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NEWSLETTER BY DEPARTMENT OF CIVIL ENGINEERING
ADI SHANKARA INSTITUTE OF ENGINEERING AND TECHNOLOGY, KALADY
APPROVED BY AICTE, NEW DELHI. AFFLIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, KERALA

DEPARTMENT VISION

•"TO EMERGE AS A CENTRE OF EXCELLENCE IN CIVIL ENGINEERING WITH GLOBAL PERSPECTIVES."

IN THIS ISSUE

DEPARTMENT MISSION

- TO IMPART QUALITY PROFESSIONAL EDUCATION SO THAT THE STUDENTS EMERGE AS A COMPETENT PROFESSIONAL IN THE AREA OF CIVIL ENGINEERING.
- TO PROMOTE INNOVATIVE THINKING AND LIFELONG LEARNING IN BUDDING ENGINEERS.
- TO PRODUCE CIVIL ENGINEERS WHO HAVE IMBIBED ETHICAL VALUES TO SERVE THE SOCIETY AND NATION.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- GRADUATES WILL HAVE A POTENTIAL TO PURSUE HIGHER STUDIES AND RESEARCH IN THE FIELD OF CIVIL ENGINEERING.
- GRADUATES WILL BE ABLE TO PRODUCE SUSTAINABLE SOLUTIONS WITH PROFESSIONAL ETHICS FOR REAL TIME CIVIL ENGINEERING PROBLEMS.
- GRADUATES WILL HAVE MANAGERIAL SKILLS AND LEADERSHIP QUALITIES IN EXECUTION OF CIVIL ENGINEERING PROJECTS.
- GRADUATES WILL BE ABLE TO WORK WITH INTEGRITY AND ETHICAL VALUES.

PROGRAM SPECIFIC OUTCOMES (PSOs)

AFTER SUCCESSFUL COMPLETION OF B.TECH IN CIVIL ENGINEERING, THE STUDENTS WILL BE ABLE TO:

- CHECK THE FEASIBILITY AND SUSTAINABILITY OF CIVIL ENGINEERING PROJECTS BY CONDUCTING GEOTECHNICAL INVESTIGATION, CIVIL ENGINEERING SURVEY AND ENVIRONMENTAL IMPACT ASSESSMENT.
- ANALYSE AND DESIGN BUILDINGS, HYDRAULIC STRUCTURES AND WATER DISTRIBUTION, WASTE MANAGEMENT AND TRANSPORTATION SYSTEMS.
- EXECUTE CIVIL ENGINEERING PROJECTS WITH THEIR KNOWLEDGE IN ESTIMATION, PROJECT MANAGEMENT, CONSTRUCTION MATERIALS AND TECHNOLOGIES.

DEPARTMENT OF CIVIL ENGINEERING

KIRF RANKING : A PROUD MILESTONE

Adi Shankara Institute of Engineering and Technology (ASIET), Ernakulam, has added another feather to its cap by securing an impressive 14th rank in the Engineering Category in the prestigious Kerala Institutional Ranking Framework (KIRF) 2025.

This remarkable achievement marks a proud and memorable moment for the entire ASIET community. The institution's consistent commitment to academic excellence, research innovation, and quality education has been recognized at the state level through this ranking.

The award was received by Dr. Sreepriya S, Professor & Dean - Research, along with Dr. Bobby Mathews C, Professor & Dean - PhD Programmes, representing the institution.

INSTITUTE EVENTS

WOMEN'S DAY CELEBRATIONS

The Women Empowerment Cell of Adi Shankara Institute of Engineering and Technology (ASIET), in collaboration with HSG ASIET and ICC ASIET, organized a series of insightful sessions on 9th and 10th March 2026 at the EC Seminar Hall as part of the Women's Day Celebrations 2026.

The event featured three impactful sessions aimed at promoting mental well-being and legal awareness among students.

The first session, "Soul and Strength", was delivered by Dr. Anu Suraj, a psychologist and Co-founder & Managing Trustee of Swaraksha. The session focused on mental wellness, encouraging participants to build inner strength, resilience, and emotional balance in their personal and academic lives.

The second session, "Her Law, Her Power", was led by Adv. Gauri Priya N, Advocate and Legal Consultant at Swaraksha NGO. The talk highlighted key aspects of law and cybersecurity, creating awareness about digital safety, legal rights, and the importance of being informed in today's technology-driven world.

Both sessions were highly engaging and informative, leaving participants with valuable knowledge and practical insights. The initiative successfully reinforced the importance of mental health, legal literacy, and women's empowerment in today's society.

The third session, "Built, Not Given" featured Squadron Leader Nadia Baba as the keynote speaker, who shared her inspiring journey, valuable insights and powerful message on perserverance, leadership and breaking barriers.

BLOOD DONATION CAMP

The NSS Units 228 and 303 of Adi Shankara Institute of Engineering and Technology (ASIET), in association with the Women Empowerment Cell ASIET and in collaboration with IMA Blood Bank, Aluva, successfully organized a blood donation camp titled “JEEVAREKHA—Donate Blood, Give Life” on 9th March 2026 at the EC Seminar Hall.

The camp was conducted with the noble objective of promoting awareness about the importance of voluntary blood donation and encouraging students and staff to contribute towards saving lives. The event witnessed enthusiastic participation from students, faculty, and volunteers, reflecting a strong sense of social responsibility and community service.

CIVIL MEDHA 2026

The Department of Civil Engineering at ASIET successfully organized “Civil medha – Pariyojana Pradarshini”, a Project Expo that showcased the creativity, technical expertise, and innovation of students.

The event was held on 24th March 2026 at 10:00 AM in the Civil Department. It served as a platform for students of eighth semester to present their academic projects, demonstrating practical applications of civil engineering concepts in areas such as sustainable construction, structural design, environmental engineering, and smart infrastructure.

The program was convened by Dr. Dhanasekar K, Professor and HOD, Civil Engineering and coordinated by Ms. Harshananda T N, Assistant Professor of the department. Students actively participated and exhibited a wide range of innovative models and research-based projects. Civil medha proved to be an enriching experience, inspiring young engineers to explore real-world challenges and develop practical, sustainable solutions for the future.

CIVIL MEDHA 2026

DEPARTMENT EVENTS

TALK ON CIVIL CONSTRUCTION MANAGEMENT

A session on Civil Construction Management was conducted for the students of Semester 8 of the department by Arcite School of Technical Education on 31st March 2026. The talk aimed to bridge the gap between academic learning and industry expectations, focusing on emerging trends and practical skills required in the field of civil construction management.

The session introduced students to Arcite's Certified Civil Construction Management program, a 7-month professional course designed to equip aspiring engineers with industry-relevant expertise. Key highlights of the presentation included integrated construction planning using Primavera and BIM workflows, quantity take-off and cost estimation techniques, and structural analysis exposure through tools such as STAAD Pro and ETABS. The discussion also shed light on field-based site execution training, offering students a glimpse into real-world project environments and global construction practices. The interactive session was coordinated by Mr. Abin Joy, Assistant Professor of the department.

KTU S5 RESULTS

STUDENT ACHIEVEMENTS

KTU S3 RESULTS

STUDENT ACHIEVEMENTS

KTU S1 RESULTS

STUDENT ACHIEVEMENTS

STUDENT INTERNSHIPS

Gopika Shanavas, Midhuna Mani, Sibiya Sabu and Sivani P Anil Kumar of S8 CE have successfully completed 2 - months internship at the the Indian Institute of Technology Madras, under the Department of Ocean Engineering. The internship was carried out from 16th January to 14th March 2026, offering a valuable platform to gain practical exposure in the field of ocean and coastal engineering.

Under the expert guidance of Prof. Nilanjan Saha (IIT Madras), the internship provided a blend of theoretical knowledge and hands-on experience, enhancing both technical competence and analytical skills.

This internship significantly contributed to the academic and professional growth of the students. It provided real-world exposure, strengthened technical skills, and enhanced confidence in handling Engineering challenges.

STUDENT ACHIEVEMENTS

DHRUVAM'S MUSICAL TRIUMPH

The college band "DHRUVAM" has once again showcased its musical excellence by securing the 3rd prize at the prestigious intercollegiate event held at M.A. College, Kothamangalam, on 7th March 2026.

Competing against talented teams from various institutions, DHRUVAM impressed the audience alike with their energetic performance, coordination, and musical creativity. Their achievement reflects the dedication, passion, and teamwork of the band members.

A special mention goes to Arundathy Suresh of S4 Civil Engineering, who was a proud member of the team and contributed significantly to this success.

STUDENT ACHIEVEMENTS

REAPPOINTED AS INDEPENDENT DIRECTOR

Dr. P K Suresh
Senior Professor

In a significant recognition of his expertise and dedicated service, the Government of Tamil Nadu, through the Water Resources Department, has extended the appointment of Dr. P. K. Suresh, Senior Professor of the department as Independent Director of the Tamil Nadu Water Resources Conservation and Rivers Restoration Corporation Limited (TNWRCC & RRC) for a further term of three years.

This reappointment comes after a thorough evaluation of his contributions during his previous tenure. His role has been instrumental in guiding policies and initiatives related to water conservation and river restoration in the state.

His continued presence on the Board reflects the trust and confidence placed in his professional acumen, leadership, and commitment to sustainable water resource management. His work aligns with the broader vision of preserving natural resources and ensuring ecological balance.

This achievement brings immense pride and inspiration to the academic and professional community.

FACULTY CONTRIBUTIONS IN RESEARCH AND LEARNING

Dr. K Dhanasekar
Professor & HOD

Dr. K Dhanasekar, Professor and HOD, CE has successfully participated in the 5 - Days Faculty Development Program "AI Tools for Engineering Faculty: Enhancing Teaching, Research, and Academic Productivity" organized by the Department of CSE, School of Engineering and Technology, CMR University, Bengaluru, held from 9th to 13th March 2026. The program focused on the effective use of AI tools for improving teaching, research and academic productivity in Engineering education.

Dr. Parameswaran T G
Associate Professor

Dr. Parameswaran T G, Associate Professor of the department has published a paper entitled "A Systematic Approach to Zeta Potential Testing and Clay Dispersivity" in the Geotechnical Testing Journal, ASTM in March 2026.

STAFF OUTREACH

3D CONCRETE PRINTING

3D Concrete Printing (3DCP) is an innovative, additive construction technology that automates building by extruding cementitious materials layer-by-layer, creating complex, structural forms without traditional formwork. Utilizing gantry systems or robotic arms, it enhances efficiency, reduces labor and material waste, and enables rapid construction for residential, civil, and artistic projects.

Special features of the system include the following;

- Design Freedom – A wide range of designs can be constructed which are structurally stable.
- Construction Efficiency – Construction time can be reduced due to the inclusion of automation during construction. Also, the manpower requirement can be reduced significantly.
- Automation – The process of construction is performed using robotic systems, also bringing accuracy.
- Labor safety – The safety of the workers can be enhanced by the use of this technology.
- No Requirement of Formwork- The printing operation of the vertical elements does not require formwork.

Scope

Residential and Commercial Construction: The primary application is printing walls for houses and small buildings, with the wall segment holding the largest market share (up to 37%). It is increasingly used for low-cost, affordable housing and complex architectural designs.

Infrastructure and Specialized Structures: 3DCP is used to create bridges, retaining walls, and specialized, durable military shelters. It allows for optimized, load-bearing, or artistic designs, such as complex facades, columns, and custom furniture.

Sustainability and Waste Reduction: 3DCP minimizes material waste through precise extrusion and enables the use of eco-friendly, recyclable, or specialized mortar mixes. It allows for the integration of insulation and hollow spaces within walls, improving energy efficiency.

Automation and Productivity: The process is highly automated, reducing the need for on- site, manual labor. It enables 24/7, round-the-clock construction, which drastically speeds up project timelines.

Design Freedom: The technology supports complex, free-form, and non-linear shapes that are difficult or impossible to achieve with traditional, mold-based construction techniques.

Uses of the system

Design Freedom: Enables complex, organic, or non-linear shapes that are challenging with traditional methods.

Efficiency & Cost: Reduces construction time and labor costs by 20% to 30%.

Sustainability: Minimizes material waste, with the potential to integrate sustainable materials, and reduces the need for traditional, non-reusable formwork.

Safety: Decreases on-site risks by reducing the need for manual labor and scaffolding.

Challenges

- Technical Constraints: Requires precise control of material viscosity and curing times.
- Regulatory Hurdles: Lack of widespread building codes and standards for 3D printed structures.
- Scale: While improving, on-site printing is restricted by the size of the printer, often requiring on-site assembly for large buildings.

A**pplications**

- Affordable Housing: Rapid production of residential units.
- Infrastructure: Construction of bridges, pedestrian bridges, and retaining walls.
- Complex Architecture: Fabrication of intricate facade components and structural elements.

Concrete 3D Printing Process

The machine consists of a pump, extruder along with a print head, and an accelerator mixing setup at the nozzle, as shown below in Fig. The printable mix needs to satisfy the three material requirements of pumpability (ability to be pumped), extrudability (ability to be extruded), and buildability (ability to build).

Printer

The printers used by Tvasta for executing construction projects have been designed and developed in-house to achieve optimal resource utilization and unconventional architecture. The printers have numerous subsystems that ensure its operations. These are integrated using our proprietary software to streamline the printing process. The printers have been designed to follow two methods of machine movement, namely, Gantry and Robotic Arm.

Gantry-based Concrete 3D Printers

These printers consist of Tvasta print heads mounted on a gantry system. The print heads print the proprietary material through screw-based extrusion. The range of printers includes;

R & D scale Concrete 3D Printer

Research 3D Printer aiding 3D Printing with a variety of materials has been developed by the Agency, as shown below in figure which is compatible with various materials and designs, easy and user- friendly in machine operation.

Off-site Concrete 3D Printer

This printer given in below fig can be used to print large-scale concrete parts that can be used individually or assembled to form a bigger structure. It implements a novel multi- pallet printing mechanism, allowing fast printing.

On-site Concrete 3D Printer

The on-Site Printer developed by the Agency is a system intended to print large-scale concrete structures such as residential buildings as shown below in Fig below. This printer can be assembled on-site and can be made ready to print (24/7) in a short duration of 2 days. A unique truss framework allows ease of transport and assembly. It has a real-time feedback system with sensors for precise printing of layers and an automated material supply system for dust-free operations.

Robotic-Arm based Concrete 3D Printers

These printers consist of print heads developed by the Agency mounted on a robotic arm. The print heads print the proprietary material through screw-based extrusion. The range of printers include:

Stationary Robotic Arm-based Concrete 3D printer

It is 6-axis robotic arm with 3 m reach given in below Fig. equipped with a unique extrusion system that allows ease of printing and movement for both large and small-scale production. This also provides greater design flexibility, faster production times and seamless deposition of layers through advanced nozzle and smart sensor systems. The streamlined arm enables access to tight spots without potentially interfering with printing.

Mobile Robotic Arm-based Concrete 3D Printer

This printer utilizes a distinct 7th axis motion system in addition to 6 axes of a robotic arm given in below Fig. The motion system consists of a crawler that enables printing large and small-scale structures. The printer has larger reach than a fixed robot and can be used ideally in a factory-setup for production.

Mixer

A batch-type mixer (Pan type planetary mixer or Drum mixer) is preferred. However, an inline continuous mixer can also be used to prepare the concrete. The dosage of admixtures needs to be optimized to reduce the probability of segregation or bleeding depending on the mixing system and parameters such as speed etc.

Pumps

Any commercially available screw-based positive displacement pump given in Fig. (with maximum particle size of 8 mm) or piston-based pump with the provision of zero dead volume can be used to pump 3D printable mix. Both pumps are used for different projects. No special modification to the available commercial pumps is required for this process.

Construction Methodology

C3DP System manufacturing details

The manufacture of the concrete 3D-printed building is schematically described in Fig. below. In the first step, the concrete needs to be designed and prepared using specified raw materials. The quality check and control of the raw materials are performed as per quality assurance plan. After batching of the concrete, the quality is checked again, and the concrete is transferred to the pump for pumping. Simultaneously, the software file for the robot to function is processed. The 3D module in the form of file is further sliced to form the G-code. The G-code is needed for the control of the print path. The robotic movement needs to be ensured before the initiation of the real print. The printing of the modules is controlled by both machine and material parameters.

Construction of 3D Printed building - Structural system describes the construction process at different elemental levels of the 3D printed building. The construction is divided into six steps starting from foundation to upper storey slab/roof. The foundation can be either cast-in-situ or precast. The outer boundary of the footing can be of 3D printed elements, however, lateral support is needed during the concreting of the foundation. The foundations are designed and constructed as per the guidelines of IS 456 and NBC. The plinth beam can be cast on- site or precast plinth beam can also be used. 3D printed beams as precast plinth beams can be used following the requirements of relevant IS codes for footings (such as IS456, IS 15916 etc.). The ground level/ plinth level floor is constructed using the cast-in- situ method.

Curing protocol

The curing protocol needs to follow IS 456. Curing shall initiate just after the

starting of printing or near the initial set of the material to avoid plastic shrinkage cracks. 21 days of curing is prescribed to avoid drying shrinkage cracks for 3D printed wall panels.

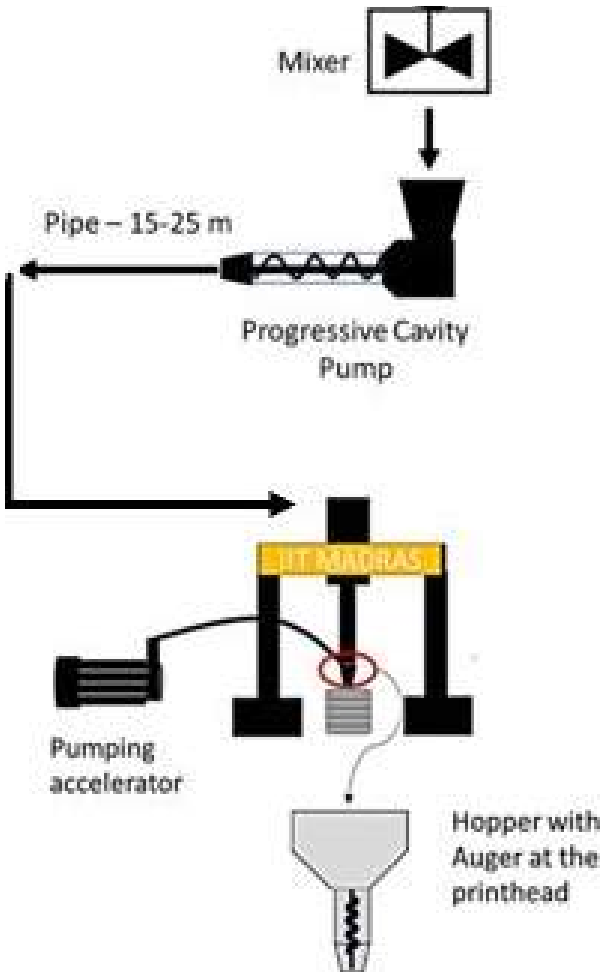
Conclusions

Sustainability & Efficiency: 3DCP significantly reduces the carbon footprint by minimizing material waste and energy usage, enabling greener, faster, and more precise construction.

Economic Impact: While initial equipment costs are high, 3DCP offers substantial long-term savings in labor and construction time.

Design Freedom: The technology allows for the creation of complex, organic, and highly customized structural shapes that are difficult to achieve with conventional methods.

Future Outlook: As research advances into material science, on-site printing capabilities, and structural reinforcement techniques, 3DCP is poised to become a mainstream, reliable, and standardized method for residential and commercial construction.



Dr. A N Swaminathan
Professor

SMART SENSORS AND IOT IN SUSTAINABLE URBAN DRAINAGE SYSTEMS (SUDS)

Urbanization increases impermeable surfaces, leading to flash flooding and untreated runoff entering natural water bodies. This article examines the integration of Internet of Things (IoT) sensors into traditional Civil Engineering drainage designs to create "Smart SuDS." This technology allows for real-time monitoring of water quality and flow, bridging the gap between structural stability and environmental protection.

Environmental engineering within the civil sector is shifting from passive infrastructure to active, responsive systems. Traditional drainage focuses on "conveyance"—moving water away as fast as possible. However, modern environmental standards require "treatment and retention." The primary challenge is managing these decentralized systems across a city.

The core of this technological advancement involves three layers:

- The Physical Layer: Permeable pavements, bioswales, and detention ponds.
- The Sensing Layer: Low-power ultrasonic sensors for water level monitoring and electrochemical probes for pH/Turbidity detection.

The Data Layer: Cloud-based platforms that use logic-based triggers to open or close automated sluice gates based on storm intensity.

Integrating these technologies is critical for several reasons:

- Flood Mitigation: Predictive modeling allows civil engineers to empty retention basins before a storm hits, maximizing capacity.
- Pollutant Control: Sensors can detect "first flush" events—where the initial runoff contains the highest concentration of toxins—and divert that water to treatment

facilities rather than local rivers.

- Lifecycle Cost Reduction: Data-driven maintenance ensures that filters and pipes are cleaned only when sensors indicate a blockage, saving municipal resources.

For the modern civil engineering student, proficiency in hardware (sensors) and software (data analysis) is now as vital as understanding structural loads. "Smart SuDS" represent the future of the field, where infrastructure is not just a stationary object, but a living, breathing system that protects the environment.

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HOD'S MESSAGE

AS THE DEPARTMENT HEAD, I ENVISION OUR COLLEAGUES AND STUDENTSWALKING HAND IN HAND, COLLECTIVELY CONSTRUCTING INNOVATIVE IDEASFOR A MORE DEVELOPED NATION.

LET'S CONTINUE THIS MOMENTUM AND STRIVE FOR EXCELLENCE IN ALL OURENDEAVOURS.