



International Joint Degree of Master of Technology (M.Tech.) in Food Science and Technology

July 2019 onwards



Information Brochure

1. Program Overview

IIT Guwahati is located in the strategic north-eastern region (NER) and bio-diversity hot spot of India, which is anticipated to become an economic corridor for world trade in South-east Asia. With its endemic horticultural and medicinal plant produce, the region can contribute significantly to global economy in the area of food science and technology. Considering these, the International Joint Degree of Master of Technology (M.Tech.) in Food Science and Technology (IMD-FST) is being jointly offered by IIT Guwahati (July 2019 onwards, India) and GIFU University (April 2019 onwards, Japan) to nurture highly-skilled professionals in food and related industries. Fundamentals associated to Food Biochemistry, Microbiology, Processing and Engineering would be nurtured in the joint degree curriculum to enhance research design thinking and a global mindset (adaptation to different cultures and cooperation with global partners) in the enrolled students. Targeting the growth of food and related industries, the curriculum anticipates to identify solutions for a sustainable society through an optimal utilization of resources to benefit NER (India) and Tokai (Japan) regions.

2. Institutional Excellence

IIT Guwahati (<http://www.iitg.ac.in>)

Established by the Government of India in 1994, the Indian Institute of Technology Guwahati (IITG) is a reputed public institution of national importance. The institution offers postgraduate degrees in various disciplines of science and engineering/technology. The young, vibrant and dynamic faculty of the institute are highly oriented towards inter-disciplinary research in various fields of science and engineering. Within a short span of 20 years, the institute became a reputed research and academic institution par excellence to offer highly skilled technical education. As per the National Institute Ranking Framework (NIRF) of MHRD, Government of India, among all institutions in India, IIT Guwahati retained its 7th position in the category of engineering.

Gifu University, Japan (<https://www.gifu-u.ac.jp>)

Established in 1949, Gifu University is a national university in Japan and offers undergraduate and postgraduate degrees in education, regional studies, medicine, engineering and applied biological sciences. Gifu University is located in Central Japan, between Tokyo and Kyoto, and has excellent international accessibility. Presently, Gifu University has several hundred foreign students and especially from various South-east Asian countries such as China, Bangladesh and India. With the central motto of 'Learning, Exploring and Contributing', Gifu University strives to become a leading global university and with aims to produce globally minded graduates that can conduct productive research and train future talented human resources. The Graduate School of Applied Biological Sciences was established in 2008 and strives to impart highest quality education and research in applied biological sciences with due consideration to application in the biological industries and to benefit mankind. The Food and Life Sciences undergraduate program of the Graduate school is very well reputed in Japan and other developed countries.

3. Participating Departments and Centers

- **Departments:** Chemical Engineering, Biosciences and Bio-engineering and Chemistry Departments
- **Centers:** Centre for Rural Technology

4. Mentoring Department

The Department of Chemical Engineering at IIT Guwahati would be the mentoring Department. A faculty member of the Department would be the Academic Co-ordinator for the program.

5. Curriculum Overview

- **Joint Degree awarded:** International Joint Degree of Master of Technology (M.Tech.) in Food Science and Technology
- **Duration:** 02 years (04 semesters)
- **Enrollment Calendar:** July 2019 onwards for Indian students
- **Capacity:** 05 Indian and 05 Japanese students
- **Eligibility and Admission**
 - **Degree:** B.Tech. Chemical/Biotechnology/Food/Agricultural Engineering/Technology and allied disciplines [OR] M.Sc. (2 years) [OR] M.S. (5 years integrated) in Chemistry, Biochemistry, Biology, Zoology, Botany, LifeSciences, Food Sciences and allied disciplines.
 - **GATE** qualification in relevant disciplines (AG/BT/CH/CY/XE/XL).
 - **Meritorious** students with research experience desirable
 - **Final selection based on interview** of short-listed candidates.
- **Curriculum structure for Indian students (for July 2019 enrollment):**
 - a) **First semester:** Each registered student would carry out their first semester course work (25th July – 30th Nov 2019) at IIT Guwahati, India.
 - b) **Incubation semester:** The student orients themselves towards research problem formulation in an incubation semester that lasts about two and half months (01 Jan to 15th Mar 2020) at IIT Guwahati.
 - c) **Second semester:** The student would visit Gifu University, Japan in the fourth week of March and spend three and half months (01 Apr to 15th July 2020) to register and complete courses and dissertation activity at Gifu University, Japan.
 - d) **Third and fourth semesters:** In the last week of July, the registered student reaches IIT Guwahati to enroll and carryout high quality dissertation under the joint supervision of a team of Professors from IIT Guwahati and Gifu University. After completion of the dissertation, an oral examination would be conducted, which upon successful completion, the student would be awarded the International Joint Master's Degree Program in Food Science and Technology.

6. Courses and Credits

Semester I (Aug – Nov, Year 1) [IIT Guwahati, India]

Course No.	Course Title	International Credits
IFST001	Advanced Food Processing	3
IFST005	Design thinking and Scientific Writing	3
IFST002	International Joint Exercises in Food Science and Technology-B (Jointly designed Course)	1
	Elective 1	3
	Elective 2	3

IFST021	Japanese Language	-
Total		13

Electives 1-2 (Any two to be chosen from the following list)

Course No.	Course Title	International Credits
IFST 006	Optimization Techniques	3
IFST 007	Membranes	3
IFST 008	Multicomponent Mass Transfer	3
IFST 009	Biomolecular and Cellular process engineering	3
IFST 010	Microbial Biotechnology	3
IFST 011	Bioprocess engineering	3
IFST 012	Plant Biotechnology	3
IFST 013	Biosensors	3
IFST 014	Industrial Wastewater Pollution Control	3
IFST 015	Livelihood Management and Agro Technology	3
IFST 016	Product and Process Development in Food & Bioprocessing industries	3

Incubation Semester (Jan – Mar, Year 2) [IIT Guwahati, India]

Course No.	Course Title	International Credits
IFST 017	Joint Degree Dissertation	2
Total		2

Semester II (April to July, Year 2) [Gifu University, Japan]

Course No.	Course Title	International Credits
GFST 001	Advanced Topics in Food Biochemistry	1
GFST 002	Advanced Topics in Food and Nutritional Biochemistry	1
GFST 003	Advanced Topics in Food Microbiology	1
GFST 004	International Joint Exercises in Food Science and Technology-A (Jointly designed course)	1
GFST 005	International Joint Global Internship & Seminar-A (Jointly designed course)	3
IFST018	Joint Degree Dissertation	4
	Elective 3	1
	Elective 4	1
	Elective 5	1
	Elective 6	1
Total		15

Electives 3-6 (to be chosen for obtaining four international credits from the following list):

Course No.	Course Title	International Credits
GFST 008	Advanced Topics in Food Science	1
GFST 009	Advanced Topics in Food Chemistry	1
GFST 010	Advanced Topics in Food Engineering	1

GFST 011	Advanced Topics in Food Preserving and Processing Technology	1
GFST 012	Advanced Topics in Molecular Life Science: Biological Aspects	1
GFST 013	Advanced Topics of Plant Translational Research	1
GFST 014	Advanced Topics in Natural Products Chemistry	1
GFST 015	Introduction to Numerical Methods and Statistics for Food Scientists and Engineers	1
GFST 016	Academic Carrier	1

Semester III (Aug to Dec, Year 2) [IIT Guwahati, India]

Course No.	Course Title	International Credits
IFST 019	Joint Degree Dissertation	9
Total		9

Semester IV (Jan to July, Year 2) [IIT Guwahati, India]

Course No.	Course Title	International Credits
IFST20	Joint Degree Dissertation	9
Total		9

Dissertation summary

Course No.	Activity and Targets	Location	Credits
IFST 017	Joint Supervisor Allocation (Jointly) Literature survey (The student will identify only important research findings in the most relevant literatures)	IITG, Guwahati	2
IFST 018	Research Problem Formulation (zeroing upon research problem based identification of gaps in available literature and converging upon objectives of the thesis)	GIFU U, Japan	4
IFST 019	Partial results in thesis (Based on objectives set and work conducted based on objectives)	IITG, Guwahati	9
IFST 020	Final and complete results in the thesis (Based on Novelty, Key findings, Conclusions and Future work)	IITG, Guwahati	9
Total International Credits (Indian – 20; Japanese – 4)			24

Summary of International Credits

Student	Available at	Course work			Dissertation	Course work + Dissertation	Jointly-designed course	Total credits
		Compulsory	Elective	Total				
IIT-G	IIT-G	6	6	12	20	32	IITG: 1 GIFU: 4	48
	Gifu-U	3	4	7	4	11		

							Total 5
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7. Benefits

- **Enhanced Placement and Research Opportunities** in India and abroad
- **Highly skilled human resources** to enhance cultural co-operation and Indo-Japan FST trade
- Interaction with **Japanese Food Industries**
- **Training and expertise in the state of the art research facilities** available for food characterization, processing, and engineering studies at IITG and Gifu-U, Japan to foster Translational FST research.
- **Adequate training and learning** in cross-cultural environment
- **1st International Joint M.Tech. Degree in FST from India (IITs)**

8. Research Facilities

IIT Guwahati, India	Gifu University, Japan
Characterization: AFM, HPLC, DuoFlow, FPLC, GC, Ion exchange Chromatograph, FACS, Real-time PCR, Microscopes, FTIR, Flowcytometer, Spectrofluorometer, Microplate reader, AAS, BET, DSc, GC-MS, LPSA, Polarimeter, Rheometer, Spinning drop Tensiometer, TGA, UV-Vis Spectrophotometer, TOC-analyzer, Interfacial rheometer, XRD, Fermenters, WVTR, OTR, ICPMS, UTM, FESEM, FETEM, GPC, LCMS-MS, XRD, Nanoindentor	Characterization (chemistry): TEM, SEM, SPM, Digital microscope, X-ray μ CT scan, XRF, XRD, CHNS, CD, FT-IR, Raman Spectrometer, Spectrophotometers (UV-Vis, Fluorescent, Infrared, Microscopic and UV-Vis-NIR), High-speed video camera, ACP-AES, NMR (400, 500, 600 MHz), ESR, DSC, DMA, Polarimeter, Rheometer, HPLC, MS, LC-MS, Particle size and zeta potential analyzer, Flow particle image analyzer
Processing: Freeze dryer, Ultracentrifuge, Circulating baths, Conductivity meter, Sonicator, Fermenters, Ovens, Furnaces, Microwave reactor	Characterization (biology): DNA sequencer, qPCR, NGS, UPLC-MS, Fluorescent image scanner, Confocal fluorescent microscope, Inverted fluorescent microscope, Flow cytometer, NMR (600, 800 MHz), XRD, Centrifugation machine, Fermenter
Softwares: COMSOL, ASPEN, ANSYS CFD, CHEMCAD, TURBOMOLE, GAMS	Softwares: Gaussian, ImageJ, Mascot, GeneSpring

9. Campus Facilities and Infrastructure

IIT Guwahati, India	Gifu University, Japan
Guest House, Cafeteria, Computer Center, Library, Placement Cell (CCD), Hostels, Hospital & Medical Center, Analytical and Research Labs, Bus facilities, Community Hall, Market complex, Students Activity Center, Sports Complex etc.,	Library, Health Administration Center, University Hospital, Information and Multimedia Center, Life Science Research Center, Center for Japanese Language and Culture, International Student Center, Hostel, University Co-op, Cafeteria, Students Activity Center, Sports Complex, etc.

10. Financial Assistance & Scholarships

Stay at IIT Guwahati	Stay at Gifu University, Japan
<ul style="list-style-type: none"> GATE Scholarship 	<ul style="list-style-type: none"> IIT Guwahati to provide to & fro Airfare for visiting Gifu University, Japan Students exempted from registration fees during stay at Gifu University Gifu University, Japan can give Research/Teaching Assistantships or Tutorships (at par with cost of living at GIFU, Japan) to visiting Indian students Students not entitled to GATE scholarship during foreign visit

Note: Living expenses at Gifu University, Japan have been estimated to be about 60,000 Japanese Yen per month (inclusive of accommodation and other living expenses).

11. Program Faculty

IIT Guwahati

Name	Field of specialization	URL
Ajaikumar B. KUNNUMAKKARA kunnumakkara@iitg.ac.in	Nutraceutical development for various chronic diseases	http://www.iitg.ac.in/kunnumakkara/
Arun GOYAL arungoyal@iitg.ac.in	Nutraceutical production and purification	https://www.iitg.ac.in/biotech/A.Goyal.html
Biman MANDAL biman.mandal@iitg.ac.in	Bio-engineered Foods	http://www.iitg.ac.in/biman.mandal/
Lalit Mohan PANDEY lalitpandey@iitg.ac.in	Biochemical Engineering	http://www.iitg.ac.in/lalitpandey/
Latha RANGAN lrangan@iitg.ac.in	Food Product Design & Development	https://www.iitg.ac.in/biotech/L.Rangan.html
Lingaraj SAHOO ls@iitg.ac.in	Functional food and Translational Agriculture	https://www.iitg.ac.in/biotech/ls/index.html
Manish KUMAR mkumar1@iitg.ac.in	Food borne infection and intoxication	https://www.iitg.ac.in/biotech/M.Kumar.html
Pakshirajan KANNAN © pakshi@iitg.ac.in	Bio-molecular and Cellular Process Engineering Wastewater treatment in Food Processes	http://www.iitg.ac.in/pakshi/
Rajaram SWAMINATHAN rsw@iitg.ac.in	Food Nutrition and Food Contamination	https://www.iitg.ac.in/biotech/R.Swaminathan.html
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Sanjukta PATRA sanjukta@iitg.ac.in	Food Microbiology	http://www.iitg.ac.in/sanjukta/
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Senthilkumar SIVAPRAKASAM senthilkumar@iitg.ac.in	Food and Bio-process Analytical Technology	http://www.iitg.ac.in/senthilkumar/index.html
Utpal BORA	Food Anthropology and	http://www.iitg.ac.in/ubora/

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Raghavendra GUPTA guptar@iitg.ac.in	Experimental and Computational Fluid Dynamics in Food Processes	http://www.iitg.ac.in/chemeng/rg/home
Rajesh UPADHYAY rkupadhyay@iitg.ac.in	Transport Phenomena in Food Processing	http://www.iitg.ac.in/chemeng/rku/home
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Senthilmurugan S. senthilmurugan@iitg.ac.in	Food Systems Engineering	http://www.iitg.ac.in/chemeng/ss/home
Tamal BANERJEE tamalb@iitg.ac.in	Green solvents for Food Processing Numerical Methods in FST	http://www.iitg.ac.in/tamalb/
Vaibhav V. GOUD vvgoud@iitg.ac.in	Food Processing	http://www.iitg.ac.in/vvgoud/
Vimal KATIYAR vkatiyar@iitg.ac.in	Food Packaging	http://www.iitg.ac.in/chemeng/vk/home
Siddhartha SINGHA siddharthafp@iitg.ac.in	Food Process Design and Development	http://www.iitg.ac.in/crt/index.html
Sudip MITRA sudipmitra@iitg.ac.in	Food Toxicology	http://www.iitg.ac.in/crt/sudip_mitra/index.html
Subhendu Sekhar BAG	Nucleic Acid Chemistry	http://www.iitg.ac.in/ssbag75/index.html

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Lal Mohan KUNDU

Nucleic Acid Chemistry

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Name (First name/ SURNAME); ©, Head; #, Coordinator; M, Master

Gifu University, Japan

Name	Field of specialization	URL
Hideharu ISHIDA ishida@gifu-u.ac.jp	Bioactive Materials Science	https://researchmap.jp/read0010821/?lang=english
Akio EBIHARA # M aebihara@gifu-u.ac.jp	Enzyme Science	https://researchmap.jp/read0117842/?lang=english
Hitoshi IWAHASHI h1884@gifu-u.ac.jp	Applied Microbiology	https://researchmap.jp/read0005223/?lang=english
Yoshihito UENO uenoy@gifu-u.ac.jp	Nucleic Acid Chemistry	https://researchmap.jp/read0180133/?lang=english
Emiko YANASE e-yanase@gifu-u.ac.jp	Bio-organic Chemistry	https://researchmap.jp/read0194418/?lang=english
Tohru SUZUKI suzuki@gifu-u.ac.jp	Genome Microbiology	https://researchmap.jp/read0090018/?lang=english
Tohru MITSUNAGA mitunaga@gifu-u.ac.jp	Natural Products Chemistry	https://researchmap.jp/7000014337/?lang=english
Yoshikuni TERAMOTO teramoto@gifu-u.ac.jp	Chemistry of Biomass-based Materials	https://researchmap.jp/read0120544/?lang=english
Tomio YABE yabet@gifu-u.ac.jp	Food Chemistry and Biochemistry	https://researchmap.jp/tomioyabe/?lang=english
Satoshi NAGAOKA nagaoka@gifu-u.ac.jp	Molecular Function of Food	https://researchmap.jp/read0010824/?lang=english
Tomoyuki NAKAGAWA t_nakaga@gifu-u.ac.jp	Food Microbiology	https://researchmap.jp/read0116999/?lang=english
Masaya SHIMADA mshimada@gifu-u.ac.jp	Molecular Nutrition	https://researchmap.jp/7000014336/?lang=english
Satoshi IWAMOTO isatoshi@gifu-u.ac.jp	Food Chemistry and Engineering	https://researchmap.jp/read0123866/?lang=english
Takahisa NISHIZU ©M nishizu@gifu-u.ac.jp	Food Process Engineering	https://researchmap.jp/read0013077/?lang=english
Masafumi SHIMIZU shimizma@gifu-u.ac.jp	Plant Pathology	https://researchmap.jp/read0119307/?lang=english
Hiroyuki KOYAMA	Plant Cell Technology	https://researchmap.jp/read0071961/?lang=english

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Yuriko KOBAYASHI k_yuriko@gifu-u.ac.jp	Molecular Plant Nutrition	https://researchmap.jp/7000014346/?lang=english
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Kohei NAKANO knakano@gifu-u.ac.jp	Postharvest Engineering	https://researchmap.jp/read0161320/?lang=english

Name (First name/ SURNAME); ©, Head of JD program; #, Coordinator; M, Master;

12. How to reach IIT Guwahati (India) and Gifu University (Japan)

Travel to IIT Guwahati	Travel to Gifu University, Japan
<p>Guwahati, the gateway for North East India, is well connected by air, rail and road with the rest of the country. There are direct air services from/to Mumbai, New Delhi and Kolkata with connectivity to all major cities in the country. Direct train services are available from/to all major metropolis and cities in the country. Indian Airlines, Jetlite, Jet Airways, Indigo, and SpiceJet operate regular flights to and from Guwahati.</p> <p>The Institute is located on the outskirts of the city of Guwahati and can be reached conveniently. It is around 20 km from the heart of the city and around 35 min. drive from the airport. To reach the IIT Guwahati campus from the airport, railway station or any other part of Guwahati city all modes of transport are available.</p>	<p>Gifu University is located about 1 hour by train (20 min frequency) from Chubu International Airport. The Chubu Airport has international flight connections with flights originating from all metro cities of India.</p> <p>The destination from Chubu International Airport is Meitetsu Gifu Station (not JR Gifu Station). To reach Gifu University from Meitetsu Gifu Station, bus services are available (about 35 min).</p>

13. Important dates

- Last Date of Application: **As per IITG M.Tech. admission policy. Statement of Purpose mandatory.**
- Intimation to short-listed Candidates for Interview: **End May, Year 1 Short-listing criteria:** Merit, GATE Score, research credentials and statement of purpose.
- Date of Interview: **1st week of June, (Tentative).** Accommodation for short-listed candidates will be provided but no TA/DA will be provided.
- Announcement of Results: **3rd week of June, (Tentative).**

14. Contact person for queries

Academic Coordinator
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