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
UCIVL02: B.Tech. Civil Engineering with Computer Application

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

UCIVL02: B.Tech. Civil Engineering with Computer Applications

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

Programme Educational Objectives (PEOs)

PEO 1	To impart comprehensive knowledge of mathematics, science, and engineering to prepare graduates for successful careers in various domains of Civil Engineering Profession.
PEO 2	To inculcate critical thinking and problem-solving abilities to handle the real world problems to meet the changing needs of the Society, and the Indian industry in areas related to civil engineering planning, design, and construction.
PEO 3	To impart qualities of teamwork, and leadership capabilities among graduates through group-based activities and projects, with exposure of use of software, development of job-related skills.
PEO 4	To develop creativity, research related skills, self- learning, entrepreneurial, and following ethical values in the profession of construction and allied industry.

PEO Articulation

	PEO1	PEO2	PEO3	PEO4	PEO5
M1					
M2					
M3					
M4					
M5					

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	Impart comprehensive knowledge of understanding the engineering behaviour of structures through computer-based analysis and design and exposure to latest methods in construction technology and in geo-spatial technology to demonstrate proficiency in the various specialisations of Civil engineering.
PSO2	Apply the knowledge and skills acquired during the program towards designing and execution of Civil engineering infrastructure projects with appropriate consideration for cost, safety and sustainability.
PSO3	Serve the society by solving various Civil engineering problems focusing on sustainable development by following the professional ethics.

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 (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
MATH2102	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
24EECE 2211	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**
24CIVL2001	200	Surveying and Geomatics	3	0	2	0	0	4
24CIVL2011	200	Principles of Mechanics	3	0	0	0	0	3
24CIVL2021	200	Mechanics of Solids	3	0	2	0	0	4
24CIVL2031	200	Fluid Mechanics and Hydraulic Machines	3	0	2	0	0	4
24CIVL2041	200	Structural Analysis	3	0	0	0	0	3
24CIVL2051	200	Building Materials and Concrete Technology	3	0	2	0	0	4
24CIVL2061	200	Water Resources Engineering	3	0	0	0	0	3
24CIVL3001	300	Environmental Engineering	3	0	2	0	0	4
24CIVL3011	300	Geotechnical Engineering	3	0	2	0	0	4
24CIVL3021	300	Highway Engineering	3	0	2	0	0	4
24CIVL3031	300	Design of Reinforced Concrete Structures	3	0	0	0	0	3
24CIVL3041	300	Building Planning, Estimation and Scheduling	3	0	0	0	0	3
24CIVL3051	300	Design of Steel Structures	3	0	0	0	0	3
24CIVL3061	300	Computer Aided Analysis and Design of Structures Laboratory	0	0	6	0	0	3

Programme Elective (PE) : 15 credits								
A minimum of 15 credits from any one of the tracks								
Program Electives of Construction Technology and Management (CTM) Track								
Course code	**Level**	**Course Title**	**L**	**T**	**P**	**S**	**J**	**C**
24CIVL3071	300	Construction Methods and Equipment Management	2	1	0	0	0	3
24CIVL3081	300	Construction Contracts Finance and Valuation	2	1	0	0	0	3
24CIVL3091	300	Construction Quality Control and Monitoring	2	1	0	0	0	3
24CIVL3101	300	Advanced Project Planning and Management	2	1	0	0	0	3
24CIVL3111	300	Contract Management and Arbitration	2	1	0	0	0	3
24CIVL3121	300	Project Appraisal and Financing	2	1	0	0	0	3
24CIVL3131	300	Applications of BIM in Civil Engineering	2	1	0	0	0	3
24CIVL3141	300	Construction Safety and Risk Management	2	1	0	0	0	3

Program Electives of Geospatial Technology and Geoinformatics (GTG) Track								
Course code	**Level**	**Course Title**	**L**	**T**	**P**	**S**	**J**	**C**
24CIVL3151	300	Remote sensing and Geographic Information System	2	1	0	0	0	3
24CIVL3161	300	Cartography, Geodesy and Global Navigation Satellite Systems	2	1	0	0	0	3
24CIVL3171	300	Photogrammetry and LiDAR	2	1	0	0	0	3
24CIVL3181	300	Spatial Data Analytics & Spatial Database System	2	1	0	0	0	3
24CIVL3191	300	Unmanned Aerial System (UAS) and Applications	2	1	0	0	0	3
24CIVL3201	300	Earth and atmospheric science	2	1	0	0	0	3
24CIVL3211	300	Advanced Remote Sensing	2	1	0	0	0	3
24CIVL3221	300	Advanced Earth Observation Systems and Applications	2	1	0	0	0	3
24CIVL3231	300	Geoinformatics in Civil Engineering	2	1	0	0	0	3
24CIVL3241	300	Geoinformatics in Disaster Management	2	1	0	0	0	3
Program Electives of Civil Engineering (CE) Track								
Structural Engineering								
Course code	**Level**	**Course Title**	**L**	**T**	**P**	**S**	**J**	**C**
24CIVL3251	300	Computational Matrix Methods of Analysis	2	1	0	0	0	3
24CIVL3261	300	Advanced Structural Analysis	2	1	0	0	0	3
24CIVL3271	300	Finite Element Method	2	1	0	0	0	3
24CIVL3281	300	Prestressed Concrete	2	1	0	0	0	3
24CIVL3291	300	Computer Aided Advanced Analysis and Design	2	1	0	0	0	3
Geotechnical Engineering								
24CIVL3301	300	Foundation Engineering	2	1	0	0	0	3
24CIVL3311	300	Advanced Foundation Engineering	2	1	0	0	0	3
24CIVL3321	300	Ground Improvement Techniques	2	1	0	0	0	3
24CIVL3331	300	Tunnel Engineering	2	1	0	0	0	3
24CIVL3341	300	Computer Applications in Geotechnical Engineering	2	1	0	0	0	3
Transportation Engineering								
24CIVL3351	300	Transportation Infrastructure Engineering	2	1	0	0	0	3
24CIVL3361	300	Traffic and Road Safety Engineering	2	1	0	0	0	3
24CIVL3371	300	Urban Transportation Planning	2	1	0	0	0	3
24CIVL3381	300	Pavement Analysis and Design	2	1	0	0	0	3
24CIVL3391	300	Computer Applications in Transportation Engineering	2	1	0	0	0	3

Water Resources and Environmental Engineering								
24CIVL3401	300	Sanitary Engineering	2	1	0	0	0	3
24CIVL3411	300	Irrigation and Hydraulic Structures	2	1	0	0	0	3
24CIVL3421	300	Waste Management	2	1	0	0	0	3
24CIVL3431	300	Watershed Management	2	1	0	0	0	3
24CIVL3441	300	Computer Applications in Water and Environmental Engineering	2	1	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

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