

(An Autonomous Institution - AFFILIATED TO ANNA UNIVERSITY, CHENNAI)
S.P.G. Chidambara Nadar - C. Nagammal Campus
S.P.G.C Nagar, K. Vellakulam - 625 701, (Near VIRUDHUNAGAR).

DEPARTMENT OF BIOTECHNOLOGY
ACCREDITED BY NATIONAL BOARD OF ACCREDITATION-NEW DELHI

September 2025

NEWSLETTER

BIO-NEXUS

Vol 2 Issue 1

JULY-SEPTEMBER 2025



ED ORS



R Gopika
II Year,
Department of
Biotechnology



R Raja Rajeswari
Assistant Professor,
Department of
Biotechnology

DEPARTMENT OF BIOTECHNOLOGY

VISION : To make the department of biotechnology the unique of its kind in the field of research and development activities pertaining to the field of biotechnology in this part of the world.

MISSION : To impart highly innovative and technical knowledge in the field of biotechnology to the urban and unreachable rural folks through “Total Quality Education”.

PEO

Program Specific Academic Excellence: The student will be able to pursue higher education in Indian Abroad in Biotechnology and its related fields by taking up competitive exam like GATE, CSIR, TANCET, GRE, TOEFL, etc

Professional attitude: The student will be able to come up with solutions for any scientific or technical problems related to Biotechnological industries/institutes by engaging in independent and life long learning.

Core Competence: The student will be able to plan and conduct experiments in modern biotechnology and allied field laboratories using modern tools including interpreting the significance of resulting data, reporting results and writing technical reports.

Collaboration: The students will be able to work in multidisciplinary team with confidence and will be able to venture out with entrepreneurial activities.

PSOs

Future ready graduates: The student will be able to identify, choose and perform to their best ability in the next career step: Higher education/Job/Entrepreneurial initiatives.

Industry ready graduates: The student will be able to apply the acquired knowledge to provide cost-effective and sustainable solutions in Biotechnology.

DEPARTMENT OF BIOTECHNOLOGY

POs

PO1: Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)

PO3: Design/Development of Solutions: Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)

PO4: Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).

PO5: Engineering Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)

DEPARTMENT OF BIOTECHNOLOGY

PO6: The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).

PO7: Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)

PO8: Individual and Collaborative Team work: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.

PO9: Communication: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences

PO10: Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.

PO11: Life-Long Learning: Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8).

STUDENT ACHIEVEMENTS



Sakthishivani of 4th year biotech won special recognition award in yoga event conducted by JCI Virudhu nagar- 12/07/2025



Sakthishivani K of 4th year Biotech won 1st prize in yoga competition conducted by VHNSNC Polytechnic college, Virudhunagar on 27/07/2025

- **Gowri** (22UBT023) of IV year B.Tech Biotechnology participated and won special award in "Yoga Arena'25"- Virudhunagar District level yoga competition Organized by JCI Virudhunagar Elite on 12/07/2025
- **Harish.M** of II Year B.Tech Biotechnology participated in a sports event titled 5 km Marathon and secured 16th position in overall performance at MINI KATTAERUMBU MARATHON, Madurai decathlon organized by kattaerumbu YouTube channel on 27/07/2025
- **Harish.M** of II year B.Tech Biotechnology participated in a sports event titled 5 km sattur marathon and secured 22nd place in overall performance at sattur organized by Inner Wheel Club of Sattur & JCI Sattur Matches City on 20/07/2025.
- **Nambeeswari. J** (22ubt007) of IV year B. Tech Biotechnology received 'C' certificate from NCC Directorate in 28,TN BN NCC, Virudhunagar on 09/09/2025

STUDENT ACHIEVEMENTS



S.Hari Prasath (23UBT002) III Yr BT and **Balaji R** (22UBT002), **Naveen BJ** (22UBT008), **Ragul K** (22UBT015) of IV year BT, won **third place** in **CM trophy basketball match** at KVS Hr. Sec, school Virudhu nagar on 30-8-2025



Durgesh M S (24UBT045) of II yr BT won **second place** in **Beach VolleyBall** in **CM trophy - Regional Level** on 8.9.2025

- Vaishnavi Rishikaa J (22ubt032) of IV B.Tech biotechnology participated in a cultural event titled "Symphonique - band competition" and won first prize at Legacy organised by MEPCO engineering college from 25.09.25 to 26.09.25.



SHARMILA R IV YEAR Won in **CM Trophy judo match** -70 category **Ist prize with 3000 ₹ cash prize** and is selected for state level competition.

- Sakthishivani K (22ubt012) of IV Year B.Tech Biotechnology won 1st prize in yoga competition titled as "LEGACY'25" organized by MEPCO Schelnk Engineering college on 26/09/2025

STUDENT ACHIEVEMENTS



Our boys Kabadi team won the **second place** in the Anna University **17th zone Inter collegiate Kabaddi tournament** for boys. congrats to **Chinnnasamy, Muthuerulappan and Jaleel Hyther II BT**.



Abinanthan K (22UBT014) of IV B.Tech Biotechnology participated in Anna university **Zonal Hockey tournament** at SSM institute of technology, Dindigul on 16.09.25 and Secured 3rd Price.

STUDENT ACHIEVEMENTS



Gowtham Raj. R, Hari Prasath. S, and Syed Sirajutheen. M III year biotechnology won first prize with a cash prize of 1500 in the national symposium BIOTRONS conducted by the Department of Biomedical Engineering, Hindustan College of Engineering and Technology, Coimbatore.

J.Vaishnavi
 Rishikaa(22ubt032)and
 S.Parkavi Nanthini(22ubt011)
 of final year biotechnology
 attended the international
 conference organized by
 Shrimathi Indira Gandhi
 College, Tiruchirappalli,
 where they presented their
 research on "3D Printing Ink
 from Cellulose derived from
 Floral Waste" and won third
 prize.



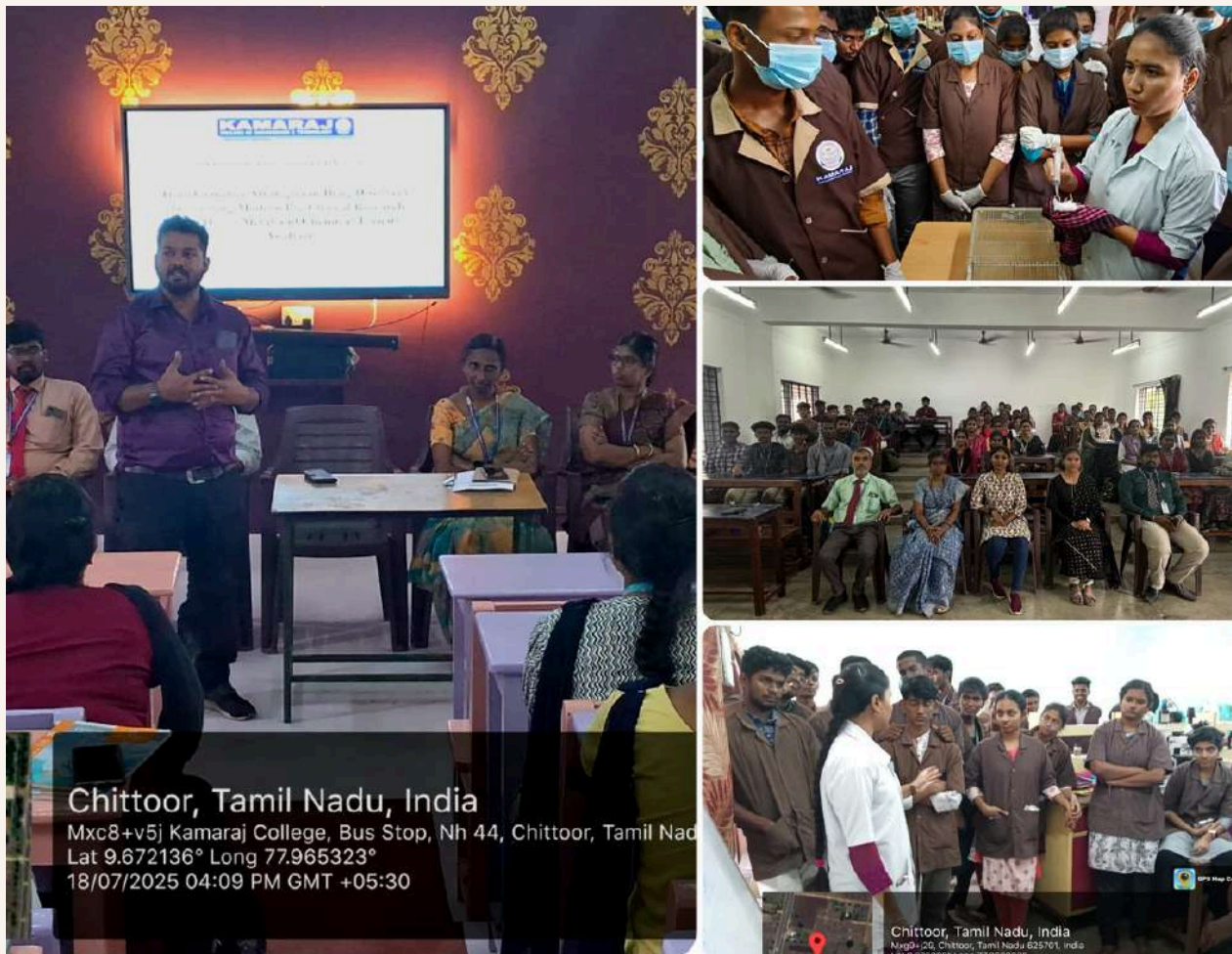
STUDENT ACTIVITIES

- **Sankarapandian P** of IV year B.Tech Biotechnology attended a workshop titled "**Good Clinical Practice Reimagined: E6 (R3) Compliance and Innovative Trial Models**" organised by Indian Society for Clinical Research in collaboration with Forum for Ethics Review Committees in India and National Association of Pharmacology and Therapeutics on 15 July 2025
- **Mohamed Rafiq**(24UBT027), **Gauri sankaran**(24UBT030) , **Sankara Narayanan** (24UBT002) of 11 year biotechnology attended **internship at Vadamalayan Hospitals** from 13.08.25 to 16.08.25.
- **Veeralakshmi.V**, 23UBT019 participated in **Shine Healthcare Hackathon** held at Trichy SRM medical College, Trichy on 26/8/25.
- **Harish.M**, 24ubt039,2nd year biotechnology, **attended CM trophy** on (29/08/2025) in **athletics competition (100m, 200m)**
- **Chinnasamy S, Muthu Erulappan** of II yr BT participated in **Kabbadi event in CM trophy** on 8.9.2025
- **Jaleel Hyther A** (24UBT019) of II yr BT participated in **Beach VolleyBall in CM trophy - Regional Level** on 8.9.2025
- **Cadet M. Kaviya** (24UBT021), **M. Kirthiga** (24UBT038), and **J. Janani Priya** (24UBT028), 2nd year B.Tech Biotechnology students, actively **volunteered in assisting the NCC Cadet Selection process** organized by NCC on 10th September 2025.
- 2nd year biotechnology girls attended an event on **Resilience and relationship management**. on 13/09/25

STUDENT ACTIVITIES

- **Meena devi (24UBT024) , M. Kaviya (24UBT021) Fathima Zulfi (24UBT040), Jebasteena(24UBT005),M.Kirthiga(24UBT038), J.Jananipriya (24UBT028), K.Koteshwari(24UBT015),Veeral akshmi (23UBT019)** organized **startup spark ,pitch competition** (hybrid mode with internal and external participants)EDC, Kamaraj college of engineering and technology as part of National Entrepreneurship Challenge
- **Jananipriya.J(24ubt028),Kirthiga .M(24ubt038),Aakila Fouzia (24UBT008)** of 11 year B.Tech Biotechnology participated in **RE-INVENT An IEEE SPAX** Sponsored One Day Symposium organized by IEEE Computational Intelligence Society Student Branch Chapter hosted by Department of Computer Science and Business Systems at Thiagarajar College of Engineering, Madurai on 12th September 2025.
- **Swetha S (22ubt031), Nancy G (22ubt040)** of IV Year B. Tech Biotechnology presented a Paper "**Adsorption behaviour and Kinetic study of Cyanobacteria and uptake of Aluminium from Pyrotechnic Effluent**" Two days International Conference on Algal sustainability (ICAS25)organised by Sadakathullah Appa College, Thirunelveli, Seaweed Research and utilisation association, Krishnamurthy Institute of Algology, SNAP alginates, SATHYAM BIO from 25/09/2025 to 26/09/2025
- **Parkavi Nanthini. S and J Vaishnavi Rishikaa** of IV B. Tech Biotechnology presented a paper titled "**Developing cellulose based ink from floral waste - an eco friendly 3D printing**" organized by Srimathi Indira Gandhi college, Tiruchy on 26/09/2025

VALUE ADDED COURSE



Dept of Biotechnology organized VAC on “**Transformative strategies in drug discovery : Integral modern pre clinical research with heavy metal & chemical toxicity analysis**” on 14th to 18th July 2025.

FACULTY ACHIEVEMENTS

- **Dr.S.Karthikumar** delivered Guest Lecture on **IPR filing in India**, at St Joseph College, Tiruchirapalli on 10.07.2025
- **Dr.R.Shyam Kumar**, Professor/BT and **Dr.S.Karthikumar** ASP/BT submitted **research proposal** jointly with Dr.G.Arthanareeswaran, Professor, Department of Chemical engineering, National Institute of technology, Tiruchirapalli to DBT, New Delhi under the scheme of Marine Research. **Title: Integrated Biorefinery of Seaweed for Scalable Production of Omega-3 Enriched Algal Oil to Promote Cardiovascular Health and Conversion of Residual Biomass into Biodegradable Foams for the Socioeconomic Empowerment of Rural Fisherfolk** -[65173], Project Cost : 2.3 crores
- "**Dr.S.Karthikumar**, ASP/BT and **Dr.R.Shyamkumar**, Prof/BT filed a Design **""Multiple Gas Detection Chamber""** Appl No.47390-001 on 17.09.2025."

Dr. S. Karthikumar, ASP/BT and Er. Karl Joseph Samuel, AP/BT served as resource persons in **"One day Workshop on Fermentation Technology"** for M.Sc Microbiology students of Madura College, Madurai on 28-08-2025



FACULTY ACTIVITIES



Dr K.Geetha, ASP, BT, delivered a guest lecture on **"Exploring the future: Career Opportunities in Biology"** at The TVS School, Madurai on 20/08/2025.

- **Dr. R. SHYAM KUMAR/Professor/BT** participated **Trekking along with II year Class toppers to Gopalasamy Hills (Modhagam)** on 23/08/2025. Principal Dr. S. Senthil, Presided over the Trekking Program.
- **Dr. R. SHYAM KUMAR /Professor/BT** Participated **ECHO - Webinar on “Natural Farming - A sustainable Approach to prosperity “Organized by ECHO India, Hyderabad. on 25/08/2025.**
- **Dr Pradiba D AP/BT** has completed a six Days online Faculty Development Programme (FDP) on **"Mastering Digital Pedagogy: Tools, Techniques and content Creation Strategies"**, organized by Department of Research and Development in Association with Institution's Innovation Council, Indra Ganesan Institutions, Trichy, from 15th to 20th September 2025.

FACULTY ACTIVITIES

- **Dr K.Geetha**, Associate Professor, Department of Biotechnology attended ONLINE FDP on “**Cutting-Edge Innovations in Protein Science: From Bioprocessing to Computational Modeling**” from 24th June – 5th July, 2025, Organized by Electronics & ICT Academy, NIT Warangal (HUB) in association with E&ICT Academy, NIT Andhra Pradesh (SPOKE) Sponsored by Ministry of Electronics and Information Technology (MeitY), GoI.
- **Dr R.Shyam Kumar**/professor/BT participated **online Webinar** on “**ECHO - SDGs in Agriculture - Pathways to a Resilient and Sustainable Future**” on 28-07-2025. Organized by EEI Hyderabad .
- **Dr.S.Karthikumar**, ASP/BT participated in **Shine Healthcare Hackathon** held at Trichy SRM medical College, Trichy on 26/8/25.
- **Dr.R.ShyamKumar Professor/Biotechnology** participated webinar on “**BIO-AI** ” organized by E-YUVA Center, Anna University,Chennai, Supported by BIRAC , New Delhi.
- **Dr D Pradiba** gave a presentation (online, as PI) to the **Internal committee, LEOS, ISRO for proposal scrutiny under ISRO-RESPOND** basket along with Co-PI Dr Aghila Prof/ADS and **Dr S Karthikumar ASP/ BT** on 25.07.2025
- **Dr. R. SHYAM KUMAR** /Professor/BT Participated Webinar on “**The Science of Sweetness: Balancing Indulgence and Health**” Organized by. Protein Food Nutrition Development Organization (PFNDAI) on 25/08/2025.

FACULTY ACTIVITIES



Dr Pradiba AP/BT visited **ICMR VCRC Field station Madurai** on 7/8/25 regarding joint projects and publications.

- **K. R. Ramesh, Raja Somasundaram, Dr.R. Shyam Kumar, Sankar Karthikumar,** published an article on, “Characterization of functional bio plasticizer from *Millettia pinnata* leaf biomass as a green alternative to petroleum based plasticizers, *Macromolecular Research*” on 14th July 2025



Dr.S.Karthikumar, Dr.P.Narayanasamy, Dr.Guru Karthik Babu attended **Faculty Development Program** on Startup and Innovation organised by Startup TN at Virudhunagar collectorate on 06.08.25

- **Dr. R. Shyam Kumar,** Professor, Department of Biotechnology, has successfully registered as a **Faculty Entrepreneur under MSME** (Udyam Registration) as an outcome of mentorship to the MSME Project (2.0). The company has been established under the name **G R BIOSOLUTIONS** with Udyam Registration Number **UDYAM-TN-32-0089088,**

FACULTY ACTIVITIES

- **Dr. R. Shyam Kumar/Prof/BT**, participated National Webinar on **BIOFACTS ANTIBIOTIC RESISTANCE"** ORGANIZED BY Chikitsak Samuha's Sir Sitaram and Lady Shantabai Patkar College of Arts and Science and V.P. Varde College of Commerce and Economics (Autonomous) and Department of Microbiology and Biotechnology 05/07/2025.
- **Dr. R. Shyam Kumar/Prof/BT** Participated **FDP on "Cutting-Edge Innovations in Protein Science: From Bioprocessing to Computational Modeling"**, scheduled from 24th June to 4th July 2025, sponsored by Ministry of Electronics and Information Technology (MeitY), GoI. Organized by Department of Biotechnology, National Institute of Technology Andhra Pradesh (Spoke) in association with E&ICT Academy, NIT Warangal (Hub).

KAMARAJ
COLLEGE OF ENGINEERING & TECHNOLOGY
(An Autonomous Institution - AFFILIATED TO ANNA UNIVERSITY, CHENNAI)
S.P.G.C. Nagar, K. Velakulam - 625 701 (Near VIRUDHUNAGAR)

Congratulations!

Happy to Share
A paper got published in **Chemical Engineering and Processing - Process Intensification - Elsevier**

Impact Factor: **3.9**

Dr. S. Karthikumar
ASP / BT

Q1 Journal

SCI Indexed

Dr. S. Karthikumar/ASP/BT and Dr. R. Shyam Kumar/Prof/BT published a paper entitled "Effectiveness of image-based classifiers for on-site identification of lichens in reserved forest" in journal Computers and Electronics in Agriculture (Impact Factor: 8.9)."

FACULTY ACTIVITIES



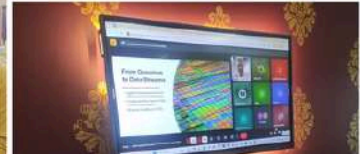
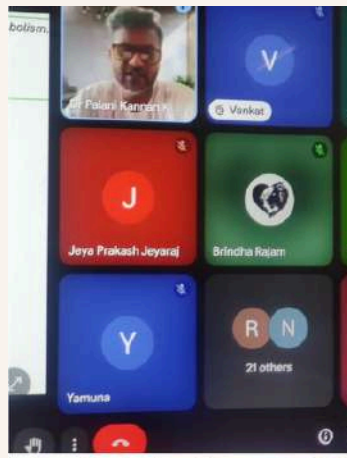
Dr.S.Karthikumar, ASP/BT delivered guest lecture on **"IPR filing in India"** at ANJA college, Sivakasi.

ALUMINI INTERACTION



Our distinguished alumnus, **Dr. K. Palani Kannan**, Clinical Bioinformatics Researcher, Empowering AI Innovation in Omics Data, Abu Dhabi Emirates, UAE delivered a guest lecture on **"Interdisciplinary Applications in Healthcare Using Genomics Data with AI Tools"** on 11th July, 2025

Our Proud Alumnus (2002 - 2006) **Dr. K. Palanikannan** delivered an Online Industrial Expert guest lecture on **"Data Sequencing and it's Informatics Application"** on 8th August 2025 to our III BT and III ADS students.



ALUMINI INTERACTION



Our Proud Alumnus **Mr. P.S.K Satyanarayanan (2004-2008)**, GM - Staffing, Spectrum Talent Management Ltd, Bangalore delivered an Alumni Guest lecture on "**Be the future ready workforce**" to our third and final year BT students 13-08-2025

Our Proud Alumnus **Ms Arulsevi Mohan (2002-2006)** has delivered a guest lecture on "**Opportunities in UK for Young Adults**" to our III BT and III BT students.19-08-2025



ALUMINI INTERACTION



Orientation programme to I year BT student - Alumni address by Ms.K.Chitradevi (Batch 2010-2014), a distinguished alumni and successful entrepreneur.
28-08-2025



Our Proud Alumnus Er. Padmasri Gurusamy (Batch 2007 - 11) delivered a guest lecture on " Scope of Biotechnologists in Management Studies" to our II and IV BT students.
08-09-2025



GUEST LECTURE



Mr. Lena Serma Kannan, Proprietor, Lena Serma Kannan Modern Rice Mill, Madurai has delivered a guest lecture on "**Scope of Biotechnology in various sectors**" for our Biotechnology students

- **Ms Renitta** (NIT Rourkela) and **Mr Santosh Kaveri** (NIT Bhopal), 2025 passed out, addressed III BT students about **GATE preparation and Higher Studies** on 23/07/2025.
- A guest lecture was delivered by **Er K Chitradevi**, Principal Consultant, Clues Advisory partners on "**Future career opportunities in food tech**" for 3rd yr Btech BT studentson 28 August 2025



- Higher Studies committee of Department of Biotechnology organized a guest lecture on "**Preparation for Higher studies Abroad**" on 25/07/2025. By 2021-2025 batch Alumnus, **Ms Nithya Shree J.**, MS in Cancer Biology and Therapeutics @ **CARDIFF UNIVERSITY**, Cardiff, UK.

ASSOCIATION ACTIVITIES



Genes Association of department of biotechnology organized a guest lecture on "career aspects and opportunities in biotechnology". Dr Danny Jeyaraju, Bristol Myers Squibb, was invited as the chief guest. Third years and Second years actively participated in the event and gained valuable insights.



Genes Association of the Department of Biotechnology organized a guest lecture on "Career opportunities in Plant Biotechnology" on 16.07.2025. Dr. S. M. Saminathan, Managing Director, Saminathan industries Pvt. Ltd addressed our students and shared his valuable insights into the scope, advancements, and industrial prospects in the field of Plant Biotechnology.

IIC of department of biotechnology organized a guest lecture on **Bioinformatics:** resource person: **Mr. swaminathan** from swaminathan industries pvt ltd. Date: 08.07.2025



ELITE BIO CLUB

- **Elite Bio club** of Biotechnology department recruited students from the IInd year by conducting a test.



A guest lecture was organized for the innovation clubs of KCET on the topic: "**Building a career abroad in deep tech research**" on 16.07.2025. **Dr. S. M. Saminathan**, Managing director, Saminathan industries Pvt Ltd engaged all the members of the innovation clubs, fostering global research perspectives and inspiring young innovators.



EliteBio club of department of biotechnology organized an **interactive session** to the 2nd year BT club members on 08.08.2025. Club bearers - Treasurer: Vibhu Purushoth VK and Joint Secretary: Syed Sirajutheen addressed the club members.

ELITE BIO CLUB



Elite Bio Club of the Department of Biotechnology organized an **interactive session** for II year BT Club members on 19th September 2025. Mr. Vijayaragavan of Third Year Biotechnology explained the basics of Bioreactors and their applications, making the session highly informative and engaging for the juniors.

IIC ACTIVITIES



Ms. Padhmapriya, HR executive, BG Crops, Madurai delivered a talk on **Entrepreneurial preparedness towards Biotech industry setups to 3rd year B.Tech. Biotechnology students** on 26/07/25 as part of IIC activities.

IIC of Department of Biotechnology organized a Guest Lecture on **Careers opportunities in Clinical Research** by **Er. Mathew Lurth Raj**, Product Manager, CPC Diagnostic, Chennai on 21.07.2025.



DEPARTMENT ACTIVITIES

- **Academic audit** for the department of biotechnology was conducted today 19.07.2025. **Dr. Nakkeeran**, Prof/BT SVCE was invited for conducting the Audit
- **4th Doctoral Committee Meeting** conducted to **Mr. Mathews Luth Raj** for finalizing oral panel for Viva Voce exam. On 21/07/2025. supervisor: **Dr. R. Shyam Kumar** /Professor/Department of Biotechnology.
- **PAC meeting** for the department of biotechnology is conducted today - 26.07.2025. **Dr Arthanareeswaran** - NIT trichy, **Ms Padmapriya** - BG crops and science and our **alumni Mr Lena Serma Kannan** were invited along with the other stakeholders.



Second year students of department of Biotechnology visited **Sathyam group of companies-Kissan care unit** on 25th July 2025 as a part of 100 kms radius industrial visit.

DEPARTMENT ACTIVITIES



44 students from II Yr BT and 5 students from IV yr BT along with Dr K Geetha, Dr D Pradiba, Er Raja Rajesweri R visited Tamilnadu Agriculture University, Madurai, on 25.08.2025 as part of gaining awareness about organic farming. (An initiative by TNAU).



III Year B.Tech Biotechnology students along with Dr. S. Karthikumar and Er. Karl Joseph Samuel visited Hatsun Agro Products Ltd. Nagari, Madurai on 08-09-2025

DEPARTMENT ACTIVITIES

Dept. of Biotech Organized Two Day Workshop on "Upstream and Downstream Operations in Industrial Fermentation" for M.Sc Microbiology Students of The Madura College, Madurai.



III BT students visited **Human and Animal Vaccine manufacturing facilities** at Indian Immunological Limited, Hyderabad on 11.09.2025

DEPARTMENT ACTIVITIES



III BT students visited Sophisticated Advanced Instruments Facility at CDFD - Centre for DNA Finger Printing and Diagnostics at Hyderabad on 12.09.25

DEPARTMENT ACTIVITIES



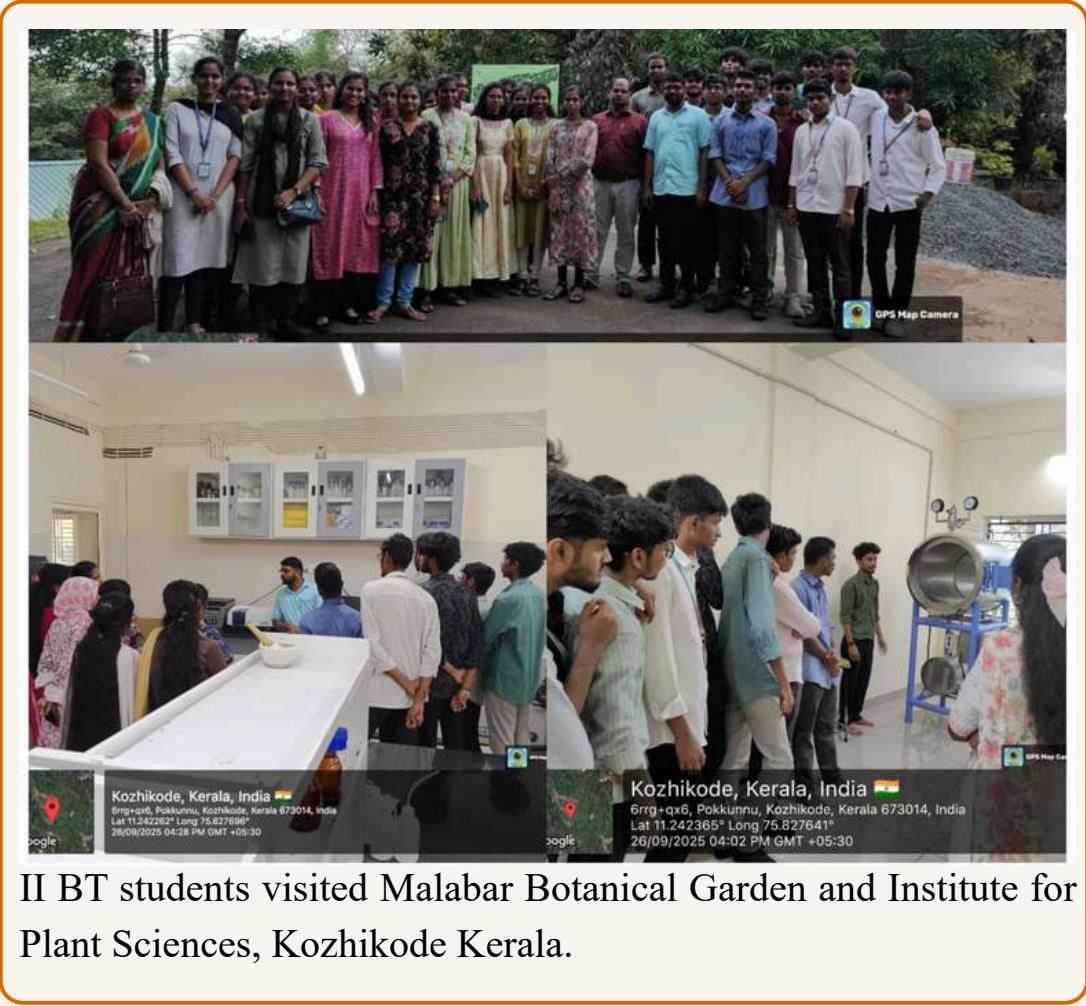
III BT students visited Next Generation Sequencing and Proteomics facilities at CCMB - Centre for Cell and Molecular Biology, Hyderabad on 12.09.2025.

DEPARTMENT ACTIVITIES



Department of Biotech organized **International Certification course on Food safety pro** for Final year BT students. 17 to 20 sept 2025.

DEPARTMENT ACTIVITIES



II BT students visited Malabar Botanical Garden and Institute for Plant Sciences, Kozhikode Kerala.



II Year BT students visited Kiwi icecreams, (E.K Foods Private Ltd) on 27.09.2025

DEPARTMENT ACTIVITIES



II BT students visited ICAR - Indian institute of Spices Research , Kozhikode , Kerala