

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.

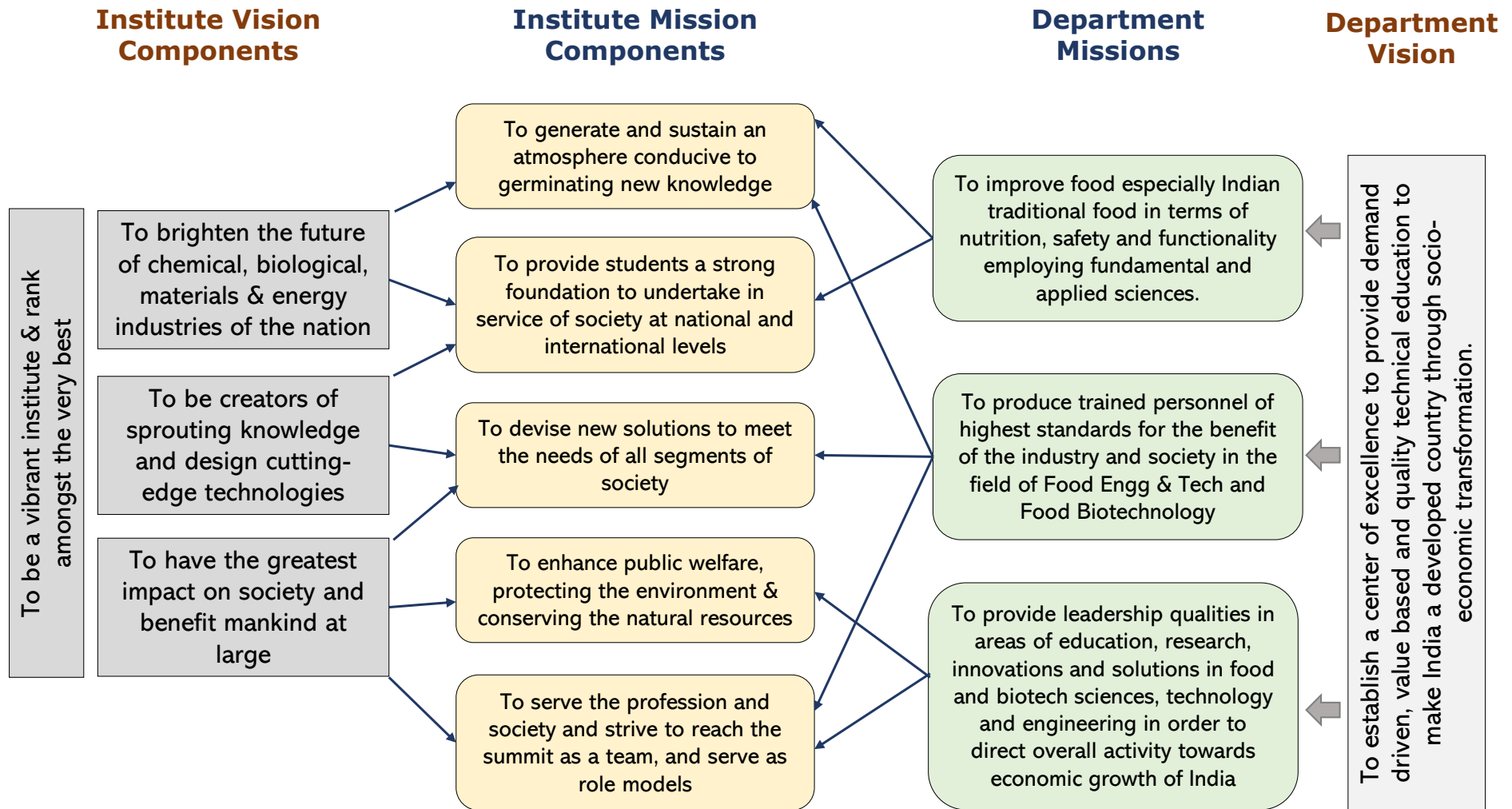


Fig. B1: The justification of the consistency between Department Vision and Mission with the Institute Vision and Mission

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:

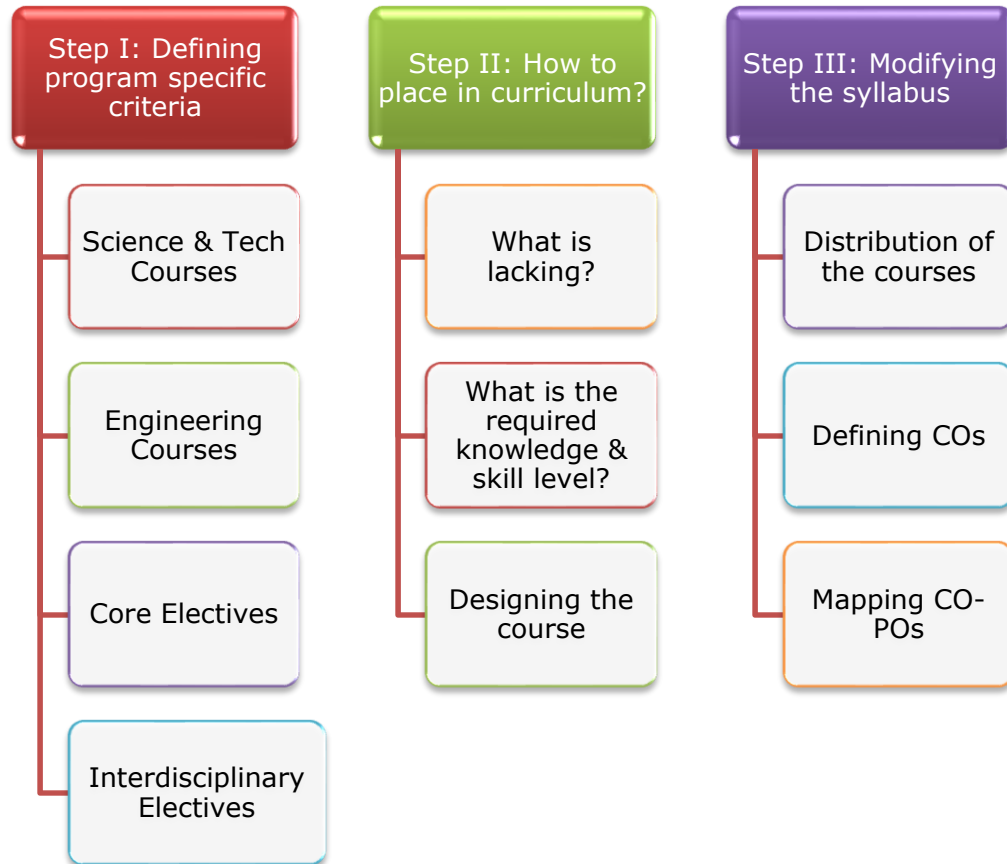
1. The needs of the learner while they are in master's degree in this field.
2. The content in terms of M. Tech. in Food Biotechnology
3. Instructional methodology for learning master level courses

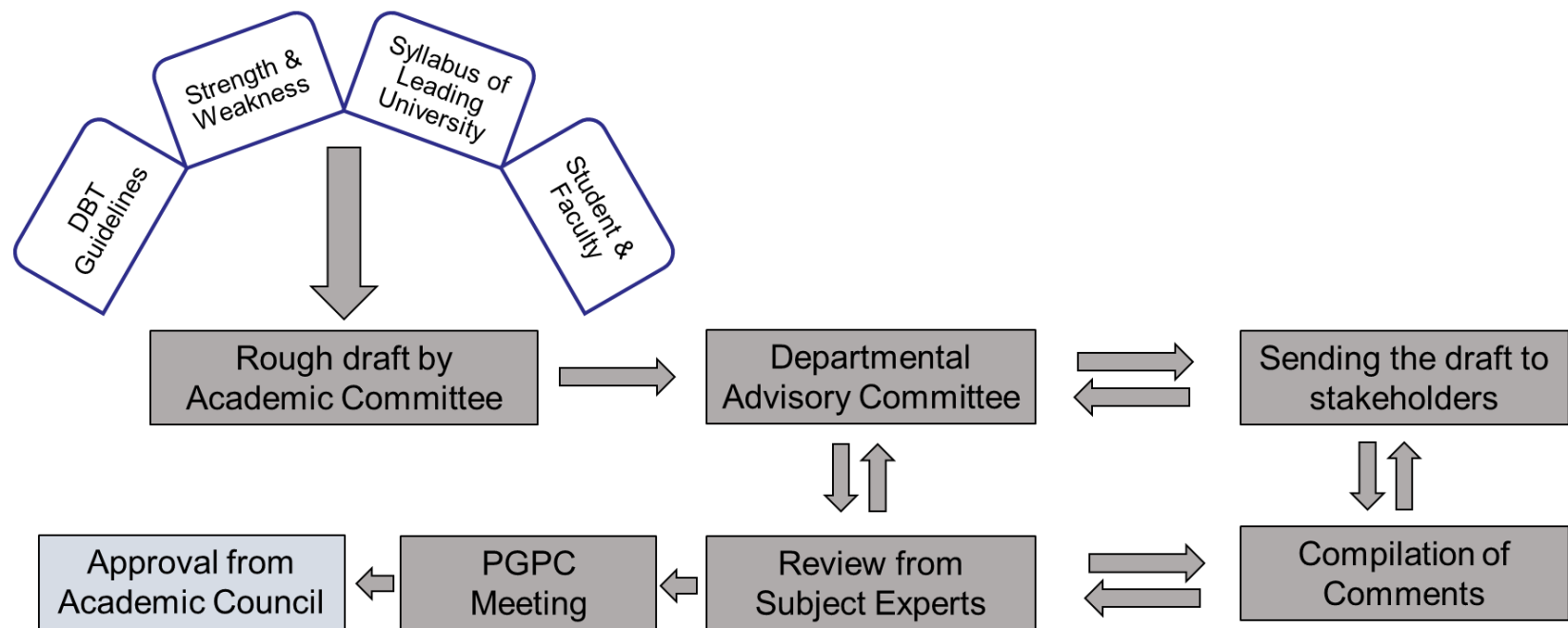
The criteria for defining curriculum are:

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:

ASSESSMENT 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.

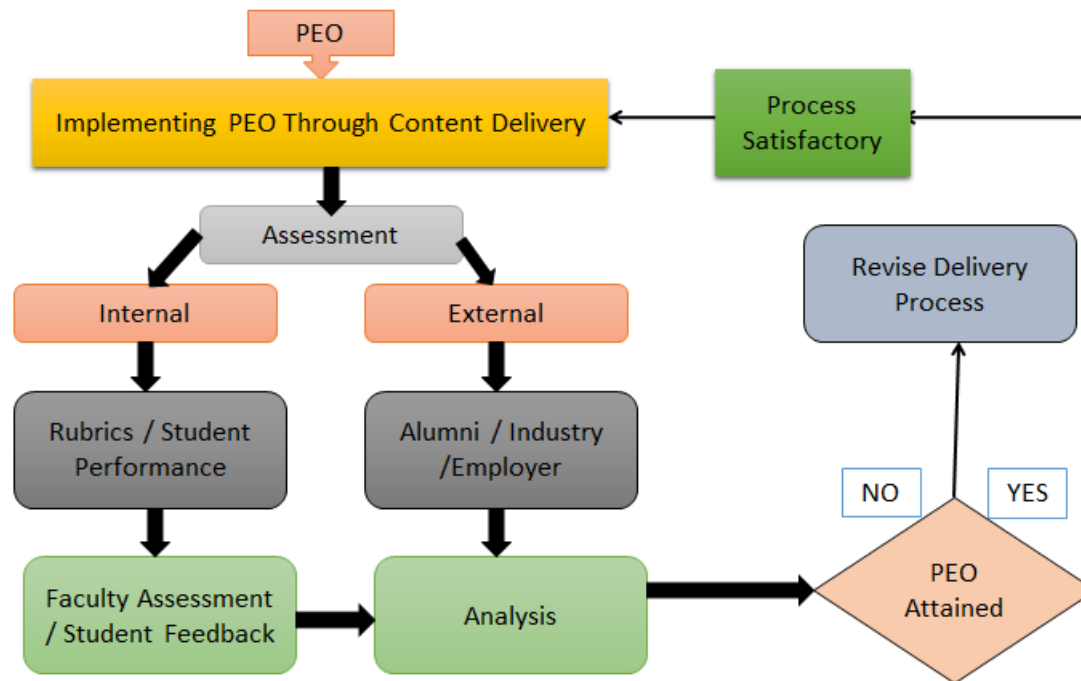
The syllabi of the top US, European as well as Indian schools are also analyzed in particular to check the distribution of the different courses.



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 |
| 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, <i>viva-voce</i> assignments, discussions |
| Practical | 50% | - | 50% | Attendance, <i>viva -voce</i> , 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
Time: 3.00 - 3.30 pm

Total Marks: 10


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) degraation 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
Time: 11:00 – 12:00

Total Marks: 15

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 UDC/CICT, Mumbai)
Elite Status and Centre of Excellence- Govt. of Maharashtra
NBA Accredited; 'A' Grade by MHRD; UNIVERSITY 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 | Answer the following in brief | 5 |
| | CO2 | a) What is the physical significance of Biot number in transient heat transfer? | |
| | CO3 | b) State the significance of LMTD correction factor in heat transfer. | |
| | CO4 | c) From the definition, comment on the values of fanning friction factor for laminar and turbulent flow. | |
| | CO5 | 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. | |
| Q2 | CO1 | 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·m ⁻³ ; molar mass 92 kg/kg mol; mass diffusivity 8.6 × 10 ⁻⁶ m ² ·s ⁻¹ . Calculate the time required for complete evaporation of the droplet. | 3+2 |
| | CO2 | b) With the help of force balance, derive the velocity profile expression for a Newtonian fluid flowing through a pipe. | |
| Q3 | CO2 | 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, and d _o . What should be the critical thickness of ice layer for the maximum heat transfer? | 3+2 |
| | CO3 | b) With a schematic, discuss the principle of a high-pressure processing for liquid food system. | |
| Q4 | CO1 | 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. | 4+ |
| | CO3 | (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. | 1+ |
| | CO4 | | 3+ |
| | | | 2 |

| | | | |
|--|--|--|--|
| | | (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). | |

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

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

+++++

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

(University under Section - I of 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: Secha 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

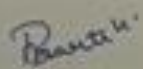
| Sr. No. | Assessment Criterion | Marks |
|----------------------------|--|---------|
| 1 | Understanding of Research Area | 55/60 |
| 2 | Problems Formulation / Experimental Design/ Mathematical Modelling | 55/60 |
| 3 | Quality of Work Done | 65/70 |
| 4 | Analysis and Interpretation of results | 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 450):- | | 414/450 |

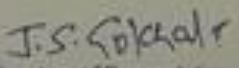
Outstanding: 100%-90%; Excellent: 89.99%-80%; Very Good: 79.99%-70%; Good: 69.99%-60%; Reasonable: 59.99%-50% (these are only guidelines)

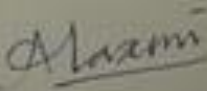
Recommendation :

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. Bharti Iyer


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


Signature of Chairperson
Name of Chairperson
Dr. Laxmi Ananthanarayana ERT
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 <i>Leuconostoc mesentroides</i> 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 <i>S. boulardii</i> and development of delivery system. | U. S. Annapure |
| 6 | 16FBT206 | Sana Shaikh | Development of <i>Idli</i> 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 <i>Cajanus cajan</i> and <i>Lathyrus sativus</i> 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 | Probiotics 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 | <ul style="list-style-type: none">- Attendance certificate duly signed- Regularity and Punctuality - Attentiveness and responsiveness- Communication, networking, personal grooming and professional conduct | 50 |
| Work done (based on presentation) | <ul style="list-style-type: none">- Work done in various domains such as production, QA, inventory management, waste management etc | 50 |
| | <ul style="list-style-type: none">- Work done in R and D, process or product or package improvement or development | 50 |
| | <ul style="list-style-type: none">- Marketing - Regulatory aspects and labelling - Understanding of business and finance | 50 |
| | <ul style="list-style-type: none">- Overall Involvement and initiative taken - Analytical methods performed, instruments/ equipment used - Innovation/ contribution to Industry | 50 |
| Learning (based on presentation) | <ul style="list-style-type: none">- Based on questions asked# and answers given during presentation | 50 |
| Presentation | <ul style="list-style-type: none">- Quality of slides (format, aesthetics) - Technical content and correctness of slides - Oral delivery - Time management | 50 |
| Report | <ul style="list-style-type: none">- Representation of all given assessment criteria of IPT (as specified above) - Correctness of the document (spelling, grammar, punctuations, format etc) | 50 |
| | <ul style="list-style-type: none">- 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 UOC Act 1956)

Elite Status and Centre of Excellence – Govt. of Maharashtra

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Ph: +91-22-33611111/2222, Fax: +91-22-33611020, www.icmtumbai.edu.in

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 | 22/25 |
| 2 | Experiment performed/Mathematical modelling if any/Design/Techno-economic feasibility/Analysis of data | 115/125 |
| 3 | Conclusion | 26/30 |
| 4 | Writing Skills including formatting 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 Examiner
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 (<i>Pisum sativum</i>) and development of rapid immunoassay for analysing its cross reactivity against peanuts (<i>Arachis hypogea</i>) | S. S. Arya | Dr. Pratap Bade Principal Investigator, Syngene International Ltd., Bengaluru |
| 3. | 16FBT203 | Mukesh Patel | Fermentative production of dextran by <i>L. mesenteroides</i> 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 <i>S. boulardii</i> and development of delivery system | U. S. Annapure | Dr. Rahul Warke Director, R & D Microbiology Div, HiMedia Laboratories Pvt. Ltd. Mumbai |
| 6. | 16FBT206 | Sana Shaikh | Development of <i>Idli</i> 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 <i>Cajanus cajan</i> and <i>Lathyrus sativus</i> 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 <i>Cucurbita moschata</i> 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. Chakraborty | Rohit Upadhyay R&D Specialist Nestle Inida, Delhi |
| 3 | 18FBT203 | Logesh V. N. | Extraction and Characterization of Gums from <i>Prosopis cineraria</i> 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 <i>Candida magnolia</i> | S. Chakraborty | 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, Maharashtra |
| 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; |

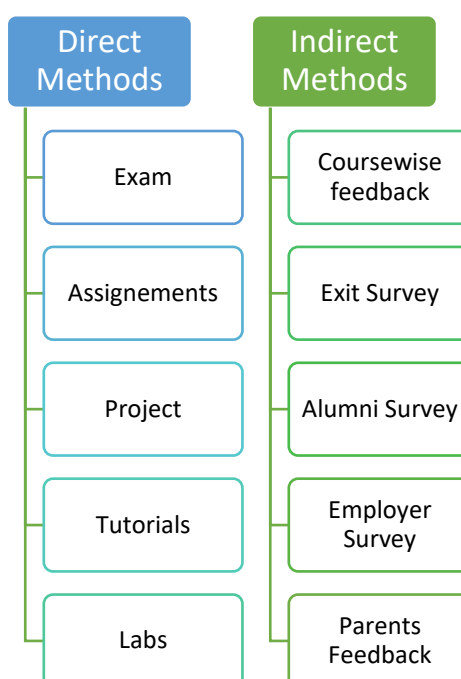
| | | |
|--|--|--|
| | | FDT 2023: Food Packaging Science and Technology; FDT 2021: Food Standards and Safety Regulations; FDT 2057: Fundamentals of Food Biotechnology, Genetics and Cell Culture Technology; FDT 2055: Biotechnology of Fermented Foods; FDT 2075: Basics of Human Nutrition |
|--|--|--|

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 |
| $59\% \leq m \leq 50\%$ | 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

$$S_{CO_{ij}} = S_{Q_{1j}} \times W_{Q_{1k}} + S_{Q_{2j}} \times W_{Q_{2k}} + S_{Q_{3j}} \times W_{Q_{3k}} + S_{Q_{4j}} \times W_{Q_{4k}} + S_{Q_{5j}} \times W_{Q_{5k}}$$

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 |
| $59\% \leq m \leq 50\%$ | 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 | $2 \times 0.8 + 2 \times 0$.2 | $2 \times 0.8 + 2 \times 0$.2 | $2 \times 0.8 + 2 \times 0$.2 | $3 \times 0.8 + 2 \times 0$.2 | $2 \times 0.8 + 2 \times 0$.2 | $3 \times 0.8 + 2 \times 0$.2 |
| Attainment of CO (A_{COi}) | 2 | 2 | 2 | 2.8 | 2 | 2.8 |
| Attainment of Course | $(2+2+2+2.8+2+2.8)/6 = 2.27$ | | | | | |

| |
|------------------------|
| (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:

$$\text{Direct PO attainment (PO}_D) = \frac{\sum_{p=1}^n (A_{\text{course } p} \times C_p)}{\sum_{p=1}^n C_p}$$

Where, n= number of Courses correlated to corresponding PO

A_{course} = Obtained attainment for pth course (0 to 3 scale)

C_p = Correlation of pth 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 safety 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:

$$a_{IPO_i} = \frac{3}{5N} \sum_{j=1}^N \sum_{k=1}^9 S_{QF_{ij}} \times W_{iQF_k}$$

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

Where, N= number of students giving Student exit feedback

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

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

Q= number of questionnaires' in feedback

W_{iQF} = weightage of k^{th} feedback question for j^{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).

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

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

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

Attainment of PO_I

| PO | Indirect Attainment (out of 3) | | |
|-----|--------------------------------|------------|-----------------|
| | 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.

$$A_{PO} = PO_D \times w_D + PO_I \times w_I$$

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}) | | = $2.19 \times 0.8 + 2.72 \times 0.2$ | | 2.30 |

2.2.2. POs attainment levels with observations (40)

Batch 16FBT

| Course | Level | PO1 | | PO2 | | PO3 | | PO4 | | PO5 | |
|--------------------|-------|------------|---------------------|------------|---------------------|------------|---------------------|------------|---------------------|------------|---------------------|
| | | Wt | A _{course} | W | A _{course} | W | A _{course} | W | A _{course} | W | A _{course} |
| 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 | A _{course} | Wt | A _{course} | Wt | A _{course} | Wt | A _{course} |
| 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 |

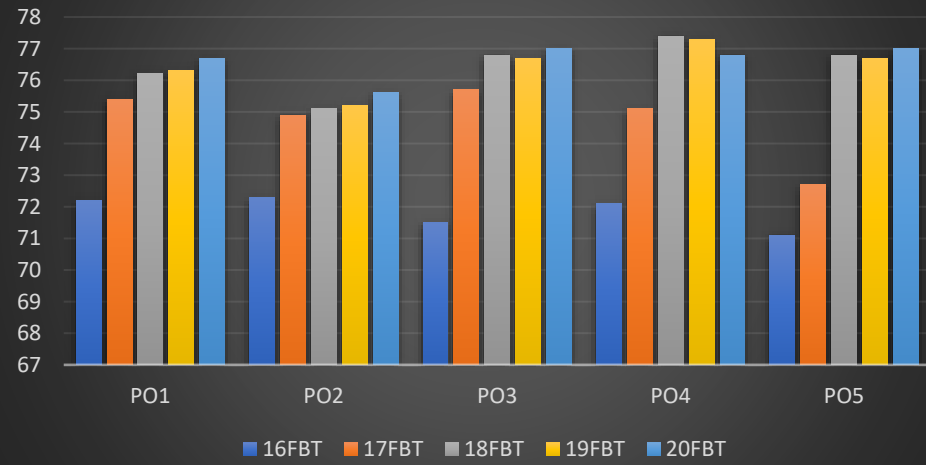
Batch 20FBT

| 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



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 |
| Indirect attainment (PO ₁) | | | 8.03 | 3 | | | 7.65 | 3 | | | 8.12 | 3 | | | 8.11 | 3 | | | 7.46 | 3 |
| Overall PO attainment (Aro) | I | I | | 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 $1 < (W*CA) \leq 3$; PO = 2 if $3.01 \leq (W*CA) \leq 6$; PO = 3 if $6.01 \leq (W*CA) \leq 9$;

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 |
| Indirect 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 (N1 + N2) | 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, Bangalore | 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, Bengaluru | 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 Institute 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 HO D? |
|--------------------------|------------|-----------------------------|----------------------------------|---|----------------------------|-----------------|---------------------------------------|---------------------|---|-------------------------|------------------|-----------------------------------|--------------------------------|----------|
| 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 | Cavitation Reactors, Process Intensification, Wastewater 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) (2 nd to 4 th year) | 48 | 48 | 48 | 48 |
| Total No of students in Department (Masters) (1 st and 2 nd year) | 56 | 48 | 40 | 40 |

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

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|-------------------------|---|--|---|
| Prof. R. S. Singhal | fermentation technology:some basic concepts | Invited lecture | UPL Limited, R & D Centre, Thane. |
| Prof. R. S. Singhal | Biotechnology in everydaylife | 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 carbondioxide and food formulations | Lecture delivered at 7 th Bioprocessing India Conference onAdvances in Bioprocessing of Agri-food Resources | CSIR-CFTRI, Mysore |
| Prof. U. S. Annapure | Scope of Research in HotelManagement & 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 | 19 th World Congress of Food Science and Technology | IUFoST- 2018 | Mumbai |
| Prof. L. Ananthanarayan | Scope of research in HotelManagement & 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 PulsedLight 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 forPasteurization of Fruit Juices | Faculty Development Programme | HBTU Kanpur, UP, India |
| Dr. S. Chakraborty | Introduction to Design ofExperiments | Workshop | Navi Mumbai, India |
| Prof. A. V. | Python and | Workshop by TEQIP | ICT, Mumbai |

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|----------------------|---|--|---|
| 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 |

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| | researchpapers | 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 |

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| Prof. P. R. Gogate | Process Intensification using Cavitation 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 alkyl resin wastewater: Hydrodynamic cavitation followed by Peroxane process in gas inducing reactor | DAE BRNS 8 th 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 |

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|--------------------|---|--|---|
| | Strategies for Chemical Industry | | |
| Prof. A. B. Pandit | Intensification of intracellular enzymerecovery | 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: | |

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|-----------------------|--|---|---|
| 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 health | Invited Lectures | Department of Studies in Food science & Nutrition, University of Mysore |
| | | | |
| | | | US Soybean Export Council, USSEC in |
| Prof. U. S. Annappure | 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. Annappure | 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 | Cavitation Reactors | Annual Convention of Marathi Vidnyan Parishad | Kudal, Maharashtra |
| Prof. P. R. Gogate | Intensification of Chemical processing applications using Cavitation | Invited Lecturer | PREC, Loni |

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| | 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 cavitation reactors | Tantr Avishkar - 2K18 | TSEC, Mumbai |
| 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 | <ul style="list-style-type: none"> • 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, IICChE, UAA |
| Prof. R. S. Singhal | <ul style="list-style-type: none"> • 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 |
| | <ul style="list-style-type: none"> • President, AFST(I), 2021 • Vice President of AFST (I), Mumbai Chapter 2016-17 |

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| <p>Prof. U. S. Annapure</p> | <ul style="list-style-type: none"> • 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 |
| <p>Prof. L. Ananathana rayan</p> | <ul style="list-style-type: none"> • 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 |
| <p>Dr. S. S. Arya</p> | <ul style="list-style-type: none"> • 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 |

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| | <p>India</p> <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • 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 |

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| | <ul style="list-style-type: none"> • Membership of Editorial Boards with name of journal and agency |
| Dr. D. D. Sarode | <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • 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 |
| | <ul style="list-style-type: none"> • 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) |

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| Prof. P. R. Vavia | <ul style="list-style-type: none">• 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 |
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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 | 19 th 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 | 8 th International Food Convention | Conference | 12 – 15 December 2018 |
| 6 | iCFRAFPT-2018 | Workshop | 17 – 19 October 2018 |
| 7 | 25 th 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 |

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|------------------------------|---|---------------------------------------|-----------------------|
| 11 | 19 th 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 | 19 th 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 | 19 th 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 | | | |

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|---------------------------|--|--|-------------------------------|
| 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 |

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| | | 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 | 23-27 th 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, Hyderabad | 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 | | | | |

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

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| 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) | Citizen | 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 | |

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|-----|-----------|-----------------------------------|----------------------|------------|
| | | 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. Ultrafiltration 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 Equipments | |
| 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 | ApliedBiosystems | |
| | | 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 |

6.1 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

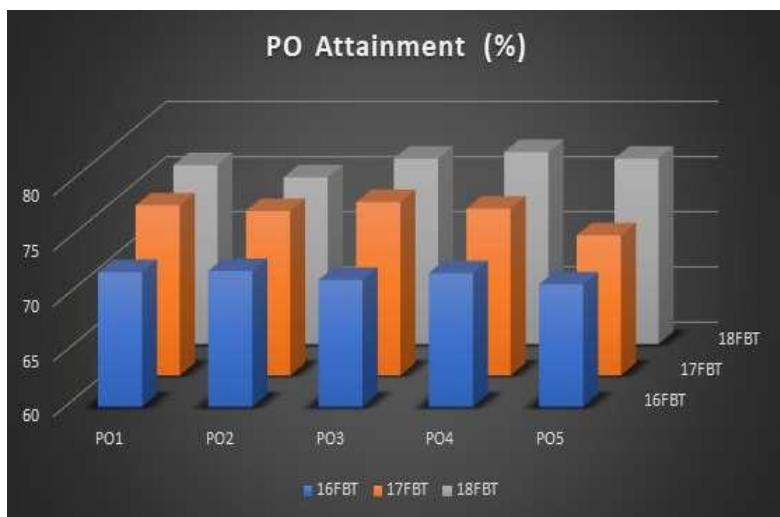
| PO | Target Value of PO attainment (%) | Actual PO Attainment (%) | Observation |
|--|-----------------------------------|--------------------------|---|
| PO1: An ability to independently carry out research or investigation and development work to solve practical problems | | | |
| PO1 | 75-80 | 76.2 | <ul style="list-style-type: none"> PO1 attainment is satisfactory. Time for research work is limited due to other course work and IPT |
| Action: <ul style="list-style-type: none"> 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. | | | |
| PO2: An ability to write and present a substantial technical report or document | | | |
| PO2 | 75-80 | 75.1 | <ul style="list-style-type: none"> PO2 attainment is satisfactory. Students demonstrate less skills for preparing technical documents and for oral presentation |
| Action: <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> • PO3 attainment is satisfactory. • Majority of students taking admission are from Biotechnology program so they do not have any background knowledge about foods. |
| <p>Action:</p> <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • 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. |
| <p>Action:</p> <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • The attainment of PO5 |

| | | | |
|--|--|--|---|
| | | | <p>is satisfactory.</p> <ul style="list-style-type: none"> 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 <i>Leuconostoc mesentroides</i> using pineapple waste. | Waste valorization |
| 16FBT204 | Nitin Sangle | Development of functional food product using fermented <i>Sangri</i> seed flour | Functional foods |
| 16FBT205 | Prabhat Chauhan | Screening of prebiotics for <i>S. boulardii</i> and development of delivery system. | Functional foods |
| 16FBT206 | Sana Shaikh | Development of <i>Idli</i> 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 <i>Cajanus cajan</i> and <i>Lathyrus sativus</i> using molecular biology techniques | Proteomic and genomic analysis |
| | | 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 supercritical 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 <i>p</i> -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.

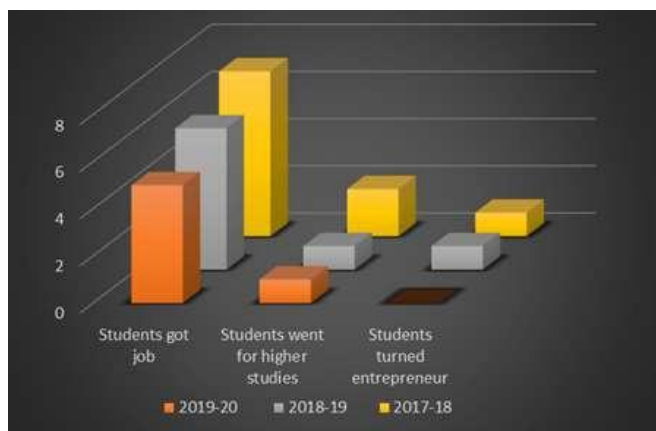
- The thesis is thoroughly checked by two examiners (internal & external) and it is also checked for plagiarism prior to submission.

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 firstyear (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 = $20 \times$ averageplacement | 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 | 2020-21 (CAY) | 2019-20 (CAYm1) | 2018-19(CAYm2) |
|---------------|---------------|-----------------|----------------|
| Highest score | 71.45 | 53.00 | 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 | Jasco | 14 lacs |
| 2 | PLC-UV | Jasco | 12 lacs |
| 3 | Rheometer | Anton Parr | 45 lacs |
| 4 | Texture Analyzer | Stable Microsystem | 10lacs |
| 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 | Schimidzu | 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 in force as on date and the institutes shall 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 will be 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

