Builders TRENDS

NOV-DEC 2024

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Department of Civil Engineering, Newsletter

GMR Institute of Technology
An Autonomous Institute Affiliated to JNTU-GV

GMRIT
Training Tomorrow's Engineers Today

THE VISION OF GMRIT

- To be among the most preferred institutions for engineering and technological education in the country.
- An institution that will bring out the best from its students, faculty, and staff – to learn, to achieve, to compete and to grow – among the very best.
- An institution where ethics, excellence and excitement will be the work religion, while research, innovation and impact, the work culture.

THE MISSION OF GMRIT

- To turnout disciplined and competent engineers with sound work and life ethics.
- To implement outcome-based education in an IT-enabled environment.
- To encourage all-round rigor and instill a spirit of enquiry and critical thinking among students, faculty, and staff.
- To develop teaching, research, and consulting environment in collaboration with industry and other institutions.

DEPARTMENT VISION

- To be a preferred department of learning for students and teachers alike, with dual commitment to Academic and Research, and serving students in an atmosphere of innovation and critical thinking.

DEPARTMENT MISSION

- To provide adoptable education for the graduates in preparing them for a rewarding career to develop academic and research in collaboration with industry and other institutions in the field of Civil Engineering. (M1)
- To prepare the students as thinking professionals and good citizens who will be able to apply their knowledge critically and innovatively in solving contemporary professional and social problems.(M2)

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO 1: Graduates with ability to solve core engineering problems through continuous self-paced learning in tune with changing technologies.

PEO 2: Reinforce engineering skills, critical thinking and problem-solving skills in professional engineering practices and deal with socio-economical, technical and business challenges.

PEO 3: Nurture professionalism with soft skills, managerial & leadership skills and ethical values.

PROGRAM OUTCOMES (POS):

Engineering graduate will be able to:

PO 1: Apply the knowledge of basic sciences and fundamental engineering concepts in solving civil engineering problems (**Engineering knowledge**)

PO 2: Identify and define civil engineering problems and investigate to analyze and interpret data to arrive at substantial conclusions. (**Problem analysis**)

PO 3: Propose appropriate solutions for engineering problems complying with functional constraints such as economic, environmental, societal, ethical, safety and sustainability in accordance with Indian standard codes of practices. (**Design/development of solutions**)

PO 4: Perform investigations, design and conduct experiments, analyze and interpret the results to provide valid conclusions. (**Conduct investigations of complex problems**)

PO 5: Select/develop and apply appropriate techniques and IT tools to analyze, design and scheduling of activities with an understanding of the limitations and successfully implement and adopt to technological changes in civil engineering with intervention of IT industries (**Modern tool usage**)

PO 6: Give reasoning and assess societal, health, legal and cultural issues with competency in professional engineering practice. (**The engineer and society**)

PO 7: Demonstrate professional skills and contextual reasoning to assess environmental/societal issues for sustainable development. (**Environment and sustainability**)

PO 8: Demonstrate knowledge of professional and ethical practices. (**Ethics**)

PO 9: Function effectively as an individual, and as a member or leader in diverse teams, and in multi- disciplinary situations. (**Individual and team work**)

PO 10: Communicate effectively with respect to oral, written and graphical communication (**Communication**)

PO 11: Demonstrate and apply engineering & management principles in their own / team projects in multidisciplinary environment. (**Project management and finance**)

PO 12: Recognize the need for, and have the ability to engage in independent and lifelong learning. (**Life-long learning**)

PROGRAM SPECIFIC OUTCOMES (PSOS):

Engineering graduate will be able to:

PSO 1: Demonstrate the quality and suitability of construction materials (**Program Specific**)

PSO 2: Ability to apply the practical aspect of analysis, design and safe construction practices (**Program Specific**)

OVERVIEW

The Department of Civil Engineering was established in 2002. It offers students a solid grounding in better utilization of resources and greater standardization of construction processes required by the construction industry. Students are taught how to use and employ innovative design methods and techniques. Exposure to contemporary facets planning, construction design and project management are key aspects of the course. Annual intake of this Department is 120 students.

Faculty Corner

CONSULTANCY

Being facilitated with well-equipped equipment and laboratories the Department of Civil Engineering always contributes a major role in the consultancy works offered to the government and private organizations around the districts and so on. As a part of Consultancy an amount of *9500/-* rupees worth core related works were carried out by the faculty with respect to various specializations.

GRANTED PATENT

- B.P.R.V.S.Priyatham, Drone for construction inspection and land mapping, Design Patent, Granted, Intellectual property India, 427393-001, 11/10/2024. https://search.ipindia.gov.in/DesignApplicationStatus

NATIONAL & INTERNATIONAL JOURNALS

- Sridhar J.et.al. Eco-Friendly Concrete Solutions: The Role of Titanium Dioxide Nanoparticles in Enhancing Durability and Reducing Environmental Pollutants-A Review, Journal of Environmental Nanotechnology, 13, no. 3, pp:332-344. *(Scopus Indexed)*
- Vivek S. et.al. Automated System for Identifying Marine Floating Plastics to Enhance Sustainability in Coastal Environments Through Sentinel-2 Imagery and Machine Learning Models, Ocean Science Journal 59, no. 4, pp: 1-17. *(Impact Factor: 1.2, SCIE and Scopus Indexed, SJR:Q3)*
- Vivek S. et.al. Drought Vulnerability Assessment Using GIS and Remote Sensing Techniques: A Case Study in Part of Coimbatore, Tamil Nadu, India, Journal of the Indian Society of Remote Sensing, pp:1-15. *(Impact Factor: 2.2, SCIE and Scopus Indexed, SJR:Q2)*
- Ram Kumar B.A.V. et.al. Sustainable use of oyster shell ash and waste engine oil in hot mix asphalt, Journal of Environmental Protection and Ecology. *(Scopus Indexed, SJR:Q3)*

- Vivek S. et.al. Advancements in nanostructured materials for enhanced water desalination, Journal of Environmental Protection and Ecology. *(Scopus Indexed, SJR:Q3)*
- Vivek S. et.al. Focusing the removal of dyes from wastewater effluents". Journal of Environmental Protection and Ecology. *(Scopus Indexed, SJR:Q3)*
- Vivek S. et.al. Anaerobic treatment for sulphate containing wastewater, Journal of Environmental Protection and Ecology. *(Scopus Indexed, SJR:Q3)*
- Ganesh Prabhu G et.al. Reuse of ceramic waste in concrete production for a sustainable ecosystem, Matéria (Rio de Janeiro) 29, no. 3, e20240325. *(SCIE and Scopus Indexed, SJR:Q4)*
- Gokulan R. et.al. Evaluation of the adsorption capacity of Cocos Nucifera shell derived biochar for basic dyes sequestration from aqueous solution, Energy Sources, Part A: Recovery, Utilization, and Environmental Effects 46, no. 1, 12663-12679. *(Impact Factor: 2.4, SCIE and Scopus Indexed, SJR:Q2)*
- Ganesh Prabhu G et.al. Engineering properties of SBS and crumb-rubber modified bitumen–a design of experiment approach. Journal of Engineering, Design and Technology, 22(6), pp.1742-1754. *(ESCI and Scopus Indexed, SJR:Q2)*
- Vivek S. et.al. Ceramic tile mix optimisation: green innovations with red mud, fly ash, and ceramic waste. Journal of Environmental Protection & Ecology, 25, No 7, 2224–2233. *(Scopus Indexed, SJR:Q3)*
- Vivek S. et.al. Analysis of air quality parameters on climate change phenomenon using Markov autoregressive model. Cogent Engineering, 11(1), p.2421284. *(ESCI and Scopus Indexed, SJR:Q2)*
- Sridhar J.et.al. Precision crack analysis in concrete structures using CNN, SVM, and KNN: a machine learning approach. Matéria (Rio de Janeiro), 29, p.e20240551. *(SCIE and Scopus Indexed, SJR:Q4)*
- Athibaranan S. et.al. Revolutionising concrete: harnessing sustainable nanomaterials for enhancing strength and durability performance. Journal of Environmental Protection & Ecology, 25, No 7, 2281–2290. *(Scopus Indexed, SJR:Q3)*

PARTICIPATIONS

- Dr. K. Naga Rajesh, attended a 5 days workshop on "Digital Twinning of Underground Utilities" during 16-20th December 2024 organized by Dept. of Civil Engineering, NIT Warangal in sponsored by SPARC, Ministry of Education, Govt. of India.

Student Corner

PARTICIPATIONS

- 70 students attended a technical event "UNIT CONVERSIONS" on 02-11-2024, conducted by GMR Institute of Technology in association with the Indian Society for Technical Education (ISTE).
- 30 students attended a technical event "LOGIC LEAGUE" on 11-11-2024, conducted by GMR Institute of Technology in association with the Indian Society for Technical Education (ISTE).
- 16 students attended a technical event "Research Rumble" on 07-11-2024, conducted by IGBC (Professional body), Dept. of Civil Engineering, GMR Institute of Technology.
- 4 students attended a technical event "Sustainability Spotlight" on 11-11-2024, conducted by Green Eco Club (Student Club), GMR Institute of Technology.

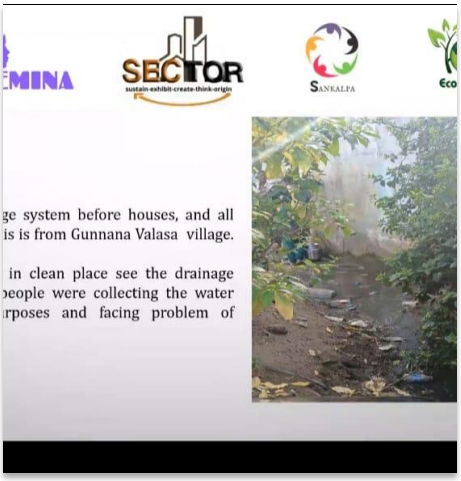
ACHIEVEMENTS

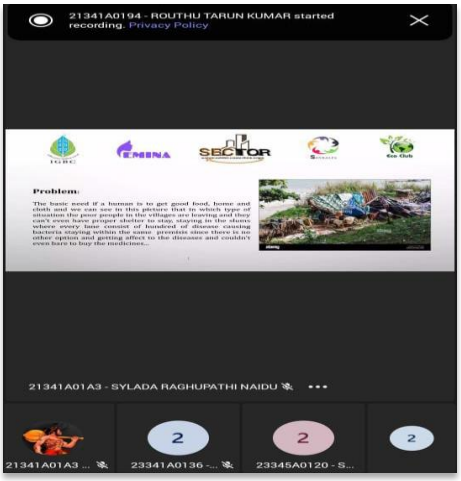
- S. Vandana, 22341A0196, 3rd yr Civil-B-Section Secured 1st Prize in Research Rumble on 07-11-2024, conducted by IGBC (Professional body), Dept. of Civil Engineering, GMR Institute of Technology.
- G. Jahnavi (22341A0130-Civil 3rd yr-A-S/c) Secured 1st Prize in Sustainability Spotlight on 11-11-2024, conducted by Green Eco Club (Student Club), GMR Institute of Technology.

ORGANIZED EVENTS

- **Research Rumble**
  - This is an event conducted on the theme of "Sustainability of Green Building". During the event, participants were given a soft copy of research paper for review up to 15 minutes. Then few questions were asked based on the provided paper. This event was organized with the aim to improve the participants focus on understanding the concepts, critical thinking and problem solving. Best participants were appreciated in the event. Total 22 numbers of students were participated in this event.

- **Frame 2 Fame-Collaborating for a Sustainable Future**
  - This is an online non-technical event organized by the SECTOR Club of department of civil engineering on 09th Nov 2024 with the theme of collaborating for a sustainable future. In this event problems faced by the nearby villages were presented in PPT. The participants were given solutions for the challenges displayed. This event was organized with the aim to improve the participants' presentation skills, communication skills and problem solving skills. The participants were appreciated in the event. Total 12 students were participated in this event.





- **Deepawali Celebrations**
  - The department of civil engineering faculty and students were celebrated **'Deeepawali-2024'** in the department on 29th Oct 2024.

- **Christmas Celebrations**
  - The department of civil engineering faculty and students were celebrated **'Christmas-2024'** in the department on 24th Dec 2024.

TECHNICAL NOTE

Virtual Reality in Civil Engineering

Virtual Reality (VR) has emerged as a transformative technology in civil engineering, enabling professionals to visualize, design, and manage construction projects in immersive and interactive environments. By creating a simulated 3D representation of structures, VR allows engineers, architects, and stakeholders to experience a project before it is built. This capability significantly enhances design accuracy, as potential issues can be identified and resolved during the planning phase, saving time and reducing costs. One of the key applications of VR in civil engineering is in design visualization. VR provides a realistic walkthrough of structures, allowing clients and stakeholders to better understand architectural and engineering plans. This interactive experience fosters better communication and collaboration, ensuring alignment among all parties involved in the project. Additionally, VR is increasingly used in safety training and construction management. Workers can practice operating machinery, navigate complex construction sites, and simulate emergency scenarios in a risk-free virtual environment, thereby improving safety awareness and preparedness. In construction, VR integrates seamlessly with Building Information Modeling (BIM), offering dynamic interactions with 3D models. This integration allows engineers to assess the spatial and functional characteristics of a structure, optimize layouts, and evaluate construction sequencing. VR also supports virtual site inspections, where engineers can assess project progress remotely, reducing the need for frequent on-site visits and enhancing efficiency.

Furthermore, VR contributes to educational and research initiatives in civil engineering. Students and professionals can engage in hands-on learning experiences by exploring virtual construction sites or conducting structural analysis in simulated environments. This practical exposure helps bridge the gap between theoretical knowledge and real-world applications. As VR technology continues to advance, it is expected to become a cornerstone in civil engineering, revolutionizing how projects are designed, communicated, and executed. Its ability to create immersive, interactive, and data-rich environments not only enhances productivity but

also sets a new standard for innovation and efficiency in the construction industry.

By
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Green Roofs and Living Walls

Green roofs and living walls are innovative sustainable technologies that integrate vegetation into building designs, offering a range of environmental, economic, and aesthetic benefits. A green roof is a roof surface covered with layers of soil, waterproof membranes, and vegetation. It provides natural insulation, reducing heat absorption and helping to maintain indoor temperatures. This lowers energy consumption for heating and cooling, making buildings more energy-efficient. Additionally, green roofs act as natural stormwater management systems by absorbing rainwater, reducing runoff, and mitigating the risk of urban flooding. They also improve air quality by filtering pollutants and releasing oxygen into the atmosphere.

On the other hand, living walls, also known as vertical gardens, involve growing plants vertically on building facades or interior walls. These walls not only enhance the aesthetic appeal of a structure but also provide functional benefits. They act as natural air purifiers, absorbing carbon dioxide and harmful toxins while releasing oxygen. Living walls also contribute to temperature regulation by providing shade and acting as

thermal insulation, reducing the heat island effect in urban areas. Furthermore, they promote biodiversity by creating habitats for birds and insects, fostering a more balanced ecosystem in dense urban environments.

Both technologies contribute to noise reduction, as vegetation absorbs sound waves, making them especially valuable in noisy urban settings. In addition to their environmental benefits, green roofs and living walls increase the lifespan of building structures by protecting them from extreme weather conditions and UV radiation. These systems also enhance property values and offer opportunities for urban agriculture, allowing small-scale food production in limited spaces. As cities strive for greater sustainability, green roofs and living walls are becoming essential components of eco-friendly building design, providing a harmonious blend of nature and urban living.

By

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