VIT Vidyalankar Institute of Technology
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An Autonomous Institute Affiliated to University of Mumbai

MEDITRONICS

DEPARTMENT OF BIOMEDICAL ENGINEERING

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Vision of the Department

To be a globally recognized centre of excellence in the field of biomedical engineering where learners are nurtured in a scholarly environment to evolve into competent professionals to benefit society

Mission of the Department

- Evolve a curriculum which emphasizes on strong engineering fundamentals with the flexibility to choose advanced courses of interest and gain exposure to tools and techniques in Biomedical Engineering.
- Encourage a teaching-learning process in which highly competent faculty share a symbiotic association with the institutes of repute.
- Facilitate creation and dissemination of biomedical engineering knowledge through a digitally-enabled learning environment.
- Develop academic and infrastructural facilities with modern equipment and other learning resources and encourage reciprocal sharing with other institutes through networking.
- Establish a centre of excellence to enhance academia – biomedical industry partnership and work on collaborative projects.

Programme Educational Objectives (PEO)

- To enable the pursuit of knowledge in the field of Biomedical Engineering and contribute to the profession and employability of the students.
- To engage in research, generate the employment through entrepreneurship and work effectively in multidisciplinary environment.
- To understand the human, social, ethical and environmental context of their profession and contribute positively to the needs of individuals and society.

WHAT'S INSIDE

Department Staff
- Prof. Suvarna Udgire
- Prof. Bhavika Khatri

Student Article
- Ms. Ameya Ghadge

Alumnus Talk
- Mr. Siddharth Roychowdhury

- Expert talk on "Ensuring Safety and Compliance: Standards for Clinical and Analytical Instruments"
- Guest lecture on " Advancements in Healthcare"

PROF. DR. GAJANAN NAGARE

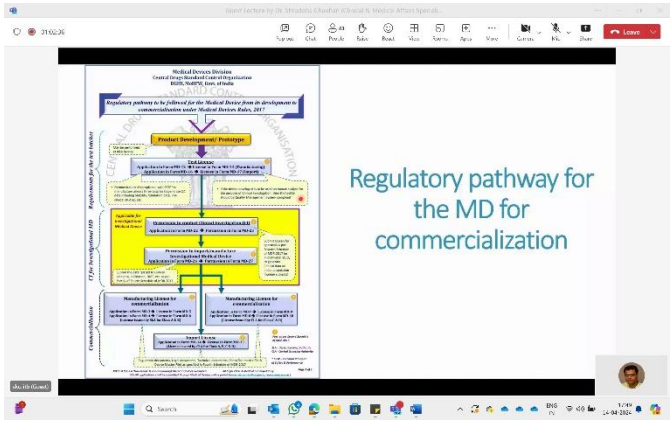
HEAD OF DEPARTMENT, BIOMEDICAL ENGINEERING

Welcome to a new academic year at the Department of Biomedical Engineering, Vidyalankar Institute of Technology, Mumbai! As the Head of the Biomedical Engineering Department, I am thrilled to embark on this journey of learning, demonstration, and innovation with all of you. Our department remains at the forefront of cutting-edge research and development, thanks to our experienced faculty and collaborations with industry experts and premier government institutes. This year, we are excited to introduce several new courses aligned with NEP2020, focusing on the latest advancements in medical technology and healthcare solutions. Our dedicated faculty and staff are committed to providing a nurturing and stimulating environment that fosters intellectual growth and practical skills. I encourage all students to fully utilize the resources available and actively engage in our vibrant community. Together, let's push the boundaries of biomedical engineering and make impactful contributions to the world of healthcare. Here's to a year of growth, learning, and success!

"When something is important enough, You do it even if the odds are not in your favor"-Steve Jobs

Expert talk on "Ensuring Safety and Compliance: Standards for Clinical and Analytical Instruments"

An expert talk titled "Ensuring Safety and Compliance: Standards for Clinical and Analytical Instruments" held on April 14, 2024, aimed to educate students on patient safety, standards, and regulations in medical devices. Dr. Shraddha Chauhan, a Clinical & Medical Affairs Specialist from Radiometer, led the session hosted on MS Teams. The session began with an introduction to medical device classifications and patient safety principles. Dr. Chauhan engaged participants actively, using case studies to illustrate concepts like the life cycle of product development and manufacturing under stringent regulatory frameworks. Her firsthand experiences provided valuable insights into navigating complexities in the field. The session was coordinated by Dr. Gajanan Nagare, allowed students to deepen their understanding of regulatory compliance and its crucial role in healthcare technology. Overall, it was an informative and interactive event that equipped attendees with practical knowledge essential for future careers in clinical and analytical instrumentation.



Screenshots of expert talk conducted in online mode

Department Staff

PROF. SUVARNA UDGIRE
ASSISTANT PROFESSOR

EDUCATION QUALIFICATION:
ME-ELECTRONICS ENGINEERING

TEACHING EXPERIENCE:
15 YEARS

INDUSTRIAL EXPERIENCE:
13 YEARS

AREA OF SPECIALIZATION:
BIOLOGICAL MODELING, NETWORKING IN MEDICAL SYSTEMS & MEDICAL DEVICES

PROF. BHAVIKA KHATRI
ASSISTANT PROFESSOR

EDUCATION QUALIFICATION:
M.E. INSTRUMENTATION ENGINEERING

TEACHING EXPERIENCE:
14 YEARS

AREA OF SPECIALIZATION:
HOSPITAL MANAGEMENT
BIOMEDICAL INSTRUMENTATION
MEDICAL IMAGING

Guest lecture on " Advancements in Healthcare"

On 16th April 2024, a session titled "Advancements in Healthcare" was held for final year biomedical students at. Mr. Somesh Pathak, a seasoned expert from Qure.ai, led the session aimed at elucidating the role of hospital consultants and the significance of engineering services in hospital infrastructure. Hosted by Prof. Priyanka Shrivastava, the session commenced with an overview of Mr. Pathak's background and insights into the students' coursework. Discussions covered various mini projects undertaken by the students and career opportunities post-graduation, particularly in AI applications for healthcare. Mr. Pathak shared his experiences in AI-driven tuberculosis diagnostics, emphasizing the role of mathematical concepts in algorithm design. The interactive session concluded with a robust Q&A, addressing student queries on projects and competitive problem-solving. Attendees gained practical strategies and deepened their understanding of healthcare advancements, enriching their academic journey.



Guest lecture on "Advancements in Healthcare"

Know an Alumnus
Mr. Siddharth Roychowdhury (2014 Batch)

Siddharth Roychowdhury is an alumnus of VIT , passed out in the year 2014 from the Biomedical Engineering Department.

I am Siddharth Roychowdhury currently heading the Biomedical Engineering Department at Wockhardt Hospitals Nagpur. I look after the following key areas:-

- Financial Management involves managing budgets, optimizing costs (CAPEX and OPEX), and employing accounting practices.
- Organizational Learning focuses on training biomedical engineers and clinical staff through external expertise.
- Operational Management ensures equipment reliability and contingency planning.
- Biomedical Supply Chain manages stocks and inventory of assets and consumables.
- Quality Management maintains compliance with statutory bodies and NABH/NABL guidelines.

VIT has provided me with excellent exposure, and I have had the opportunity to learn from the best teachers in the industry. As a result, classroom teaching remains fresh in my mind. The college has enabled me to think beyond and manage my time effectively. The reading room has enriched my knowledge across various fields beyond Biomedical Engineering, providing me with the time and resources to achieve more.

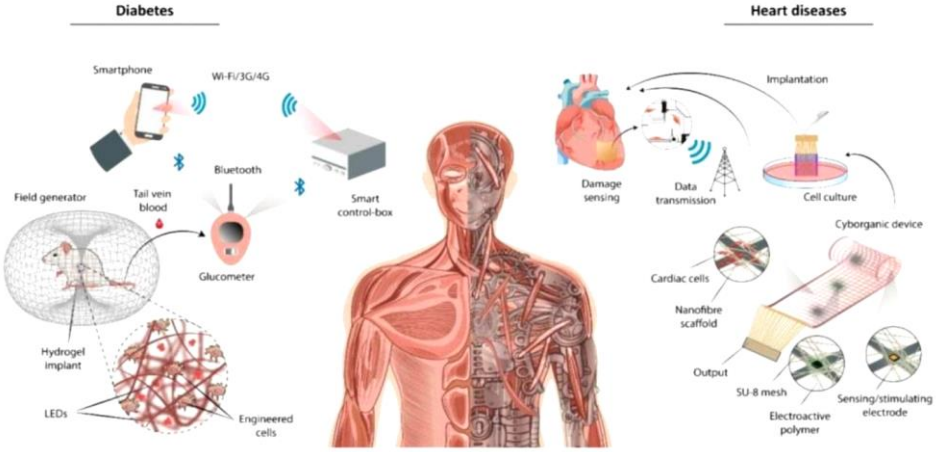
All the work assigned by our professors not only enhances knowledge but also improves our time management skills, data collection, and data sequencing skills. These skills will propel you forward, aiding in meeting deadlines and fostering punctuality. Respect your professors; they are your lifelong teachers who sometimes adopt a firm approach to shape you for your own benefit. Approach your final year project with the curiosity of an engineer fascinated by science. This approach will prepare you to avoid lifelong revisits to textbooks before interviews or when facing challenges.

STUDENT ARTICLE

"Cyborg Tissue Evolution: From Science Fiction to Reality" -Ms. Ameya Ghadge(T.E. Biomedical)

Image from the movie Robocop.

Amputee Claudia Mitchell with her bionic arm.



Bridging biology with technology, heart cells integrated into nanoelectronic devices offer smart solutions for managing heart diseases. Additionally, synthetic cells embedded in electronic biomaterials empower diabetic patients to autonomously produce insulin in response to glucose levels.

Imagine a world where humans and machines are seamlessly integrated. It's a common theme in science fiction, from "The Terminator" to "RoboCop." These stories feature cyborgs. But what exactly is a cyborg? The term "cyborg" combines "cybernetic" and "organism." It was first used by scientists Manfred Clynes and Nathan S. Kline in 1960. "Cyborg" differs from bionics, biorobotics, or androids, referring specifically to organisms that gain restored or enhanced abilities through integration with artificial components or technologies, often involving feedback mechanisms. The concept of cyborgs is increasingly becoming a reality with recent scientific advancements, particularly in the development of cyborg tissue. Further, let's find out what is a cyborg tissue.

Cyborg tissue, also known as cyborganic tissue, is a groundbreaking innovation in bioengineering. Originating from milestone contributions by Harvard scientists in 2012, this technology integrates electronic components with living tissues, blending biological processes with nanoelectronics. Led by Professor Charles M. Lieber, the team developed bioactive 3D microenvironments by embedding biocompatible nanowire transistors within engineered tissues. These flexible, silicon-based scaffolds can be incorporated into 3D cell cultures without disrupting their functions. This work enables the electrical probing of key physicochemical and biological events within the tissue, creating responsive tissues that detect cellular electrical signals. Published in "Nature Materials," this research laid the foundation for cyborg tissue, promising advancements in regenerative medicine and transforming our understanding of interactions between biological tissues and electronic devices.

Recently, researchers at Harvard SEAS made it possible to monitor the functional development and maturation of cardiomyocytes on a single-cell level using cyborg tissue. Ron Feiner and his team at Tel Aviv University developed a cyborganic patch that Cyborg integrates living heart tissue with electronic materials, enabling remote synchronization of cardiac cells and controlled drug release. Another leap forward came from Shao and colleagues, who engineered a wireless system allowing smartphones to regulate insulin production in diabetic mice via an electronic scaffold. This innovation hints at future cyborganic feedback loops capable of sensing deficiencies and delivering precise biological stimuli.

As we embark on the era of cyborg science, blending biology with cutting-edge technology, the possibilities for transformative medical breakthroughs are tantalizingly close. Yet, navigating challenges of durability, biocompatibility, data accuracy, and ethical integration will determine how seamlessly we transition into this brave new world of cyborg tissue.

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THE

EDITORIAL TEAM

PROF. ARUNKUMAR RAM
Chief Editor