

**GANDHI INSTITUTE OF TECHNOLOGY AND MANAGEMENT (GITAM)**

(Deemed to be University)

VISAKHAPATNAM \* HYDERABAD \* BENGALURU

Accredited by NAAC with A<sup>++</sup> Grade

**GITAM School of Technology**



**CURRICULUM AND SYLLABUS**

**4 Year Undergraduate Programme**

**UAERO01: B.Tech. Aerospace Engineering**

w.e.f. 2024-25 admitted batch

(Updated on May 2024)

# Academic Regulations

**Applicable for the Undergraduate Programmes in the  
School of Technology (except B.Tech.CSBS)**

**<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.

## **VISION AND MISSION OF THE SCHOOL**

### **VISION**

To become a global leader in holistic engineering education and research

### **MISSION**

- To impart a strong academic foundation and practical education through a flexible curriculum, state-of-the-art infrastructure, and best learning resources
- To actively pursue academic and collaborative research with industries and research institutions, both in India and abroad
- To build a congenial and innovative eco system by enabling the latest technologies, thus helping the students, to solve the challenges of societal importance
- To provide our students with the appropriate leadership, management, communication skills and professional ethics for career success and to continuously impact the global lives

## **VISION AND MISSION OF THE DEPARTMENT**

### **VISION**

### **MISSION**

## UAERO01: B.Tech.Aerospace Engineering

(w.e.f. academic year 2024-25 admitted batch)

### Programme Educational Objectives (PEOs)

<b>PEO 1</b>	Demonstrate their expertise in solving contemporary problems through design, analysis, implementation and evaluation of hardware and software systems.
<b>PEO 2</b>	Engage in the Aerospace Engineering profession locally and globally by contributing ethically to the competent and professional practice of Engineering or other professional careers.
<b>PEO 3</b>	Adapt to a constantly changing world through professional development and sustained learning.
<b>PEO 4</b>	Exhibit leadership and entrepreneurship skills by incorporating organizational goals and providing facilities for peer members with defined objectives.
<b>PEO 5</b>	Develop communication skills and show a commitment to teamwork necessary to function productively and professionally on multidisciplinary teams.

### PEO Articulation

	<b>PEO1</b>	<b>PEO2</b>	<b>PEO3</b>	<b>PEO4</b>	<b>PEO5</b>
<b>M1</b>	H	H	H	M	M
<b>M2</b>	H	H	H	M	H
<b>M3</b>	H	H	M	H	M
<b>M4</b>	M	H	H	M	H

H – High, M – Medium, L – Low

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

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

<b>PO1</b>	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO2</b>	Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO3</b>	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
<b>PO4</b>	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
<b>PO5</b>	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
<b>PO6</b>	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
<b>PO7</b>	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
<b>PO8</b>	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO9</b>	Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO10</b>	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
<b>PO11</b>	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
<b>PO12</b>	Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
<b>PSO1</b>	Identify, formulate, and solve Aerospace engineering problems in the related domains to provide efficient solutions
<b>PSO2</b>	Analyze, design and develop applications of varying complexities in the emerging areas of Aerospace Engineering
<b>PSO3</b>	Provide a platform to engage in research with professional and ethical responsibility to meet societal needs

# **Curriculum Structure**

*(Flexible Credit System)*



**Minimum Credit Requirements for the Award of Degree**

<b>S.No.</b>	<b>Course Category and Category Code</b>	<b>Minimum Credits</b>	<b>% of credits in the Programme</b>
1.	University Core (UC)	19	11.87
2.	Faculty Core (FC)	53	33.13
3.	Programme Core (PC)	49	30.62
4.	Programme Electives (PE)	15	9.38
5.	Open Electives (OE)	24	15.00
	<b>Total</b>	<b>160</b>	<b>100</b>

University Core (UC) : 19 Credits								
Course code	Level	Course Title	L	T	P	S	J	C
<b>Ability Enhancement Courses</b>								
LANG1201	100	<a href="#">Critical Thinking</a>	2	0	0	0	0	2
LANG1241	100	<a href="#">Communicative English - I</a>	0	0	4	0	0	2
LANG1251	100	<a href="#">Communicative English - II</a>	0	0	4	0	0	2
IENT1051	100	<a href="#">Fundamentals of Entrepreneurship</a>	2	0	0	0	0	2
<b>Skill Enhancement Courses</b>								
CLAD1041	100	<a href="#">Art of Persuasive Communication</a>	0	0	2	0	0	1
CLAD1051	100	<a href="#">Competence in Communication</a>	0	0	2	0	0	1
CLAD1061	100	<a href="#">Life Skills</a>	0	0	2	0	0	1
CLADXXXX	100	Soft Skills - 4	0	0	2	0	0	1
<b>Value Added Courses</b>								
ENVS1003	100	<a href="#">Environmental Studies</a>	3	0	0	0	0	3
POLS1051	100	<a href="#">The Indian Constitution</a>	1	0	0	0	0	1
<b>Pass / Fail Courses (Mandatory)</b>								
FINA1081	100	<a href="#">Personal Financial Planning *</a>	1	0	0	0	0	1
PHPY1011	100	<a href="#">Gandhi and the Contemporary World *</a>	1	0	0	0	0	1
<b>Pass / Fail Courses (Any one course to be chosen)</b>								
DOSP1181	100	<a href="#">Yogasana</a>	0	0	0	2	0	1
MFST1002	100	<a href="#">Health and Wellbeing *</a>	0	0	2	0	0	1
DOSL1081	100	<a href="#">Student Life Activities (Participant)</a>	0	0	0	2	0	1
DOSL1091	100	<a href="#">Student Life Activities (Organizer)</a>	0	0	0	2	0	1
DOSL1101	100	<a href="#">Student Life Activities (Competitor)</a>	0	0	0	2	0	1
DOSL1111	100	<a href="#">Foundations of Student (Leadership)</a>	0	0	0	2	0	1
DOSL1042	100	<a href="#">Community Services – Volunteer</a>	0	0	2	0	0	1
DOSL1052	100	<a href="#">Community Services – Mobilizer</a>	0	0	2	0	0	1
DOSP1003	100	<a href="#">Badminton</a>	0	0	0	2	0	1
DOSP1033	100	<a href="#">Football</a>	0	0	0	2	0	1
DOSP1043	100	<a href="#">Volleyball</a>	0	0	0	2	0	1
DOSP1053	100	<a href="#">Kabaddi</a>	0	0	0	2	0	1
DOSP1073	100	<a href="#">Table Tennis</a>	0	0	0	2	0	1
DOSP1083	100	<a href="#">Handball</a>	0	0	0	2	0	1
DOSP1093	100	<a href="#">Basketball</a>	0	0	0	2	0	1
DOSP1113	100	<a href="#">Throw ball</a>	0	0	0	2	0	1
DOSP1142	100	<a href="#">Cricket</a>	0	0	0	2	0	1
DOSP1132	100	<a href="#">Functional Fitness</a>	0	0	0	2	0	1
DOSP1171	100	<a href="#">Martial Arts/Self Defence</a>	0	0	0	2	0	1

\* Massive Open Online Course (MOOC)

FACULTY CORE (FC) : 53 credits								
Course code	Level	Course title	L	T	P	S	J	C
MATH1341	100	<a href="#">Calculus and Differential Equations</a>	3	1	0	0	0	4
MATH1272	100	<a href="#">Linear Algebra</a>	3	1	0	0	0	4
MATH2102	200	<a href="#">Probability and Statistics for Engineering</a>	3	1	0	0	0	4
MATH2601	200	<a href="#">Numerical Methods</a>	3	0	2	0	0	4
PHYS1301	100	<a href="#">Basics of Engineering Physics</a>	3	0	2	0	0	4
CHEM1111	100	<a href="#">Engineering Chemistry</a>	2	1	2	0	0	4
24CSEN1031	100	<a href="#">Programming for Problem Solving - 1</a> (Programming with Python)	0	0	6	0	0	3
24CSEN1041	100	<a href="#">Programming for Problem Solving - 2</a> (Programming with C)	0	0	6	0	0	3
24XXXXXXXX	xxx	Engineering Basket - Choice 1	2	0	2	0	0	3
24XXXXXXXX	xxx	Engineering Basket - Choice 2	2	0	2	0	0	3
MECH1011	100	<a href="#">Engineering Visualization and Product Realization</a>	0	0	4	0	0	2
MECH1041	100	<a href="#">Technology Exploration and Product Engineering</a>	0	0	4	0	0	2
24PROJ4777	400	Capstone Project - Introduction	0	0	0	0	2	1
24IENT3777	300	Internship-1	0	0	0	0	2	1
24PROJ4888 / 24IENT4888 / 24RESH4888	400	Capstone Project - Final / Internship-2 / Research	0	0	0	0	16	8
HSMCH102	100	Universal Human Values 2: Understanding Harmony	2	1	0	0	0	3

## Engineering Basket 1 &amp; 2

Six credits have to be chosen from the basket other than Parent Department course.

Course code	Level	Course title	L	T	P	S	J	C
24EECE2221	200	<a href="#">Fundamentals of Sensors and Internet of Things</a>	2	0	2	0	0	3
24EECE2211	200	<a href="#">Fundamentals of Electrical and Electronics Engineering</a>	2	0	2	0	0	3
24EECE2231	200	<a href="#">Foundations of Electrical and Electronics Engineering</a>	3	0	2	0	0	4
24MECH1001	100	<a href="#">Introduction to Mechanical Engineering</a>	2	0	2	0	0	3
24CIVL1001	100	<a href="#">Introduction to Civil Engineering</a>	2	0	2	0	0	3
24BTEN1021	100	<a href="#">Biotechnology and Bioengineering</a>	2	0	2	0	0	3
24BTEN1031	100	<a href="#">Introduction to Biomedical Engineering</a>	2	0	2	0	0	3
24CSEN2261	200	<a href="#">Data Structures and Algorithms</a>	2	0	2	0	0	3

Programme Core (PC) : 49 credits								
49 credits to be earned through programme core courses.								
Course code	Level	Course Title	L	T	P	S	J	C
24AERO1001	100	<a href="#">Introduction to Aerospace Engineering and Aero workshop</a>	2	0	2	0	0	3
24MECH2001	200	<a href="#">Engineering Mechanics</a>	3	0	0	0	0	3
24AERO2001	200	<a href="#">Engineering Thermodynamics</a>	3	0	0	0	0	3
24AERO2011	200	<a href="#">Aerodynamics - I</a>	3	1	0	0	0	4
24AERO2021	200	<a href="#">Solid Mechanics</a>	3	0	2	0	0	4
24AERO1011	100	<a href="#">Aerospace Materials</a>	3	0	0	0	0	3
24AERO4001	400	<a href="#">Aerodynamics - II</a>	3	0	2	0	0	4
24AERO3001	300	<a href="#">Aerospace Structure</a>	3	0	2	0	0	4
24AERO2031	200	<a href="#">Flight Mechanics</a>	3	0	0	0	0	3
24AERO3011	300	<a href="#">Aircraft Propulsion</a>	3	0	2	0	0	4
24AERO3021	300	<a href="#">Aircraft Systems and Instruments</a>	3	0	0	0	0	3
24AERO3031	300	<a href="#">Flight Dynamics</a>	3	0	0	0	0	3
24AERO4011	400	<a href="#">Aerospace Propulsion</a>	3	1	0	0	0	4
24AERO4021	400	<a href="#">Flight Vehicle Design and Practice</a>	3	0	2	0	0	4

Programme Elective (PE) : 15 credits								
A minimum of 15 credits from any one of the tracks								
Track # :AVIONICS								
Course code	Level	Course Title	L	T	P	S	J	C
24EECE2301	200	<a href="#">Embedded systems</a>	2	0	2	0	0	3
24AERO2041	200	<a href="#">Introduction to Avionics</a>	3	0	0	0	0	3
24AERO2051	200	<a href="#">Aircraft Instrumentation and Measurement</a>	3	0	0	0	0	3
24AERO3041	300	<a href="#">Aircraft Flight Control Systems</a>	3	0	0	0	0	3
24AERO3051	300	<a href="#">Aircraft Inertial Navigation Systems</a>	3	0	0	0	0	3
24AERO3061	300	<a href="#">Flight Management Systems</a>	3	0	0	0	0	3
24AERO3071	300	<a href="#">Global Navigation Satellite Systems (GNSS) in Avionics</a>	3	0	0	0	0	3
24AERO2061	200	<a href="#">Aircraft Electrical Systems</a>	3	0	0	0	0	3
24AERO2071	200	<a href="#">Radar Systems for Avionics</a>	3	0	0	0	0	3
24AERO2081	200	<a href="#">Avionics Cybersecurity</a>	3	0	0	0	0	3
							<b>Total Credits 15</b>	

<b>Track # : AEROSPACE DESIGN</b>								
24AERO3081	300	<a href="#">Design and Analysis of Composite Structures</a>	3	0	0	0	0	3
24AERO3091	300	<a href="#">Design of Aircraft Systems</a>	3	0	0	0	0	3
24AERO3101	300	<a href="#">Aircraft Performance</a>	3	0	0	0	0	3
24AERO3111	300	<a href="#">UAV/UAS Design</a>	3	0	0	0	0	3
24AERO4031	400	<a href="#">Design for Manufacturing and Operation</a>	3	0	0	0	0	3
24AERO4041	400	<a href="#">Conceptual Aircraft Design</a>	3	0	0	0	0	3
24AERO3121	300	<a href="#">Propulsion and Power Systems</a>	3	0	0	0	0	3
24AERO4051	400	<a href="#">Integrated Vehicle Health Management</a>	3	0	0	0	0	3
24AERO4061	400	<a href="#">Spacecraft Design</a>	3	0	0	0	0	3
24AERO4071	400	<a href="#">Human Factors in Aerospace Design</a>	3	0	0	0	0	3
<b>Total Credits</b>								<b>15</b>
<b>Track # : GENERAL</b>								
24AERO3131	300	<a href="#">Computational Fluid Dynamics</a>	3	0	0	0	0	3
24AERO3141	300	<a href="#">Finite Element Methods</a>	3	0	0	0	0	3
24AERO4081	400	<a href="#">Hypersonic Aerodynamics</a>	3	0	0	0	0	3
24AERO3151	300	<a href="#">Helicopter Aerodynamics</a>	3	0	0	0	0	3
24AERO4091	400	<a href="#">Mechanics of Composite Materials</a>	3	0	0	0	0	3
24AERO3161	300	<a href="#">Experimental Techniques</a>	3	0	0	0	0	3
24AERO3171	300	<a href="#">Rockets and Missiles</a>	3	0	0	0	0	3
24AERO3181	300	<a href="#">Satellite Attitude and Control</a>	3	0	0	0	0	3
24AERO3191	300	<a href="#">Space Technology</a>	3	0	0	0	0	3
24AERO3201	300	<a href="#">Airport Planning and Management</a>	3	0	0	0	0	3
24AERO3211	300	<a href="#">Introduction to Unmanned Aerial System Operations</a>	3	0	0	0	0	3
<b>Total Credits</b>								<b>15</b>

## Open Electives (OE)

A minimum of 24 credits are to be earned under this category of courses, out of which 9 credits are from other departments from the School of Technology and the remaining 15 credits are from schools other than the School of Technology.

The current list of courses offered under OE will be available through the registration portal. Refer [here](#) for the tentative list of courses offered under OE category



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