

**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**

**UEECE04: B.Tech. Electrical and Computer 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**

**UEECE04: B.Tech. ELECTRICAL AND COMPUTER ENGINEERING**  
**(w.e.f. academic year 2024-25 admitted batch)**

**Programme Educational Objectives (PEOs)**

<b>PEO 1</b>	Demonstrate comprehensive knowledge of analytical foundations to Electrical and Computer Engineering in terms of founding principles of circuit theory, design, computing, and machinery.
<b>PEO 2</b>	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.
<b>PEO 3</b>	Exhibit qualities of teamwork, appreciation of collaboration that entails interdisciplinary endeavors and the potential impact of technology on society.
<b>PEO 4</b>	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**

	<b>PEO1</b>	<b>PEO2</b>	<b>PEO3</b>	<b>PEO4</b>
<b>M1</b>	H	M	L	L
<b>M2</b>	M	H	L	H
<b>M3</b>	M	H	M	H
<b>M4</b>	L	M	H	M
<b>M5</b>	L	L	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>	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.
<b>PSO2</b>	Design and translate abstract concepts in electrical machines, power systems, power electronics and computing to real-time circuits & systems and analyze their performance.
<b>PSO3</b>	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**

<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

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
MATH2581	200	<a href="#">Probability theory and Random process</a>	3	1	0	0	0	4
MATH2591	200	<a href="#">Complex variables &amp; transform techniques</a>	3	1	0	0	0	4
PHYS1321	100	<a href="#">Electromagnetic Fields</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 (Programming with Python)</a>	0	0	6	0	0	3
24CSEN1041	100	<a href="#">Programming for Problem Solving - 2 (Programming with C)</a>	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
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 &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
24EECE1011	100	<a href="#">Electrical Circuit Analysis</a>	3	0	2	0	0	4
24EECE2141	200	<a href="#">Analog and Digital Electronics</a>	3	0	0	0	0	3
24EECE2151	200	<a href="#">Introduction to Microcontrollers</a>	3	0	2	0	0	4
24EECE2161	200	<a href="#">Electrical Machines - I</a>	3	0	2	0	0	4
24EECE3401	300	<a href="#">Power Electronics</a>	3	0	2	0	0	4
24EECE4191	400	<a href="#">Power Systems</a>	3	0	0	0	0	3
24EECE3041	300	<a href="#">Control Systems</a>	2	1	0	0	0	3
24EECE3411	300	<a href="#">Electrical Machines - II</a>	3	0	2	0	0	4
24EECE2011	200	<a href="#">Signals and Systems</a>	2	1	0	0	0	3
24CSEN3001	300	<a href="#">Design and Analysis of Algorithms</a>	3	0	2	0	0	4
24CSEN2161	200	<a href="#">Machine Learning</a>	3	0	2	0	0	4
24CSEN2271	200	<a href="#">Fundamentals of Operating Systems</a>	3	0	0	0	0	3
24CSEN2281	200	<a href="#">Fundamentals of Computer Networks</a>	3	0	0	0	0	3
24CSEN2291	200	<a href="#">Fundamentals of Database Management Systems</a>	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	<a href="#">Introduction to Electric Vehicle Technologies</a>	3	0	0	0	0	3
24EECE2171	200	<a href="#">Sensors and Communication in Electric Vehicles</a>	3	0	0	0	0	3
24EECE3421	300	<a href="#">Power Industrial Drives for Electric Vehicles</a>	3	0	0	0	0	3
24EECE3431	300	<a href="#">Electric Vehicle Modeling and Dynamics</a>	3	0	0	0	0	3
24EECE4201	400	<a href="#">Electric Vehicle Thermal and Energy Management</a>	3	0	0	0	0	3
24EECE3441	300	<a href="#">Embedded Systems for Electric Vehicles</a>	3	0	0	0	0	3
24EECE3451	300	<a href="#">Energy Storage and Grid Integration</a>	3	0	0	0	0	3
24EECE3461	300	<a href="#">Soft Computing Techniques for Electric Vehicles</a>	3	0	0	0	0	3
24EECE3471	300	<a href="#">Battery Management Systems</a>	3	0	0	0	0	3
24EECE3601	300	<a href="#">Model Based System Engineering</a>	3	0	0	0	0	3
24EECE2201	200	<a href="#">Fundamentals of Autonomous Vehicles</a>	3	0	0	0	0	3
<b>Any 5 Program Electives Total Credits</b>							<b>15</b>	

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

<b>Robotics</b>								
Course code	Level	Course Title	L	T	P	S	J	C
24EECE3541	300	<a href="#">Fundamentals of Robotics</a>	3	0	0	0	0	3
24EECE3551	300	<a href="#">Introduction to Robot Operating Systems</a>	2	0	2	0	0	3
24EECE3561	300	<a href="#">Industrial Robotics and Automation</a>	3	0	0	0	0	3
24EECE3571	300	<a href="#">Motion Planning and Control for Robotics</a>	3	0	0	0	0	3
24EECE3581	300	<a href="#">Introduction to Robot Kinematics and Dynamics</a>	3	0	0	0	0	3
24EECE3591	300	<a href="#">Introduction to Computer Vision for Robotics</a>	3	0	0	0	0	3
24EECE2201	200	<a href="#">Fundamentals of Autonomous Vehicles</a>	3	0	0	0	0	3
<b>Any 5 Program Electives 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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