VIT Vidyalankar Institute of Technology
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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

PROF. DR. GAJANAN NAGARE

HEAD OF DEPARTMENT, BIOMEDICAL ENGINEERING

It is with great pleasure that I address you through this newsletter as the Head of the Department of Biomedical Engineering. As we stride ahead into a new academic term, I am filled with optimism and enthusiasm for the journey that lies ahead.

In the realm of academia, we are pleased to announce that we have three visiting faculty members from esteemed industries who are instructing courses in Medical Imaging Equipment, Data Analysis in Healthcare, and Medical Device Regulations. This opportunity promises to offer our students a unique and enriching learning experience.

Our faculty members, with their diverse expertise and unwavering dedication, play a pivotal role in shaping the minds of our students. Through their mentorship and guidance, many students from third and final year exhibited their projects at various competitions. The events coordinated by BMSA and BMESI have offered valuable insights to students.

As we embark on this new academic term, let us reaffirm our commitment to academic rigor, innovation, and collaboration. I encourage each and every one of you to actively engage in the myriad opportunities that our department offers – whether it be through research projects, internships, or extracurricular activities. Embrace every challenge as an opportunity for growth and learning, and remember that your journey in engineering is not just about acquiring knowledge but also about making a positive impact on the world around you.

Best wishes for a successful and fulfilling academic term ahead!

"Always aim at perfection for only then will you achieve excellence."
-J. R. D. Tata

Alumni Speed Mentoring and Panel Discussion organized by BMESI-VIT Chapter

The event, titled 'The Alumni Speed Mentoring and Panel Discussion,' was organized by the Biomedical Student Association of India (BMESI - VIT). The esteemed guests included: Mr. Omkar Dicholkar, a biomedical engineer at Tata Memorial Hospital, Mumbai. Mr. Imam Maddi, a Product Manager. Dr. Jignasha Dalal, a corporate IT trainer and Ms. Sanyukta Sharma, an MS Mathematics student at ICT, who also served as the moderator for the panel discussion event.

Dr. Jignasha Dalal shared her journey from being a professor at the start to pursuing her PhD in Blockchain technology and spending the last two years in the industry, where she's been training students for the corporate world. In her discussion, she highlighted the concept of Web 3, which expands on artificial intelligence, machine learning, and Internet of Things, ultimately advancing Blockchain technology.

Mr. Omkar, a biomedical engineer at Tata Hospital, finds satisfaction in his work with cancer patients. He discussed the application of AI in medical devices, citing growing technology statistics in the US. He shared his recent experience with an ultrasound machine and highlighted specifications for tracking ailments and lowering scan times.

Mr. Iman Maddi discussed the crucial role of software in medical devices, emphasizing the significance of cloud computing. He elaborated on the drug delivery model, outlining steps such as feeding data models into code, creating models, and enabling detection. Furthermore, he highlighted the usefulness of data analytics in medical devices and mentioned SHAKTI CLOUD, a new cloud computing project originating in India.

Ms. Sanyukta, the moderator for the day, shared her career experience, highlighting her approach of applying reverse engineering. As an MS mathematics student, she studies mathematics and then explores its applications in statistical analysis within the medical domain.

Department Staff

PROF. SUVARNA UDGIRE
ASSISTANT PROFESSOR

EDUCATION QUALIFICATION:
M.E (ELECTRONICS)

TEACHING EXPERIENCE:
15 YEARS
INDUSTRIAL EXPERIENCE:
13 YEARS

AREA OF SPECIALIZATION:
HEALTHCARE INFORMATICS
BIOLOGICAL MODELLING & SIMULATION
NISM

PROF. PRIYANKA SHRIVASTAVA
ASSISTANT PROFESSOR

EDUCATION QUALIFICATION:
M.E (ELECTRONICS & TELECOM)

TEACHING EXPERIENCE:
13 YEARS

AREA OF SPECIALIZATION:
AI & ML
DIGITAL SIGNAL PROCESSING
REHABILITATION ENGINEERING

IDEATHON: Joint Event of BMESI-VIT Chapter and BMSA

The "Ideathon" was an event conducted within the Vidyalankar Institute of Technology (VIT) by the Biomedical Students Association (BMSA VIT) and The Biomedical Engineering Society of India (BMESI VIT). The event provided students with a unique platform to showcase their innovative ideas by identify problem statements, suggest solutions, and present their ideas with a shark tank pitch style with ppt and prototype. The primary goal of the event was to encourage students to think outside the box and come up with creative solutions to real-world problems.

The second day of the Ideathon event marked a significant milestone as a total of 16 teams advanced to the next stage after a rigorous examination by a panel of esteemed judges. The event unfolded with enthusiasm and anticipation, showcasing the diverse talents and innovative ideas of the participating teams. Pratik Vetal took on the role of hosting the second day's proceedings, setting the stage for a day filled with insightful presentations and exciting developments. The teams were divided into a panel of two with 3 judges per panel.

The examination process was overseen by a distinguished panel of judges, including Prof. Sonaali Borkar, Dr. Sheetal Mhapare, Dr. Aruna Deogire, Prof. Geetha Narayanan, Prof. Priyanka Shrivastava and Prof. Neelam Punjabi. Their collective expertise ensured a fair evaluation of each team's efforts. All 16 selected teams had the opportunity to present their projects, demonstrating their dedication, creativity, and problem-solving skills. Ideathon Day 2 was not just a platform for showcasing innovative ideas, but a testament to the collaborative spirit and creativity that thrives within the academic community. The event left participants, judges, and attendees with a renewed sense of inspiration and a commitment to fostering innovation in the future.

Know an Alumna

Ms. Divya Subramanian(2012 Batch)

Divya Subramanian is an alumna of VIT , passed out in the year 2012 from the Biomedical Engineering Department.

I am currently pursuing my PhD in Bioengineering in the U.S.A from the University of Texas at Dallas where I am developing a platform for studying the corneal cell behavior using a microfluidics approach. Prior to joining the PhD program, I completed a Master's degree in Biomedical Engineering from MGMCET and worked as an Assistant Professor in DY Patil, Belapur.

I thoroughly cherished my time at VIT and am very thankful for the friendships and memories I made here. As a young student interested in pursuing a degree in Biomedical Engineering which was a relatively new field at the time, VIT helped me develop a deep understanding of the field and aided my overall development as an Engineer. The great infrastructure, extremely knowledgeable faculty and excellent laboratory facilities at VIT contributed to my overall success. Incidentally, my initial interest in microfluidics developed as a final year student through the final semester course 'MEMS'.

My message to the current students is to work hard, never ever give up on your dreams and enjoy the process! VIT is a great place to develop your skills and achieve your dreams.

STUDENT ARTICLE

"Neuroplasticity"
-Ms. Himakshi Prajapati (T.E. Biomedical)

The human brain, a sophisticated and self-organizing biological system, is composed of trillions of interconnected nerve cells known as neurons. Neuronal operations give rise to two distinct forms of information processing: signaling and integration. Each neuron transmits signals through action potentials—electrochemical currents that traverse the entire length of its axon. These currents prompt the release of neurotransmitters, which traverse synapses, the gaps between neurons. Specialized receptor cells at the terminal ends of dendrites, the tree-like branches of the receiving neuron, receive these chemical messages.

The stimulation of dendritic receptors by neurotransmitters leads to integration, where substantial amounts of information from multiple neurons are aggregated before reaching a threshold to initiate the action potential down the subsequent axon. Through this intricate process, perceptual information from both the external environment and the internal body milieu is transmitted and processed in the brain, ultimately giving rise to cognition, emotion, and behavior—essentially encapsulating the essence of the human experience. The brains of infants and children exhibit plasticity, experiencing bursts of neuronal development when exposed to stimuli during crucial period. This developmental process includes the generation of neurons, enhanced connectivity among existing neurons, and the formation of new synaptic connections between neurons that were not previously linked.

However, there was a prevalent belief that neuronal connections in the adult brain were unalterable. It was widely accepted that the neurons within a specific brain area remained fixed, adhering to the predetermined form and function dictated by the genetic code for that region. But it wasn't the case, Research developments confirmed that neuroplasticity is present all through our lives, whenever we are learning or memorizing something new. Here, comes in the concept of neuroplasticity. Neuroplasticity has been considered as one of the most extraordinary discoveries of the 20th century. Neuroplasticity is the brain's ability to change and adapt in response to stimuli over time. On a cellular level, it involves modifying existing synapses, building new connections between neurons, and generating entirely new neurons and neural networks through a process rightly called neurogenesis. Imagine your brain as a bustling city, constantly adapting and evolving. Two vibrant districts, the hippocampus and the cerebellum, act as hubs for growth and renewal. In the hippocampus, memories are forged, and spatial maps are drawn. Meanwhile, the cerebellum acts as a bustling construction site, churning out new brain cells that migrate and integrate into various neighborhoods, strengthening existing connections and paving the way for new learning and experiences. This ongoing urban renewal project, known as neuroplasticity, keeps our brains sharp and adaptable throughout life.

Scientific findings indicate numerous approaches to enhance neuroplasticity and neurogenesis, the generation of new brain cells. These two processes are intricately connected. Essentially, engaging in activities that introduce novelty, foster learning, and challenge the brain beyond its accustomed state can effectively stimulate neuroplastic changes. Various lifestyle factors have been associated with promoting neuroplasticity. Intermittent fasting, for instance, has shown potential benefits by influencing molecular pathways that support brain health. Traveling exposes the brain to new environments and experiences, stimulating neural pathways. Learning to play a musical instrument engages multiple cognitive functions, fostering neuroplastic changes. Reading fiction and playing video games, when done in moderation, can provide mental stimulation. Adequate sleep is crucial, as it is during this period that the brain consolidates memories and undergoes repair processes. Learning a new language challenges the brain's linguistic abilities, promoting neuroplasticity.

Regular exercise has been linked to increased neurogenesis and improved cognitive function. While psychoactive substances should be approached cautiously, certain compounds may have neuroprotective effects. Finally, stress reduction techniques, such as mindfulness and relaxation exercises, contribute to a neuroplastic-friendly environment. Adopting a holistic approach that incorporates these elements into one's lifestyle can potentially enhance neuroplasticity and support overall brain health.

Students' Achievement

Himakshi Prajapati and Chrysanna Fernandes presented the project titled "Portable audiometry device to detect the type and degree of hearing loss" under the guidance of Prof. Amol Sakhalkar held at the Biomed Bharat, Biomedical Device Hackathon, 2024 organized by GITAM School of Technology (GST) & GITAM Institute of Medical Science and Research (GIMSR) of GITAM (Deemed to be University). They have been awarded a cash prize of 50K for their innovative solution.

THE
EDITORIAL TEAM

PROF. CHAITALI DESHMUKH
Chief Editor