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

UEECE04: B.Tech. Electrical and Computer Engineering

w.e.f. 2024-25 admitted batch

(Updated on June 2025)

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.

UEECE04: B.Tech. ELECTRICAL AND COMPUTER ENGINEERING

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

Programme Educational Objectives (PEOs)

PEO 1	Demonstrate comprehensive knowledge of analytical foundations to Electrical and Computer Engineering in terms of founding principles of circuit theory, design, computing, and machinery.
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 Electrical and Computer 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	H	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 Electrical and Computer Engineering focusing on the subareas of Electric Vehicle Technology, Industrial Automation and Control and Robotics and apply this knowledge to solve advanced problems.
PSO2	Design and translate abstract concepts in electrical machines, power systems, power electronics and computing to real-time circuits & systems and analyze their performance.
PSO3	Research and formulate suitable technologies for the implementation of Electrical and Computer 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

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
CLAD1071	100	Business Communication	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
MATH2581	200	Probability theory and Random process	3	1	0	0	0	4
MATH2591	200	Complex variables & transform techniques	3	1	0	0	0	4
PHYS1321	100	Electromagnetic Fields	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
24INTN3777	300	Internship-1	0	0	0	0	2	1
24PROJ4888/ 24INTN4888/ 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**
24EECE1011	100	Electrical Circuit Analysis	3	0	2	0	0	4
24EECE2141	200	Analog and Digital Electronics	3	0	0	0	0	3
24EECE2151	200	Introduction to Microcontrollers	3	0	2	0	0	4
24EECE2161	200	Electrical Machines - I	3	0	2	0	0	4
24EECE3401	300	Power Electronics	3	0	2	0	0	4
24EECE4191	400	Power Systems	3	0	0	0	0	3
24EECE3041	300	Control Systems	2	1	0	0	0	3
24EECE3411	300	Electrical Machines - II	3	0	2	0	0	4
24EECE2011	200	Signals and Systems	2	1	0	0	0	3
24CSEN3001	300	Design and Analysis of Algorithms	3	0	2	0	0	4
24CSEN2161	200	Machine Learning	3	0	2	0	0	4
24CSEN2271	200	Fundamentals of Operating Systems	3	0	0	0	0	3
24CSEN2281	200	Fundamentals of Computer Networks	3	0	0	0	0	3
24CSEN2291	200	Fundamentals of Database Management Systems	3	0	0	0	0	3

Programme Elective (PE) : 15 credits								
Electric Vehicle Technology								
Course code	**Level**	**Course Title**	**L**	**T**	**P**	**S**	**J**	**C**
24EECE2061	200	Introduction to Electric Vehicle Technologies	3	0	0	0	0	3
24EECE2171	200	Sensors and Communication in Electric Vehicles	3	0	0	0	0	3
24EECE3421	300	Power Industrial Drives for Electric Vehicles	3	0	0	0	0	3
24EECE3431	300	Electric Vehicle Modeling and Dynamics	3	0	0	0	0	3
24EECE4201	400	Electric Vehicle Thermal and Energy Management	3	0	0	0	0	3
24EECE3441	300	Embedded Systems for Electric Vehicles	3	0	0	0	0	3
24EECE3451	300	Energy Storage and Grid Integration	3	0	0	0	0	3
24EECE3461	300	Soft Computing Techniques for Electric Vehicles	3	0	0	0	0	3
24EECE3471	300	Battery Management Systems	3	0	0	0	0	3
24EECE3601	300	Model Based System Engineering	3	0	0	0	0	3
24EECE2201	200	Fundamentals of Autonomous Vehicles	3	0	0	0	0	3
Any 5 Program Electives Total Credits								15

Industrial Automation and Control								
Course code	**Level**	**Course Title**	**L**	**T**	**P**	**S**	**J**	**C**
24EECE3481	300	Introduction to Automation and Control	3	0	0	0	0	3
24EECE3601	300	Model Based System Engineering	3	0	0	0	0	3
24EECE3491	300	PLC and SCADA systems and Programming	3	0	0	0	0	3
24EECE4211	400	Distributed Control Systems	3	0	0	0	0	3
24EECE3501	300	Signal Conditioning, Data Acquisition and Communication	3	0	0	0	0	3
24EECE4221	400	Industrial Internet of Things	3	0	0	0	0	3
24EECE3511	300	Process Modelling, Simulation and Control	3	0	0	0	0	3
24EECE3521	300	Manufacturing Execution Systems	3	0	0	0	0	3
24EECE3531	300	Industrial Sensors and Transducers	3	0	0	0	0	3
24EECE4231	400	Soft Computing Techniques in Industrial Control	3	0	0	0	0	3
24EECE2191	300	Electrical Measurements	3	0	0	0	0	3
Any 5 Program Electives Total Credits								**15**

Robotics								
Course code	**Level**	**Course Title**	**L**	**T**	**P**	**S**	**J**	**C**
24EECE3541	300	Fundamentals of Robotics	3	0	0	0	0	3
24EECE3551	300	Introduction to Robot Operating Systems	2	0	2	0	0	3
24EECE3561	300	Industrial Robotics and Automation	3	0	0	0	0	3
24EECE3571	300	Motion Planning and Control for Robotics	3	0	0	0	0	3
24EECE3581	300	Introduction to Robot Kinematics and Dynamics	3	0	0	0	0	3
24EECE3591	300	Introduction to Computer Vision for Robotics	3	0	0	0	0	3
24EECE2201	200	Fundamentals of Autonomous Vehicles	3	0	0	0	0	3
Any 5 Program Electives 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 from the School of Technology and the remaining 15 credits are from schools other than the School of Technology.

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**

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