

Department of Biomedical Engineering
KPR Institute of Engineering and Technology



KPR Institute of Engineering and Technology

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Highlights of this month

01.11.2022

**Webinar on Pattern Recognition
based on PCA and Decision theory**

08.11.2022

Department Orientation Program

12.11.2022

Interaction with Alumni

22.11.2022

BOS meeting - VII

**Student Participation /
Achievements**

Faculty Contribution

"We are Engineers for Doctors"

Biomedical Engineering is one of the premier Engineering disciplines among technocrats since it merges Healthcare Technology with Electronics and Software technologies including Artificial Intelligence, Machine Learning, Robotics in Medicine, Bioinformatics, Prosthetic Engineering etc. to serve better to the human community with advance and continuously upgrading technologies. In KPRIET, we nourish our students with advance laboratories like Bio-signal processing, Diagnostics and Therapeutic Equipment, Human Anatomy and Physiology, Biomedical Instrumentation to learn by practicing. Hospital training and internship are arranged with leading multispecialty hospitals and biomedical industries to facilitate the students for better career. Research activities are vibrant with publications and patents in the recent trends.

Dr. D. Ganesh kumar HoD/BME

Monthly Newsletter: Department of Biomedical Engineering

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About KPRIET

KPR Institute of Engineering and Technology (KPRIET), founded by Dr. K. P. Ramasamy, is one of the leading institutions of academic excellence by imparting technical, intellectual and professional skills to students. The Institution is ranked 200-250 band by NIRF. The institute, with its diverse and energetic community of students offers a distinguishing blend of some of the premium graduate, undergraduate and research programs, talented faculty, world class amenities and a residential campus set on a sprawling 150 acres of lush green campus.

While students at KPRIET immerse themselves in academics, the institute has a lot in store for them outside the classroom. Student life includes participation in sports, co-curricular activities and cultural. In short, at KPRIET, students will find an academic and social environment where everyone- from faculty members to peer's support shape their future.

KPRIET is a home to artistically designed buildings with state of the-art computer and internet facilities, modern workshops, seminar halls, auditoriums and well stocked libraries, sports and games fields in addition to an indoor badminton court and gymnasium.

KPRIET has a faculty strength of 264 with a faculty student ratio of 1:15. Out of the total, 139 faculty members PhDs. and 95 are in the process of completing their PhDs. As an exemplary institution of learning, KPRIET follows an admission policy that strongly favours merit, even as it enables access to education for students from all strata of society through appropriate scholarships. The Institution boasts of a strong alumni network with alumni events held every year serving as a platform for past students to give back to KPRIET and share their experiences with its present fellow students.

About the Department

The Department of Biomedical Engineering of KPR Institute of Engineering and Technology, Coimbatore was established in the year 2017 with an annual intake of 60 students. The Department has highly qualified faculty members with Ph. D. and M.E. / M. Tech / M.S. under various specialize such as Biomedical Signal and Image Processing, Medical Electronics, Healthcare Data Analytics, Biomaterials, Regenerative medicine and Nanoscience. The total strength of the Faculties in the Department is Fifteen. Out of which, 60% of the faculty Members (9 Faculties) have completed their PhD and Five faculties are pursuing their PhD.

The faculty members contribute to academic development by publishing books / journals, products, patent filing and presenting papers in International and National Conferences. The Department of Biomedical Engineering signed MoUs with the reputed industries like Aravind Eye Care Hospital, Helix Private Ltd., GEM Hospitals, Ganga Medical Center and Hospital, Masonic Medical Centre for children, Waxwing Medical Technologies, Vital Bio-systems and ALERT (NGO) to bridge the gap between theory and field practices.

The Department also provides an opportunity for students in improving practical knowledge in the field of Biomedical Engineering and Software skills like MATLAB, LabVIEW, Proteus, Pspice simulation through KPI Centre of Excellence, in addition to Communication and Presentation skills. The students have to undergo Industrial Training and Industrial Visit to facilitate them to take up industrial live projects to understand the industry needs. The Students from Biomedical Engineering as well as faculty members has lifetime membership in various Professional Societies like ISTE and BMESI to gain knowledge through various programs conducted by these bodies across the Nation.

Vision of the Department

To be a **center of excellence** for **dissemination of knowledge, research and development** in biomedical and allied engineering fields to serve the society.

Mission of the Department

The Mission of the Department is to

- To impart value-based education in biomedical engineering with state-of-the-art facilities.
- To build an integrated team of biomedical engineers to foster the technologies through research, development and innovation.
- To be in pace with healthcare industries by practicing lifelong learning with ethical and moral values.

**LIST OF EVENTS / PROGRAMS CONDUCTED
DURING OCTOBER 2022-23**

S. No.	Date	Type of Event / Program	Title of the Event
1	01.11.2022	Webinar	Pattern recognition using PCA and Decision theory
2	08.11.2022	Orientation program	Biomedical Department Orientation Program
3	12.11.2022	Guest lecture – Alumni	Interaction with Alumni regarding Career opportunities
4	22.11.2022	BOS meeting - VII	Meeting with BOS members

EVENT - 1

Pattern recognition using Principal Component Analysis and Decision theory

The Department of Biomedical Engineering have organized a Webinar for IV-year BME Students on 01.11.2022 from 03:00 a.m. to 04:00 pm. The Resource person is Mr. R. Raghul, Computer Vision Engineer, Tartasense Pvt. Ltd., Bangalore. On behalf of the Department, Mr. R. Krishna kumar, AP/BME has welcomed the Chief Guest and gave Introduction about the Chief Guest. The Chief Guest had interacted with the students regarding how Pattern recognition is being analysed. He then explained the two methods of Analysis to the students. Total of 53 students and two faculty members attended the webinar. The session was very interactive and the students got benefitted from the Webinar.

Principal Components Analysis (PCA)

- Principle**
 - Linear projection method to reduce the number of parameters
 - Transfer a set of correlated variables into a new set of uncorrelated variables
 - Map the data into a space of lower dimensionality
 - Form of unsupervised learning
- Properties**
 - It can be viewed as a rotation of the existing axes to new positions in the space defined by original variables
 - New axes are orthogonal and represent the directions with maximum variability

HOW TO: In the right direction, the original axes are rotated and the new axes are found. The new axes are orthogonal and represent the directions with maximum variability.

Diagram: The diagram shows a 2D coordinate system with original axes (x1, x2) and rotated axes (y1, y2). A blue airplane icon is shown in both coordinate systems to illustrate the rotation. Labels include 'Original axes', 'Rotated axes', 'Direction of maximum variance', and 'Direction of minimum variance'.

Decision theory:

- A set of quantitative methods for reaching optimal decisions
- Examples of strategies are
 - Otsu thresholding
 - Triangle thresholding
 - Bayes theorem

How does Otsu's Binarization work?

The better description of Otsu's Binarization is that it does not actually work. If you are not interested, you can skip this. Since we are working with binary images, Otsu's algorithm tries to find a threshold value t which restricts the weighted within-class variance given by the equation:

$$s^2(t) = w_0(t) \sigma_0^2 + w_1(t) \sigma_1^2$$

where

$$w_0(t) = \sum_{i=0}^t P(i) \quad \& \quad w_1(t) = \sum_{i=t+1}^{255} P(i)$$

$$\mu_0(t) = \frac{\sum_{i=0}^t i P(i)}{w_0(t)} \quad \& \quad \mu_1(t) = \frac{\sum_{i=t+1}^{255} i P(i)}{w_1(t)}$$

$$s^2(t) = \sum_{i=0}^t (i - \mu_0(t))^2 P(i) + \sum_{i=t+1}^{255} (i - \mu_1(t))^2 P(i)$$

EVENT - 2**Biomedical Department Orientation Program**

The Department of Biomedical Engineering organized Department Orientation program on 08.11.2022. The Head of the Department, Dr. D. Ganesh kumar, had addressed the First-year students of BME and presented the Vision, Mission, PSO and PEOs of the Department. He then elaborated the List of Faculties, their area of expertise and the Department activities to the students.

Followed by HoD, Mr. John Amose, AP(Sr.G)/BM and the Department Placement coordinator had explained the Placement activities of the department to the students. He then suggested the students on how to plan their Career opportunities from their first year of Engineering education.

Mr. R. Krishna kumar. AP/BM and Department IIPC Incharge gave introduction of IIPC and Department and College IIPC activities. He has listed the MOU companies and Hospitals and the activities conducted so far. The Orientation program was conducted in Offline mode at First year BME classroom at KPRIET, Coimbatore.



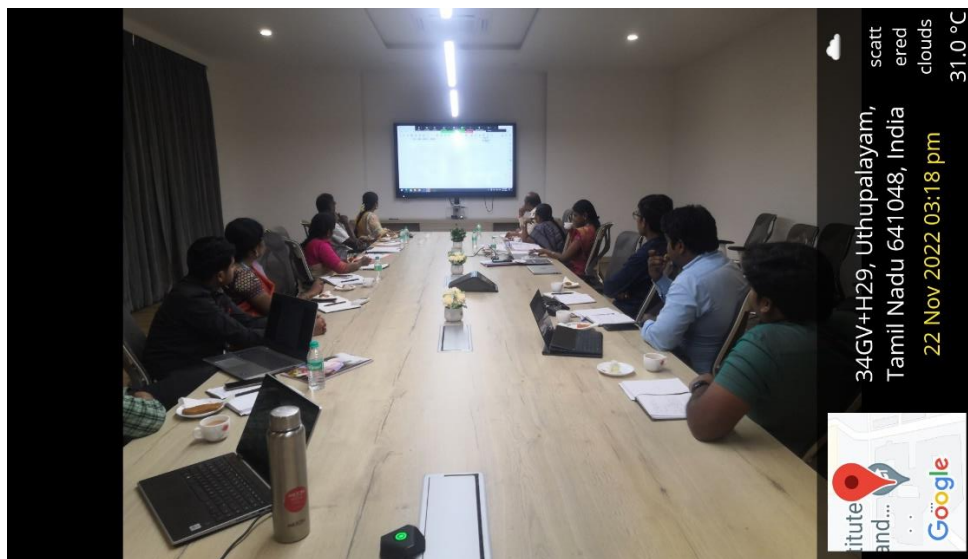
EVENT - 3**Alumni Interaction**

The Department of Biomedical Engineering organized Alumni Interaction activity on 12.11.2022 for Third-year BM students. The Guests are Mr. Karthick, KGISL and Mr. Manibalan, Machenn Innovations, Coimbatore. The Alumni explained the career opportunities of Biomedical field and the skills expected by the industry. The students were actively interacted with the Alumni and enquired about the career opportunities and scope of Biomedical Engineers in Industry and Hospitals in future.



EVENT - 4**Meeting with BOS members**

The Department of Biomedical Engineering conducted BOS meeting with Experts and Board members of BME, KPRIET on 22.11.2022. The meeting was conducted in hybrid mode (Online and Offline) for presenting the syllabus framed for Pre-final and Final year syllabus for R2021 curriculum and Professional electives for awarding Honors as per Anna University 2021 regulation. Ms. Swathy, AP (Sr.G)/BM, Department BOS coordinator had organized the meeting. Head of the Department, Dr. D. Ganesh kumar addressed and welcomed the BOS members and presented the Syllabus, framed by the BM Faculties. Suggestions were received from the Panel members to improve the curriculum. The department has started working on it to improving the quality of education of the students.



Student Achievements – Technical / Non-Technical

S.No	Name of the Students	Year	Name of the Event / Program	Achievements
1	Mr. P.Tamizhan	IV BME (2019-23 batch)	Udhayam Medical Systems, Coimbatore	Offered Internship
2	Mr. C.Tamilan -		Sam Enterprises Pvt, Ltd. Coimbatore	Offered Internship
1	Ms. Lithyashree	II BME (2021-25 batch)	Anna University Zone IX - Volleyball	Secured 2nd prize
2	Mr. Kishore		Anna University Zone IX - Kabadi	Secured 3rd prize
3	Ms. D S Rayma		WSTC skill training	Completed Phase 1 successfully
4	Ms. Varnika		WSTC skill training	Completed Phase 1 successfully
5	Mr. Narendhar		INNOVSENSE competition	Best Commercialization Award
6	Ms. R Lakshitha		Dance competition in Anna University	Won First prize

1	Ms.P Sureka	III BME (2020-24 batch)	Poster Presentation at International Bio-technical forum'22	Won 1 st prize
2	Ms. I T Joselyne Sneha		Project and Prototype presentation at International Bio-technical forum'22	Won 2 nd prize
3	Ms. M Nisha		WSTC skill training	Completed Phase 1 successfully
4	Mr. V Meiyarasan		WSTC skill training	Completed Phase 1 successfully
5	Ms. Neha Nesnas		Visit to Malaysian Universities	Upskilling Knowledge
6	Ms. Shwetha A K		Visit to Malaysian Universities	Upskilling Knowledge
7	Ms. Sriya B		INNOVSENSE competition	Winners - Best commercialization Award
8	MS. Neha Neshnas			
9	Ms. Sangamithra		INNOVSENSE competition	Secured III Place
10	Ms. Preethika			

Faculty Contribution

Patents / Achievements / FDP/ Conference and Workshops Attended

S. No	Name	Name of the Webinar/ Workshop/ FDP/ Internship/ Achievement	Organized by
1	Dr. D. Ganesh kumar	Guest lecture – Resource person	KPR Mill Ltd, Coimbatore.
2	Dr. P. Sreelatha	Won Two Awards in INNOSENSE competition	KPRIET, Coimbatore
		Patent Publication	Not Applicable
		Resource Person in EDII – TN funded One day Awareness program on Importance of Innovation	KPRIET, Coimbatore
3	Dr. S. Logesh kumar	Patent publication	Not Applicable
		Awarded Best Thesis of the year by Biomedical Engineering Society of India	BMESI
4	Dr. N. Rajasingam	Virtual Bioinstrumentation using Lab-View at Department of Biomedical Engineering	Karpagam Academy of Higher Education
		Completed NPTEL course with silver score in Accreditation and Outcome Based Learning	NPTEL Swayam
		Completed Faculty Development Program in Accreditation and Outcome Based Learning	NPTEL Swayam
5	Mr. R. Krishna kumar	Completed Online Certification Course	Coursera
		Completed 30-day Online training in Image processing	Pantech Learning
		Attended Conference in Emerging trends in Biomedical Engineering	Iatome Electric Pvt. Ltd. Coimbatore.