GANDHI INSTITUTE OF TECHNOLOGY AND MANAGEMENT (GITAM)

(Deemed to be University)

VISAKHAPATNAM * HYDERABAD * BENGALURU

Accredited by NAAC with A^{++} Grade

GITAM School of Core Engineering

CURRICULUM AND SYLLABUS

4 Year Undergraduate Programme
UAERO01: B.Tech. Aerospace Engineering

w.e.f. 2024-25 admitted batch

(Updated on July 2025)

Academic Regulations

Applicable for the Undergraduate Programmes in the School of Core Engineering

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

To become a global leader in holistic engineering education and research

MISSION

- Empower students with innovative education in aerospace engineering, enhancing passion-driven learning.

- Engage with communities to address societal needs through aerospace advancements, nurturing a culture of inclusive innovation.

- Conduct interdisciplinary research to address real-world challenges in aerospace, creating transformative solutions for the industry.

- Nurture the intellectual, ethical, emotional and professional growth of the students.

UAERO01: B.Tech.Aerospace Engineering

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

Programme Educational Objectives (PEOs)

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

PEO Articulation

	PEO1	PEO2	PEO3	PEO4	PEO5
M1	H	H	H	M	M
M2	H	H	H	M	H
M3	H	H	M	H	M
M4	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:

PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	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.
PO4	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.
PO5	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.
PO6	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.
PO7	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.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	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.
PO11	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.
PO12	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.
PSO1	Identify, formulate, and solve Aerospace engineering problems in the related domains to provide efficient solutions
PSO2	Analyze, design and develop applications of varying complexities in the emerging areas of Aerospace Engineering
PSO3	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

S.No.	Course Category and Category Code	Minimum Credits	% of credits in the Programme
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	09.38
5.	Open Electives (OE)	24	15.00
	Total	**160**	**100**

University Core (UC) : 19 Credits								
Course code	Level	Course Title	L	T	P	S	J	C
Ability Enhancement Courses								
LANG1201	100	Critical Thinking	2	0	0	0	0	2
LANG1241	100	Communicative English - I	0	0	4	0	0	2
LANG1251	100	Communicative English - II	0	0	4	0	0	2
IENT1051	100	Fundamentals of Entrepreneurship	2	0	0	0	0	2
Skill Enhancement Courses								
GCGC1001	100	Aptitude and Self-Management Skills	0	0	2	0	0	1
GCGC1011	100	Integrated Aptitude and Ethical Communications	0	0	2	0	0	1
GCGC1021	100	Applied Communication and Quantitative Skills	0	0	2	0	0	1
GCGC1031	100	Placement Preparation and Professional Readiness	0	0	2	0	0	1
Value Added Courses								
ENVS1003	100	Environmental Studies*	3	0	0	0	0	3
POLS1051	100	The Indian Constitution	1	0	0	0	0	1
Pass / Fail Courses (Mandatory)								
FINA1081	100	Personal Financial Planning *	1	0	0	0	0	1
PHPY1011	100	Gandhi and the Contemporary World *	1	0	0	0	0	1
Pass / Fail Courses (Any one course to be chosen)								
DOSP1181	100	Yogasana	0	0	0	2	0	1
MFST1002	100	Health and Wellbeing *	0	0	2	0	0	1
DOSL1081	100	Student Life Activities (Participant)	0	0	0	2	0	1
DOSL1091	100	Student Life Activities (Organizer)	0	0	0	2	0	1
DOSL1101	100	Student Life Activities (Competitor)	0	0	0	2	0	1
DOSL1111	100	Foundations of Student (Leadership)	0	0	0	2	0	1
DOSL1042	100	Community Services – Volunteer	0	0	2	0	0	1
DOSL1052	100	Community Services – Mobilizer	0	0	2	0	0	1
DOSP1003	100	Badminton	0	0	0	2	0	1
DOSP1033	100	Football	0	0	0	2	0	1
DOSP1043	100	Volleyball	0	0	0	2	0	1
DOSP1053	100	Kabaddi	0	0	0	2	0	1
DOSP1073	100	Table Tennis	0	0	0	2	0	1
DOSP1083	100	Handball	0	0	0	2	0	1
DOSP1093	100	Basketball	0	0	0	2	0	1
DOSP1113	100	Throw ball	0	0	0	2	0	1
DOSP1142	100	Cricket	0	0	0	2	0	1
DOSP1132	100	Functional Fitness	0	0	0	2	0	1
DOSP1171	100	Martial Arts/Self Defence	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	Calculus and Differential Equations	3	1	0	0	0	4
MATH1272	100	Linear Algebra	3	1	0	0	0	4
MATH2561	200	Probability and Statistics for Engineering	3	1	0	0	0	4
MATH2601	200	Numerical Methods	3	0	2	0	0	4
PHYS1301	100	Basics of Engineering Physics	3	0	2	0	0	4
CHEM1111	100	Engineering Chemistry	2	1	2	0	0	4
24CSEN1031	100	Programming for Problem Solving - 1 (Programming with Python)	0	0	6	0	0	3
24CSEN1041	100	Programming for Problem Solving - 2 (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	Engineering Visualization and Product Realization	0	0	4	0	0	2
MECH1041	100	Technology Exploration and Product Engineering	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 & 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	Fundamentals of Sensors and Internet of Things	2	0	2	0	0	3
24EECE2211	200	Fundamentals of Electrical and Electronics Engineering	2	0	2	0	0	3
24EECE2231	200	Foundations of Electrical and Electronics Engineering	3	0	2	0	0	4
24MECH1001	100	Introduction to Mechanical Engineering	2	0	2	0	0	3
24CIVL1001	100	Introduction to Civil Engineering	2	0	2	0	0	3
24BTEN1021	100	Biotechnology and Bioengineering	2	0	2	0	0	3
24BTEN1031	100	Introduction to Biomedical Engineering	2	0	2	0	0	3
24CSEN2261	200	Data Structures and Algorithms	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	Introduction to Aerospace Engineering and Aero workshop	2	0	2	0	0	3
24MECH2001	200	Engineering Mechanics	3	0	0	0	0	3
24AERO2001	200	Engineering Thermodynamics	3	0	0	0	0	3
24AERO2011	200	Aerodynamics - I	3	1	0	0	0	4
24AERO2021	200	Solid Mechanics	3	0	2	0	0	4
24AERO1011	100	Aerospace Materials	3	0	0	0	0	3
24AERO4001	400	Aerodynamics - II	3	0	2	0	0	4
24AERO3001	300	Aerospace Structures	3	0	2	0	0	4
24AERO2031	200	Flight Mechanics	3	0	0	0	0	3
24AERO3011	300	Aircraft Propulsion	3	0	2	0	0	4
24AERO3021	300	Aircraft Systems and Instruments	3	0	0	0	0	3
24AERO3031	300	Flight Dynamics	3	0	0	0	0	3
24AERO4011	400	Aerospace Propulsion	3	1	0	0	0	4
24AERO4021	400	Flight Vehicle Design and Practice	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	Embedded systems	2	0	2	0	0	3
24AERO2041	200	Introduction to Avionics	3	0	0	0	0	3
24AERO2051	200	Aircraft Instrumentation and Measurement	3	0	0	0	0	3
24AERO3041	300	Aircraft Flight Control Systems	3	0	0	0	0	3
24AERO3051	300	Aircraft Inertial Navigation Systems	3	0	0	0	0	3
24AERO3061	300	Flight Management Systems	3	0	0	0	0	3
24AERO3071	300	Global Navigation Satellite Systems (GNSS) in Avionics	3	0	0	0	0	3
24AERO2061	200	Aircraft Electrical Systems	3	0	0	0	0	3
24AERO2071	200	Radar Systems for Avionics	3	0	0	0	0	3
24AERO2081	200	Avionics Cybersecurity	3	0	0	0	0	3
							Total Credits	**15**

Track # : AEROSPACE DESIGN

24AERO3081	300	Design and Analysis of Composite Structures	3	0	0	0	0	3
24AERO3091	300	Design of Aircraft Systems	3	0	0	0	0	3
24AERO3101	300	Aircraft Performance	3	0	0	0	0	3
24AERO3111	300	UAV/UAS Design	3	0	0	0	0	3
24AERO4031	400	Design for Manufacturing and Operation	3	0	0	0	0	3
24AERO4041	400	Conceptual Aircraft Design	3	0	0	0	0	3
24AERO3121	300	Propulsion and Power Systems	3	0	0	0	0	3
24AERO4051	400	Integrated Vehicle Health Management	3	0	0	0	0	3
24AERO4061	400	Spacecraft Design	3	0	0	0	0	3
24AERO4071	400	Human Factors in Aerospace Design	3	0	0	0	0	3
							Total Credits	**15**

Track # : GENERAL

24AERO3131	300	Computational Fluid Dynamics	3	0	0	0	0	3
24AERO3141	300	Finite Element Methods	3	0	0	0	0	3
24AERO4081	400	Hypersonic Aerodynamics	3	0	0	0	0	3
24AERO3151	300	Helicopter Aerodynamics	3	0	0	0	0	3
24AERO4091	400	Mechanics of Composite Materials	3	0	0	0	0	3
24AERO3161	300	Experimental Techniques	3	0	0	0	0	3
24AERO3171	300	Rockets and Missiles	3	0	0	0	0	3
24AERO3181	300	Satellite Attitude and Control	3	0	0	0	0	3
24AERO3191	300	Space Technology	3	0	0	0	0	3
24AERO3201	300	Airport Planning and Management	3	0	0	0	0	3
24AERO3211	300	Introduction to Unmanned Aerial System Operations	3	0	0	0	0	3
							Total Credits	**15**

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 in the 'School of Computer Science and Engineering' and 'School of Core Engineering' and the remaining 15 credits are from other schools of the university.

Minor

Students may opt to enroll in a Minor programme for 20 Credits extra beyond the academic requirement of 160 Credits to obtain the B.Tech. degree.

The list of available Minor Programmes are listed **here**

GITAM School of Core Engineering

GITAM (Deemed to be University)

Visakhapatnam | Hyderabad | Bengaluru