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Rangarajan Dr. Sagunthala
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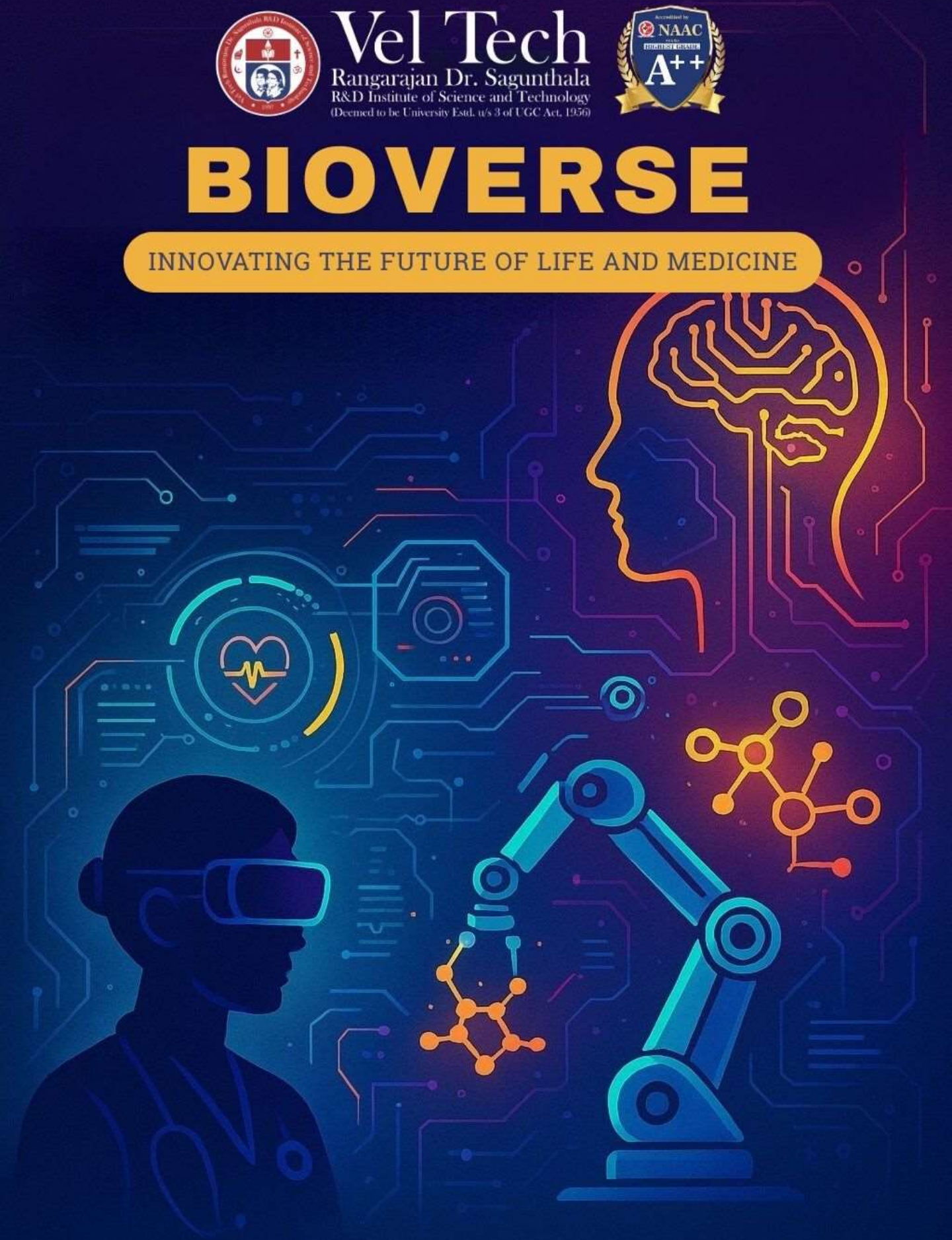
BIOVERSE

INNOVATING THE FUTURE OF LIFE AND MEDICINE



JUNE 2023
VOLUME V

SCHOOL OF ELECTRICAL AND COMMUNICATION
DEPARTMENT OF BIOMEDICAL ENGINEERING

Institute Vision

To create, translate and disseminate frontiers of knowledge embedded with creativity and innovation for a positive transformation of emerging society.

Institute Mission

M1: To nurture excellence in teaching, learning, creativity and research; translate knowledge into practice

M2: To foster multidisciplinary research across science, medicine, engineering, technology and humanities

M3: To incubate entrepreneurship; instill integrity and honour

M4: To inculcate scholarly leadership towards global competence and growth beyond self in a serene, inclusive and free academic environment

Department Vision

To be recognized as an excellent centre in Biomedical Engineering for imparting quality technical education that leads to transformative advancements in healthcare industries

Department Mission

M1: To infuse critical thinking skills by providing a strong foundation that enables the students for continuing education

M2: To create an ambience of academic excellence with state-of-the-art laboratories to compete globally

M3: To establish a dynamic research environment that integrates advanced healthcare technologies for innovation and progress

Program Education Objectives

PEO1: **Exhibit proficiency in designing and analyzing healthcare solutions to cater to the needs of the medical industry and societal needs**

PEO2: **Demonstrate professional networking in a diverse team setting and collaborate among peers with ethical practices in the workplace, ensuring integrity**

PEO3: **Reinforce lifelong learning practices for professional advancement not limited to higher studies and research.**

Program Special Outcomes

PSO1: **Apply critical reasoning to analyse, identify and solve solutions for problems related to Brain-Computer Interface (BCI)**

PSO2: **Design an effective interface between biological and electronic systems.**

PSO3: **Apply the knowledge of Artificial intelligence in healthcare engineering to solve real-time problems**

Magazine Credits

From the Magazine Team

This edition of our departmental magazine celebrates the people, ideas, and moments that define our academic journey. It is a reflection of the shared effort of a community that learns, grows, and innovates together throughout the year. Within these pages, you'll find faculty insights, student achievements, technical projects, and creative contributions that capture the energy and spirit of our department. Each section highlights dedication, curiosity, and teamwork, showing how diverse talents come together to create a vibrant and evolving academic environment. Beyond accomplishments, the magazine also honors the experimentation, perseverance, and learning that make success possible.
May this volume remind us of the power of collaboration and the meaningful outcomes that arise when we work together with purpose and passion. We hope it inspires you to embrace opportunities, push boundaries, and continue shaping the future of our department.

HAPPY READING!"

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- Aravind M S (VTU16502) - VI BME
- Lawanbha Lyngdoh (VTU11962) - VI BME
- Wandahunshisha P Marak (VTU16364) - VI BME
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Mr. A. Padmanabha Sarma

(Assistant Professor)

CONTENTS:

DEAN'S Desk

As we present this edition of the departmental magazine, I am filled with pride at the continued growth and achievements of our Biomedical Engineering department. Over the past year, our students and faculty have embraced challenges, explored new ideas, and contributed to a culture of innovation that goes far beyond the classroom.

The landscape of science, technology, and healthcare continues to evolve rapidly, and our department has risen to meet these changes. We focus not just on academic excellence, but on real-world relevance, problem-solving, and the development of skills that prepare our students for meaningful careers. The balance between rigorous learning and practical application is what makes our graduates confident and capable.

I am particularly impressed by the spirit of collaboration that defines our community. Faculty mentorship, teamwork among students, and interdisciplinary initiatives have created an environment where curiosity and creativity thrive. These interactions help students grow not only academically, but also personally and professionally.

This magazine captures these efforts and achievements. I congratulate the faculty, students, and editorial team for their dedication in putting this edition together. May it inspire our community to continue striving for innovation, excellence, and a meaningful impact in the world of healthcare and biomedical engineering.

Prof. Dr. R S Valarmathi

Dean- School of Electrical & Communication

HoD'S Reflection

As we release this edition of our departmental magazine, I am reminded of the energy, creativity, and determination our students bring to the department every day. This year has been full of learning, experimentation, and growth, both inside and outside the classroom, shaping the leaders and innovators of tomorrow.

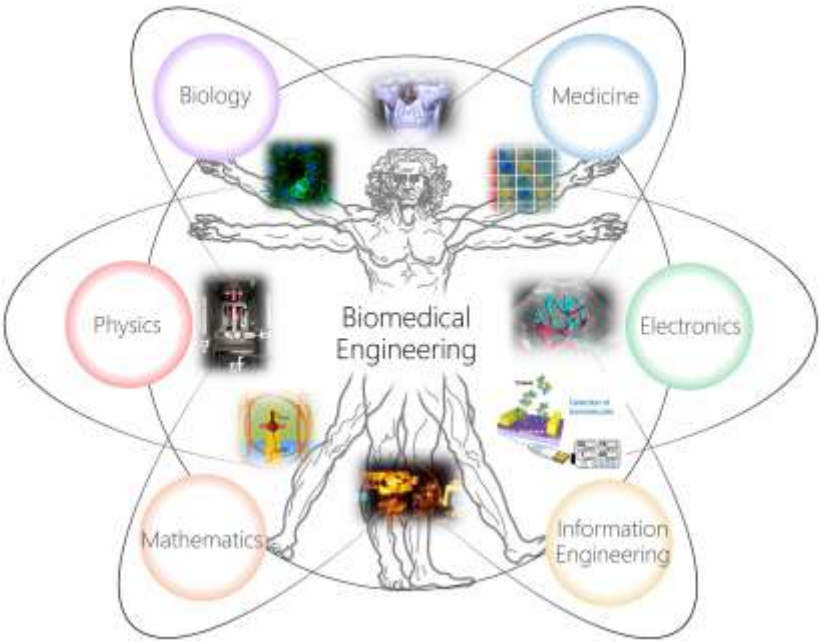
Our department strives to create an environment where curiosity is encouraged and ideas can flourish. Students have engaged in projects, research, technical initiatives, and collaborative activities that challenge them to think critically and apply their knowledge in meaningful ways. These experiences are what transform learning into lasting skills.

Equally important is the culture of mentorship and teamwork within the department. Faculty guidance, peer support, and interdisciplinary collaboration have helped students not only achieve academic excellence but also develop confidence, adaptability, and a sense of responsibility toward the larger community.

This magazine captures these collective efforts and achievements. I congratulate our students and the editorial team for their dedication in compiling this edition. May it inspire all of us to continue exploring, innovating, and striving for excellence in the years ahead..

Dr. Balasubramaniam. D

About the Department



The Department of Biomedical Engineering was established in the year 2017 with the objective of bridging engineering principles with medical and biological sciences to address challenges in healthcare. The department offers B.Tech. and Ph.D. programs, aimed at developing skilled professionals and researchers capable of contributing to healthcare technology, medical device development, and biomedical research. Emphasis is placed on outcome-based education, hands-on learning, and research-oriented training. With a focus on emerging areas such as medical imaging, biomechanics, biomedical signal processing, and artificial intelligence in healthcare, the department strives to produce graduates who are industry-ready, research-driven, and socially responsible.

News in Trend – Hydrogel Implant Coating

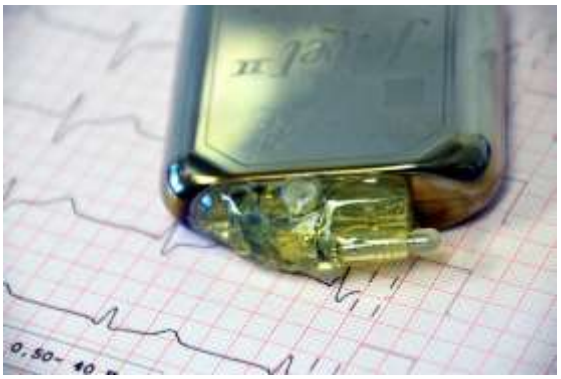
Biomedical engineers are enhancing medical implants with smart coatings that resist infections and degradation, improving patient safety and device durability.

MIT researchers introduced adhesive hydrogel coatings in June 2023 that bond strongly to pacemaker leads, drug delivery stents, and orthopedic screws, prolonging functionality by fivefold in lab tests. These soft, slippery materials mimic natural tissue adhesion while repelling bacteria through dynamic polymer networks.

Over 100 million implants are placed yearly, but biofouling and infections cause 10-20% failure rates, leading to costly revisions and complications like sepsis. Traditional coatings crack under movement or fail to prevent biofilm formation; MIT's version uses catechol-inspired chemistry for robust wet adhesion and antimicrobial peptide release triggered by inflammation.

For implant recipients, this means fewer surgeries and better outcomes, particularly for high-risk cardiac and joint devices where longevity is critical.

This innovation represents a paradigm shift in biomedical engineering by engineering "living" interfaces that adapt to the body via self-healing hydrogels and bioresponsive elements. It overcomes mechanical mismatch between rigid implants and soft tissues, enabling next-gen devices like neural probes and vascular grafts that integrate seamlessly for decades.



News in Trend- Beating Heart Transplant

Advanced biomedical engineering is expanding the organ donor pool by keeping hearts alive during transplantation from donation-after-circulatory-death donors. Stanford Medicine surgeons performed the world's first beating-heart transplant in June 2023, using a novel perfusion device that maintains blood flow to donor hearts after circulatory death. This technique employs thoracoabdominal normothermic regional perfusion (TA-NRP) to rapidly restore circulation, delivering viable organs that function like those from brain-dead donors.

Traditional heart transplants rely on brain-dead donors, limiting availability to just 2,300 U.S. recipients yearly while 100,000 await lifesaving procedures. DCD hearts—available from 6,000 potential donors annually—were previously unusable due to warm ischemia damage; Stanford's system reverses this within minutes using specialized catheters and ECMO technology.

For end-stage heart failure patients, this doubles transplant opportunities, slashing waitlist deaths and enabling same-day surgeries with outcomes matching standard procedures.

This represents a paradigm shift in biomedical engineering by transforming organ procurement from static cold storage to dynamic, living preservation systems. Integrating vascular engineering with real-time hemodynamic monitoring overcomes ischemia-reperfusion injury, potentially extending to livers, kidneys, and lungs while revolutionizing global transplant medicine.

Wandahunshisha P Marak(VTU16364)

Best Project

IoT Based Phototherapy for Neonatal Jaundice

The project titled **"IoT Based Phototherapy for Neonatal Jaundice"** focuses on developing a smart, efficient, and affordable treatment system to manage neonatal jaundice effectively. Neonatal jaundice is a common medical condition in newborns caused by elevated levels of bilirubin in the bloodstream, resulting in yellow discoloration of the skin and eyes. Although mild jaundice is often harmless, severe cases can lead to complications such as kernicterus and permanent neurological damage if not treated at the right time. Early detection and continuous monitoring are therefore essential to ensure safe and effective treatment.

Phototherapy is the standard treatment for neonatal jaundice, where blue light with a specific wavelength (typically around 460–490 nm) helps convert excess bilirubin into water-soluble forms that can be excreted naturally by the infant's body. The proposed system improves traditional phototherapy units by integrating Internet of Things (IoT) technology to enable real-time monitoring and intelligent control of treatment parameters.

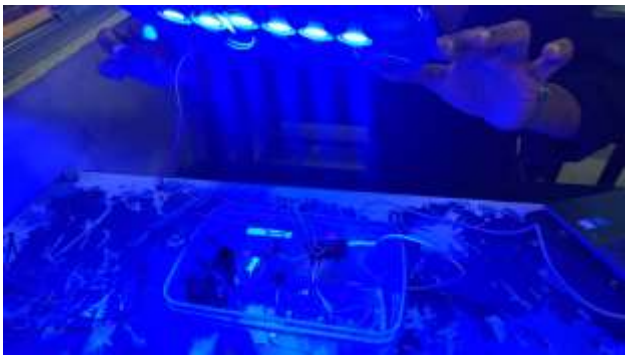
The system uses high-intensity blue LEDs as the primary light source, ensuring uniform light distribution and optimal irradiance levels. Temperature sensors are included to monitor the baby's environment and prevent overheating, while light intensity sensors ensure that the therapeutic range is consistently maintained. A microcontroller serves as the central processing unit, collecting sensor data, regulating light output, and maintaining safe operational conditions.

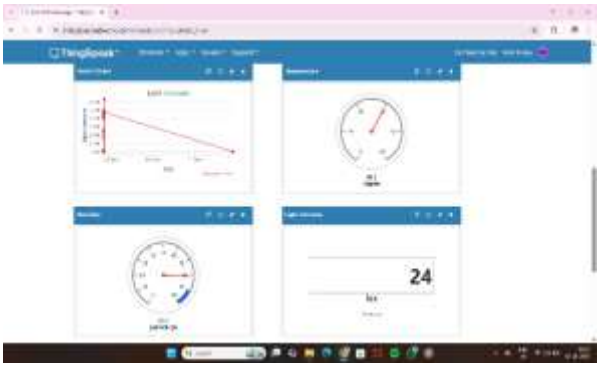
One of the key innovations of this project is IoT connectivity. The microcontroller transmits real-time treatment data to a cloud-based platform through Wi-Fi. Healthcare providers can access live data, monitor treatment duration, and observe parameter trends through a user-friendly dashboard. In case of abnormal temperature or light intensity levels, the system generates instant alerts, ensuring timely corrective action.

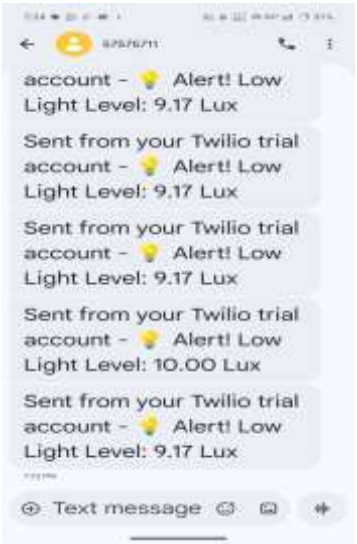
Best Project

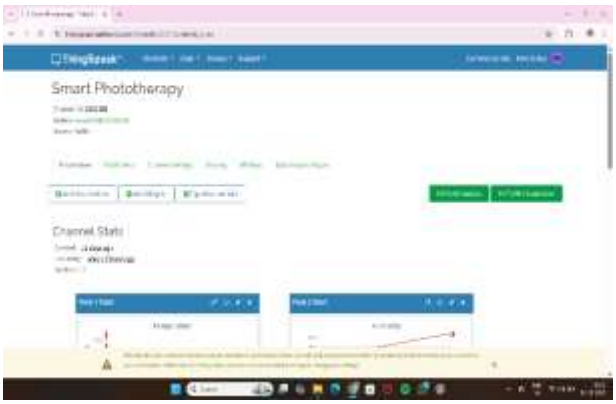
The device is designed to be portable, energy-efficient, and cost-effective, making it particularly suitable for rural healthcare centers and low-resource settings where advanced neonatal care facilities may be limited. By integrating embedded systems, sensor monitoring, and cloud connectivity, this project enhances safety, accuracy, and accessibility in neonatal treatment.

Overall, the IoT-based phototherapy system represents a significant step toward smart neonatal healthcare, combining medical science and engineering innovation to improve treatment outcomes and ensure safer care for newborns.









B Pooja (VTU12628)

Alumni Spotlight

Being back on campus brings back so many memories of our time as students—the long nights, last-minute project deadlines, and those moments of doubt that somehow taught us resilience. **Riddhi Khanal**, an alumna of the Department of Biomedical Engineering, reflects on these experiences not only with nostalgia but also with gratitude for the journey that shaped her path. She shares not just her achievements today, but the experiences and lessons that helped her reach where she is now.

For Riddhi Khanal, college was much more than lectures and exams. It was a place where she learned to balance priorities, collaborate with people from different backgrounds, and step beyond her comfort zone. Whether it was working on a challenging internship, participating in a tech club project, or having meaningful conversations with mentors, every experience contributed to building the skills and confidence she carries into her professional life today.

As Riddhi Khanal began her professional journey, she encountered new challenges that went beyond classroom learning. Tight deadlines, teamwork in unfamiliar environments, and real-world problem-solving tested her abilities in unexpected ways. However, the habits she developed during her college years—curiosity, persistence, and the courage to ask questions—became the foundation that helped her navigate these challenges successfully.

To the students who are still on campus, Riddhi Khanal shares a heartfelt message: make the most of every opportunity, do not be afraid to make mistakes, and always stay curious. The lessons you learn, the friendships you build, and the experiences you gather during your college years will guide your career and remain with you long after

Gallery


Vel Tech
Rangarajan Dr. Sagunthala
Lavaza
2023
VIBE
BME
BIO-MEDICAL ENGINEERS
organizes a
Treasure Hunt
Register at
https://lavaza.veltech.edu.in/
Rules & Regulations :
1. All teams must have at least 3 members not more than 4 members.
2. Teams must stay together during the treasure hunt and are encouraged to work together to solve the clues and find the final destination.
3. No team members are allowed to go together with other teams.
4. Don't help or discuss with other team members.
5. Think out of the box and improve your searching skills.
6.Team will complete the task within 90 minutes.
7. The team who are reaching the destination first will be announced as the winner of the game.
Connections
Crosswords
Jumble Words
Aptitude
Venue : Biomedical Department | Block : 24 | Room No : 2406 | Date : 09-02-2023
Timings : 9:30 am - 01:30 pm
Contact us @ +91 9677032354, +91 9600101819