HI INSTITUTE OF TECHNOLOGY AND MANAGEMENT (GITAM)

(Deemed to be University)

VISAKHAPATNAM * HYDERABAD * BENGALURU

Accredited by NAAC with A^{++} Grade

GITAM School of Science

CURRICULUM AND SYLLABUS

2 Year Postgraduate Programme
PENVS01: M.Sc. Environmental Science

w.e.f. 2025-26 admitted batch

(Updated on July 2025)

Academic Regulations

Applicable for the Postgraduate Programmes in the Schools of Humanities & Social Sciences and Science (except M.C.A)

https://www.gitam.edu/academics/academic-regulations

GANDHI INSTITUTE OF TECHNOLOGY AND MANAGEMENT

Vision

GITAM will be an exceptional knowledge-driven institution advancing on a culture of honesty and compassion to make a difference to the world.

Mission

- Build a dynamic application-oriented education ecosystem immersed in holistic development.
- Nurture valuable futures with global perspectives for our students by helping them find their ikigai.
- Drive impactful integrated research programmes to generate new knowledge, guided by integrity, collaboration, and entrepreneurial spirit.
- Permeate a culture of kindness within GITAM, fostering passionate contributors.

Quality Policy

To achieve global standards and excellence in teaching, research, and consultancy by creating an environment in which the faculty and students share a passion for creating, sharing and applying knowledge to continuously improve the quality of education.

GITAM School of Science

Vision

Nurturing a high-quality Science Education and Research by providing a best learning ecosystem to create world class academicians and researchers.

Mission

- To teach the most renewed curriculum that lay the foundation for students to start exciting careers in academia, research, and industry.
- To foster an environment of healthy curiosity, an innovative mindset, and a strong desire to contribute to the science world.
- To advance our understandings of the natural processes of Physical, Chemical and Biological systems for a better habitable world.
- To inculcate a strong sense of empathy, integrity, and trust in the GITAM Fraternity with a strong commitment towards society and environment.

VISION AND MISSION OF THE DEPARTMENT

VISION

Fostering a seamless and innovative interdisciplinary research-driven academic ecosystem to address complex biological challenges, by reinforcing critical thinking, creativity, and collaboration

MISSION

- Holistic development of the students through interdisciplinary research and teaching programs with focus on contemporary problems in health, food, disease and environment
- Encourage students to embrace their curiosity to understand the natural processes and boost entrepreneurship for sustainable development
- To emerge as centre of excellence by addressing global challenges in personalized food and medicine, sustainable agriculture and environment through cutting-edge and collaborative research
- Nurture a culture of honesty, kindness, empathy and trust among the Life Sciences fraternity with a strong commitment towards all life on earth and its environment

Programme Educational Objectives (PEOs)

PEO 1: Exhibit their proficiency for solving contemporary environmental issues through measurement, modelling, monitoring and management.

PEO 2: Engross in environmental science profession at local and global levels through ethical contribution in terms of professional and skilled practice of science and allied professions.

PEO 3: Acclimatize to the dynamically changing world through sustained learning and professional development.

PEO 4: Present skills of entrepreneurship and leadership through incorporating goals of the organization and through providing facilities for peer associates with defined objectives.

PEO 5: Acquire communication skills and exhibit commitment towards teamwork which is necessary for functioning productively and professionally on multidisciplinary teams.

PEO Articulation

	PEO1	PEO2	PEO3	PEO4	PEO5
M1	3	2	2	1	1
M2	3	3	3	3	1
M3	3	3	2	1	1
M4	1	3	1	2	3

3 - High Correlation, 2 - Medium Correlation, 1 - Low Correlation

Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)

At the end of the Programme the students would be able to demonstrate:

PO1: Identify and appreciate scope of ecology and familiarize with interactions of organisms with physical and biological environment

PO2: Learn chemistry of environment and experimental techniques and develop an insight of natural world through studying neighboring ecosystems.

PO3: Evaluate exposure of plant, animal and humans to potentially hazardous environmental agents, which are physical, chemical and biological in nature and study the impacts of the exposure on health of plant, animal humans and environment. Appreciate the role of microbes in biogeochemical processes in different ecosystems.

PO4: Gain skills required for environmental monitoring comprising of carrying out experiments and analysis of results / data.

PO5: Comprehend pollution of various spheres and gain exposure to control technologies and their application for pollution abatement.

PO6: Analysis and determination of environmental pollution using environmental analytical techniques.

PO7: Identify, envisage and estimate environmental, economic and social impacts of various development actions and to deliver evidence on the environmental consequences for decision making.

PO8: Acquire insights to various methodologies and tools like environmental impact assessment, remote sensing and sustainable development.

PO9: Knowledge on interpreting and apply emerging and suitable environmental regulations, standards and best practices.

PO10: Achieve knowledge on recommending, operative and evaluating controls towards avoiding, reducing and eliminating pollution.

PO11: Appraise industrial safety and environmental remediation technologies.

PO12: Methods for conducting research towards identification, abatement and elimination of hazards that affect wildlife, people and environment.

PSO1: Recognize, devise and resolve concerns related to environment towards providing competent solutions.

PSO2: Evaluate and devise techniques and methods of varying intricacies in the emergent areas of pollution abatement.

PSO3: Provide a platform for involving in research with proficient and ethical responsibilities towards meeting societal needs.

Curriculum Structure

(Flexible Credit System)

Minimum Credit Requirements to Award Degree Under Each Category

Duration & Name of the Programme				S.No	Course Category		Minimum Credit Requirement		
Programme	Eligibility	Programme	Eligibility				2 Year PG (2nd year- Course Work alone)	2 Year PG (2nd year - Course Work and Research)	2 Year PG (2nd year - Research alone)
2-year PG Degree (with exit option at the end of first year)	3-year UG Degree	1 year & PG Diploma	3-year UG Degree	1	Programme Core Courses & Labs	PC	28	28	28
				2	Programme Electives Courses	PE	8	8	8
				3	Research Methodology	FC	4	4	4
				4	Seminar	FC	1	1	1
				5	Term Paper	FC	1	1	1
				6	Internship	FC	4	4	4
				Total (At the end of I Year)			46	46	46
		1 year & PG Degree	4-year UG Degree	7	Programme Core Courses	PC	40	20	0
				8	Programme Electives Courses	PE			
				9	Research Project	FC	0	20	0
				10	Research Dissertation	FC	0	0	40
				Total (At the end of II Year)			86	86	86

2 Year PG programme:

Semester I and II: Common Structure for Course Work, Course Work & Research and Research Alone

Course Code	Category	Level	Course Title	L	T	P	S	J	C
Semester - I									
25ENVS6001	PC	600	Ecological Principles and Applications	4	0	0	0	0	4
25ENVS6011	PC	600	Environmental Chemistry and Instrumentation	4	0	0	0	0	4
25ENVS6021	PC	600	Environmental Microbiology	4	0	0	0	0	4
25ENVS6031	PC	600	Ecological Principles and Applications Laboratory	0	0	4	0	0	2
25ENVS6041	PC	600	Environmental Microbiology Laboratory	0	0	4	0	0	2
Choose any one of the following electives:									
25ENVS6051	PE	600	Environmental Toxicology	4	0	0	0	0	4
25ENVS6061	PE	600	Biodiversity and its Conservation	4	0	0	0	0	4
			Total Credits						**20**
Semester - II									
25ENVS6071	PC	600	Environmental Pollution	4	0	0	0	0	4
25ENVS6081	PC	600	Earth Science - System and its Resources	4	0	0	0	0	4
25ENVS6091	PC	600	Environmental Pollution Laboratory	0	0	4	0	0	2
25ENVS6101	PC	600	Earth Science - System and its Resources Laboratory	0	0	4	0	0	2
25ENVS6444	FC	600	Research Methodology	4	0	0	0	0	4
25ENVS6777	FC	600	Term Paper	0	0	0	0	2	1
25ENVS6666	FC	600	Seminar	0	0	0	0	2	1
25ENVS6333	FC	600	Internship	0	0	0	0	8	4
Choose any one of the following electives:									
25ENVS6111	PE	600	Air Pollution and Control	4	0	0	0	0	4
25ENVS6121	PE	600	Water and Wastewater Treatment	4	0	0	0	0	4
25ENVS6131	PE	600	Climate Change and Sustainability	4	0	0	0	0	4
			Total Credits						**26**

2nd Year - Research alone:

Course Code	Category	Level	Course Title	L	T	P	S	J	C
Semester - III									
25ENVS7888	FC	700	Research Dissertation - I	0	0	0	0	40	20
			Total Credits						**20**
Semester – IV									
25ENVS7999	FC	700	Research Dissertation - II	0	0	0	0	40	20
			Total Credits						**20**

2nd Year – 'Course Work alone' & 'Coursework and Research':

Semester – III (Common Structure for 'Course Work alone' & 'Course Work and Research')									
Course Code	**Category**	**Level**	**Course Title**	**L**	**T**	**P**	**S**	**J**	**C**
25ENVS7001	PC	700	Environmental Impact Assessment	4	0	0	0	0	4
25ENVS7011	PC	700	Solid and Hazardous Waste Management	4	0	0	0	0	4
25ENVS7021	PC	700	Environmental Impact Assessment Laboratory	0	0	4	0	0	2
25ENVS7031	PC	700	Solid and Hazardous Waste Management Laboratory	0	0	4	0	0	2
Choose any two of the following electives:									
25ENVS7041	PE	700	Remote sensing and its Applications	4	0	0	0	0	4
25ENVS7051	PE	700	Environmental Biotechnology and Nanotechnology	4	0	0	0	0	4
25ENVS7061	PE	700	Bioenergy and Life Cycle Analysis	4	0	0	0	0	4
			Total Credits						**20**

Course Work alone

Semester - IV									
Course Code	**Category**	**Level**	**Course Title**	**L**	**T**	**P**	**S**	**J**	**C**
25ENVS7071	PC	700	Environmental Remediation	4	0	0	0	0	4
25ENVS7081	PC	700	Industrial Safety and Disaster Management	4	0	0	0	0	4
25ENVS7091	PC	700	Environmental Remediation Laboratory	0	0	4	0	0	2
Choose any two of the following electives:									
25ENVS7101	PE	700	Marine Pollution and Coastal Zone Management	4	0	0	0	0	4
25ENVS7111	PE	700	Environmental Planning and Sustainable Development	4	0	0	0	0	4
25ENVS7121	PE	700	Behavioural Ecology	4	0	0	0	0	4
Choose any one of the following electives:									
25ENVS7131	PE	700	Marine Pollution and Coastal Zone Management Laboratory	0	0	4	0	0	2
25ENVS7141	PE	700	Environmental Planning and Sustainable Development Laboratory	0	0	4	0	0	2
25ENVS7151	PE	700	Behavioural Ecology Laboratory	0	0	4	0	0	2
			Total Credits						**20**

Coursework and Research

Semester – IV									
Course Code	**Category**	**Level**	**Course Title**	**L**	**T**	**P**	**S**	**J**	**C**
25ENVS7555	FC	700	Research Project	0	0	0	0	40	20
			Total Credits						**20**

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