GANDHI INSTITUTE OF TECHNOLOGY AND MANAGEMENT (GITAM)

(Deemed to be University)

VISAKHAPATNAM * HYDERABAD * BENGALURU

Accredited by NAAC with A^{++} Grade

GITAM School of Technology

CURRICULUM AND SYLLABUS

4 Year Undergraduate Programme
UEECE01: B.Tech. Electronics and Communication 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

To become a global leader in holistic engineering education and research

MISSION

- Empower the students with knowledge to face real-world challenges for holistic development.
- Conduct multidisciplinary research that makes an impact on society, addressing key challenges through innovative solutions.
- Foster a culture emphasizing empathy, respect, commitment upholding the ethical standards.

UEECE01: B.Tech. Electronics and Communication Engineering

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

Programme Educational Objectives (PEOs)

PEO 1	Demonstrate comprehensive knowledge of analytical foundations to Electronics and Communication Engineering in terms of founding principles of circuits, design, computing, signal processing and communication.
PEO 2	Demonstrate critical thinking and problem-solving abilities to handle the real-world problems by applying theoretical foundations and practical skills in different fields of Electronics and Communication Engineering.
PEO 3	Exhibit qualities of teamwork, appreciation of collaboration that entails inter-disciplinary endeavors and the potential impact of technology on society.
PEO 4	Develop creativity, Research related skills, self-learning, entrepreneurial and leadership skills in order to meet the ever-changing needs and challenges in the profession.

PEO Articulation

	PEO1	**PEO2**	**PEO3**	**PEO4**
M1	H	H	M	M
M2	M	H	M	H
M3	L	M	H	M

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	Demonstrate comprehensive knowledge and practical skills in Electronics and Communication Engineering focusing on subareas of Aerospace and Defence Electronics, Telecommunications, Sensors and IoT, AI and ML Applications and Software Defined Vehicles and apply this knowledge to solve advanced problems.
PSO2	Design and translate abstract concepts in circuits, communications, signal processing, computing and sensing to real-time circuits & systems and analyze their performance.
PSO3	Research and formulate suitable technologies for the implementation of Electronics and Communication Engineering solutions, demonstrating entrepreneurial and research aspects with a commitment to professional ethics and a focus on societal well-being.

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	9.38
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								
CLAD1041	100	Art of Persuasive Communication	0	0	2	0	0	1
CLAD1051	100	Competence in Communication	0	0	2	0	0	1
CLAD1061	100	Life Skills	0	0	2	0	0	1
CLADXXXX	100	Soft Skills - 4	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 (MOO

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
MATH2581	200	Probability theory and Random process	3	1	0	0	0	4
MATH2591	200	Complex variables and transform techniques	3	1	0	0	0	4
PHYS1001	100	Physics	2	1	2	0	0	4
CHEM1111	100	Engineering Chemistry	2	1	2	0	0	4
24CSEN1031	100	Programming for Problem Solving - 1	0	0	6	0	0	3
24CSEN1041	100	Programming for Problem Solving - 2	0	0	6	0	0	3
24xxxxxxx		Engineering Basket - Choice 1	2	0	2	0	0	3
24xxxxxxx		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**
24EECE1001	100	Network Theory and Analysis	2	1	0	0	0	3
24EECE2001	200	Electronic Devices and Circuits	3	0	2	0	0	4
24EECE2071	200	Analog Circuits	3	0	2	0	0	4
24EECE3001	300	Introduction to VLSI Design	3	0	2	0	0	4
24EECE2011	200	Signals and Systems	2	1	0	0	0	3
24EECE2111	200	Electromagnetic Waves and Transmission Lines	2	1	0	0	0	3
24EECE3011	300	Antennas Analysis and Design	2	0	2	0	0	3
24EECE3021	300	Analog and Digital Communications	3	0	2	0	0	4
24EECE3031	300	Data Communication and Networking	3	0	0	0	0	3
24EECE3041	300	Control Systems	2	1	0	0	0	3
24EECE2291	200	Digital Logic Design	3	0	2	0	0	4
24EECE3051	300	Computer Organization and Design	3	0	0	0	0	3
24EECE3061	300	Microprocessors and Microcontrollers	3	0	2	0	0	4
24EECE3071	300	Digital Signal Processing	3	0	2	0	0	4

Programme Elective (PE) : 15 credits								
A minimum of 15 credits from any one of the tracks								
Track # **Aerospace & Defence Electronics**								
Course code	**Level**	**Course Title**	**L**	**T**	**P**	**S**	**J**	**C**
24AERO2091	200	Aerospace and Defence Electronics Basics	3	0	0	0	0	3
24AERO3221	300	Avionics Systems and Technologies	3	0	0	0	0	3
24EECE4001	400	Satellite Communications	3	0	0	0	0	3
24EECE3081	300	Radar Systems and Signal Processing	3	0	0	0	0	3
24CSEN2301	200	Fundamentals of Cyber Security	2	0	2	0	0	3
24EECE3091	300	Electromagnetic Compatibility	3	0	0	0	0	3
24EECE3101	300	Digital Image Processing	3	0	0	0	0	3
24EECE3111	300	Command, Control and Communication Systems	3	0	0	0	0	3
24EECE3121	300	Jamming and ECM/ECCM Technologies	3	0	0	0	0	3
24EECE2301	200	Embedded Systems	2	0	2	0	0	3
24EECE4011	400	Unmanned Aerial Vehicles	2	0	2	0	0	3
24EECE3131	300	Electronic Packaging and Testing	3	0	0	0	0	3

Track # : Telecommunications								
24EECE4021	400	Software Defined Radio and Networks	3	0	0	0	0	3
24EECE4001	400	Satellite Communications	3	0	0	0	0	3
24EECE4031	400	Optical Communications and Networks	3	0	0	0	0	3
24EECE3141	300	Principles of Radar Systems	3	0	0	0	0	3
24EECE3151	300	Information Theory and Coding	3	0	0	0	0	3
24EECE3161	300	Fundamentals of Wireless Communications	3	0	0	0	0	3
24EECE3171	300	Mobile Communication System with Optimization	3	0	0	0	0	3
24EECE2021	200	Applied Linear Algebra with Machine Learning, Wireless Communication and Data Analytics	2	0	2	0	0	3
24EECE4041	400	LTE and Advanced LTE Technologies for Mobile Communications	3	0	0	0	0	3
24EECE4051	400	5G Technologies and Its Applications	3	0	0	0	0	3
Track # : Sensors and IoT								
24EECE2031	200	Introduction to IoT and its Applications	3	0	0	0	0	3
24EECE2041	200	IoT Sensors and Actuators	3	0	0	0	0	3
24EECE3181	300	IoT Architecture and Protocols	3	0	0	0	0	3
24CSEN3261	300	IoT Security and Privacy	3	0	0	0	0	3
24CSEN3271	300	Cloud Computing for IoT	3	0	0	0	0	3
24EECE2051	200	Embedded Systems for IoT	2	0	2	0	0	3
24EECE4061	400	Wireless Sensor Networks	3	0	0	0	0	3
24EECE3191	300	IoT Device Design and Development	3	0	0	0	0	3
24EECE3201	300	Industrial IoT and Automation	3	0	0	0	0	3
24EECE3211	300	IoT for Transportation	3	0	0	0	0	3
Track # : AI and ML Applications								
24CSEN2311	200	Machine Learning Techniques	2	0	2	0	0	3
24CSEN2321	200	Fundamentals of Neural Networks	2	0	2	0	0	3
24CSEN2331	200	Fundamentals of Deep Learning	2	0	2	0	0	3
24CSEN3281	300	Fundamentals of Natural Language Processing	3	0	0	0	0	3
24EECE4071	400	Machine Learning for Audio, Image, and Video Analysis	3	0	0	0	0	3
24EECE4081	400	Machine Learning for Antenna Array Applications	3	0	0	0	0	3
24EECE4091	400	Applications of Artificial Intelligence in VLSI Design	3	0	0	0	0	3

24EECE4101	400	Wireless Communications with Artificial Intelligence	3	0	0	0	0	3
24EECE4111	400	Embedded Systems with Artificial Intelligence	3	0	0	0	0	3
Track # : Software Defined Vehicles								
24MECH2081	200	Fundamentals of Automotive Engineering	3	0	0	0	0	3
24EECE3221	300	Introduction to Automotive Electronics and Vehicle Architecture	3	0	0	0	0	3
24CSEN2341	200	Software Engineering for Automotive Applications	3	0	0	0	0	3
24EECE3231	300	Vehicle Networks and Communication Protocols	3	0	0	0	0	3
24EECE3241	300	Automotive Embedded Systems and Operating Systems	3	0	0	0	0	3
24EECE3251	300	Model Based System Design	3	0	0	0	0	3
24CSEN3291	300	Automotive Cyber Security	3	0	0	0	0	3
24EECE4121	400	Advanced Driver Assistance Systems (ADAS) System Design	3	0	0	0	0	3
24EECE3261	300	Introduction to AUTOSAR	3	0	0	0	0	3
24EECE4131	400	Vehicle-to-Everything (V2X) Communications	3	0	0	0	0	3
24EECE2061	200	Introduction to Electric Vehicle Technologies	3	0	0	0	0	3

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

GITAM School of Technology

GITAM (Deemed to be University)

Visakhapatnam | Hyderabad | Bengaluru