OCTOBER 2025

MEDCHRONICLE

ABOUT US

DEPARTMENT OF BIOMEDICAL ENGINEERING
OSMANIA UNIVERSITY
COLLEGE OF ENGINEERING

The University College of Engineering (A), Osmania University, established in 1929, is one of India's largest and most historic colleges. The Department of Biomedical Engineering was the first in the country to offer an undergraduate program in 1982, maintaining a leading edge through research, consultancy projects, and government grants. In November 2019, the B.E (BME) program received NBA accreditation for six years. The department's faculty members actively contribute to the SERB and DST projects, making it one of the top graduate creators in the nation.

Head of the Department's message:

Biomedical Engineering bridges engineering, medicine, and technology to advance human health through innovation. At UCEOU, we nurture innovators who combine technical expertise with empathy. Our curriculum blends theory with practice through internships, workshops, and projects, fostering real-world healthcare solutions.

This newsletter showcases our achievements in academics, research, and outreach. We thank our faculty, staff, and students for their dedication and the editorial team for their efforts. Our mission is to develop compassionate engineers committed to improving human health and quality of life.

Dr. G. Shravanya received the Best Faculty Award from the Government of Telangana on Teachers' Day, 2025, acknowledging her exemplary contribution to academics and commitment to student development.

Faculty participations

- Dr. K. E. CH Vidyasagar participated in national level one-week online faculty development program on "Unlocking Innovation: Research Funding, Proposal writing, and IPR Strategies for Startups" from 3rd March to 8th March 2025 organized by the Department of Electrical and Electronics Engineering, Joginpally B R Engineering College, Hyderabad.

- Dr. K. E. Ch. Vidyasagar and Dr. K. Harish attended one week online Short-term Course in Telemedicine and Digital Health organized by UGC-Malaviya Mission Teacher Training Centre, North- Eastern Hill University, Shillong during 04-09 March, 2024.

- Ms. G. Shravanya, Dr. K. E. Ch. Vidyasagar and Dr. K. Harish participated in a Two day National seminar on Quality Assurance and Faculty Preparation for NAAC Accreditation of Osmania University organised by IQAC, OU on 27th and 28th February 2024.

- NAAC course by IQAC recently

STUDENT ACHIEVEMENTS

The Department of Biomedical Engineering proudly recognizes the outstanding accomplishments of its students in various national-level technical events.

- B.E. Fourth-year students K. Harika and M. Venkata Jaideep Datta, under the guidance of Dr. K. E. Ch. Vidyasagar, secured the First Prize with a cash award of ₹10,000 in the "Hack-A-Board Hackathon" organized by Soham Academy on October 4, 2025, for their project titled "Integrated Assistive Technology System for Paralysis Patients".
- B.E. Fourth-year students G. Rajashree Padmavathi and Ch. Harsha Vardhan, received the best presentation Award with a cash prize of ₹2,500 in the "Hack-A-Board Hackathon" organized by Soham Academy for their project titled "Redex – Wearable Hand Exoskeleton for Rehabilitation".
- B.E. third-year students K. Harika and M. Jaideep, under the guidance of Dr. K. E. Ch. Vidyasagar, secured First Prize in the Model Presentation Competition at Spoorthi 2025, JNTUH, for their project "NeuroDriven Mobility & Emergency Aid for Individuals with Limited Mobility."
- The Department represented Telangana in the 2nd National Floor Curling Championship and won the Silver Medal.
- B.E. second-year students Vaibhav Singh, Hema Harshitha, and Beulah won First Prize in Poster Presentation at PRAZASTI 2K24, Spoorthy College of Engineering under the guidance of Dr. K. E. Ch. Vidyasagar
- At PROMETHEAN 2025, Ch. Shaarvani and N. Seethala won First Prize in the NeuroKnack Competition, while Ch. Shaarvani and Prasanna Devika secured First Prize in Decode and Reveal.
- Karthik Barupatla, final-year Biomedical Engineering student, secured a Gold Medal in Debate and a Silver Medal in English Poetry as part of Anti-Drug Awareness, conducted by the Telangana State Anti- Narcotics Bureau he was felicitated by Prof. Kumar Molugaram, Vice-Chancellor of Osmania University on 26th June 2025.
- We are happy to share that Ms. Saneya Siddiqui, a final year student of BE Biomedical Engineering has won 3rd prize in an all India level essay writing competition organized by Comptroller & Auditor General of India(CAG) on the account of Audit Diwas. She received a cash award of Rs.30,000 and a medal on 16th November 2024 in New Delhi.
- Ms. Saneya Siddiqui have secured first prize in the NTPC Electron Quiz 2025 Regional Round and have received prize of ₹30,000 from our honourable VC Prof M Kumar. With this win, they will now be representing the Southern Region and our college in the National Semi Finals at Power Management Institute (PMI), Noida.

STUDENT AND FACULTY RESEARCH PUBLICATIONS:

- **PUPIL DETECTION BY MASK-R-CNN MODEL FOR THE CLASSIFICATION OF RELATIVE AFFERENT PUPILLARY DEFECT AND CATARACT :-**
  M. Srinivas, Department of Biomedical Engineering, UCEOU.

- **FABRICATION OF FLAX SEED-BASED COMPOSITE SCAFFOLD FOR TISSUE ENGINEERING APPLICATIONS**
  Rithika Jain, Jahnavi Shree , Shravanya Gundu.

- **IMPACT OF VARIOUS DATA SPLITTING RATIOS ON THE PERFORMANCE OF MACHINE LEARNING MODELS IN THE CLASSIFICATION OF LUNG CANCER**
  Harish Kuchulakanti, Archana Nazarkar, Chandra Sekhar Paidimarry, Sravya Kulkarn.

- **FOOTWEAR-BASED GAIT ANALYSIS: A NEW FRONTIER INPARKINSON'S DISEASE RESEARCH**
  Mr. Ajay Teja Asodu and Dr. Suman Dabbu.

- **IMPACT OF VARIOUS DATA SPLITTING RATIOS ON THE PERFORMANCE OF MACHINE LEARNING MODELS IN THE CLASSIFICATION OF LUNG CANCER**
  Dr. Harish Kuchulakanti, Ms. Archana Nazarkar, Prof. Chandra Sekhar Paidimarry and Ms. Sravya Kulkarni.

- **HARNESSING AI: A NEW ERA IN HEALTHCARE INNOVATION**
  Dr.D.Suman, Associate Professor, Department of BME ,UCEOU.

- **CANCER RESEARCH USING ARTIFICIAL INTELLIGENCE: A PARADIGM IN EARLY DIAGNOSIS**
  Gayathri Bulusu, K. E. Ch Vidyasagar, Malini Mudigonda and Manob Jyoti Saikia.

- **DECELLULARIZATION TECHNIQUES FOR TISSUE ENGINEERING: TOWARDS REPLICATING NATIVE EXTRACELLULAR MATRIX ARCHITECTURE IN LIVER REGENERATION**
  Ms. Ishita Allu, Mr. Ajay Kumar Sahi, Ms. Meghana Koppadi, Dr. Shravanya Gundu and Prof. Alina Sionkowska.

- **ESTIMATION OF PSD AND NON-LINEAR ENTROPY PARAMETERS OF FHRV**
  Ms. Ushasri Akkanapalli, Prof. Malini Mudigonda, Ms. Sai Sreeja Samavedam and Ms. Meghana Koppadi.

Department events:

Recent Trends in Medical Engineering (RTME)

The Department of Biomedical Engineering, UCE, Osmania University, hosted "Recent Trends in Medical Engineering" (RTME) on 25–26 October 2024. The event began with a classical dance and inaugural ceremony led by Prof. Kumar Molugaram (Vice Chancellor, OU) and Guest of Honor Prof. P. Chandra Shekhar (Principal, UCE, OU), followed by lectures, presentations, exhibits, and a quiz. Day two featured technical sessions, a NIPER talk, and live demos of endoscopy and ventilator tech. The valedictory, presided by Prof. Sriram Venkatesh (Secretary, TSCHE) and Dr. Amith Asthana (Associate Professor & Head, Dept. of Medical Devices), celebrated top contributions, fostering innovation and collaboration.

Hands-on IOT Workshop for Medical Applications

The Department of Biomedical Engineering, University College of Engineering, Osmania University, conducted a hands-on IoT Workshop coordinated by Dr. K. E. Ch. Vidyasagar, focusing on embedded systems and biomedical applications. Day one covered Arduino programming, Proteus simulation, and ESP32 interfacing with LEDs, keypads, and LCDs. Day two featured Raspberry Pi training and a MyoArm demo, highlighting its use in prosthetics. The workshop fostered innovation and equipped participants with practical skills in microcontroller programming and bio-signal processing.

Hands-on Workshop on Biomaterials: the cutting edge and real-world applications

The Department of Biomedical Engineering, University College of Engineering, Osmania University, conducted a biomaterials workshop led by Dr. Shravanya, who introduced the speakers and highlighted the role of biomaterials in modern tech. Dr. K. Dharmalingam and Dr. Kiran Yellappa Vajanthri presented on biomaterial properties, demonstrated hydrogel preparation, and showcased a swelling experiment for wound care. They also discussed drug release profiles, antioxidant activity via DPPH assay, and hemocompatibility techniques for dental implants. Participants gained hands-on experience and practical insights into artificial scaffolds and their applications.

Department events:

ATAL Faculty Development Program (FDP)- “Additive Manufacturing-based Surface Modification techniques for innovative medical solutions”

The ATAL Faculty Development Program (FDP) Workshop on "Additive Manufacturing-based Surface Modification Techniques for Innovative Medical Solutions" was successfully conducted from January 6th to 11th, 2025, at Osmania University. Bringing together renowned experts and participants, the six-day event explored the transformative role of additive manufacturing (AM) in biomedical applications, with a focus on custom prosthetics, biocompatible implants, and rapid surgical prototyping.The inaugural session, led by Prof. P. Chandrasekar, Principal, UCE(A), Osmania University, set the stage for insightful discussions on Fused Deposition Modeling (FDM), Stereolithography (SLA), Selective Laser Sintering (SLS), and Electron Beam Melting (EBM). Sessions delved into nanomaterials for drug delivery, tribocorrosion analysis of orthopedic implants, and bioprinting for tissue engineering, with a technical visit to CPDDAM and NCAM, providing hands-on exposure to cutting-edge AM applications in healthcare. The workshop featured interactive hands-on sessions, computational modeling exercises, and in-depth case studies, enhancing participants’ practical understanding of AM technologies, material characterization, and post-processing techniques. The event concluded with a valedictory ceremony, where Prof. B. Mangu, Vice Principal, UCE(A), Osmania University, highlighted the importance of interdisciplinary collaboration and research-driven innovation.

Department events:

MyoTech

On March 18, 2024, the Department of Biomedical Engineering at the University College of Engineering, Osmania University, organized the Myotech Workshop, a dynamic one-day event focused on Signal and Image Processing, as well as machine learning and deep learning (ML/DL). Coordinated by Dr. K. E. Ch. Vidyasagar, held at the Department of Biomedical Engineering, the workshop commenced with an insightful introduction, covering diverse applications of multi-domain knowledge. Participants immersed themselves in a rich learning environment, exploring Python basics and advanced concepts such as data preprocessing techniques for images and EMG signals. Hands-on exercises and interactive quizzes reinforced comprehension, while special sessions showcased innovative projects like "Subway Surfers - Live Action" and "FitForm Coach," demonstrating real-time gameplay and workout posture detection using ML/DL techniques and libraries like OpenCV and MediaPipe. The workshop fostered active participation, collaboration, and deeper understanding, driving innovation in biomedical engineering education and practice.

Biomaterials and fabrication techniques

The Biomaterials and Fabrication Techniques workshop, spanning March 1st to 2nd, 2024, at the Department of Biomedical Engineering, UCEOU, coordinated by Mrs. G. Shravanya, saw the convergence of 100 participants. On March 1st, inaugurated with traditional lamp lighting, renowned speakers like Dr. Suruchi Poddar and Dr. Kiran Yellappa Vajanthri shared insights on electrospinning, 3D printing, and biomaterial characterization techniques, fostering engaging discussions. Day two commenced at 10:00 am with hands-on sessions covering various topics such as 3D printing, nanoparticle fabrication, and microscope operation, followed by a BioIdeation task encouraging creative problem-solving. The day concluded with a quiz competition and a valedictory session where certificates were awarded by Principal, Prof. P. Chandrasekhar, wrapping up the workshop on a high note, leaving a lasting impact on biomedical engineering research and education.

Department events:

MEDITECH 2K25

Meditech 2K25, the national-level technical symposium organized by the Department of Biomedical Engineering, concluded with resounding success, reaffirming its status as a premier platform for interdisciplinary innovation. Cantered around the theme “Amalgamation of Engineering & Medicine,” this year’s edition brought together a vibrant community of students, researchers, and industry professionals to explore the convergence of engineering principles and biological sciences in addressing contemporary healthcare challenges.

The symposium featured a dynamic line-up of activities, including paper and poster presentations, model exhibitions, and guest lectures by esteemed experts in biomedical technology. These sessions provided participants with opportunities to showcase their research, receive constructive peer feedback, and engage in meaningful discussions on emerging trends and breakthroughs in medical science and engineering. The diversity of topics and formats encouraged cross-disciplinary dialogue and highlighted the creative potential of young innovators.

Meditech 2K25 also served as a catalyst for collaboration, fostering connections between academia and industry while nurturing the next generation of biomedical engineers. The event’s interactive atmosphere and emphasis on knowledge exchange created a fertile ground for new ideas and partnerships. Participants left inspired by the depth of insight shared and the spirit of innovation that permeated every session.

Carrying forward the legacy of its predecessors, Meditech 2K25 not only met but exceeded expectations, leaving a lasting impression on all who attended. The symposium stood as a testament to the department’s commitment to advancing healthcare technology through education, research, and community engagement.

Student Projects:

Sustainable Biomaterials: Chia and Flax seeds gel - based films for Tissue Engineering Applications

This study explores biocompatible scaffold films for tissue engineering using natural hydrogels from chia and flax seeds, enhanced with 6% polyvinyl alcohol (PVA) to improve mechanical strength. Rich in polysaccharides, these plant-based gels are biodegradable, hydrophilic, and non-toxic, but lack structural integrity on their own. The PVA-blended composites were evaluated for swelling, contact angle, and stability. Formulations combining both seed mucilages with PVA showed improved strength, water absorption, and moderate hydrophilicity—ideal for cell adhesion and moisture retention. These findings support their potential in wound healing and soft tissue regeneration, highlighting the promise of sustainable hydrogel-polymer scaffolds in biomedical applications.

Implementation of a Cost-Effective CNC-Based 2D Plotter

This project presents a low-cost CNC-based 2D plotter ("DrawBot") designed to convert G-code into precise X-Y motion with pen control via a servo-driven Z-axis. Built using NEMA 17 stepper motors, Arduino Uno, CNC Shield, and A4988 drivers running GRBL firmware, the system features 3D-printed parts, linear rods, and GT2 belts for stable Cartesian movement. A micro servo (MG90S) salvaged from a CD-ROM enables vertical pen actuation. The workflow integrates Inkscape with MI GRBL for G-code generation and UGS for control. Aimed at students and hobbyists, the plotter offers an affordable, modular platform for learning CNC concepts and experimenting with creative automation. The report details design, construction, testing, and future enhancements, highlighting its scalability and open-source flexibility.

Active Particle-Based Computational Studies on Cancer Diffusion and Metastasis

This project presents a computational model of cancer invasion using an active particle framework, where cells are treated as self-propelled agents with tunable motility and drift. The extracellular matrix (ECM) is simulated as a degradable grid, allowing dynamic remodeling during cell migration. Simulations in 2D and 3D environments, analyzed via mean squared displacement (MSD), reveal that persistence, drift, and ECM degradation are critical for deep invasion. Notably, without matrix remodeling, even highly motile cells show limited migration. This model overcomes experimental constraints, offering insights into biophysical drivers of metastasis and a flexible platform to explore tumor microenvironmental factors and inform anti-metastatic strategies.

Student Projects:

Sign language recognition using machine learning

This project presents a real-time Sign Language Recognition System to bridge communication gaps for the deaf and hard of hearing. Using MediaPipe for hand landmark detection, OpenCV for video processing, and TensorFlow for classification, the system identifies static hand signs for alphabets and numbers with over 95% accuracy. It features image preprocessing, landmark extraction, model training, and audio output. Designed for inclusivity, the system can be expanded to support dynamic gestures and regional language translation, offering a practical assistive tool for accessible communication.

Design and Implementation of a Smart Assistive System for Physically Impaired Users

This project introduces a low-cost, wireless assistive system for individuals with quadriplegia, enabling control of a wheelchair, home appliances, and emergency communication via head movements and voice output. A Python-based GUI uses MediaPipe for facial landmark detection and dwell-based selection, while Google Translate and gTTS provide multilingual voice assistance. The ESP32-based hardware setup uses ESP-NOW for wireless communication: one receiver controls wheelchair movement via Arduino and motor drivers; another manages appliances and emergency calls via a SIM module. The system offers contactless, customizable support for independent mobility and communication.

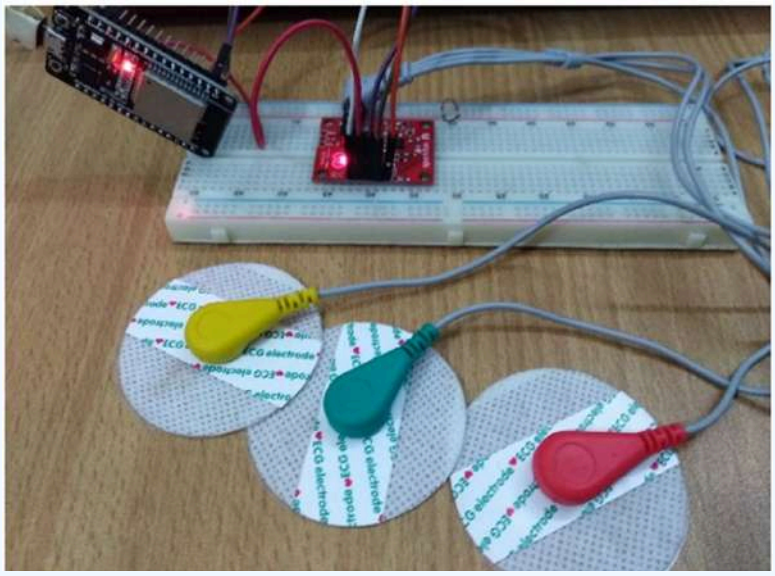
Wireless Text to Refreshable Braille Display and Feedback Display

This project presents a low-cost, IoT-enabled Braille text display that converts digital input into tactile output using electromechanical actuators. Designed for accessibility and portability, the system uses a microcontroller to interpret text and actuate Braille dot patterns in real-time, simulating the six-dot cell configuration. A graphical display aids partially sighted users, while adjustable timing enhances comfort. Powered by a cloud-connected interface, the system supports remote input and remains energy-efficient when idle. Its modular design allows future expansion into multi-cell displays, audio feedback, and speech-to-text, offering a scalable solution for inclusive literacy and communication.

Student Projects:

Real-Time ECG Monitoring System on ESP32 with Advanced Signal Filtering and Pan-Tompkins BPM Detection and arrhythmia detection using CNN model

This project presents a real-time, remote cardiac monitoring system using AD8232 and pulse sensors to capture ECG and BPM data. An ESP32 microcontroller transmits signals to the cloud via Wi-Fi, enabling remote access for health specialists. A multi-stage digital filter pipeline—ANC, Butterworth, Savitzky-Golay, and MWI—cleans the signal, while the Pan-Tompkins algorithm detects QRS complexes to identify conditions like tachycardia and bradycardia. A FastAPI backend with a CNN model analyzes raw ECG segments for rhythm abnormalities. Additionally, a local web interface displays real-time ECG plots. This edge-cloud hybrid system offers a scalable, low-cost solution for telemedicine, home care, and wearable health devices.



Gesture-Based Assistive Communication System using Myo Armband

This project introduces a gesture-controlled communication system using the Myo Armband to assist individuals with speech, hearing, or mobility impairments. It detects hand gestures via sEMG and inertial data, classifies them using machine learning, and transmits results via Bluetooth to an Arduino UNO. The Arduino drives an I2C LCD for message display and a DFPlayer Mini for audio output in multiple languages, including regional dialects. The system offers visual and auditory feedback, ensuring accessibility across diverse environments. Portable and low-cost, it supports future upgrades like cloud connectivity and AI-based learning, making it ideal for rehabilitation, education, and personal care settings.

The Foundation of Prakruthi

Prakruthi was born out of a simple yet powerful realization — that true education extends beyond classrooms. It includes understanding our environment, respecting nature, and taking responsibility for the world, we live in. Our college campus, with its blend of greenery and energy, served as the perfect starting point for a movement towards sustainability.

Prakruthi foundation day April 22nd, 2025

Club inauguration with faculty members and Principal

The foundation of Prakruthi marks a collective step by the students of the college to make the campus a model of environmental consciousness. What started as a small initiative to clean and green our surroundings has now grown into a club with a clear mission: to connect people, purpose, and the planet.

The motivation and Idea behind Prakruthi

The inspiration behind Prakruthi came from the vision and guidance of Mr. Madhu, whose passion for environmental protection and community development deeply influenced us. His constant reminder — *"If not us, then who? If not now, then when?"* encouraged us to act instead of waiting for change to happen.

Madhu's initiatives and sustainable lifestyle demonstrated how individual actions can create collective impact. His involvement in tree plantation drives, and environmental awareness campaigns showed us that real change begins at the grassroots level. It was his encouragement that motivated us to form a dedicated platform where like-minded students could come together to continue this mission.

Prakruthi stands as a tribute to his inspiring leadership, a living reminder that small steps, when taken together, can lead to big transformations.

Our Inspiration – Madhu, whose vision for a greener tomorrow continues to guide Prakruthi.

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