

CURRICULUM & SYLLABUS

Master of Technology in BIOTECHNOLOGY (Program Code: 110)

(Applicable for the Batch of 2026-2028)



Haldia Institute of Technology

[An Autonomous Institute of ICARE]

Approved by: All India Council for Technical Education (AICTE)

***Affiliated to: Maulana Abul Kalam Azad University of Technology, West
Bengal (Formerly Known as WBUT)***

HIT Campus, ICARE Complex, Purba Medinipur - 721657, WB, India

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THE INSTITUTE'S VISION AND MISSION

VISION

To achieve Centre of Excellence in the field of Science, Technology and Management Education for creating dynamic human resources of global standards with capabilities of accepting new challenges.

MISSION

M1: To impart quality and value based education to raise satisfaction level of all stakeholders.

M2: To create competent, creative professionals, and great entrepreneurs who can work as individual or in group in multi-cultural global environments.

M3: To prepare citizens who would grow to be competent enough to contribute significantly with personal integrity and civic responsibility for the betterment of mankind throughout their careers and profession.

VISION AND MISSION OF THE DEPARTMENT (BIOTECHNOLOGY)

VISION

To evolve as a pioneer to combat biological challenges and to develop students with sound concepts in Biotechnology who can excel as Leaders in the field of Research, Entrepreneurship, Industry and Management.

MISSION

M1: Implementation of outcome based teaching-learning methodology to fulfil current emerging challenges in various areas of Biotechnology.

M2: To fill up the gap between theory and practical in tune with the challenging demands of Biotechnology based industry and academia.

M3: To emphasize on certain areas such as soft skills, ethics, team spirit, environmental and societal issues for overall development.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO 1: Specialized Knowledge and Research Expertise:

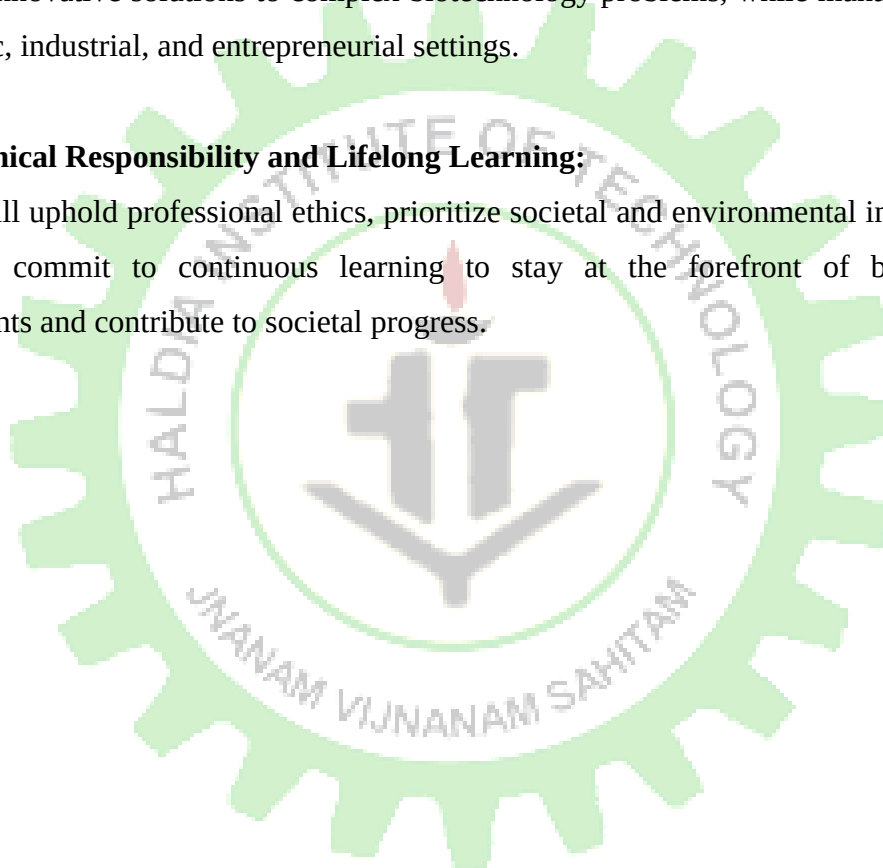
Students will possess in-depth knowledge of advanced biotechnology concepts and will be skilled in conducting independent research to address real-world challenges in healthcare, agriculture, and environmental sustainability.

PEO 2: Leadership, Collaboration, and Innovation:

Students will demonstrate leadership capabilities, effectively work in multidisciplinary teams, and apply innovative solutions to complex biotechnology problems, while managing projects in academic, industrial, and entrepreneurial settings.

PEO 3: Ethical Responsibility and Lifelong Learning:

Students will uphold professional ethics, prioritize societal and environmental impact in their work, and commit to continuous learning to stay at the forefront of biotechnology advancements and contribute to societal progress.



PROGRAM OUTCOMES (POs)

PO1: Advanced Domain Knowledge:

Apply comprehensive and in-depth knowledge of biotechnology and related disciplines (molecular biology, genetic engineering, bioprocess engineering, bioinformatics, etc.) to analyze complex problems and innovate biotechnological solutions.

PO2: Research and Critical Thinking:

Conduct independent research and critically evaluate existing literature, experimental data, and biotechnological systems to formulate hypotheses, design experiments, and interpret results for addressing real-world challenges.

PO3: Modern Tools and Techniques:

Select and utilize appropriate modern tools, laboratory techniques, software and computational methods with proficiency to model, simulate, analyze, and solve advanced biotechnology problems.

PO4: Problem Solving and Innovation:

Identify, formulate, and solve complex biotechnology problems using creative, analytical, and systems approaches while integrating ethical, regulatory, safety, and sustainability considerations in practice.

PO5: Communication and Professional Skills:

Demonstrate effective communication (oral, written, presentations), teamwork, leadership, and project management skills suitable for multidisciplinary environments in research, industry, and academia.

PO6: Ethics, Lifelong Learning, and Societal Responsibility:

Commit to professional ethics, societal responsibility, and environmental sustainability; pursue lifelong learning to stay current in emerging biotechnological trends and contribute positively to society.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO 1: Advanced Biotechnology Application:

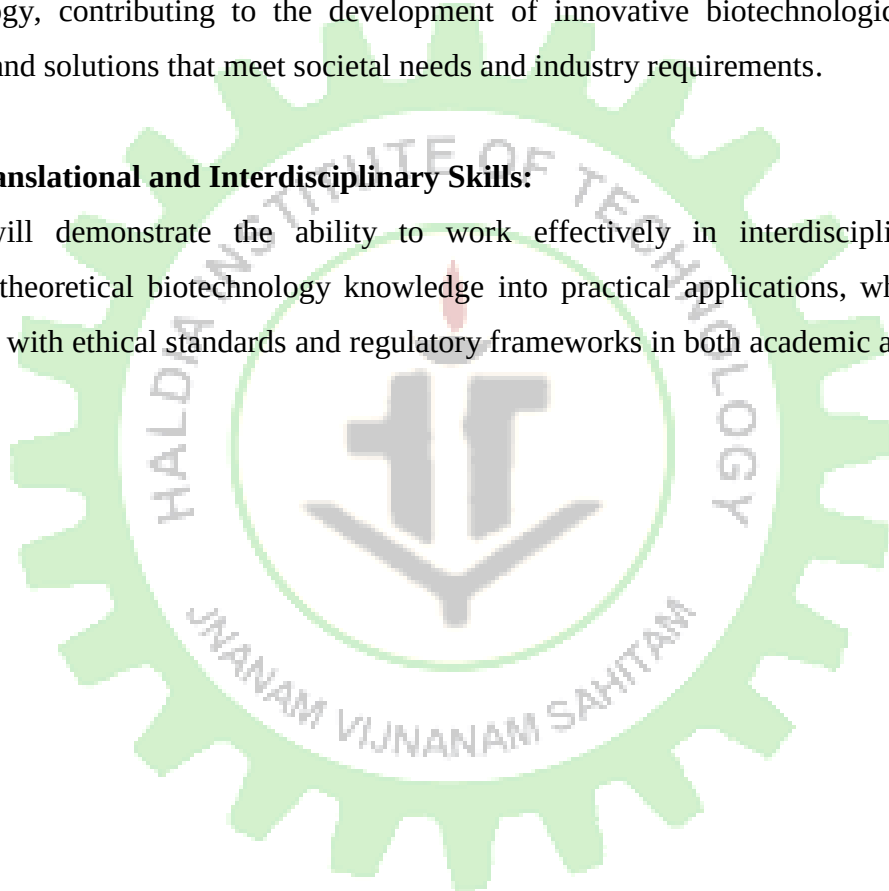
Students will be capable of applying advanced concepts of biotechnology to solve complex problems in academia or industries such as healthcare, pharmaceuticals, agriculture, and environmental biotechnology.

PSO 2: Research, Innovation, and Development:

Students will have the skills to design, conduct, and analyze research experiments in biotechnology, contributing to the development of innovative biotechnological products, processes, and solutions that meet societal needs and industry requirements.

PSO 3: Translational and Interdisciplinary Skills:

Students will demonstrate the ability to work effectively in interdisciplinary teams, translating theoretical biotechnology knowledge into practical applications, while ensuring compliance with ethical standards and regulatory frameworks in both academic and industrial settings.



CURRICULUM STRUCTURE

M.TECH 1ST YEAR (SEMESTER I)

Field	Course Code	Course Name	Contact Hours / Week				Credit
			L	T	P	Total	
Programme Core	PC-MBT101	Genetic Engineering	3	0	0	3	3
Programme Core	PC-MBT102	Plant Molecular Biology & Biotechnology	3	0	0	3	3
Programme Elective	PE-MBT103	Immunotechnology (PE-MBT103A)	3	0	0	3	3
		Cell Biology (PE-MBT103B)					
		Advanced Tissue Engineering (PE-MBT103C)					
Programme Elective	PE-MBT104	Genomics and Proteomics (PE-MBT104A)	3	0	0	3	3
		Instrumentation in Biotechnology (PE-MBT104B)					
Mandatory Learning Course	MLC-MBT101	Research Methodology and IPR	2	0	0	2	2
Audit Course	AC-MBT101	Audit Course 1	2	0	0	2	0
Programme Core	PC-MBT191	Genetic Engineering Laboratory	0	0	4	4	2
Programme Core	PC-MBT192	Plant Molecular Biology & Biotechnology Laboratory	0	0	4	4	2
Total Credit							18

M.TECH 1ST YEAR (SEMESTER II)

Field	Course Code	Course Name	Contact Hours / Week				Credit
			L	T	P	Total	
Programme Core	PC-MBT201	Bioinformatics	3	0	0	3	3
Programme Core	PC-MBT202	Animal Cell Culture	3	0	0	3	3
Programme Elective	PE-MBT203	Downstream Processing (PE-MBT203A)	3	0	0	3	3
		Bioreactor Design, Development and Scaleup (PE-MBT203B)					
Programme Elective	PE-MBT204	Bioprocess Engineering (PE-MBT204A)	3	0	0	3	3
		Pharmaceutical Biotechnology (PE-MBT204B)					
		Computer Aided Drug Design (PE-MBT204C)					
		Natural Product: Biology & Technology (PE-MBT204D)					
Audit Course	AC-MBT201	Audit Course 2	2	0	0	2	0
Programme Core	PC-MBT291	Bioinformatics Laboratory	0	0	4	4	2
Programme Core	PC-MBT292	Animal Cell Culture Laboratory	0	0	2	2	1
Programme Core	PC-MBT293	Bioprocess Engineering Laboratory	0	0	2	2	1
Sessional	SE-MBT281	Mini Project with Seminar	0	0	4	4	2
Total Credit							18

M.TECH 2ND YEAR (SEMESTER III)

Field	Course Code	Course Name	Contact Hours / Week				Credit
			L	T	P	Total	
Programme Elective	PE-MBT301	Biostatistics and Design of Experiments (PE-MBT301A)	3	0	0	3	3
		Quantitative approaches in Industrial Biotechnology (PE-MBT301B)					
		Problem solving through Programming Languages (PE-MBT301C)					
		Big Data Analytics (PE-MBT301D)					
		Nanobiotechnology (PE-MBT301E)					
		Environmental Biotechnology (PE-MBT301F)					
		Food Biotechnology (PE-MBT301G)					
		Healthcare Informatics (PE-MBT301H)					
		Aquatic Biotechnology (PE-MBT301I)					
Open Elective	OE-MBT301	Business Analytics (OE-MBT301A)	3	0	0	3	3
		Operations Research (OE-MBT301B)					
		Cost Management of Engineering Projects (OE-MBT301C)					
		Industrial Safety (OE-MBT301D)					
		Composite Materials (OE-MBT301E)					
		Waste to Energy (OE-MBT301F)					
Sessional	SE-MBT381	Dissertation-I (Progress)	0	0	20	20	10
Total Credit							16

M.TECH 2ND YEAR (SEMESTER IV)

Field	Course Code	Course Name	Contact Hours / Week				Credit
			L	T	P	Total	
Sessional	SE-MBT481	Dissertation-II (Completion)	0	0	32	32	16
Total Credit							16

Audit Course 1 & 2

1. English for Research Paper Writing (AC-MBT101A / AC-MBT201A)
2. Pedagogy Studies (AC-MBT101B / AC-MBT201B)
3. Constitution of India (AC-MBT101C / AC-MBT201C)
4. Disaster Management (AC-MBT101D / AC-MBT201D)
5. Value Education (AC-MBT101E / AC-MBT201E)
6. Stress Management by Yoga (AC-MBT101F / AC-MBT201F)
7. Personality Development through Life Enlightenment Skills (AC-MBT101G / AC-MBT201G)
8. Sanskrit for Technical Knowledge (AC-MBT101H / AC-MBT201H)

DISTRIBUTION OF CREDITS

Category	1st Semester	2nd Semester	3rd Semester	4th Semester	Total Credit
Programme Core (PC)	10	10	-	-	20
Programme Elective (PE)	6	6	3	-	15
Mandatory Learning Course (MLC)	2	-	-	-	2
Audit Course (AC)	0	0	-	-	0
Sessional (SE)	-	2	10	16	28
Open Elective (OE)	-	-	3	-	3
Total Credit	18	18	16	16	68