GANDHI 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
PMATH02: M.Sc. Statistics

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

To provide quality education and research in Mathematical Sciences by creating an enabling and enjoyable learning experiences and fostering a community of passionate learners

MISSION

- Inculcate an application-oriented education in mathematical sciences, preparing students for successful careers in academia, research, and industry.
- Conduct innovative research in mathematics and statistics, including mathematical modelling and interdisciplinary problems, to advance knowledge and benefit communities.
- Identify and nurture students' strengths, fostering curiosity, innovation, and a commitment to contributing to the science world.
- Promote a diverse and inclusive environment, ensuring equity, fairness, and empathy in all academic and professional endeavours, with a strong commitment to society and the environment.

Programme Educational Objectives (PEOs)

PEO 1: To apply basic knowledge of mathematics and science to understand the real world problems.

PEO 2: To establish the methodologies for core mathematical problems.

PEO 3: To implement computer solution methods for large systems.

PEO 4: To perform inter-disciplinary research objectives

PEO 5: To imbibe professional and ethical responsibility towards the society

PEO Articulation

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

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: Apply basic knowledge of mathematics and science to understand the real world problems.

PO2: Develop complexity problem solving techniques using mathematical tools.

PO3: Establish the methodologies for core mathematical problems.

PO4: Implement computer solution methods for large systems.

PO5: Assess the influence of global changes on organization for effective decision making business problems.

PO6: Acquire knowledge of fast changing methodologies for solving engineering and science problems.

PO7: Exhibit leadership capabilities.

PO8: Perform inter-disciplinary research objectives.

PO9: Communicate effectively in peer and research related conferences.

PO10: Acquire skills to become a good researcher.

PO11: Engage in life-long learning environment.

PO12: Imbibe professional and ethical responsibility towards the society.

PSO1: Create Statistical and Mathematical Models (along with solution) for various physical needs.

PSO2: Use Mathematics and Statistics, not only in the discipline of Statistics, but also in other disciplines and in their future endeavours.

PSO3: Develop the statistical and computer programming skill for solving various physical problems

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									
25MATH6171	PC	600	Time Series Analysis - I	4	0	0	0	0	4
25MATH6181	PC	600	Probability theory	4	0	0	0	0	4
25MATH6191	PC	600	Distribution Theory	4	0	0	0	0	4
25MATH6321	PC	600	Python for Statistical Analysis Laboratory	0	0	4	0	0	2
25MATH6241	PC	600	Time Series Analysis - I Laboratory	0	0	4	0	0	2
Choose any one of the following electives:									
25MATH6021	PE	600	Linear Algebra	4	0	0	0	0	4
25MATH6071	PE	600	Mathematical Modelling	4	0	0	0	0	4
25MATH6211	PE	600	Sampling theory	4	0	0	0	0	4
			Total Credits						**20**
Semester - II									
25MATH6251	PC	600	Multivariate Statistical Analysis	4	0	0	0	0	4
25MATH6311	PC	600	Applied Regression Analysis	4	0	0	0	0	4
25MATH6271	PC	600	Multivariate Statistical Analysis Laboratory	0	0	4	0	0	2
25MATH6281	PC	600	Applied Regression Analysis Laboratory	0	0	4	0	0	2
25MATH6444	FC	600	Research Methodology	4	0	0	0	0	4
25MATH6666	FC	600	Seminar	0	0	0	0	2	1
25MATH6777	FC	600	Term Paper	0	0	0	0	2	1
25MATH6333	FC	600	Internship	0	0	0	0	8	4
Choose any one of the following electives:									
25MATH6291	PE	600	Biostatistics	4	0	0	0	0	4
25MATH6301	PE	700	Econometrics	4	0	0	0	0	4
25MATH6261	PE	600	Statistical Inference	4	0	0	0	0	4
			Total Credits						**26**

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**
25MATH7351	PC	700	Time Series Analysis - II	4	0	0	0	0	4
25MATH7361	PC	700	Applied Stochastic Processes	4	0	0	0	0	4
Laboratory courses:									
25MATH7371	PC	700	Time Series Analysis –II Laboratory	0	0	4	0	0	2
Choose any one of the following laboratory courses:									
25MATH7571	PC	700	Advance Big Data Analytics Laboratory	0	0	4	0	0	2
25MATH7441	PC	700	Statistical Machine Learning Laboratory	0	0	4	0	0	2
25MATH7581	PC	700	Pattern Recognition Laboratory	0	0	4	0	0	2
25MATH7591	PC	700	Intensive Computational Methodologies using R Laboratory	0	0	4	0	0	2
Choose any one of the following electives:									
25MATH7391	PE	700	Reliability theory	4	0	0	0	0	4
25MATH7401	PE	700	Statistical Computing	4	0	0	0	0	4
25MATH7411	PE	700	Decision Theory	4	0	0	0	0	4
25MATH7461	PE	700	Data Science	4	0	0	0	0	4
Choose any one of the following electives:									
25MATH7431	PE	700	Advance Big Data Analytics	4	0	0	0	0	4
25MATH7381	PE	700	Statistical Machine Learning	4	0	0	0	0	4
25MATH7451	PE	700	Pattern Recognition	4	0	0	0	0	4
25MATH7421	PE	700	Intensive Computational Methodologies using R	4	0	0	0	0	4
			Total Credits						**20**

2nd Year - Research alone:

Course Code	**Category**	**Level**	**Course Title**	**L**	**T**	**P**	**S**	**J**	**C**
Semester - III									
25MATH7888	FC	700	Research Dissertation - I	0	0	0	0	40	20
			Total Credits						**20**
Semester – IV									
25MATH7999	FC	700	Research Dissertation - II	0	0	0	0	40	20
			Total Credits						**20**

2nd Year - Course Work alone									
Semester - IV									
Course Code	**Category**	**Level**	**Course Title**	**L**	**T**	**P**	**S**	**J**	**C**
25MATH7471	PC	700	Advanced Bayesian Inference	4	0	0	0	0	4
25MATH7481	PC	700	Hierarchical Linear Models	4	0	0	0	0	4
Laboratory courses:									
25MATH7601	PC	700	Hierarchical Linear Models - Laboratory	0	0	4	0	0	2
Choose any one of the following laboratory courses:									
25MATH7491	PC	700	Longitudinal Data Analysis Laboratory	0	0	4	0	0	2
25MATH7611	PC	700	Categorical Data Analysis Laboratory	0	0	4	0	0	2
25MATH7501	PC	600	Risk Modelling and Analysis (RMA) Laboratory	0	0	4	0	0	2
Choose any one of the following electives:									
25MATH7511	PE	700	Longitudinal Data Analysis	4	0	0	0	0	4
25MATH7521	PE	700	Categorical Data Analysis	4	0	0	0	0	4
25MATH7531	PE	600	Risk Modelling and Analysis (RMA)	4	0	0	0	0	4
Choose any one of the following electives:									
25MATH7541	PE	700	Statistical Deep Learning	4	0	0	0	0	4
25MATH7551	PE	700	Neural Networks	4	0	0	0	0	4
25MATH7561	PE	700	Industrial Statistics	4	0	0	0	0	4
			Total Credits						**20**

2nd Year - Coursework and Research

Semester – IV									
Course Code	**Category**	**Level**	**Course Title**	**L**	**T**	**P**	**S**	**J**	**C**
25MATH7555	FC	700	Research Project	0	0	0	0	40	20
			Total Credits						**20**

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