DEPARTMENT OF BIOTECHNOLOGY

UNIVERSITY COLLEGE OF ENGINEERING

BIT CAMPUS, ANNA UNIVERSITY

TIRUCHIRAPPALLI- 620 024

BIT BIOTALKS

DEPARTMENT NEWSLETTER

"I see a bright future for the biotechnology industry when it follows the path of the computer industry, the path that von Neumann failed to foresee, becoming small and domesticated rather than big and centralized."

- Freeman Dyson

TABLE OF CONTENT

Note from the editors

We are delighted to present this edition of our department newsletter, a platform that showcases the latest advancements, achievements, and ongoing research within our community. This issue brings you insightful articles, student and faculty accomplishments, recent events, and upcoming opportunities that shape our academic and professional journey.

In this Edition
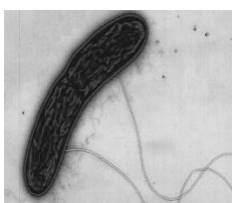
Vision and Mission

THE INSTITUTION

Vision

To transform students into competent professional and responsible citizens by focusing on assimilation, analysis, synthesis and dissemination of knowledge to meet the societal needs.

Mission

- Impart quality education to meet the needs of the profession and society.
- Attract and develop talented and committed human resource and provide an environment conducive to innovation and research.
- Facilitate effective interactions among faculty, students, premier educational Institutions, R&D laboratories, industries, alumni and other stack-holders.
- Practice and promote high standards of professional ethics, transparency and accountability and team spirit and entrepreneurial skills.

THE DEPARTMENT

Vision

To develop technical manpower in biotechnology to enhance the knowledge and skill to solve problems and challenges countenanced by the industry and academia for betterment of the society.

Mission

- To provide an academic environment that emphasizes critical thinking.
- To encourage intellectual depth and creativity of the students.
- To establish institute industry interaction through projects and training.
- To promote the students to adhere professional ethics and safety consideration for the societal benefits.
- To motivate the students to pursue higher studies in various spheres of technology.

UNDER GRADUATE

PROGRAM EDUCATIONAL OBJECTIVES:

I.   To enable the students to formulate, analyse and solve issues in various areas of biotechnology.

II. To apply the acquired knowledge to cater the needs of the academia, research and industry.

III. To develop ethical quality among the students for providing constructive service to the society.

IV. To emphasize the value of continuous learning to face the challenges in professional career.

PROGRAMME OUTCOMES:

Upon completion of the Bachelor in Biotechnology program, graduates will be able to:

1. Apply knowledge of mathematics, science and engineering to biotechnological problems. Generate hypothesis, design and conduct experiments, interpret and analyse data, and report results.

2. Design systems and process to find solutions for biotechnological problems to meet the needs of society.

3. Employ research skills to investigate, design, conduct experiments and interpret the data to arrive valid conclusions.

4. Use of biological concepts and appropriate techniques to find solution for the problems. Recognize the moral and social values to appreciate the need for ethical standards and professional codes of conduct.

5. Appreciate the contribution of biotechnology to maintain the quality of environment and sustainability of life.

6. Demonstrate adherence to accepted standards of professional ethics and responsibilities. Work independently and function effectively as a member or leader of a team.

POST GRADUATE

PROGRAM EDUCATIONAL OBJECTIVES:

I.   To provide students with strong fundamentals with good scientific and technical knowledge so as to comprehend, analyse, design, and create novel products and solutions for developing novel therapeutics and enzymes.

II. To prepare students to excel and succeed in Biotechnology research or industry through the latest state-of-art post graduate education.

III. To sensitize students about scientific temper and the necessity of bioethics, social responsibility and awareness of the environment.

IV. To enable the student to develop good communication and leadership skills, respect for authority, loyalty and the life-long learning needed for a successful scientific and professional career.

PROGRAMME OUTCOMES:

On successful completion of the Masters in Biotechnology graduates will be able to

1. Acquire in-depth knowledge of biological science and Bioengineering for gaining ability to develop and evaluate new ideas.

2. Demonstrate Scientific and technological skills to design and perform research through modern techniques for the development of high throughput process and products.

3. Provide potential solutions for solving technological problems in various domains of Biotechnology considering the societal, public health, cultural environmental factors.

4. Create and apply modern engineering tools for the prediction and modelling of complex bioengineering activities.

5. Analyse Biotechnological problems and formulate intellectual and innovative vistas for research and development with self-management and team work skills towards collaborative, multidisciplinary scientific endeavours in order to achieve common goals.

6. Demonstrate adherence to accepted standards of professional bioethics and social responsibilities with entrepreneurial and managerial skills for the implementation of multidisciplinary projects.

Profile

The Department of Biotechnology was started in the year 1999 with a vision to develop technical manpower in the wide area of biotechnology. It is a DST-FIST Sponsored Department and is offering B. Tech., M. Tech., and Ph. D. degree programmes in Biotechnology. The department attracts meritorious students for both B.Tech. and M. Tech. Degree programmes. The UG and PG programmes are designed to train the students to become masters who can identify a problem and to solve it through the biotechnological approaches. Towards this goal, training is given in the wide areas of biotechnology such as tissue culture (animal and plant), fermentation technology and enzyme engineering for chemicals, antibiotics and other product development; utilization of agricultural and forest residues and industrial wastes; genetic engineering, immunology, molecular biology and nanobiotechnology. The department has many laboratories equipped with advanced instruments like Quantitative Real Time PCR, Multimode Detector, G-PCRs, HPLC, GC, UV-Visible spectrophotometers, Fermenter, CO_2 and Multi - gas incubators, Gel Documentation system, Fluorescent Microscopes, DNA Sequencer, Electroporator, Plant Growth Chamber, Rotary Evaporator, Bio-safety Cabinet (Class II) and facility for plant tissue culture. Currently, our department is strengthened by 12 well qualified faculty members from diverse fields and specializations. Several research projects funded by various national funding agencies like DBT, DST, DRDO, ICMR, and UGC have been carried out by our faculty members. Our department had been funded by AICTE for the establishment of Computational Biology and Bioinformatics laboratory under MODROB scheme.

Academic Activities

Publication:

Yeswanth R, Saayaa N, Ravi Shankar, Brindha R et al. Understanding integrative approach of translational bioinformatics on cardiovascular disease: Myocardial Ischemia. Egypt J Med Hum Genet 25, 153 (2024).

Course Attended:

Aadhithya A, B. Tech. (IV Year) completed online course on "Biomedical Nanotechnology" by NPTEL in November 2024; completed online course on "Organ Printing" by NPTEL in October 2024; completed online course on "Cell Culture Technologies" by NPTEL in December 2024.

Barath M, B. Tech. (IV Year) completed online course on "Design and Conduct of Clinical Trials" by Coursera in December 2024

Rajanandhini S V, B. Tech. (IV Year) completed online courses on "Cell Culture" and "Fundamental protein chemistry" by NPTEL in December 2024.

Abishek S, B. Tech. (II Year) completed course on "Next Generation Sequencing Technologies, Data Analysis and Applications" by NPTEL in December 2024.

Dhanush J U, Florence Hinrika B, Shilviya R, B. Tech. (II Year) completed course on "Neurobiology" by NPTEL.

Rayan Afrin S, B. Tech. (II Year) completed courses on "Introduction to Cell Biology", "Developing Soft Skills and Personality", "Climate Resilient Plants for Future" by NPTEL and completed "SAWIT.AI learnathon" in September 2024.

Mahabunisha M, B. Tech. (II Year) completed course on "Introduction to Cell Biology" by NPTEL.

Abarna P S, B. Tech. (II Year) completed course on "Cell Culture Technologies" by NPTEL.

Webinar Attended:

Devadharshini S, B. Tech. (IV Year) attended webinar on "Building Innovation on Scalable Business" organized by Scinicorn labs in November 2024.

Arulmurugan I, B. Tech. (III Year) attended a webinar on "Streamlining the Production of Complex Skin Organoids" conducted by Technology networks in February 2025.

Workshop Attended:

Arun Kumar K, Bhavadharani S, Maran S, Prasanna Devi B, Reeteha E, Sabarinathan S, Sankar Sridhar A and Sri Devi J, B. Tech. (IV Year) attended workshop on "Recalcitrant pollutants Degradation and Toxicity Assessment" in January 2025.

Saayaa N and Yeswanth R, B. Tech. (IV Year) attended workshop in ICMR-NIRTH on "NGS-Ion Torrent" in August 2024

Devadharshini S, B. Tech. (IV Year) attended workshop in IIT Madras on "Vaccine Technology" in December 2024.

Conference Attended:

Arun Kumar K, B. Tech. (IV Year) participated International Conference on "Sustainable Technology for Health and Environment in July 2024.

Chitra C and Venni D, B. Tech. (IV Year) participated 2nd National Conference on "Recent Trends in Environment, Energy and Sustainability" in August 2024.

Abdul Haleeq H, Prasanna Devi B and Shruthi V A, B. Tech. (IV Year) attended hackathon on "Chem E Hack" in August 2024.

Internship Training

NAME	TITLE	INSTITUTE/ INDUSTRY	DATE
B.Tech. (II Year)			
Abarna P S, Florence Hinrika B, Shilviya R & Sowmiya S	Clinical Genetics	Christian Medical College, Vellore	22/01/25 - 04/02/25
Abishek S & Rayan Afrin S	Biochemical Tests and Biofilm Formation	Central University of Tamil Nadu, Thiruvarur.	21/01/25-04/02/25
Suryaselvan E & Gladsonraj I	DNA Isolation	PAR Lab, Woraiyur, Trichy.	23/01/25-06/02/25
B.Tech. (III Year)			
Sanjeevi M	Agro-Industrial Training	Agriya Agro-Tech	13/08/24-23/08/24

Science Everywhere

Artificial Intelligence in Classifying HER2 Status in Breast Cancer

HER2 is a transmembrane tyrosine kinase receptor that regulates cell growth and proliferation. About 15–20% of breast cancers overexpress HER2, often leading to aggressive disease. Standard HER2 assessment involves IHC scoring, with ambiguous cases (score 2+) requiring additional testing using in situ hybridization (ISH). The recent DESTINY-Breast04 trial demonstrated that patients with HER2-low expression (IHC 1+ or 2+ without gene amplification) benefit from T-DXd, making accurate HER2 classification critical.

Visual IHC scoring is time-consuming and subject to interobserver variability. Pathologists may have difficulty differentiating HER2 scores, especially between 0 and 1+, leading to inconsistencies in treatment eligibility. Digital pathology, combined with AI, offers a potential solution by automating and standardizing HER2 assessment.

AI models, particularly deep learning (DL) and convolutional neural networks (CNNs), have been applied to analyze whole slide images (WSIs) of stained breast cancer tissues. AI-based HER2 scoring follows a multi-step process:

- Preprocessing: Digitized WSIs are segmented into smaller patches.

- Training: AI models learn from annotated datasets to recognize HER2 staining patterns.

- Validation: The trained AI model is tested against pathologist-assessed data.

- Final classification: The AI algorithm assigns an overall HER2 score based on aggregated patch-based assessments.

This meta-analysis included studies that assessed AI-based HER2 classification. The researchers searched multiple databases, identifying 1581 records and narrowing them down to 13 studies that met inclusion criteria. These studies analyzed a total of 1285 cases, 24,626 image patches, and various AI algorithms.

AI demonstrated high accuracy in classifying HER2 scores, with a pooled sensitivity of 0.97 and specificity of 0.82 in distinguishing HER2-low cases. AI models performed better with deep learning and patch-based analysis, while performance declined when using externally validated and commercially available algorithms. Sensitivity and specificity improved for higher HER2 scores (2+ and 3+), but AI struggled with differentiating score 1+ from 0. AI models using deep learning (CNNs) achieved better results compared to traditional machine learning models. The AI's overall concordance with pathologists was 93%, with highest agreement at HER2 3+ (97%) and lowest at HER2 1+ (88%).

Reference:

Albuquerque, D.A.N., Vianna, M.T., Sampaio, L.A.F. *et al.* Systematic review and meta-analysis of artificial intelligence in classifying HER2 status in breast cancer immunohistochemistry. *npj Digit. Med.* 8, 144 (2025).

B Facts

Discover the wonders of life with B FACTS, your go-to corner for intriguing and mind-blowing facts in biology! From the tiniest cells to the vast complexities of ecosystems, explore the science behind life in the most fascinating way. Stay curious, stay informed!

»Do you know that some people find cilantro tastes like soap?

The genetic variation in an olfactory receptor gene (notably OR6A2) is linked to why some people perceive cilantro (coriander) as tasting soapy. The study found that aldehydes present in cilantro—which are also found in soaps—activate this receptor more strongly in individuals with certain gene variants, leading them to experience a soapy flavour.

For more info: Callaway, Ewen. "Soapy taste of coriander
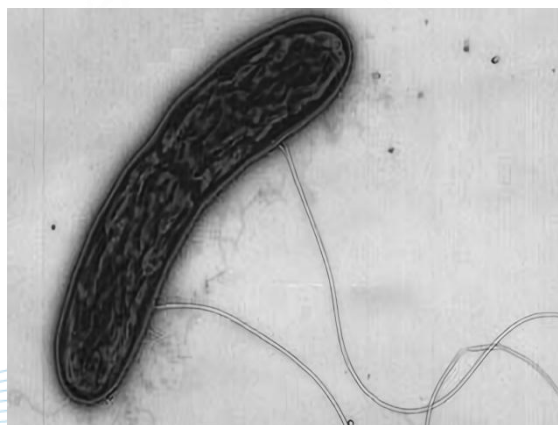
»Microbes as electricity generators

Geobacter sulfurreducens is a widespread soil bacterium capable of iron reduction and electrode respiration, generating electric currents. Its metabolism relies on a vast network of c-type cytochromes, resulting in a unique cellular composition characterized by high iron and lipid content.

For more info: Tabares, Marcela, Hunter Dulay, and Gemma Reguera. "Geobacter sulfurreducens." *Trends in Microbiology* 28.4 (2020): 327-328.

»Purple Reign: When Tomatoes Go Royal!

Purple tomatoes are genetically engineered to be rich in anthocyanins, powerful antioxidants found in blueberries. These compounds help reduce the risk of cancer, heart disease, and inflammation. Developed using genes from snapdragons, these tomatoes offer enhanced nutrition and longer shelf life.

For more info: Gonzali, Silvia, and Pierdomenico Perata. "Anthocyanins from purple tomatoes as novel antioxidants to promote human health." *Antioxidants* 9.10 (2020): 1017.

Photo Gallery

After an incredible showcase of talent and creativity, we're thrilled to announce the Top 3 Winners of our Photography Contest, along with 2 Special Mentions for their outstanding artistic vision. Each photograph captured a unique perspective, telling a compelling story through the lens. A huge thank you to all participants who submitted breathtaking shots!


Abdul Haleeq H

B. Tech. – IV year

JULY- DECEMBER 20

This photograph uses low-key lighting and chiaroscuro to create a dramatic, mysterious mood. The cat's illuminated face contrasts sharply with the dark background, emphasizing its curious expression. A shallow depth of field and off-centre composition add depth, making it a fine-art, cinematic portrait with storytelling elements.
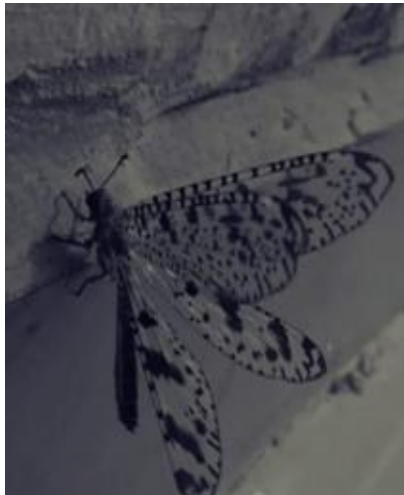
Shanmugapriya A
B. Tech. – III year

Theme:
monochrome, macro photography,
nature's intricacy

Venni D
B. Tech. – IV year

Theme:
natural beauty,
solitude,
resilience

Lokesh S, B. Tech.– IV year

Natraj R, B. Tech.– II year

A huge thank you to all participants for sharing their amazing work with us! Stay tuned on next edition, and keep capturing the world through your unique perspective.

Art of Lines

Art has the power to tell stories, evoke emotions, and bring imagination to life with just a pencil and paper. Our Pencil Sketch Contest was a testament to this creativity.

Muthumalar B
B. Tech. – III year

Theme: Cosmic, Exploration, Adventure, Universe Within.

This drawing features an astronaut floating in space, surrounded by colourful planets and celestial objects.

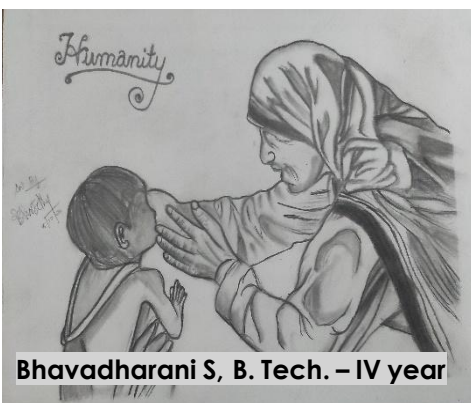**Harsha Vardhini S**
B. Tech. – I year

This pencil sketch of Thanos captures his formidable presence through bold lines, deep shading, and high contrast. The detailed textures on his face and Armor emphasize strength and dominance. The expression and composition evoke a sense of power.

Bhavadharani S
B. Tech. – IV year

Theme: Realism, Celebrity/Fan Art, Strength & Confidence.

This drawing appears to be a realistic pencil portrait of a Virat Kohli with sharp facial features and expressive eyes.

Bhavadharani S, B. Tech. – IV year

Mouriya J, B. Tech. – II year

Harsha Vardhini S, B. Tech. – I year

A heartfelt thank you to all participants for sharing their incredible talent with us! Stay tuned for the next edition, and continue expressing your creativity through the art of sketching.

Poetry

We invite you to submit your original poems to **bitbtnewsletter@yahoogroups.com**. Submissions should be a minimum of 10 lines and can explore a variety of themes. Let your words weave compelling narratives and evoke deep emotions. We look forward to featuring your creative expressions, so send in your poems and be a part of our literary space!

கல்லூரி காலம்

எட்டி விட்டோம் எண்ணி பார்க்கும்
நாட்களை.....
ஆம்...
இரவு பகல் பாராது பேசி சிரித்த
நாட்கள் முடியும் தருணம்...
விரல் விட்டு என்னும் தூரத்தை
எட்டிவிட்டது....
மிக குறுகிய காலமும் அல்ல....
நீண்டு கிடந்த நாட்களும் அல்ல....
மணி முள் நகர்வது போல் நகர்ந்திட்ட
காலம் .....
இன்று பனிமலையின் சுமையை
நினைவாக தருகிறது.....
ஆயிரம் புலம்பினாலும்....
கண்ணீர் மல்க ஆரத்தலுவினலும்....
இறுதியாக செல்கையில்...
திரும்பி பார்த்து பேச மொழி
இல்லாமல் நின்ற வார்த்தைகள்
உணர்திடுமே....

வாழ்க்கை பயணத்தில் இது ஒரு
அழகிய நிறுத்தம் என்று.....

-   **Prasanna Devi B, B. Tech. (IV Year)**

Lost in the Name of God

The world is full of endless strife,
Yet no one values every life.
God whispers softly in our ears,
Yet in His name, we grow our fears.

People believe in myths untold,
Shaped into symbols, rigid and cold.
God is not here for us to fight,
But to guide us toward the light.

In the name of ritual and creed,
Conflicts arise, fuelled by greed.
God teaches love, kindness, and care,
Yet rituals bind us in despair.

Divided by class, by rank, by name,
Sinking deep in a river of shame.
If only hearts could truly see,
Faith was meant to set us free.

-   **Lingesh S M, B. Tech. (IV year)**

Opportunities

JOBS:

Dr. Reddy's Laboratories, Subject Matter Expert Biologics, Hyderabad, Telangana. **https://careers.drreddys.com/**

Syngene Biotech, Downstream Process Development –Research Associate, Bangalore, India. **https://careers.syngeneintl.com/job/**

Novo Nordisk, Global Launch Manager, Bangalore, India. **https://careers.novonordisk.com/job/**

Merck, Bioinformatics Data Analytics, Bangalore, India. **https://www.merckgroup.com/in-en/careers.html**

Sun Pharmaceutical Industry, QC Analyst, Dewas SGO-Plant. **https://careers.sunpharma.com/**

Amgen, Regulatory compliance change Assessor, Hyderabad, India. **https://careers.amgen.com/**

Aurigene Oncology Limited, Research Associate, Bangalore, India. **https://careers.aurigeneservices.com/**

AstraZeneca, Specialist, Global Clinical Solutions, Bangalore **https://careers.astrazeneca.com/**

Novotech, Clinical Data Associate, India. **https://novotech-cro.com/careers**

Fortrea, Trial Master File (Associate), Bangalore, India. **https://careers.fortrea.com/**

Cepheid, Manufacturing Supervisor, Bangalore, India. **https://jobs.danaher.com/**

Schreiber Foods, Senior Quality Assurance Associate, Baramati, India **https://www.schreiberfoods.com/**

IQVIA, Associate Lab Project Service Manager, Kochi, India. **https://jobs.iqvia.com/en/job/**

Zydus Biologics, Executive –Production Department, Ahmedabad. **https://zydusgroup.darwinbox.in/**

Terumo, Laboratory Scientist, Thiruvananthapuram, Kerala. **https://careers.terumobct.com/**

Beckman Coulter Life science, Scientific writer, Kolkata. **https://jobs.danaher.com/**

Novozymes, Quality Assurance Associate, Bangalore. **https://novozymes.wd103.myworkdayjobs.com/**

SUMMER INTERNSHIP

DBT-inStem SuRF 2025 – Summer Research Fellowship 2025. **https://surf.instem.res.in/**

Program Duration   : May 15-July 24 (10 weeks)

Fellowship   : 25000.

PH.D. PROGRAMME

Institute of Bioresource and Sustainable Development IBSD, PhD JRF Life Science Recruitment, Imphal, Manipur. **admin.ibsd@nic.in.**

i3c BRIC – RCB Ph.D. Programme 2025-2026

 https://rcb.res.in/i3c/

Achievements

Venni D, B. Tech. (IV Year)
Zonal Tournament
Kho Kho – Winner
October 2024

Chitra C, B.Tech. (IV Year)

Won Best Paper Award at National Conference on "Recent trends in Environment, energy and sustainability held in Vivekananda College of Engineering for Women

Indhumathi J R, B. Tech. (IV Year)
The Chief Minister Trophy – Boxing
Regional Level– Silver Medal
October 2024

Indhumathi J R, B. Tech. (IV Year)
Interzonal Tournament
Boxing – Bronze Medal
November 2024

Chitra C &
Varshini S,
B.Tech. (IV Year)

Funded Project from CSRC Student Innovative Project Programme

Indhumathi J R, B. Tech. (IV Year)
The Chief Minister Trophy – Boxing
October 2024

Arun Kumar K, B.Tech. (IV Year)

International Conference on sustainable Technology for Health and environment Held on Scinicorn Labs

Paper presentation – 2nd Prize
Video presentation – 1st Price

Sabarinathan S, B. Tech. (IV Year)
Zonal Winner – Table Tennis
October 2024

Arun Kumar K,
B.Tech. (IV Year)

Zonal Tournament

Javelin Throw

3rd Place

Sanjeevi M, B. Tech. (III Year)
Zonal Winner – Handball
October 2024

With Thanks...

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Share your academic / Cultural Activities, Articles,
Blogs, Photos, Videos and events on
BIT - Bio Talks
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To bitbtnewsletter@yahoogroups.com