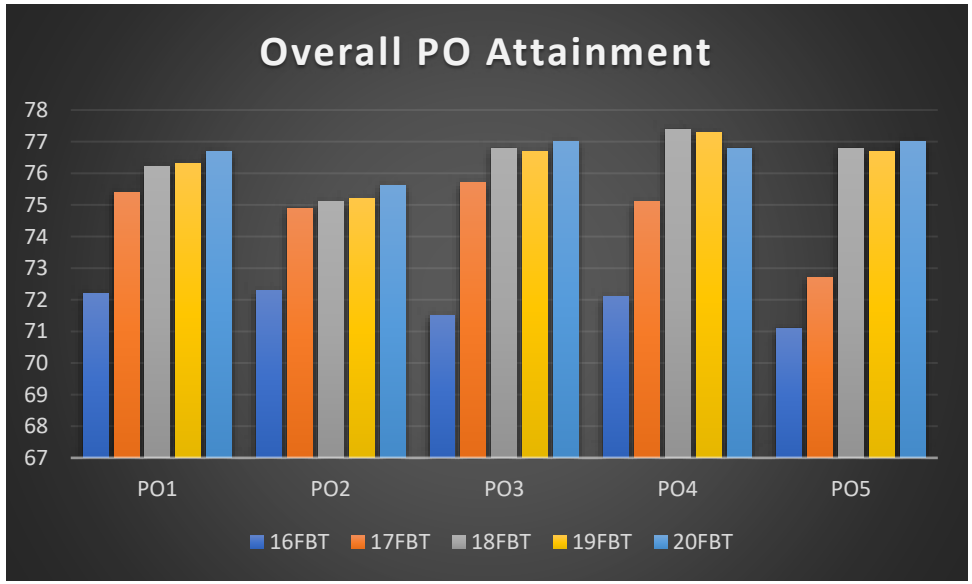
Course	Level	PO1		PO2		PO3		PO4		PO5	
		Wt	A_{course}	Wt	A_{course}	Wt	A_{course}	Wt	A_{course}	Wt	A_{course}
FDT2056	K5	3	2.40	3	2.40	3	2.40	3	2.40	3	2.40
FDT2008	K5	3	2.16	3	2.16	3	2.16	3	2.16	3	2.16
FDT2053	K5	3	2.20	3	2.20	3	2.20	3	2.20	3	2.20
FDP2067	K5	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDP2066	K6	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDP2068	K6	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDT2058	K5	3	2.60	3	2.60	3	2.60	3	2.60	3	2.60
FDT2055	K4	3	2.18	3	2.18	3	2.18	3	2.18	3	2.18
FDT2002	K5	3	1.60	3	1.60	3	1.60	3	1.60	3	1.60
FDP2052	K5	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDP2069	K5	3	3.00	3	3.00	3	3.00	3	3.00	3	3.00
FDP2070	K6	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDT2057	K5	3	2.20	3	2.20	3	2.20	3	2.20	3	2.20
FDT2021	K5	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDT2023	K5	3	2.40	3	2.40	3	2.40	3	2.40	3	2.40
FDT2075	K5	3	2.20	3	2.20	3	2.20	3	2.20	3	2.20
Direct Attainment			2.18		2.18		2.18		2.18		2.18
Indirect-Survey I			2.8		2.70		2.73		2.91		2.87
Indirect-Survey II			2.7		2.40		2.80		2.80		2.67
Final Attainment		PO1	2.3	PO2	2.26	PO3	2.3	PO4	2.32	PO5	2.3
%Attainment		**PO1**	76.3	**PO2**	75.2	**PO3**	76.7	**PO4**	77.3	**PO5**	76.7

Batch 20FBT

Course	Level	PO1		PO2		PO3		PO4		PO5	
		Wt	A_{course}	Wt	A_{course}	Wt	A_{course}	Wt	A_{course}	Wt	A_{course}
FDT2056	K5	3	2.20	3	2.20	3	2.20	3	2.20	3	2.20
FDT2008	K5	3	1.84	3	1.84	3	1.84	3	1.84	3	1.84
FDT2053	K5	3	2.04	3	2.04	3	2.04	3	2.04	3	2.04
FDP2067	K5	3	3.00	3	3.00	3	3.00	3	3.00	3	3.00
FDP2066	K6	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDP2068	K6	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDT2058	K5	3	1.80	3	1.80	3	1.80	3	1.80	3	1.80
FDT2055	K4	3	2.53	3	2.53	3	2.53	3	2.53	3	2.53
FDT2002	K5	3	1.20	3	1.20	3	1.20	3	1.20	3	1.20
FDP2052	K5	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00
FDP2069	K5	3	3.00	3	3.00	3	3.00	3	3.00	3	3.00
FDT2057	K5	3	1.60	3	1.60	3	1.60	3	1.60	3	1.60
FDT2021	K5	3	2.68	3	2.68	3	2.68	3	2.68	3	2.68
FDT2023	K5	3	2.13	3	2.13	3	2.13	3	2.13	3	2.13
FDT2075	K5	3	1.80	3	1.80	3	1.80	3	1.80	3	1.80
Direct Attainment			2.2		2.2		2.2		2.2		2.2
Indirect-Survey I			2.8		2.70		2.73		2.67		2.87
Indirect-Survey II			2.7		2.40		2.80		2.80		2.67
Final Attainment		PO1	2.3	PO2	2.27	PO3	2.31	PO4	2.30	PO5	2.31
%Attainment		**PO1**	76.7	**PO2**	75.6	**PO3**	77.0	**PO4**	76.8	**PO5**	77.0

POs attainment levels with observations

Overall PO Attainment					
Batch	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
16FBT	2.17	2.17	2.15	2.16	2.13
17FBT	2.26	2.25	2.27	2.25	2.18
18FBT	2.30	2.25	2.31	2.32	2.31
19FBT	2.3	2.26	2.3	2.32	2.3
20FBT	2.3	2.27	2.31	2.3	2.31
% Overall PO Attainment					
Batch	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
16FBT	72.2	72.3	71.5	72.1	71.1
17FBT	75.4	74.9	75.7	75.1	72.7
18FBT	76.2	75.1	76.8	77.4	76.8
19FBT	76.3	75.2	76.7	77.3	76.7
20FBT	76.7	75.6	77.0	76.8	77.0


Overall PO Attainment
78
77
76
75
74
73
72
71
70
69
68
67
PO1
PO2
PO3
PO4
PO5
16FBT
17FBT
18FBT
19FBT
20FBT

Overall PO attainment

Course	PO1				PO2				PO3				PO4				PO5			
	w	CA	W*CA	a;	w	CA	W*CA	a;	w	CA	W*CA	a;	w	CA	W*CA	a;	w	CA	W*CA	a;
FDT2056	3	2.20	6.60	3	3	2.20	6.60	3	3	2.20	6.60	3	3	2.20	6.60	3	3	2.20	6.60	3
FDT2008	3	2.14	6.42	3	3	2.14	6.42	3	3	2.14	6.42	3	3	2.14	6.42	3	3	2.14	6.42	3
FDT2053	3	2.10	6.30	3	3	2.10	6.30	3	3	2.10	6.30	3	3	2.10	6.30	3	3	2.10	6.30	3
FDP2067	3	2.50	7.50	3	3	2.50	7.50	3	3	2.50	7.50	3	3	2.50	7.50	3	3	2.50	7.50	3
FDP2066	3	2.50	7.50	3	3	2.50	7.50	3	3	2.50	7.50	3	3	2.50	7.50	3	3	2.50	7.50	3
FDP2068	3	2.00	6.00	2	3	2.00	6.00	2	3	2.00	6.00	2	3	2.00	6.00	2	3	2.00	6.00	2
FDT2058	3	2.14	6.41	3	3	2.14	6.41	3	3	2.14	6.41	3	3	2.14	6.41	3	3	2.14	6.41	3
FDT2055	3	2.57	7.71	3	2	2.57	5.14	2	3	2.57	7.71	3	3	2.57	7.71	3	3	2.57	7.71	3
FDT2002	3	1.77	5.30	2	3	1.77	5.30	2	3	1.77	5.30	2	3	1.77	5.30	2	3	1.77	5.30	2
FDP2052	3	2.00	6.00	2	3	2.00	6.00	2	3	2.00	6.00	2	3	2.00	6.00	2	3	2.00	6.00	2
FDP2069	3	1.50	4.50	2	3	1.50	4.50	2	3	1.50	4.50	2	3	1.50	4.50	2	3	1.50	4.50	2
FDP2070	3	2.50	7.50	3	3	2.50	7.50	3	3	2.50	7.50	3	3	2.50	7.50	3	3	2.50	7.50	3
FDP2071	3	2.00	6.00	2	3	2.00	6.00	2	3	2.00	6.00	2	3	2.00	6.00	2	3	2.00	6.00	2
FDT2057	3	2.57	7.70	3	3	2.57	7.70	3	3	2.57	7.70	3	3	2.57	7.70	3	3	2.57	7.70	3
FDT2021	3	2.24	6.72	3	3	2.24	6.72	3	3	2.24	6.72	3	3	2.24	6.72	3	3	2.24	6.72	3
FDT2023	3	1.68	5.03	2	3	1.68	5.03	2	3	1.68	5.03	2	3	1.68	5.03	2	3	1.68	5.03	2
FDT2075	3	2.74	8.21	3	3	2.74	8.21	3	3	2.74	8.21	3	3	2.74	8.21	3	3	2.74	8.21	3
Direct attainment (PO_0)				2.65				2.59				2.65				2.65				2.65
Indirect attainment (PO_1)			8.03	3			7.65	3			8.12	3			8.11	3			7.46	3
Overall PO attainment (Aro)				2.72				2.67				2.72				2.72				2.72

W = Correlation of a course with corresponding PO in 1-3 scale, where 3, 2, 1 stand for strong, medium, and weak correlation, respectively.

CA = Average of the attainment obtained for a specific course (in 1-3 scale);

W*CA = total attainment for a course in 1-9 scale;

a = final attainment for the course with respect to a specific PO.

The logic used here is: a = 1 if 1 1<(W*CA)≤3; PO = 2 if 3.01≤(W*CA)≤6; PO = 3 if 6.01≤(W*CA)≤9;

Overall PO attainment (A) = (PO *0.8+PO *0.2)

POs attainment

Course	P01	P02	P03	P04	POS
FDT056	3	3	3	3	3
FDT008	3	3	3	3	3
FDT053	3	3	3	3	3
FDT023	2	2	2	2	2
FDT021	3	3	3	3	3
FDP066	3	3	3	3	3
FDP067	3	3	3	3	3
FDP068	2	2	2	2	2
FDT057	3	3	3	3	3
FDT055	3	2	3	3	3
FDT058	3	3	3	3	3
FDT075	3	3	3	3	3
FDT002	2	2	2	2	2
FDP052	2	2	2	2	2
FDP069	2	2	2	2	2
FDP070	3	3	3	3	3
FDP071	2	2	2	2	2

Attainment Level

Direct attainment weightage(in numbers from 1 to 100)	Indirect attainment weightage
80	20

Course		P02	P03	P04	POS
Direct Attainment	2.65	2.59	2.65	2.65	2.65
lndirect Attainment	3	3	3	3	3
PO Attainment	2.72	2.67	2.72	2.72	2.72

CRITERION 3	Students' Performance	75

Table: 3.1

Item	AY 2020-21	AY 2019-20	AY 2018-19	AY 2017-18	AY 2016-17
Sanctioned intake of the program (N)	10	10	10	10	10
Total number of students admitted through GATE (N1)	10	10	10	10	10
Total number of students admitted through PG Entrance and others *(N2)*	0	0	0	0	0
Total number of students admitted in the Program (*N*1 + *N*2)	10	10	10	10	10

Table: 3.2

Year of entry	*N1 + N2* (As defined above)	Number of students who have successfully graduated	
		I Year	II Year
2020-21	10	9	In Process
2019-20	10	10	8
2018-19	10	9	9
2017-18	10	9	9
2016-17	10	10	10

3.1. Enrolment Ratio through GATE (20)

Table: 3.1.1

Year of entry	N	N1	Enrolment Ratio= N1 /N;
2020-21	10	10	100
2019-20	10	10	100
2018-19	10	10	100

N is sanctioned intake; N1 is number of students admitted through GATE.

3.2. Success Rate in the stipulated period of the program (20)

Item	AY 2019-20	AY 2018-19	AY 2017-18	AY 2016-17
Number of students admitted in first year of same batch (X)	10	10	10	10

Number of students completing program in stipulated duration	8	9	9	10
S.I.	0.8	0.9	0.9	1

S.I. = Number of students completing program in stipulated duration/ Number of students admitted in first year of same batch; Average S.I.= Mean of SI for past 3 Batches Assessment points = 20 X Average S.I.

Average SI [(SI1 + SI2 + SI3 + SI4) / 4]: 0.90

Assessment [20 * Average SI]: 18

3.3. Placement, Higher Studies and Entrepreneurship (20)

Table: 3.3.1

Item	**Graduating in AY**		
	2019-20	**2018-19**	**2017-18**
The total no. of students admitted in first year (N)	10	10	10
No. of students placed in companies or Government Sector (X)	6	6	7
No. of students pursuing Ph.D. / JRF/ SRF(y)	1	1	2
No. of students turned entrepreneur in engineering/technology (Z)	0	1	1
Placement Index: (x + y + z) /N	0.7	0.8	1
Average placement= (P1 + P2 + P3)/3	0.83		
Assessment Points = 20 × average placement	**0.80 x 20 = 16.66**		

3.3.1a. Provide the placement data in the below mentioned format with the name of the program and the assessment year:

Program name: M. Tech. Food Biotechnology

Batch 2019-2021

S.no.	Name of the student placed	Enrollment no.	Name of the employer	Appointment letter reference no. with date
1	Sheetal Shrigadiwar	19FBT202	Dohler India Pvt. Ltd., Pune	E578
2	Sakshi Singh	19FBT203	N.A.	NA
3	Naresh K	19FBT206	Hatson Agro Product Ltd, Chennai	20700
4	Vesapolu Hesuh	19FBT204	N.A.	NA
5	Pratibha Prajapati	19FBT207	Future Bridge Cheers Interactive Pvt Ltd, Mumbai	CH/HR/CO/0/21-22/1440
6	Suraj Modanwal	19FBT209	N.A.	N.A.
7	Srilekha K	19FBT210	Iyurveda, Banglore	IYUR0006
8	Aastha Jaiswal	19FBT211	Future Bridge Cheers Interactive Pvt Ltd, Mumbai	CH/HR/CO/0/21-22/1442
9	Avinash Sahu	19FBT212	Knowde, Progton Technologies, Bengalaru	185, Technical Analyst
10	Siddhant Singh	19FBT208	Mondelze India Pvt Ltd, Mumbai	70019879; 23/09/2021

Batch 2018-2020

S.no.	Name of the student placed	Enrollment no.	Name of the employer	Appointment letter reference no. with date
1	Aayushi Pal	18FBT201	NA	NA
2	Chirag Anandi	18FBT202	NA	NA
3	Logesh V. N.	18FBT203	ThinkingForks, Bengaluru	Development Associate (1 Feb 2021)
4	Shahrukh Mohammad	18FBT204	Sahayog Health Foods	26/03/2021
5	Mona Kokwar	18FBT205	AVKL Food solutions Enterprise, Mumbai	Management Trainee (2 Feb 2021)
6	Shruthy Seshadrinathan	18FBT206	Biocon Biologics, Bangalore	Senior Executive (Ref: BBIL/HR/LET)
7	Srutee Rout	18FBT207	IIT Kharagpur	PhD Student
8	Varad Bende	18FBT208	ITC, Bangalore	PD Executive (Grade M2) (25 Nov 2020)
9	Zumismita Kalita	18FBT209	Inventia Healthcare Limited, Thane	Junior Scientist (10 Mar 2021)

Batch 2017-2019

S.no.	Name of the student placed	Enrollment no.	Name of the employer	Appointment letter reference no. with date
1	Abdur Rehman Khan	17FBT201	Coaching class	Teacher
2	Bishal prasher	17FBT203	Mondelez International	Technical Trainee (12 Aug 2020)
3	Deep Dave	17FBT204	Evo Foods	Research Scientist (1 Jul 2020)
4	Lathika G. V.	17FBT205	ICT Mumbai	Project Fellow,
5	Shreyasi Phatak	17FBT206	Kay Bee Exports, Thane	Executive QA (1 Aug 2019)
6	Shriya Das	17FBT207	Planning to pursue PhD	NA
7	Sneha Kamble	17FBT208	Zywie Ventures Pvt. Ltd	Product team (15 Jul 2019)
8	Stuti Agarwal	17FBT209	Waffles and Pancakes Your way, Jhansi	Start-up (Feb 2021)
9	Sudharshini B.	17FBT210	Food Buddies, Tamilnadu	Food Formulation Trainee: FB/HR/19-20/June (10 Jul 2019)

Batch 2016-2018

S.no.	Name of the student placed	Enrollment no.	Name of the employer	Appointment letter reference no. with date
1	Alisha Sukhija	16FBT201	Mondelez International	Scientist 1 (1 Aug 2018)
2	Harsha Bharwani	16FBT202	BITS Pilani, Hyderabad	PhD student (2018PHXP0007H)
3	Mukesh Patel	16FBT203	Shivanika Food Pvt. Ltd	Research Analyst (1 Jul 2020)
4	Nitin Sangle	16FBT204	Healthviser Pvt. Ltd. Mumbai	Nutrition Consultant (TS0334)
5	Prabhat Chauhan	16FBT205	Evalueserve SEZ (Gurgaon) Pvt. Ltd.	Research Associate (16 Jul 2018)
6	Sana Shaikh	16FBT206	Evalueserve SEZ (Gurgaon) Pvt. Ltd.	Research Associate (1 Jun 2020)
7	Lubna Shaik	16FBT207	ICT, Mumbai	PhD student (60618)
8	Shraddha Srinivasan	16FBT208	FSSAI	Technical Officer (E-12013/03/2019 (Vol-II)/Pt.I)
9	Shubham Gaikwad	16FBT209	OSI Group, India	Project Trainee (8 Jul 2019)
10	Sumita Kumari	16FBT210	Agilent Technologies	Sales Account Manager

3.4. Professional Activities (15)

3.4.1. Student's participation in Professional societies/chapters and organizing engineering events (5)

From the MTech batch 19FBT, 18FBT, 17FBT, 16FBT

1. Logesh V N and Chirag Anandi attended workshop on Sensory Analysis, 18 December 2019 organized by SIES, Sion, Mumbai.
2. Logesh V N, Sneha Kamble, Jyoti Gokhale, Utilization of jackfruit seeds as a cocoa substitute. Poster Presentation at Bioprocessing India Conference, 14-16 December 2019 organized by CSIR-CFTRI, Mysore.
3. Shruti Seshadhrinathan and Snehasis Chakraborty, Saccharification of lignocellulosic agro-food waste using ligno-xylano-cellulolytic microbes. Poster Presentation at Bioprocessing India Conference, 14-16 December 2019 organized by CSIR-CFTRI, Mysore.
4. Varad Bende and Chirag Anandi attended Bioprocessing India Conference, 14-16 December 2019 organized by CSIR-CFTRI, Mysore.
5. Sakshi Singh and Sheethal Jayesh, New food product development, One week online workshop from 10 to 15 October 2020, organized by Gruwitz.
6. Naresh K and Srilekha K attended Space food research and product development, October 17 to November 26, 2020, Astro Research Society, Andhra Pradesh
7. Pratibha Prajapati and Avinash Sahu attended Essential of Statistics for Process Control in the Food Industry, online workshop organized by ITCFSAN.
8. Aastha Jaiswal, Hyphenated Techniques: GC-MS, One day Online webinar on May 26, 2020, organized by Guru Nanak Khalsa College, Mumbai.
9. Organized Professor J. V. Bhat Memorial Lecture on 23 September 2019 in association with AFST(I) Mumbai Chapter.
10. Organized "World Food Day" celebration and Dr. K. U. Naram Award ceremony on 16 October 2019 in association with AFST(I) Mumbai Chapter.
11. Professor D. V. Rege Memorial Lecture on 16 October 2019 in association with AFST(I) Mumbai Chapter
12. Organized one-day-in-house Product Development competition on 16 March 2019. The topic was "Utilization of Food Processing Waste in Food Product Development".
13. Organized Shri GCP Rangrao Memorial Lecture on 7 September 2018. The talk was delivered by Professor Laxmi Ananthanarayan on the topic "Emerging Food Packaging Techniques for Food Preservation".
14. Workshop on food preservation techniques was jointly organized in association with biotechnology industry research assistance council (BIRAC) and Department of Food Engineering and Technology, ICT Mumbai on and from 26 February 2018.
15. Organized "World Food Day" celebration and Professor J. V. Bhat Memorial Lecture on 16 October 2018 in association with AFST(I) Mumbai Chapter.
16. Organized one day in-house seminar on "Uprising Drift in the Path of Food Biotechnology and Fermentation Technology" on 26th December 2018.
17. A workshop on 'Analytical and preparative instrumentation for the food industry' was conducted by Anton Paar on 27th February 2017 in FETD, ICT, Mumbai. The objective of this workshop was to help students to find the best solution for trace element analysis of food ingredients, quality checks on flavours and sophisticated analysis of mouthfeel, mixing and stirring behavior.
18. The FETD, ICT organized a hands-on training for analysis of food bioactives on 2-4 March 2017 with the assistance of TEQIP. The workshop was coordinated by Dr. Shalini Arya and her team of post-graduate and Ph.D. Students. Industry

professionals, academicians and scientists from reputed institutes attended this workshop.

19. A three day "Bakery Technology Workshop" was held at FETD from 27th to 29th July 2017. It was jointly organized by FETD and Assocom Instituite of Bakery Technology and Management (AIBTM). There was a session on introduction to bakery products, bakery equipment and short bread cookies. The participants learnt about the different ingredients and mixing methods involved in preparation of breads, cookies and cakes. They prepared chocolate chip cookies, buns, chiffon cake, chocolate truffle cake, French baguette, and hard oils.
20. DuPont Nutri Scholars Awards 2017: Ms. Aratrika Ray, Mrs. Suman Kumari and Mrs. Anu Ahlwawat stood second and won One lakh cash prize in the category Ultimate Health and Wellness Product under the guidance of Dr. US Annapure.
21. DuPont Nutri Scholars Awards 2017: Ms. Madhura Janve, Mr. Baburaj Regubalan, Ms. Shraddha Srinivasan and Ms. Sana Shaikh won Stood second and won cash prize of one lakh in the category MOST NUTRITIOUS FOOD IDEA under the guidance of Dr. Laxmi Ananthanarayan.
22. Organized "World Food Day" celebration and Dr. K. U. Naram Award ceremony on 16 October 2017 in association with AFST(I) Mumbai Chapter.
23. Every year students of FETD participate in "National Nutrition Week" which is organized by AFSTI at ICT, Mumbai

3.4.2. Student's publications (10)

1. Shraddha Srinivasan, Kriti Kumari Dubey and Rekha S. Singhal. (2019). Influence of food commodities on hangover based on alcohol dehydrogenase and aldehyde dehydrogenase activities. Current Research in Food Science, 1, 8-16.

2. Garg, D., Chakraborty, S., & Gokhale, J. S. (2020). Optimizing the extraction of protein from Prosopis cineraria seeds using response surface methodology and characterization of seed protein concentrate. LWT, 117, 108630.

3. Logesh V N and J. S. Gokhale. Rheological, Technofunctional and Physicochemical Characterization of *Prosopis Cineraria* (Sangri) Seed Gum: A Potential Food and Pharmaceutical Excipient. Revision submitted to Journal of Food Processing and Preservation.

4. Logesh V. N., Dhananjeyan Venkatachalam and Jyoti S. Gokhale, Plant-Based Meat Alternatives: Sustainability, Sourcing, Processing, Nutritional and Organoleptic implications. Submitted to Food Bioscience. *Under review*.

5. Shruti Seshadrinathan and Snehasis Chakraborty. Fermentative production of erythritol from molasses using Candida magnolia: Media optimization, partial purification, and characterization. *Submitted to Biotechnology and Bioprocess Engineering*.

6. Bende Varad, Ray Aratrika, Singhal R. S. Supercritical Fluid Extraction vis-à-vis solvent extraction of limonin from lemon peels and its application in gummy bears. *To be submitted to Waste and Biomass Valorisation*.

7. Sneha Kamble, Jyoti S. Gokhale. Utilization of Fermented Jackfruit Seed as a Cocoa Substitute. *To be submitted to Journal of Food Science and Technology.*

4. **FACULTY CONTRIBUTIONS (75)** Total Marks 75.00

Name	PAN No.	University Degree	Date of Receiving Highest Degree	Area of Specialization	Research Paper Publication	Ph. D. guidance	Ph.D. granted during assessment years	Current Designation	Date (Designated as Prof/Assoc. Prof.).	Initial Date of Joining	Association Type	Currently Associated with(Yes/No)	In case of NO, Date of Leaving	IS HOD?
Dr. Rekha S.Singhal	ABEPS5434M	ME/M. Tech and PhD	30/09/1989	Food Technology	375	47	4	Professor	30/04/2007	01/08/1989	Regular	Yes		Yes
Dr. Uday S. Annapure	AGDPA0605L	ME/M. Tech and PhD	29/09/2000	Food Chemistry	110	29	2	Professor	16/04/2009	16/04/2003	Regular	Yes		No
Dr. Laxmi Ananthanarayan	AAGPA3226L	ME/M. Tech and PhD	09/09/2010	Biochemistry	69	17	3	Professor	01/10/2013	16/10/1985	Regular	Yes		No
Dr. Shalini S.Arya	APQPG4745P	ME/M. Tech and PhD	31/12/2008	Food Technology	77	8	0	Assistant Professor		25/07/2008	Regular	Yes		No
Dr. Jyoti S. Gokjale	BGMPS3371P	ME/M. Tech and PhD	27/09/2011	Bioprocess Technology	10	2	0	Assistant Professor		16/06/2014	Regular	Yes		No
Dr. Snehasis Chakraborty	ALNPC0296J	ME/M. Tech and PhD	08/08/2015	Food Engineering and Technology	35	8	0	Assistant Professor		29/10/2015	Regular	Yes		No
Dr. Gunjan Prakash	AQRPP0679Z	M.Sc. (Engineering)and PhD	08/08/2007	Bioprocess Technology	21	3	0	Associate Professor	26/01/2017	09/02/2009	Regular	Yes		No
Professor A. B. Pandit	AADPP3869K	ME/M. Tech and PhD	31-07-1984	Sono chemical processes, reactor design and process intensification	376	50	15	Professor	01-01-1996	01-01-1991	Regular	Yes		No
Dr. Pradeep R.Vavia	ABNPV8456H	MS and PhD	01/07/1991	Drug Delivery Systems	150	50	7	Professor	08/04/2003	01/12/1993	Regular	Yes		No
Dr. Shamlan MS Reshmwala	BAVPR7928E	M.Sc. and PhD	18/08/2012	Overexpression and secretion of Recombinant Proteins,	8	0	0	Assistant Professor		20/08/2014	Regular	Yes		No

				Enzyme Engineering										
Dr. Parag R. Gogate	AHNPG3328H	ME/M. Tech and PhD	20/06/2002	Cavitational Reactors, Process Intensification, Wasterwater Treatment	304	14	5	Professor	05/07/2018	03/07/2007	Regular	Yes		No
M A K Kerawala	AACPK9005D	M.E/M.Tech	29/09/1984	General Engineering	10	0	0	Associate Professor	16/02/1987		Regular	Yes		No
Dr. Anand V. Patwardhan	ABWPP6169L	ME/M. Tech and PhD	29/02/1988	Membrane Separation, Green Technology, Synthesis of Chemicals	67	17	2	Professor	18/12/2007		Regular	Yes		No
Dr. Dilip D. Sarode	AALPS9158E	ME/M. Tech and PhD	15/02/2010	General Engineering	20	6	0	Associate Professor	01/03/2014		Regular	Yes		No
Dr. Sachin Jadhav	BFMOJ9477E	ME/M. Tech and PhD	03/03/2016	Wastewater Treatment, Membrane-based Separation	11	0	0	Assistant Professor		09/07/2018	Regular	Yes		No

4.1 Student-Faculty Ratio (SFR) (10)

Year	2020-21	2019-20	2018-19	2017-18
Total No of students in Department (UG) (2nd to 4th year)	48	48	48	48
Total No of students in Department (Masters) (1st and 2nd year)	56	48	40	40

Description	CAY (2020-21)	CAYm1 (2019-20)	CAYm2 (2018-19)
Total No. of Students in the Department(S)	104 **Sum total of all (UG+PG) students**	96 **Sum total of all (UG+PG) students**	88 **Sum total of all (UG+PG) students**
No. of Faculty in the Department(F)	14 **F1**	14 **F2**	14 **F3**
Student Faculty Ratio(SFR)	7.43 **SFR1=S1/F1**	6.86 **SFR2=S2/F2**	6.29 **SFR3=S3/F3**
Average SFR	6.86 **SFR=(SFR1+SFR2+SFR3)/3**		

5.1.1. Provide the information about the regular and contractual faculty as per the format mentioned below:

	Total number of regular faculty in the department	Total number of contractual faculty in the department
CAY(2020-21)	14	0
CAYm1(2019-20)	14	0
CAYm2(2018-19)	14	0

Average SFR for three assessment years: 6.86
Assessment SFR: 10

4.2 Faculty competencies in the area of Program specialization (30)

Total Marks 30.00

4.2.1 Faculty name and specialization for the program under consideration (10)

Institute Marks 10.00

Name of the faculty	Relevant Area of Specialization	
	2020-21 (CAY)	2019-20 (CAYm1)
Dr. Anand V. Patwardhan	Membrane separation, Green Technology, Bioprocess Technology	Adsorption, Membrane separation, Green Technology, Biotechnology

Dr. Aniruddha B. Pandit	Physical and Chemical Processing applications of Cavitation	Physical and Chemical Processing applications of Cavitation
Dr. Dilip D. Sarode	Concrete Technology – Construction Chemicals - Risk Analysis and its mitigation. Recycling of wastes. Recycling of agricultural waste and improving soil fertility	Concrete Technology – Construction Chemicals - Risk Analysis and its mitigation. Recycling of wastes. Recycling of agricultural waste and improving soil fertility
Dr. Gunjan Prakash	Genetic Engineering of Microalgae, Nuclear and Chloroplast Engineering, Algal Biotechnology and Biofuels	Genetic Engineering of Microalgae, Nuclear and Chloroplast Engineering, Algal Biotechnology and Biofuels
Dr. Jyoti S. Gokhale	Functional Foods, Nutraceuticals, Extraction, Food Biotechnology	Functional Foods, Nutraceuticals, Extraction, Food Biotechnology
Dr. Laxmi Ananthanarayan	Human nutrition, Food packaging, Enzymes in Food Indus	Human nutrition, Food packaging, Enzymes in Food Indus
Dr. Parag R. Gogate	Sonochemistry, Hydrodynamic Cavitation, Process Intensification	Sonochemistry, Hydrodynamic Cavitation, Process Intensification
Dr. Pradeep R. Vavia	Cyclodextrins based drug delivery systems, Nanosponge based drug dlivery	Cyclodextrins based drug delivery systems, Nanosponge based drug delivery
Dr. Rekha S. Singhal	Food additives and ingredients, Current topics in food science	Food additives and ingredients, Current topics in food science
Dr. Sachin Jadhav	Water and Wastewater Treatment, Membrane-based Separations	Water and Wastewater Treatment, Membrane-based Separations
Dr. Shalini S. Arya	Hydrodynamic cavitation of liquid food, Cereal chemistry a	Hydrodynamic cavitation of liquid food, Cereal chemistry a
Dr. Shamlan M S Reshmwala	Molecular & synthetic biology of prokaryotic & eukaryotic	Molecular & synthetic biology of prokaryotic & eukaryotic
Dr. Snehasis Chakraborty	Advances in Food Technology, Advances in Food Engineering	Advances in Food Technology, Advances in Food Engineering
Dr. Uday S. Annapure	Carbohydrate chemistry and technology	Carbohydrate chemistry and technology
M A K Kerawala	Power Electronics applications in Power systems analysis	Power Electronics applications in Power systems analysis
Dr. S. S. Lele	Food product/process development, fruit and vegetable based beverages	Food product/process development, fruit and vegetable based beverages

4.2.2 Faculty Research Publication (10)

Institute Marks 10.00

Name of the faculty	Academic Research							
	Number of quality publications in refereed/SCI Journals, citations, Books/Book Chapters etc.				Ph.D. guided /Ph.D. awarded during the assessment period while working in the institute			
	2020-21	2019-20 (CAYm1)	2018-19 (CAYm2)	2017-18 (CAYm3)	2020-21	2019-20 (CAYm1)	2018-19 (CAYm2)	2017-18 (CAYm3)
Dr. Anand V. Patwardhan	2	2	4	3	0	2	2	1
Dr. Aniruddha B. Pandit	14	13	20	11	3	6	2	3
Dr. Dilip D. Sarode	2	1	2	1	0	1	0	0
Dr. Gunjan Prakash	6	5	1	0	1	0	0	0
Dr. Jyoti S. Gokhale	4	2	1	0	0	0	0	0
Dr. Laxmi Ananthanarayan	7	9	10	4	3	3	3	3
Dr. Parag R. Gogate	38	26	32	27	4	4	3	3
Dr. Pradeep R. Vavia	12	9	5	9	3	0	0	0
Dr. Rekha S. Singhal	6	17	18	9	0	4	5	2
Dr. Sachin Jadhav	2	0	0	1	0	0	0	0
Dr. Shalini S. Arya	5	14	14	8	0	0	3	1
Dr. Shamlan M S Reshmwala	2	2	0	1	0	0	0	0
Dr. Snehasis Chakraborty	12	17	12	3	0	0	0	0
Dr. Uday S. Annapure	10	7	6	7	2	2	2	2
M A K Kerawala	0	0	0	1	0	0	0	0
Dr. S. S. Lele	0	14	15	3	0	2	3	1

4.2.3 Faculty Development work (10) Institute Marks 10.00

Details of Faculty development work are given below

Name of Faculty	Title	Conducted /Participated in Symposia/Seminar/Conference /Workshop	Place
2019-20			
Prof. S. S. Lele	Appropriate Career Selection and Planning	Shri Guru Gobind Singhji (SGGS) Institute of Engineering and Technology, Nanded	Shri Guru Gobind Singhji (SGGS) Institute of Engineering and Technology, Nanded
Prof. S. S. Lele	Exotic Fruit Wines: Science and Technology	Seminar conducted by National Institute of Food Technology Entrepreneurship and Management, (NIFTEM), Haryana on "Current Trends in Food Biotechnology",	National Institute of Food Technology Entrepreneurship and Management, (NIFTEM), Haryana
Prof. S. S. Lele	Invited talks	Invited talk at Ankushrao Tope Mahavidyalaya, Jalna	Ankushrao Tope Mahavidyalaya, Jalna
Prof. S. S. Lele	Role of Teacher in Moulding the Students	Series "Vichar Vikas" for the teachers	-
Prof. S. S. Lele	Commercially Sustainable Fruits and Vegetables Processing for SMEs: Wholistic Approach	Conference on "Capacity Building of Sustainable Food Value Chains" at Delhi organized by National Productivity Council, Ministry of Industry, Government of India	Delhi
Prof. S. S. Lele	Fruit wine workshop	Organised by Prof. S. S. Lele	Mumbai
Prof. R. S. Singhal	19th World Congress of Food Science and Technology	IUFoST- 2018, Mumbai	
Prof. R. S. Singhal	Delivered lectures online in webinars	Online webinar organized by Nutrition Society of India (NSI)	Online
Prof. R. S. Singhal	Delivered lectures online in webinars	Online webinar organized by Amity University	Online
Prof. R. S. Singhal	Food as a complex matrix of chemicals and materials: some innovations	Invited lecture	ICT Jalna Campus
	Fermentation and		

Prof. R. S. Singhal	fermentation technology: some basic concepts	Invited lecture	UPL Limited, R & D Centre, Thane.
Prof. R. S. Singhal	Biotechnology in everyday life	Late V. N. Bedekar Colloquium Lecture	Department of Biotechnology and Microbiology of VPM's B. N. Bandodkar College of Science, Thane
Prof. R. S. Singhal	Valorization of kokum kernels: Extraction of the fat by supercritical carbon dioxide and food formulations	Lecture delivered at 7th Bioprocessing India Conference on Advances in Bioprocessing of Agri-food Resources	CSIR-CFTRI, Mysore
Prof. U. S. Annapure	Scope of Research in Hotel Management & Catering Technology	Workshop	Mumbai
Prof. U. S. Annapure	Cold Plasma: An Emerging Non-thermal Technology for Food and Agriculture	Invited talk at International Conference on "Technological Innovations for Integration of Food and Health (TIIFH 2019): A focus on North-East India	Tezpur University (A Central University), Assam, India
Prof. L. Ananthanarayan	19th World Congress of Food Science and Technology	IUFoST- 2018	Mumbai
Prof. L. Ananthanarayan	Scope of research in Hotel Management & Catering Technology	Workshop	Mumbai
Dr. S. Chakraborty	Pulsed Light Treatment of Beverage from Tropical Fruits	Oral presentation in national conference	Jamia Hamdard, New Delhi
Dr. S. Chakraborty	An Overview on Pulsed Light Treatment of Food	Webinar series	Amity Institute of Food Technology, India
Dr. S. Chakraborty	Pulsed Light treatment of pineapple juice	Oral presentation in national conference	Tezpur University, India
Dr. S. Chakraborty	Pulsed Light Treatment for Pasteurization of Fruit Juices	Faculty Development Programme	HBTU Kanpur, UP, India
Dr. S. Chakraborty	Introduction to Design of Experiments	Workshop	Navi Mumbai, India
Prof. A. V.	Python and	Workshop by TEQIP	ICT, Mumbai

Patwardhan	Machine Learning		
Prof. P. R. Gogate	Improved wastewater treatment using hydrodynamic cavitation	Training	Lviv Polytechnic, Lviv, Ukraine
Prof. P. R. Vavia	Guest of Honor and Speaker	54th Annual Convention of the IHPA	ISF College of Pharmacy, Chandigarh
Prof. P. R. Vavia	Cyclodextrin Nanosponges: A Promising platform for Drug Delivery	Faculty Development Programme on the topic, "Pharmaceutical Nanoconstructs"	Parul Institute of Pharmacy and Research Parul University, Vadodara, Gujarat
Prof. P. R. Vavia	Transdermal Patches: Fabrication, Evaluation, Scale up	Faculty Development Programme on "Industrial Pharmacy-III" (Under PMMMNMTT, MHRD, GoI)	SWVSM's Tatyasaheb Kore College of Pharmacy, Warananagar
Prof. P. R. Vavia	Nanocarrier for Targeting Cancer: Case Studies	International Seminar "Intervention of Nanotechnology in Targeted Drug Delivery System"	Sinhgad College of Pharmacy, Pune
Prof. P. R. Vavia	Pharmaceutical Research: Connecting with the Pharmaceutical Industry for Collaborative Projects	Faculty Development Program On "Emerging Trends in Pharmaceutical Sciences: From Research to Revenue"	L. M. College of Pharmacy, Ahmedabad
Prof. P. R. Vavia	Endothelial cell targeting through nanocarrier based drug delivery system	2nd International Conference sponsored by Society for Research Development in Health Science	Ambe Durga Education Society Dadasaheb Balpande College of Pharmacy, Besa, Nagpur
2018-19			
Prof. U. S. Annapure	Cold Plasma: An Emerging Non-thermal Technology for Food and Agriculture	Invited talk at International Conference on "Technological Innovations for Integration of Food and Health (TIIFH 2019): A focus on North-East India'	Tezpur University (A Central University), Assam, India
Prof. U. S. Annapure	Cold Plasma Processing for Food and Agriculture	Invited talk at International Conference on Recent Advances in Food Processing	Indian Institute of Food Processing Technology, Thanjavur
Prof. R. S. Singhal	Bioavailability of nutraceuticals: Some insights.	Golden Jubilee lecture	Indian Institute of Food Processing Technology, Thanjavur
Prof. R. S. Singhal	Tips for writing	Delivered lecture on the occasion of National Science	College of Home Science, Nirmala Niketan, Churchgate, organized by

	research papers	Day	Nutrition Society of India (Mumbai Chapter)
Prof. R. S. Singhal	Food fortification: the technological considerations	Lecture delivered at a seminar on 'Transition from Food Security to Nutrition Security', organized by Nutrition Society of India	Smt Maniben M. P. Shah Women's College, Mumbai
Prof. R. S. Singhal	Food safety from farm-to-fork: an overview	Lecture delivered at TEQIP sponsored two-day National Workshop on Food Safety: Current Scenario and Future Challenges	Islamic University of Science and Technology Awantipora, Pulwama, J & K
Prof. R. S. Singhal	Traceability to control and monitor safety and quality throughout the food chain	Lecture delivered at Session 62 on 'Effective Methods to Provide Quality and Safe Food Chain'	IuFOST 2018, held at CIDCO Convention and Exhibition Centre, Navi Mumbai, India
Prof. R. S. Singhal	Ecotoxicity of metal nanoparticles in a model aquatic organism: enzymatic biomarkers and bioaccumulation perspective	Lecture given at 'Bio-Innovation for Environmental and Health Sustainable Developments'	Indian Institute of Toxicology Research, Lucknow in association with Biotech Research Society of India
Prof. R. S. Singhal	Influence of climate change on food safety	Lecture delivered at International Conference on Food Security: Challenges and Opportunities	Thapar Institute of Engineering and Technology, Patiala
Dr. S. Chakraborty	Pulsed Light Treatment for Pasteurization of Fruit Juices	Oral presentation in national conference	NIT Rourkela, Odisha, India
Prof. P.R. Gogate	Chemical Reaction Engineering	Training program for Field officers of Maharashtra Pollution Control Board	Maharashtra
Prof. P.R. Gogate	Process Calculations, Distillation & Extraction, Crystallization & Filtration	Invited Faculty in Refresher course on Chemical Engineering organized by Indian Chemical Council	Ranipet, Tamilnadu
Prof. P.R. Gogate	Hydrodynamic cavitation for wastewater treatment	Invited Lecture in School on Advanced Oxidation Processes	BITS, Goa,
Prof. P.R. Gogate	Cavitation Technologies for Wastewater treatment	Invited lecture organized by MITCOE	Alandi, Pune
Prof. P.R. Gogate	Chemical Reaction Engineering	Invited Faculty in Refresher course on Chemical Engineering organized by Indian Chemical Council	Mumbai

Prof. P. R. Gogate	Process Intensification using Cavitational reactors	Invited lecturer	Kurukshetra University
Prof. P. R. Gogate	Process Calculations, Chemical Reaction Engineering, Distillation & Extraction, Crystallization & Filtration	Invited Faculty in Refresher course on Chemical Engineering organized by Indian Chemical Council	Southern Regional Center, Cuddalore, Tamilnadu
Prof. P. R. Gogate	Sono-crystallization	Industrial training program on “Crystallization”	Cipla, Mumbai
Dr. S. V. Jadhav	Enhancing Accountability and Responsiveness in Scientific Organisations	TEQUIP III workshop	Osmania University, Hyderabad
Prof. A. B. Pandit	Sustainable Waste Management: Municipal Solid Waste and e-waste	IGCS Winter School	IIT- Madras
Prof. A. B. Pandit	Groundnut shell Biochar-Production, characterization, and study of its interactive mechanism with crop fertilizer	2nd International Conference on Bioresources, Energy, Environment & Materials Technology	Gangwon Province, South Korea
Prof. A. B. Pandit	A two-stage treatment of alkyd resin wastewater: Hydrodynamic cavitation followed by Peroxane process in gas inducing reactor	DAE BRNS 8th Biennial Symposium on emerging trends in Separation Sciences and Technology	BITS-Pilani-Goa
Prof. A. B. Pandit	INAE DST initiative on Laboratory safety and hazardous waste management	Lecture at Indian Institutes of Science Education and Research (IISER), Pune	Pune
Prof. A. B. Pandit	Process Intensification	ICT-UAA Silver Jubilee Seminar	Ahmadabad

	Strategies for Chemical Industry		
Prof. A. B. Pandit	Intensification of intracellular enzyme recovery	Keynote Speaker at 'ACES-2019'	IISER Bhopal
Prof. A. B. Pandit	National Opportunities for Chemical Engineers	Keynote Lecture, CHEMIX 2019	VNIT Nagpur
Prof. A. B. Pandit	Laboratory Safe Practices and Waste Disposal in Academic and R & D Institutes	Invited Talk at 'INAE-DST'	Savitribai Phule Pune University, Pune
Prof. D. D. Sarode	Modern Formwork Systems in Constructions particularly in High Rise Buildings	Modern Formwork Systems in Constructions particularly in High Rise Buildings	BIT Mesra
Prof. D. D. Sarode	Recent Advances in Material Science and Technology at Government College of Engineering	Chief Guest at National Conference	Keonjhar, Odisha
Prof. D. D. Sarode	Use of Biotechnology for Improving the properties of Materials	Keynote address in National Conference on Recent Advances in Material Science and Technology	Keonjhar, Odisha
Prof. P. R. Vavia	Polymeric based drug delivery system – basic approaches and practical applications	Invited talk	Modern College of Pharmacy, Moshi, Pune
2017-18			
Prof. S. S. Lele	Mango, Jamun & Other Fruit Wine Making	Organized two successive one week workshop in collaboration with Sawarde Valley Food Foundation (SVFF) and supported by SUPP	Sawarde, Chiplun
Prof. S. S. Lele	How to stay fit, happy and be efficient at work	Capacity building program for support staff	Institute of Engineers, Gangtok
Prof. S. S. Lele	Fruit processing	Invited talk	Devgad Cluster of 100 entrepreneurs
Prof. S. S. Lele	Bioprocessing of fruit vegetable waste	Resource person at UGC faculty development program for biotechnology	Vaze College
	Procedures and data	lecture delivered at a seminar on 'Food Additives:	

Prof. R. S. Singhal	requirements for approval of food additives in India.	A Global Perspective on Safety Evaluation and Use', organized by USDA/ FSSAI and ILSI-India	FDA Bhawan, New Delhi
Prof. R. S. Singhal	Health and Wellness through Affordable Food Technology	Seminar on 'Prosperity through Science & Technology	Marathi Vidnyan Parishad, Nehru Science Centre
Prof. R. S. Singhal	Supercritical fluid extraction of biomolecules	Lecture delivered at a workshop on Food Preservation Techniques	Organized by BIRAC, New Delhi at ICT, Mumbai
Prof. R. S. Singhal	Innovations in Chemistry -Laboratory to Society (ICLS- 2018)	Food as a complex matrix of chemicals and materials: some innovations, plenary lecture, National Conference ICLS-2018	North Maharashtra University, Jalgaon
	Microencapsulation of		
Prof. R. S. Singhal	sensitive food constituents and nutraceuticals for joint	Invited Lectures	Department of Studies in Food science & Nutrition, University of Mysore
	health		
			US Soybean Export Council, USSEC in
Prof. U. S. Annapure	Soy Based Extruded Products	Invited talk delivered at seminar on "Entrepreneurship Development in Soy Food Processing"	collaboration with the Association of Food Scientists and Technologist, Hotel Peninsula Grand, Saki Naka, Andheri
			(E), Mumbai
Prof. U. S. Annapure	Principles of Food Preservation	Invited talk delivered at workshop on food preservation techniques	BIRAC in collaboration with Institute of Chemical Technology at ICT, Mumbai
Prof. P. R. Gogate	Hydrodynamic cavitation for Wastewater treatment	Invited for presentation	Saudi Arabia
Prof. P. R. Gogate	Intensified Hybrid oxidation processes based on hydrodynamic cavitation for treatment of emerging contaminants	Invited Lecture at AOSS-3	SRM University
Prof. P. R. Gogate	Cavitational Reactors	Annual Convention of Marathi Vidnyan Parishad	Kudal, Maharashtra
Prof. P. R. Gogate	Intensification of Chemical processing applications using Cavitational	Invited Lecturer	PREC, Loni

	Reactors		
Prof. P. R. Gogate	Intensified Production of Biofuels from Sustainable Raw Materials using Ultrasonic Reactors	Invited Lecture at the Indo- Japan Bilateral Symposium	IIT-Guwahati
Prof. P. R. Gogate	Crystallization using ultrasonic irradiation	Invited lecture at WFCFD	ICT Mumbai
	Process Intensification of		
Prof. P. R. Gogate	Chemical Processing applications using	Tantr Avishkar - 2K18	TSEC, Mumbai
	cavitational reactors		
Prof. P. R. Vavia	Cyclodextrins: Pharmaceutical Application	Roquette Tech seminar	Bangladesh
Prof. P. R. Vavia	Drug Delivery	Invited talk	CIRCOT, Mumbai
Prof. P. R. Vavia	Advances in formulation aspects with industrial perspectives	Invited talk	Modern College of Pharmacy, Moshi, Pune

Faculty Recognition and memberships

Faculty Name	Faculty recognition and memberships
Prof. S. S. Lele	• VASVIK Award, 2018 • AFST Fellow (2018) • Member CSIR- Food and Safety Solution (Focus)2018-2020 • Member, FIST program for science colleges, DST, 2017- 2020 • ICT Coordinator, Unnat Bharat and Maharashtra Abhiyaan programme • Member, Examination Board, K J Somaiya College of Engineering, Vidyavihar, Mumbai. (Since 2014 – till date) • Life member of a number of national and international professional bodies engaged in activities related to Science & Technology and Women Scientists, AFST, AMI, BRSI, IIChE, UAA
Prof. R. S. Singhal	• INSA Award 2021 • Member, Editorial Board, Carbohydrate Polymers, Elseviers, UK • Member, Selection committee for promotions, BARC, Mumbai • Member, Expert group in the area of secondary agriculture, Department of Biotechnology, Government of India • Member, Subject Expert Committee (SEC) on Engineering & Technology (ET), WOS-A scheme Department of Science and Technology, New Delhi • Member, Subject Expert Committee (SEC) on Health, Food and Nutrition (HFN), WOS-B scheme Department of Science and Technology, New Delhi • Member, Scientific panel of FSSAI, New Delhi, on (i) Food Additives, Flavouring, processing Aids and Materials in Contact with Food, and (ii) Water (including flavoured water) and beverages (alcoholic and non-alcoholic) • Life Member, Association of Food Scientists and Technologists (India) • Life Member, Association of Carbohydrate Chemists and Technologists, India • Member, Advisory Board, Trends in Carbohydrate Research, published by ACCT (I) • Member, BIPP, BIG, SBIRI, SPARSH, BIRAP, and Secondary Agriculture/ Food Processing Entrepreneurial Network (SAEN) in Punjab, Department of Biotechnology, Government of India • Member, Monitoring Committee on CSIR Mission on Nutritionals and Nutraceuticals • Member, Technical Expert Committee (TEC) on Medicinal Aromatic Plants, Bioresource and Secondary Agriculture and Silk Biotechnology for NER, DBT, Government of India • Special invitee, Expert Committee meeting of Engineering Sciences – NPDF, DST, Government of India • Member, working group, Preparation of Teachers' Manual for Jeevan Kaushal (Life Skills) Curriculum, UGC, New Delhi Referee, Several journals in food science and technology, and bioprocess technology • Examiner, Ph.D. thesis at some universities in India and one in Malaysia
	• President, AFST(I), 2021 • Vice President of AFST (I), Mumbai Chapter 2016-17

Prof. U. S. Annapure	• Member, Board of Studies (BoS) for M.Sc. Food Technology at Defence Institute of Advanced Technology (Deemed University), Pune • Member, Research and Recognition Committee in subject of food science and technology at Shivaji university Kolhapur, 2017- 18 Member, selection committee for promotion under CAS, Dr. Babasaheb Ambedkar Marathwada university • Member, selection committee for promotion under CAS at North Maharashtra university, Jalgaon • Member, RRC in subject of chemical technology (food) at Dr. Babasaheb Ambedkar Marathwada university Member, Research advisory committee, Indian Institute of food processing Technology (IIFPT, Tanjavur) Referee, for various national and international journal in the area of food science and technology • Examiner for Ph.D. thesis of various universities in India • Member, food additives sectional committee (FAD 8) at BUREAU of Indian standard New Delhi • Member, National Core group for broad subject matter area (BSMA), Indian council for education research (ICAR), New Delhi • Member, committee for scrutinizing minor research proposal at Mumbai university • Member, Selection committee for appointments of Assistant Professor at Shivaji University Kolhapur Life Member, Association of Food Scientists and Technologists, India [(AFST (I)] • Life Member, Association of Carbohydrate Chemists and Technologists of India (ACCTI) Life • Member, Biotech Research Society of India (BRSI) • Member, International Society of Food Engineering (ISFE), USA Life Member, UDCT Alumni Association
Prof. L. Ananathanarayan	• Life Member, Association of Food Scientists and Technologists (India) Life Member, UDCT Alumni Association • Member of Board of studies of Biotechnology Department of SIES College, • Mumbai University Nominee on The Board of studies at Modern College, Vashi • Member of Board of studies of Biochemistry Department of Sophia College for Women, Mumbai
Dr. S. S. Arya	• Member, Global Young Academy, Halle, Germany, 2018 • Member, Indian National Young Academy, INSA, Government of India New Delhi • Member, National Science and Technology Innovation Policy, PSA, Government of India • Local Executive Committee Member, Association of Food Scientists and Technologists (I), Mumbai Chapter • Life Member, Biotechnology Research Society of India (BRSI), India • Life Member, Association of Carbohydrate Chemists and Technologists of

	India • Member, Society of Chemical Industry (SCI), London • Member, International Society of Food Engineering (ISFE), Pullman, USA • Member, OWSD, TWAS, Italy • Member, CFT-PBN Alumni Association (CPAA), Mumbai
Dr. J. S. Gokhale	• Joint Secretary, Association of Food Scientists and Technologists (India) (AFST(I)), Mumbai Chapter • Life Member, Biotechnology Research Society of India (BRSI) • Life Member, UDCT Alumni Association (UAA) • Life Member Association of Food Scientists and Technologists (India) (AFST(I))
Dr. S. Chakraborty	• Honorary Treasurer for Association of Food Scientists & Technologists, India (AFST(I)) Mumbai Chapter, 2016-17 • Panel member for Food Additives & Ingredients; Food & Agriculture Department - 28; Bureau of Indian Standards
Prof. A. B. Pandit	• Fellow, The World Academy of Sciences, 2015 • Fellow, National Academy of Sciences in India, Allahabad, 2009 • Fellow, Indian National Science Academy, 2008 • Fellow, Indian Academy of Sciences, 2008 • Fellow, Indian National Academy of Engineering, 2006 • Fellow, Maharashtra Academy of Sciences, 1996 • Member of DST-FIST • Member of UGC-SAP • Member of DST ChemEngg PAC • Member of DST MOFPI PAC • Adjunct Professor at BIT's Goa Campus • Member, Board of Governor of IIT Bombay Chairman, HyCa Technology Pvt. Ltd., Mumbai President, Land Research Institute (LRI)
Prof. A. V. Patwardhan	• Life member of Indian Institute of Chemical Engineers • Member – Experts' panel formed by the DSIR (New Delhi) for accreditation of Research and Development units of various industries • Member – reviewers' panel of Global Initiative of Academic Networks (GIAN), IIT Kharagpur • PhD / Master's Open Defence Examinations of IIT Kharagpur; IIT Bombay; NIT Rourkela • Faculty selection committees: IIT Kharagpur; Mumbai University; NMU Jalgaon • BOG Member: UDCT Alumni Association; Thadomal Shahni Engineering College, Mumbai • Member – Research and Recognition Committee in Chemical Engineering, Chemical Technology and Biotechnology (Engineering) under the faculty of Science and Technology

	• Membership of Editorial Boards with name of journal and agency
Dr. D. D. Sarode	• Member of Board of Studies in Civil Engineering in VJTI • Member of Board of Studies in Civil Engineering for Dr Babasaheb Ambedkar Technological University, Lonere, Maharashtra • Member of Research Progress Committee and P G examiner in VJTI, Mumbai 19 • Fellow of Indian Geotechnical Society • Member of Indian Society for Technical Education • Member of Institution of Engineers • Member of UDCT Alumni Association • Managing Committee Member and Chief Project Coordinator for VJTI Alumni Association
Dr. P. R. Gogate	• Member, Indian Institute of Chemical Engineers, 2003 • Young Associate of Maharashtra Academy of Sciences, 2007 • Member, National Academy of Sciences, Allahabad, 2009 • Young Associate, Indian Academy of Sciences, Bangalore, 2009-2012 • Member, Indian Society for Technical Education, 2011 • Young Associate, Indian National Academy of Engineering, 2012 • Member, Editorial Board, Ultrasonics Sonochemistry, 2013 onwards Chartered • Member, Institution of Chemical Engineers, UK, 2013 Fellow, Maharashtra Academy of Sciences, 2014 • Member, Board of Governors & Honorary Secretary, UDCT Alumni Association, 2013-2015, 2015-2017, 2017-2019 Member, Editorial Board, Desalination and Water Treatment (Taylor & Francis), 2016- 2018 • Associate Editor, Chemical Engineering Processing, Process Intensification (Elsevier), 2016-2019 • Member, Board of Governors & Honorary Secretary, UDCT Alumni Association • Member, Editorial Board, Desalination and Water Treatment (Taylor & Francis), 2016- 2018 Associate Editor, Chemical Engineering Processing, Process Intensification (Elsevier), 2016-2019 Member, Editorial board, Ultrasonics Sonochemistry (Elsevier), 2015-2018
	• Best teacher award at ICT, Mumbai for the year 2018-19 and 2019-20 • Life member, Indian Pharmaceutical Association • President, Indian Pharmaceutical Association (2002-2004) (Maharashtra State Branch) • Member, Association of Pharmacy Teachers of India (APTI) • Member, Royal Pharmaceutical Society of Great Britain (Hon. Membership)

Prof. P. R. Vavia	• Inspector appointed by Pharmacy Council of India for Inspection of Institutions • Inspector appointed by AICTE for Inspection of Institution • Member, Editorial board of Indian Journal of Pharmaceutical sciences • Editorial Board of Pharma Times • Expert Member, DSIR for inspection of industrial R & D facility • Nominee of Vice-chancellor for appointment of teachers of Mumbai University Academic Dean, Institute of Chemical Technology, (2012 to till date) • Member, International Advisory board, Asian Oceanic Cyclodextrin League Scientific Convener, Indian Pharmaceutical Congress Association, 2006-2009 • Member of Italian Cyclodextrin League • Convener, 5th Young Innovative Choice Competition (YICC) and Young Research Competition (YRC), 2010-2011 • IDMA Technical Sub-Committee • Governing Body Bombay college of pharmacy • Western Region Subcommittee of AICTE

4.3 Faculty as participants in Faculty development/training activities/STTPs (5) **Institute Marks 5.00**

Sr. No.	Program Title	Description	Date/ Duration
		Prof. S. S. Lele	
1	Training Program	NBA Accreditation	5 – 6 February 2016
2	Prof. D. V. Rege Memorial Seminar	Nutraceuticals: Science to Business	15 February 2017
3	Bioreactors and challenge in scale up of food bioprocessing	UGC refresher course	1 March 2017
4	Mango, Jamun & other fruit wine making	Modules on fruit selection and characterization, fruit processing, upstream and downstream processing of wine, routine wine analysis, sensory evaluation techniques, and finance and market opportunities	June 2018
5	Ideas, Innovation & Industry enabling smart food factories	-	3 March 2018
6	Advanced pedagogy and management capacity building training for engineering faculty and senior administrators	Faculty development program	21 – 25 June 2018
7	How to stay fit, happy and be efficient at work	Capacity building program	24 July 2018
8	Lecture on Fruit processing	Arranged for cluster of Entrepreneurs	7 January 2018
9	Bioprocessing of fruit vegetable waste	Faculty development program	15 October 2017
10	19th World Congress of Food Science and Technology	IUFoST- 2018	23 – 27 October 2018
		Prof. U. S. Annapure	
1	Palm Oil Familiarization Program	Seminar	21 – 27 August 2016
2	Tailoring Technologies for Rural Sector: Development & Dissemination	Seminar	29 October – 2 November 2018
3	Techniques in Food Processing & Preservation	Seminar	23 March 2019
4	Scope of Research in Hotel Management & Catering Technology	Workshop	8 October 2019
5	8th International Food Convention	Conference	12 – 15 December 2018
6	iCFRAFPT-2018	Workshop	17 – 19 October 2018
7	25th ICFoST-XXV	Workshop	10 – 12 November 2016
8	Post-Harvest Handling, Ambient Controlled Storage and Supply Chain Management	Workshop	2 February 2018
9	Bakery Technology	Workshop	27 – 29 July 2017
10	Prof. D. V. Rege Memorial Seminar Nutraceuticals: Science to Business	TEQUIP and supported by world bank	15 February 2017

11	19th World Congress of Food Science and Technology	IUFoST- 2018	23 – 27 October 2018
Prof. R. S. Singhal			
1	Regulatory Practices: Interpretation & Compliance, PFNDAI	Faculty development program	18 April 2016
2	Prosperity through Science & Technology, Marathi Vidnyan Parishad	Seminar	16 February 2018
3	Food Preservation Techniques, BIRAC, New Delhi	-	15 – 17 February 2018
4	Advanced pedagogy and management capacity building training for engineering faculty and senior administrators	Workshop, Faculty development program	21 - 25 June 2018
5	19th World Congress of Food Science and Technology	IUFoST- 2018	23 - 27 October 2018
Dr. L. Ananthanarayan			
1	Advanced pedagogy and management capacity building training for engineering faculty and senior administrators	Faculty development program	21 - 25 June 2018
2	19th World Congress of Food Science and Technology	IUFoST- 2018	23 - 27 October 2018
3	Scope of research in Hotel Management & Catering Technology	Theory course in food analysis	10 August 2019
Dr. S. S. Arya			

1	Food Entrepreneurship Development	Workshop organized by Food Engineering and Technology Department, ICT & AFST(I) (Mumbai Chapter)	12 August 2016
2	Fruits and Vegetable Processing Opportunities in Maharashtra	Workshop	27 September 2016
3	19th World Congress of Food Science and Technology	IUFoST- 2018	23 - 27 October 2018
4	Level 2 workshop on Research Based Pedagogical Tools	Workshop	6 - 8 December 2017
5	Science Leadership Workshop for New Global Young Academy Members	8th International Conference of Young Scientists & Annual General Meeting of the Global Young Academy, Pattaya, Thailand	7 - 11 May 2018
6	Research Based Pedagogical Tools	Training on Level 2 workshop by National Science Academy (INSA), New Delhi, India Centre of Excellence in Science and Mathematics Education (CoESME), Indian Institute of Science Education and Research (IISER), Pune and Sheffield Hallam University, UK	6 - 8 December 2017
7	Research Based Pedagogical Tools,	Level 1 Teacher Training Workshop, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh and Sheffield, Hallam University, UK	6 - 9 October 2017
Dr. J. S. Gokhale			
1	Microwave Heating and Processing of Foods	AICTE Sponsored one-week QIP Short Term Course	13 - 17 August 2019
2	Nutraceuticals: Recent Trends and Advances	National Seminar	30 November 2018
3	Uprising Drift in the Path of Food Biotechnology and Fermentation Technology	In-House Seminar for Research Scholars of Department of Food Engineering and Technology	26 December 2018
4	Faculty Induction Program	Faculty Induction Program	27 November - 2 December 2017
5	Orientation Program	Orientation Program	6 February - 4 March 2017
6	Teaching and Learning Biology: Problem Solving Approach	National Workshop	4 - 11 August 2014
Dr. S. Chakraborty			
1	Microwave Heating and Processing of Foods	Concept of microwave technology, its effect on food materials, and	13 - 17 May 2019

		research work done on it so far (at IIT Bombay)	
2	Recent Advances in Chemical Science and Technology	Recent Advances in Chemical Science and Technology at Mumbai University, India	12 November - 1 December 2018
3	Preparative Processing and Analysis of Bio/Pharmaceuticals	Preparative Processing and Analysis of Bio/Pharmaceuticals at ICT Mumbai, India	14 - 18 March 2018
4	Summer Workshop on Bioprocess Engineering	Summer Workshop on Bioprocess Engineering at IIT Madras, India	27 June - 1 July 2016
5	Training Program on NBA Accreditation	Training Program on NBA Accreditation at ICT Mumbai, India	4 - 5 December 2015 5 - 6 February 2016
6	19th World Congress of Food Science and Technology	IUFoST- 2018	23-27th October 2018
Prof. P. R. Gogate			
1	The Art of Living Productivity Enhancement Program (PEP)	Training at ICT, Mumbai	2020 (3 days)
2	Training Programme on “Digital Transformation through E- Governance and Information & Communication Technology (ICT)”	Training at ICT, Mumbai	2018 (5 days)
Prof. A. V. Patwardhan			
1	Professional development training program	Management Development Programme, IIT Trichy	2019 (4 days)
Dr. S. V. Jadhav			
1	Enhancing accountability and responsiveness in Scientific organization	Faculty Development Programme, Osmania University, Hydrabad	2019 (1 week)
2	Programming for Everybody	Online Training, University of Michigan	2020 (8 weeks)
3	AI for everyone	Online Training, deeplearning.ai (Stanford University)	2020 (4 weeks)
Prof. D. D. Sarode			

1	Training on scholarship Fellowship offered by Ministry of Tribal Affairs Department	Faculty Development Program, ICT Mumbai	2021 (3 days)

4.4 Research and Development (30)

Total Marks 30.00

4.4.1 Sponsored Research (15)

Assessment Year: 2020-21 (CAY)

Institute Marks 15.00

Project Title	Duration	Funding Agency	Amount (in Rupees)
Optimizing the fermentative production o	2021-2024	CSIR	1614000.00
Identifying and evaluating various natura	2020-2023	Orchard Brands Pvt. Ltd. Mumbai	2475000.00
Mad Parsee Foods LLP	2021	Mad Parsee Foods LLP	545750.00
Malaysian Palm Oil Board	2021	Malaysian Palm Oil Board	478937.80
Food Processing	2021	DST SERB	341210.00
WasteWater Treatment	2021	DST WTI	1130000.00
COLD TRAP	2021	IGCAR	258000.00
Waste Water Management	2021	DST	5073000.00
			Total Amount(X): 11915897.80

Assessment Year: 2019-20 (CAYm1)

Project Title	Duration	Funding Agency	Amount (in Rupees)
Testing and evaluation of performance o	2019-2020	Nippon Synthetic Chemical	515550.00
Development of Controlled Release (CR	2019-2022	DSIR	15955000.00
DBT BCIL	2019-2020	DBT BCIL	437969.00
Brownian Movement	2019-2020	DST SERB	220000.00
Sea water	2019-2020	DSTSERB	424245.00
Cold Trap	2019-2020	IGCAR	896800.00
Aditya Birla Science and Tech Co.	2019-2020	Aditya Birla Science and Tech Co.	330748.00
Wipro Ltd.	2019-2020	Wipro Limited	147876.00
			Total Amount(Y): 18928188.00

Assessment Year: 2018-19 (CAYm2)

Project Title	Duration	Funding Agency	Amount (in Rupees)
Techno-commercial Viability Studies for	2018-2020	RGSTC, Govt. of India	3176000.00
Novel, non-thermal, energy efficient, ind	2018-2020	MoFPI	4409000.00
Novel, non-thermal, energy efficient, ind	2018-2021	DST-SERB	4306000.00
Novel, green, cloud point extraction of b	Sept2018-March2020	TEQIP-III	657500.00
Integrated processing of beverages from	Dec 2018 Dec 2021	MoFPI	3646800.00
FIST Level I	2018-2023	UGC	20600000.00
			Total Amount(Z): 36795300.00

Cumulative Amount (X + Y + Z) = 67639385.80

4.4.2 Consultancy (from Industry) (15) Institute Marks 15.00

Assessment Year: 2020-21 (CAY)

Project Title	Duration	Funding Agency	Amount (in Rupees)
Development of plant based milk products	Jan 2020 - July 2020	Vegnnovative Solution Pvt. Ltd. Bangalor	643100.00
Characterization and application of extracted proteins	Feb 2020 - Aug 2020	Praj Industries Pvt. Ltd.	531000.00
			Total Amount(X): 1174100.00

Assessment Year: 2019-20 (CAYm1)

Project Title	Duration	Funding Agency	Amount (in Rupees)
Developemnt of ready to custard	Jan 2020 - jun 2020	Vita Nutrics Foods and feeds Pvt. Ltd	604750.00
Development of Plant based Egg Alterna	2019-2020	Shivanika Foods Pvt. Ltd.	387500.00
Marico Ltd.	2019-20	Marico Pvt. Ltd.	105000.00
			Total Amount(Y): 1097250.00

Assessment Year: 2018-19 (CAYm2)

Project Title	Duration	Funding Agency	Amount (in Rupees)
Study of effect of incorporation of dietary fibres	Oct-2019	Aditya Birla S&T Pvt. Ltd.	398250.00
Application of dilatory fibers (soluble & insoluble)	July-2019	Aditya Birla S&T Pvt. Ltd.	427750.00
Probiotic study on K-Ber100 dietary fiber	July-2019	Aditya Birla S&T Pvt. Ltd	725000.00
Utilization of mango waste for byproduct	June 2019	Exotic Foods Pvt. Ltd.	693250.00
Performance evaluation of natural green	May-2018	Kancor Ingredients Ltd.	588520.00
Optimization of process parameters	Aug-2018	Reliance Industries Ltd.	878520.00
Application of dilatory fibers in bakery products	Aug-2018	Aditya Birla S&T Pvt. Ltd.	493240.00
			Total Amount(Z): 4204530.00

Cumulative Amount (X + Y + Z) = 6475880.00

CRITERION 5	Laboratories and Research Facilities	75

5.1. Adequate & well-equipped laboratories in area of Program specialization (30)

List of support staff

Name	Designation
Mrs. S. S. Jadhav	Lab Technician
Mrs. C. B. Koli	Lab Assistant
Ms. S. R. Dhakne	Lab Assistant
Mrs. Pramila Pawar	Lab Attendant
Mr. Santosh Rajam	Lab Attendant
Mr. Ganesh Bhagat	Lab Attendant
Mr. Rupesh Alim	Lab Attendant

Laboratory Used for M. Tech. Food Biotechnology

S.No.	**Name of the Laboratory**	**Specialized Equipment Name**	**Equipment details**	**Related PO**
1.	Food Biotechnology Lab (A238)	Autoclave	Centrofix Scientific States Syndicate	PO1, 3, 4
		RO Water System	Aquanovo Water Purifier	PO1, 3, 4
		Magnetic Stirrer (×4)	Remi	PO1, 3, 4
		pH Meter	Eutech Instrunment	PO1, 3, 4
		Hot air oven	Labline	PO1, 3, 4
		Ultrasonic Cleaner	Citizon	PO1, 3, 4

		Thermostatic Water bath	Labline	PO1, 3, 4
		Shaking bath	Hally Instrunment	PO1, 3, 4
		Microbial Colony counter	Labline	PO1, 3, 4
		Vortex	Remi	PO1, 3, 4
		Hot plate	Centrofix	PO1, 3, 4
		Microwave Oven	Samsung	PO1, 3, 4
		Weighing balance (*2)	Citizon	PO1, 3, 4
		Refrigerator (*2)	Godrej Pentacool	PO1, 3, 4
		Centrifuge	Remi C-30	PO1, 3, 4
		Shaking Incubator	Remi	PO1, 3, 4
		Laminar Air Flow	Scientific Sales Syndicate	PO1, 3, 4
		Mixer grinder	Bajaj	PO1, 3, 4
3.	Food Analysis Lab	Spectrophotometer	Shimadzu	PO1, 3, 4
		Refrigerator	Remi	PO1, 3, 4
		Micro weighing balance	-	PO1, 3, 4
		Hot Air Oven	Labline	PO1, 3, 4
		Cyclo mixer	Remi	PO1, 3, 4
		Hot plate x 3units	Labline	PO1, 3, 4
		Water Purification System	Sartorius	PO1, 3, 4
		Autoclave	Equiptronics	PO1, 3, 4
		Water Bath	Equiptronics	PO1, 3, 4
		Fumehood	Inhouse design	PO1, 3, 4
4.	Food Processing Lab (A 289)	Refrigerator	Samsung	PO1, 3, 4
		Homogenizer	APV	PO1, 3, 4
		Balance 1kg	Smart	PO1, 3, 4
		Balance 3kg	Smart	PO1, 3, 4

		Coating Pan	Hally instruments	PO1, 3, 4
		Colloidal Mill	Hally instruments	PO1, 3, 4
		Conventional Oven	Garbin	PO1, 3, 4
		Deep Freezer	Bluestar	PO1, 3, 4
		Dough mixer	Abrazo	PO1, 3, 4
		Dryer 2 no	Adv system	PO1, 3, 4
		Filter press	Dinshaw	PO1, 3, 4
		Hammer mill x 2	Natraj	PO1, 3, 4
		Heavy duty mixer	Bosch	PO1, 3, 4
		Hot Air Oven	Labline	PO1, 3, 4
		IR Dryer	Gel Engg	PO1, 3, 4
		Juicer x 2	Prestige	PO1, 3, 4
		Particle size shaker	CS Scientific	PO1, 3, 4
		Planetary mixer	Abrazo	PO1, 3, 4
		Pulper	Parson	PO1, 3, 4
		Refractometer	ABBE	PO1, 3, 4
		Retort	Laxmi Engg	PO1, 3, 4
		Sealing Machine	Pakona	PO1, 3, 4
		Sheeter	Ferneto	PO1, 3, 4
		Stone Grinding mill	Smartken	PO1, 3, 4
		Vacuum pump	Vijay	PO1, 3, 4
		Hydrodynamic Cavitator	Germsafe Technology	PO1, 3, 4
		Continuous Microwave	Twin Engineering	PO1, 3, 4

5.2. Research facilities / Centre of excellence (30)

S.No.	**Lab name**	**Specialized Equipment**	**Equipment details**	**Related PO & Used in Experiment**
1.	Lab A-209	Extruder	Brabender	PO1, 3, 4
		Atmospheric Cold Plasma	PlamaLeap Technologies	

2.	Instrumentation Room	Differential Scanning Calorimeter	Shimadzu	PO1, 3, 4
		HPTLC	LamagAhchlom	
		Laminar Air Flow	Micro-Med India	
		Microscope	Motic	
		UV-vis spectrophotometer	Shimadzu	
		UV-vis spectrophotometer	Hitachi	
		Centrifuge (J2-MC)	Bechmann	
3.	Lab A-211	Shaker incubator	Remi	PO 1, 3, 4
		Water Purification	Borosil RO	
		Autoclave	Local	
		pH meter	Thermo fisher	
		Rotary Evaporator	Ika	
		Centrifuge	Remi	
		Weighing balance	Wensar	
4.	Lab A-213	1. Centrifuge	Remi	PO 1, 3, 4
		2. Shaker algae 25C	Orbiteck	
		3. Bath Sonicator	-	
5.	Lab A-214	2. Shaker algae 25C	Orbiteck	PO 1, 3, 4
		3. Bath Sonicator	-	
		Heating block	Neolab	
		Rocking platform	Neolab	
		UV transilluminator	UVP	
6.	Lab A-217 (DVR-CAFT)	96- Well Plate Spectrophotometer	Biotech	PO1, 3, 4
		HPLC (*3)	Dionex & Jasco	
		PCR (*3)	Bio Rad	
		Protein Purification Fraction Collector	Bio Rad	
		Rheometer	Brookefield	
		Colorimeter	HunterLab	
		Sonicator (probe+tub)	Branson Technologies	

		Weighing Balance	Wensor	
		Weighing Balance	Sartorius	
		GC	Agilent Technologies	
		GC	Chemito	
		Viscometer	Haake	
		Gel Doc	BioRad	
		DSC	Schimatzu	
		UV Spectrophotometer (2 no)	Jasco, Schimadzu	
		Water activity meter	Rotronics	
		HPTLC	CAMAG	
		Texture analyser	Stable Microsystem	
7.	Lab A-218	1. Cooling centrifuge	Remi	PO 1, 3, 4
		2. Incubator	Thermolab	
		3. Ultraflitration unit	Millipore	
		4. Rotavap	Buchi	
		5. Pulsed Light	Xenon	
8.	Lab A-237	1. Bath Sonicator	Plasto crafts	PO 1, 3, 4
		2. Centrifuge Superspin R-V/FA	Equiptronics	
		3. pH meter with magnetic stirrer	Sunbim	
		4. Reflux unit	-	
		5. Microwave oven	Vacucell	
		6. Vacuum oven	Omkar Eqipments	
10.	Lab A-283	1. Hot Air Oven	Expe Hi-Tech	PO1
		2. Kel Plus	Kjeldahl Unit	
		3. Sox plus	Pelican	
		4. Fibra plus	Pelican	
		5. Weighing Balance	Contech	
		6. pH meter	Hanna	
11.	Lab A-212	1. Environmental Test	Remi Instruments	PO1

		Chamber	Ltd.	
		2. Oil/Water Bath Shaker	Global Corp.	
		3. Water Bath Shaker		
10.	Lab A-237	MAP-CAP	Reepack	PO1
		Cooling Centrifuge	Remi	
		Weighing Balance	Wensor	
		Water bath	Equiptrons	
11.	Lab A-215	UV-vis spectrophotometer	Shimadzu	PO1
		Milipore Lab Scale Ultra filtration System	Millipore	
		Real Time PCR	AppliedBiosystems	
		Fermentor	Sartorius	
		GC-MS	Varian	
12	Lab A-285	Spray dyer x 2	JISL, LS8-48, JISL, Spraymate	PO1
		Supercritical Fluid Extraction x 2	Applied Separation and chemtron	

5.3. Access to laboratory facilities, training in the use of equipment (15)

1. All M. Tech. Food Biotechnology students have access to all instruments and equipment facilities present in Department of Food Engineering and Technology as list in 5.1 and 5.2.
2. During first year induction program for newly admitted students, they are taken around the department to show them various facilities with brief explanation of use of each facility.
3. A special lab induction program is conducted where students are shown the use of different instruments by senior research students. During this induction program, students are exposed to Standard Operating Procedures and Dos and Don’ts of usage. They are also taught to make appropriate entry in the logbook.
4. Half-day lab safety program is held to make students aware of lab safety protocols.
5. Course on Safety and Risk Management (CET2161) is conducted for M. Tech. Food Biotechnology (Sem II). Main topics covered in this subject are:

- Safety and risk management
- Material hazards and hazard evaluation techniques
- Risk identification and Assessment techniques
- Laboratory safety
- Storage handling and transportation of hazardous substances
- Fire safety, prevention and Fighting.
- Biosafety

6. The research guide of each student ensures support to M. Tech. Food Biotechnology students by providing mentor from his/her research group for proper usage of lab facilities.
7. When student want to use high-end facility, first few turns are under the supervision of senior research fellow.
8. Specialized facilities of other departments can be availed by M. Tech. Food Biotechnology students after taking appropriate permission and only under supervision.
9. Besides the above, instrument suppliers always provide the hands-on training. A list of such training received by students is provided in Table 5.3.2.

List of FETD Laboratory and Utilization

Sr. No	Lab No	Name	Utilization*
1	A-209	Extruder Room	PG, Ph.D.
2	A-208	Instrumentation Lab	PG, Ph.D.
3	A-211	FETD Lab	PG, Ph.D.
4	A-212	Autoclave room	PG, Ph.D.
5	A-213	Lab-A213	PG, Ph.D.
6	A-214	Mol. Bio Lab	PG, Ph.D.
7	A-215	Fermentation Lab	PG, Ph.D.
8	A-216	Laminar Room	PG, Ph.D.
9	A-217	CAFT-Prof. D. V. Rege Lab	PG, Ph.D.
10	A-218	FETD Lab	PG, Ph.D.
11	A-237	PTC Lab	PG, Ph.D.
12	A-238	FBT Lab	PG, Ph.D.

13	A-283	Lab 283	PG, Ph.D.
14	A-285	Super Critical Extraction Room	PG, Ph.D.
15	A-289	Processing Lab	UG, PG, Ph.D.
16	A-241	Technical Analysis Lab	UG, PG, Ph.D.

*UG students are allowed to use research facilities only under the supervision of instrument in-charge.

Training given to Students in last three years

Sr no.	Date of Training	Name of the equipment/ facility	Training Given By
1	8/01/2017	Turbidity meter	Systronics meter
2	15/01/2017	HPLC UV	Jasco
3	25/05/2017	Vacuum oven	Best Engine
4	20/03/2018	Pulsed Light System	Xenon Corporation
5	05/04/2018	FTIR	Thermofisher
6	28/06/2018	Viscotip	Brookfield
7	25/07/2018	Texture Analyser	Stable Microsystems
8	17/08/2018	LAB Spectrophotometer	Jasco
9	03/01/2019	Colorimeter	Hunter Lab
10	12/02/2019	Cooling centrifuge	Remi
11	15/03/2019	Water Activity Meter	Potronics
12	27/08/2019	HPLC RID	Jasco
13	30/08/2019	Rheometer	Anton Paar
14	21/01/2020	HPLC	Merck
15	27/01/2021	HPTLC	CAMAG

6. CONTINUOUS IMPROVEMENT (75) **Total Marks 73.00**

6.1 Actions taken based on the results of evaluation of each of the PCs (25)
Total Marks 25.00

Being one of the premier institutes in the country in Food Biotechnology, the skill level of the student is expected to be on the higher side. Therefore, starting with 70% attainment level in graduating batch 2018, the target for PO attainment for graduating batch 2020 is kept at least at 75-80%.

Comment on Overall PO Attainment for M. Tech. FBT Batch Graduating in 2020

PO	Target Value of PO attainment (%)	Actual PO Attainment (%)	Observation
PO1: An ability to independently carry out research or investigation and development work to solve practical problems			
PO1	75-80	76.2	• PO1 attainment is satisfactory. • Time for research work is limited due to other course work and IPT
Action: • The research component of the curriculum has been revised from AY2017-18. • Research guide allocation is done soon after admission and research project identification and ideation begin from semester I itself with continuation in subsequent semesters with completion in semester IV.			
P02: An ability to write and present a substantial technical report or document			
PO2	75-80	75.1	• PO2 attainment is satisfactory. • Students demonstrate less skills for preparing technical documents and for oral presentation
Action: • Research guide allocation is done soon after admission and research project identification and ideation begin from semester I itself with continuation in subsequent semesters with completion in semester IV. • Seminar topic and guide allocation are done soon after admission and compilation of literature review in the form of presentation and report in semester I. • The submission of technical report has been increased in revised syllabus from AY2017-18 onwards. This is mainly associated with Research I, II, III (thesis) and Industrial Training reports. • Providing robust specifications for preparation of all technical documents (reports) has helped improve the report quality. • Providing guidance as to flow of presentation for seminar + CRRP, Research and Industrial training has helped improve presentation outcomes. • Scheduling all presentation-based activities with report submission in advance thereby giving students sufficient time to prepare for these academic activities. • Report submission follows presentation so that students get an opportunity to implement corrective feedback received during presentation in their report.			

More weightage of evaluation given to report thereby encouraging students to submit well compiled reports.			
PO3: An ability to demonstrate a degree of mastery over the area of Food Biotechnology			
PO3	75-80	76.8	• PO3 attainment is satisfactory. • Majority of students taking admission are from Biotechnology program so they do not have any background knowledge about foods.
Action: • Fundamental courses in food science, technology, engineering, nutrition, packaging, and food safety are well implemented to strengthen their knowledge in the food domain. • Students are given many assignment topics as extensions to classroom teaching in various courses to promote self-learning and learning beyond the defined syllabi. • Laboratory courses have been suitably modified to give them a better hands-on experience on various aspects of foods. • The research component has been strengthened by implementing it continuously over the two years program with very productive outcomes. • The inclusion of industrial training of 4 to 6 months with credits assigned and proper evaluation has helped students to realize practical problems related to Food domain. • Industrial experience gives the students real time experiences which complement the academic training.			
PO4: An ability to use and evaluate modern techniques or tools applied in food biotechnology for product and process development and for analysis			
PO4	75-80	77.4	• The attainment of PO4 is satisfactory. • Since all students are from Biotechnology program, they do not have knowledge related to use of analytical techniques and other modern tools in the food domain.
Action: • The curriculum of Food Analysis and Processing lab and Food Biotechnology lab has been designed to familiarize the students in areas of food analysis and food processing. • The work undertaken for research project mostly involves product/ process development and students are using all the facilities provided by the Department in their work. • Students are encouraged to use different analytical techniques in their research.			
PO5: An ability to analyze problems and offer solutions related to food science, nutrition, food safety and packaging			
PO5	75-80	76.8	• The attainment of PO5

			is satisfactory. • In classroom teaching and lab-based research students do not get exposure to practical, everyday problems encountered by the Industry

Action:

- IPT of 4 to 6 months has been introduced from 2017FBT batch giving it course credits and proper evaluation format (450 marks).
- This industrial experience exposes the students to real-life situations in large scale processing units and helps them realize problems and identify practical solutions to these problems.

6.2 Improvement in Quality of Projects (10) **Total Marks 10.00**

Institute Marks 10.00

M. Tech FBT 2016-2018

Roll no.	Student	Thesis Title	Broad Category in Food Biotechnology
16FBT201	Alisha Sukhija	Studies on fermentative production of mead from honey	Process development
16FBT202	Harsha Bharwani	Influence of processing on anti-nutritional factors and allergens of white peas and development of rapid immunoassay for cross reactivity studies against peanuts.	In silico and in vitro analysis
16FBT203	Mukesh Patel	Fermentative production of dextran from *Leuconostoc mesentroides* using pineapple waste.	Waste valorization
16FBT204	Nitin Sangle	Development of functional food product using fermented *Sangri* seed flour	Functional foods
16FBT205	Prabhat Chauhan	Screening of prebiotics for *S. boulardii* and development ofdelivery system.	Functional foods
16FBT206	Sana Shaikh	Development of *Idli* premix for accelerated fermentation.	Product development
16FBT207	Lubna Shaik	Studies on fruit wines	Food fermentation
16FBT208	Shraddha Srinivasan	Influence of dietary factors on hangover	Product development
16FBT209	Shubham Gaikwad	Bioactives from fish waste	Waste valorisation
16FBT210	Sumita Kumari	Study of *Cajanus cajan and Lathyrus sativus* using molecular biology techniques	Proteomic and genomicanalysis
		Maximum Score (%)	**95.0**
		Minimum Score (%)	**52.2**
		Average Score (%)	**80.6**
		No. of students scoring more than average (out of 9 students)	**4**
		Attainment assigned in scale of 3	**2**

M. Tech FBT 2016-2018

Roll no.	Student	Thesis Title	Broad Category in Food Biotechnology
17FBT201	Abdur Rehman Khan	Production of microbial lipopeptide and its food application	Microbial fermentation
17FBT203	Bishal Prasher	Process intensification in the form of fruity flavor esters using superrcritical carbon-dioxide based enzymatic process	Process intensification
17FBT204	Deep Dave	Probiotic to Paraprobiotic: Enumeration, Inactivation Kinetics and Bioactivity	Nutraceuticals
17FBT205	Lathika G. V.	Bacterial cellulose from fruits and vegetables and strain isolation	Waste valorization
17FBT206	Shreyasi Phatak	Cashew apple wine and study of functional molecules	Food fermentation

		in cashewapple.	
17FBT207	Shriya Das	Gluten free sour dough bread development.	Product development
17FBT208	Sneha Kamble	Studies on utilization of selected fruit seed waste	Waste valorization
17FBT209	Stuti Agarwal	Utilization of industrial waste for the production of value-added products	Waste valorization
17FBT210	Sudharshini B.	Extraction of pigments (Carotenoids) from natural sources	Natural food pigments
		Maximum Score (%)	**93.1**
		Minimum Score (%)	**68.9**
		Average Score (%)	**81.5**
		No of students scoring more than average (out of 9)	**4**
		Attainment assigned in scale of 3	**2**

M. Tech FBT 2018-2020

Roll no.	**Student**	**Thesis Title**	**Broad Category in Food Biotechnology**
18FBT201	Aayushi Pal	Study of bioactive compounds and complete utilization of pineapple	Waste valorization
18FBT202	Chirag Anandi	Process technology of vegan milk and its food application	Product and process development
18FBT203	Logesh V. N.	Extraction and characterization of gums from Sangri seeds	Food polysaccharides
18FBT204	Mohammad Shahrukh	Time temperature indicator (TTI) for smart packaging using natural pigments from plant sources	Product packaging development
18FBT205	Mona Kokwar	Fermented probiotic multigrain drink	Product development
18FBT206	Shruty Seshadrinathan	Saccharification of agricultural lignocellulosic waste for different food applications	Fermentation
18FBT207	Srutee Rout	Studies on effect of cold plasma treatment in combination with enzyme on cellulose	Non thermal processing
18FBT208	Varad Bende	Limoninase: CLEAs for food applications	Enzymology
18FBT209	Zumismita Kalila	Microwave assisted enzyme catalysis in transesterification of *p*-anisyl alcohol	Process intensification
		Maximum Score (%)	**88.0**
		Minimum Score (%)	**59.3**
		Average Score (%)	**73.65**
		No. of students scoring more than average	**3**
		Attainment assigned in scale of 3	**1**

Comments on overall improvement in quality of Research Projects

- The average score (%) has remained almost same with a small increase. While the maximum score(%) has remained more or less steady there is a marked improvement in the minimum score(%) from 52.2 (2016-18) to 73.3 (2018-20).
- The work on research project right from semester I has led to improvement in the research work outcomes.
- The application of experimental design and using modern state-of the art instruments are facilitating the improvement.

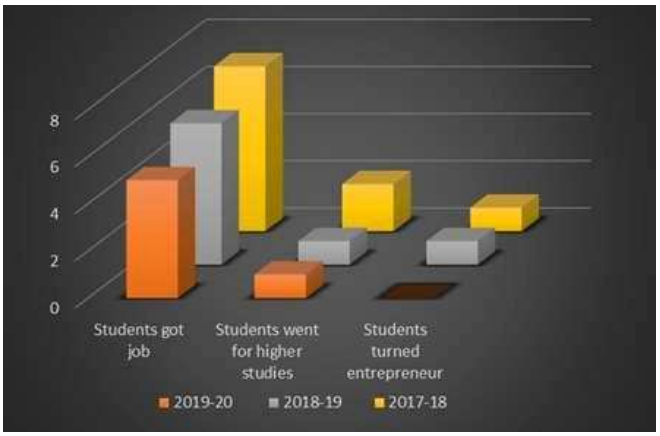
- The thesis is thoroughly checked by two examiners (internal & external) and it is also checked for plagiarism prior to submission.

6.3 Improvement in Placement, Higher Studies and Entrepreneurship (10) Total Marks 10.00

Item	Graduating in AY		
	2019-20	2018-19	2017-18
The total no. of students admitted in first year (N)	10	10	10
No. of students placed in companies or Government Sector (X)	5	6	7
No. of students pursuing Ph.D. / JRF/SRF(y)	1		2
No. of students turned entrepreneur in engineering/technology (Z)	0		
Placement Index: (x + y + z) /N	0.6	0.8	1
Average placement= (P1 + P2 + P3)/3	0.80		
Assessment Points = 20 x average placement	0.80 x20 = 16		

Comments on improvement in Placement

- One student from entry year 2017-18 and 2018-19 (17FBT202 and 18FBT210) did not continue after admission.
- The placement for 2018 and 2019 passed out batch is more than 80%. For the last year batch (2020), even in this pandemic situation, placement is 60%. and remaining students are either looking out for job opportunities or higher studies.
- The average pay package of the students, graduating in AY 2017-18, who got placed in industry was Rs. 5.5 lakh per annum whereas, the average package from previous year was within Rs. 5-6 lakh per annum.
- All the students placed in last graduating year (AY 2019-20) are in Core national or Multinational company in Food sector.
- Number of students opting for higher studies each year is 10 to 20%.
- Of late there is a trend for students to enter entrepreneurship. It is expected that in coming years more students will turn towards entrepreneurship in food sector.



6.4 Improvement in the quality of students admitted to the program (10)

Gate Score	1 2020-21 (CAY)	2019-20 (CAYm1)	2018-19(CAYm2)
Highest score	71.45	53 oo	56.00
Minimum Score	45.41	40.00	37.75

6.5 Improvement in quality of paper publication (10) **Institute Marks: 9**

Research Publications

1. Shraddha Srinivasan, Kriti Kumari Dubey and Rekha S. Singhal. (2019). Influence of food commodities on hangover based on alcohol dehydrogenase and aldehyde dehydrogenase activities. Current Research in Food Science, 1, 8-16.

2. Garg, D., Chakraborty, S., & Gokhale, J. S. (2020). Optimizing the extraction of protein from Prosopis cineraria seeds using response surface methodology and characterization of seed protein concentrate. LWT, 117, 108630.

3. Logesh V N and J. S. Gokhale. Rheological, Technofunctional and Physicochemical Characterization of *Prosopis Cineraria* (Sangri) Seed Gum: A Potential Food and Pharmaceutical Excipient. Revision submitted to Journal of Food Processing and Preservation.

4. Logesh V. N., Dhananjeyan Venkatachalam and Jyoti S. Gokhale, Plant-Based Meat Alternatives: Sustainability, Sourcing, Processing, Nutritional and Organoleptic implications. Submitted to Food Bioscience. *Under review*.

5. Shruti Seshadrinathan and Snehasis Chakraborty. Fermentative production of erythritol from molasses using Candida magnolia: Media optimization, partial purification, and characterization. *Submitted to Biotechnology and Bioprocess Engineering*.

6. Bende Varad, Ray Aratrika, Singhal R. S. Supercritical Fluid Extraction vis-à-vis solvent extraction of limonin from lemon peels and its application in gummy bears. *To be submitted to Waste and Biomass Valorisation*.

7. Sneha Kamble, Jyoti S. Gokhale. Utilization of Fermented Jackfruit Seed as a Cocoa Substitute. *To be submitted to Journal of Food Science and Technology.*

Comments on improvement in quality of paper publication

- As discussed earlier, the quality of thesis work has improved in last three years and it is reflecting through publications.
- It is a fact that the manuscript needs to undergo rigorous revision and journal protocols prior to being accepted for publication.

6.6 Improvement in laboratories (10) **Institute Marks 10**

In the department of food engineering where MTech Food Biotechnology program is conducted has received many substantial donations from benevolent alumni and industries as listed below.

Sr No.	Laboratory name	Industry Sponsor	Amount received (Rs)
1	Prof. D. V. Rege Laboratory	HiMedia Lab., India	58,00,000
2	Food Analysis lab	Goodwill Industries Ltd., India	8,00,000
3	PTC Research Lab	Goodwill Industries Ltd., India	5,00,000
4	Fermentation Lab	Fine Organics Ltd., India	15,00,000
5	Smart Classroom	Fine Organics Ltd., India	38,00,000

6	Research Lab 283	Morde Foods	48,00,000
7	Food Processing Lab	Dr. Shrikhande	10000 USD

Details of instruments/ equipment acquired in last five years are as follows:

	Name	Company	Cost
Analytical Instruments			
1	PLC-RI	IJasco	14 lacs
2	PLC-UV	Jasco	12 lacs
3	Rheometer	Anton Parr	45 lacs
4	Texture Analyzer	Stable Microsystem	10Iacs
5	Laminar air (3 no)	HMG India	3 lacs
6	Centrifuge (2 no)	Remi	4.5 lacs
7	Water Activity Meter	Potronics	0.5 lacs
8	Keldahl Distillation System	Pelican	1.25 lacs
9	Fat Estimation System	Pelican	1.5 lacs
10	Spectrometer	ISchimadzu	4.4 lacs
11	Moisture Analyzer	Ohaus	1 lac
12	Viscometer	Brookfield	2.5 lacs
13	Colorimeter	Hunter Lab	1.56 lacs
Equipment			
1	Atmospheric Cold Plasma	PlamaLeap Technologies	35 lacs
2	Incubator Shaker	Remi	1.75 lacs
3	Pulsed Light System	Xenon	26 lacs
4	Hydrodynamic Cavitation System	Germsafe Technology	1.98 lacs
5	Continuous Microwave	Twin Engineering	13 lacs

Annexure I

PROGRAM OUTCOMES (POs)

P01 : An ability to independently carry out research /investigation and development work to solve practical problems

P02 : An ability to write and present a substantial technical report/document

P03 : Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program

Declaration

The head of the institution needs to make a declaration as per the format given -

- I undertake that, the institution is well aware about the provisions in the NBA's accreditation manual concerned for this application, rules, regulations, notifications and NBA expert visit guidelines inforce as on date and the institutes hall fully abide by them.
- It is submitted that information provided in this Self Assessment Report is factually correct.
- I understand and agree that an appropriate disciplinary action against the Institute willbe initiated by the NBA. In case, any false statement/information is observed during pre-visit, visit, postvisit and subsequent to grant of accreditation.

Head of the Institute

Name: Professor A. B. Pandit

Designation: Vice Chancellor Signature:

Seal of The Institution :

Place : Mumbai
Date : 28-12-2021