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St. XAVIER'S CATHOLIC COLLEGE OF ENGINEERING (Autonomous)

Chunkankadai, Nagercoil - 629003
Kanyakumari District, Tamil Nadu

Approved by AICTE & Affiliated to Anna University, Chennai
Accredited with 'A' Grade by NAAC
UG Programs(ECE, EEE, Mech, Civil, CSE & IT) Accredited by NBA
Anna University Recognized Research Institute
Recognized under section 2(f) & 12(B) of UGC Act, 1956
UG Programs(ECE, EEE, Mech, Civil, CSE & IT),
MBA & MCA Programs Permanently Affiliated

News Letter

Department of Mechanical Engineering

"Education is not preparation for life; education is life itself."

Department Vision

Developing technically sound mechanical engineering professionals to serve the global community with academic excellence and innovative research

Department Mission

M 1 To transform the students into mechanical technocrats with clear conceptual understanding and hands-on experience

M 2 To integrate the fundamentals with recent concepts through technical gatherings, research and industry interactions

M 3 To impart managerial quality and develop soft skills through leadership and personality development programs

M 4 To inculcate core human values through ethical practices and inspire them to serve the society

HoD's Message

It gives me immense pleasure to present to you the departmental newsletter for the period July to December 2024. This semester has been marked by exceptional strides in research, skill development, and collaborative outreach. Our faculty members have published extensively in reputed international journals, addressing frontier topics ranging from sustainable materials to computational optimization in energy systems. Their accomplishments not only elevate our academic standing but also inspire our students to pursue research-driven careers.

On the student front, we have organized a rich array of seminars, industrial visits, workshops, and symposia through MEGX, SAE, and ISHRAE, Events like the Engineer's day competition and the association inauguration ceremony have fostered collaboration, creativity, and leadership among our students.

Faculty participation in national and international FDPs and conferences remains strong, covering critical areas such as AI in engineering, energy sustainability, and educational ethics. The diversity of these engagements reinforces our commitment to holistic and future-ready education.

As we reflect on this successful half-year, I wish to extend my heartfelt appreciation to the faculty, staff, students, and industry partners who have made this journey so enriching. Let us continue to build a department that not only imparts knowledge but also shapes thinkers, innovators, and responsible engineers. - *G. Antony Miraculas*

ABOUT THE DEPARTMENT

Established in 2003, the Department of Mechanical Engineering offers comprehensive undergraduate and postgraduate programs, emphasizing research, innovation, and industry collaboration. Accredited by the NBA and granted autonomous status, the department ensures academic excellence through a dynamic, industry-aligned curriculum. Active student bodies such as MEGX, SAE, and ISHRAE enhance professional development by organizing workshops, seminars, and industry interaction programs. With a focus on practical skills and emerging technologies, the department prepares students to meet the evolving demands of the engineering sector.

Editors

Dr. G. Antony Miraculas
Dr. Y. Balto
Mr. Lijin Alex A. (IV Mech.)
Mr. Ajil Prasad A.P. (IV Mech.)

Faculty Research Publications – 2024 Highlights

The Department of Mechanical Engineering takes immense pride in presenting its faculty members' research achievements published in reputed journals during the year 2024. These contributions reflect the department's dedication to innovation in materials, manufacturing, renewable energy, and computational engineering.

Jebeen Moses J., Felix Xavier Muthu M.

"Tribological Behaviour of AA7075 Hybrid Composites Reinforced with Al_2O_3 and TiO_2 Particles"

Investigates the friction and wear properties of advanced aluminum composites used in aerospace and automotive applications.

Journal of Ceramic Processing Research, Vol. 25(6), pp. 1142–1153.

Jebeen Moses J., Felix Xavier Muthu M.

"Machining of Ti6Al4V under Cu Particle Mixed Dielectric Medium using Aluminium Composite Tool for Production of Electric Motor Components"

Proposes a novel EDM technique for precision machining of titanium alloys.

Journal of Ceramic Processing Research, Vol. 25(6), pp. 1069–1086.

Michel Raj T.

"Influence of Milled Carbon Fiber (MCF) on Mechanical and Dynamic Mechanical Behaviour of Carbon Fiber Fabric Reinforced Polymer Composites"

Explores the enhancement of mechanical properties through hybrid fiber reinforcement.

Materials Today: Proceedings, Elsevier.

Jose Aloysius, Jebeen Moses, Vijumon, Felix Xavier Muthu

"Near Dry Powder Mixed Electric Discharge Machining of AA7050 Hybrid Composites Utilizing Composite Tool Materials"

Demonstrates sustainable and efficient EDM machining with powder-enhanced dielectrics.

Materials Science, Medziagotyra, Vol. 30(2), pp. 203–211.

Gerald Arul Selvan M.

"Optimization and Statistical Analysis on Mechanical, Thermal, Wear and Water Absorption Characteristics of Fragrant Screwpine Fiber Reinforced Polymer Biocomposites"

Focuses on the development of bio-composites with optimized performance for eco-friendly applications.

Iranian Polymer Journal, Vol. 34, pp. 399–412.

Gerald Arul Selvan M., Antony Miraculas G.

"Chromolaena Odorata Stem Biowaste as Natural Bio-Reinforcement for Polymer Composites: An Effective Waste Management Technique"

Utilizes invasive weed (Chromolaena odorata) as reinforcement in polymer composites, addressing both waste management and material sustainability. The composites display promising mechanical behavior, making them ideal for low-load structural uses.

Polymer Bulletin, Springer, Vol. 22, pp. 4777–4790.

Gerald Arul Selvan M. & Arul Raj Jayson

"Extraction and Characterization of Oplismenus Hirtellus Grass Fiber for Possible Bio-Reinforcement Material in Polymer Composites"

Highlights the viability of a lesser-known natural fiber Oplismenus hirtellus as a reinforcement in polymers. The study includes physical, chemical, and mechanical characterizations, proposing it as a cost-effective, renewable composite material.

Polymer Bulletin, Vol. 81, pp. 13729–13747.

Ajith J. Kings, Ashwand Jesvil L.J., Anujith N. Rajan

"Synthesis of Biodiesel from a Unique Potential Oil Reserve (Delonix regia) Using a Novel Biocatalyst (Bamboo Stem): A Comparative Study by RSM and ANN"

Combines experimental and AI techniques for efficient biodiesel production.

Industrial Crops and Products, Elsevier, Vol. 208, Article 117763.

Ajith J. Kings, Jain B. Marshel

"Optimized Biodiesel Production from Mixed Non-Edible Oils Using Advanced Computational Techniques and a Novel Bifunctional Liquified Catalyst: Compatibility Assessment in IC Engines"

Discusses performance evaluation of biofuels in internal combustion engines.

Biomass & Bioenergy, Elsevier, Vol. 190, Article 107412.

Ajith J. Kings

"Optimization of Engine Performance, Emission and Combustion Parameters Using Mixed Non-Edible Oil Biodiesel with Nano-Additives via Hybrid Techniques"

Focuses on improving fuel efficiency and emission control using nano-enhanced biodiesel.

Energy, Elsevier, Vol. 305, Article 132413.

Anto Kumar R.P., Merbin Jose P.J., Ajith J. Kings

"Amine Functionalised Graphene Embedded Polyvinyl Alcohol (PVA) and PVA-Chitosan Hydrogel Composites"

Develops multifunctional hydrogels with enhanced mechanical and thermal properties.

International Journal of Biological Macromolecules, Elsevier, Vol. 267(2), Article 13149.

JeyaSutha M., Ramesh Dhanaseelan F., Felix Nes Mabel M., Vijumon V.T.

"T2FM: A Novel Hash Table Based Type-2 Fuzzy Frequent Itemsets Mining"

Introduces a data mining algorithm for complex, fuzzy data environments.

Journal of Intelligent & Fuzzy Systems, IOS Press, Vol. 46(2).

Jebeen Moses J., Vijumon V.T., Jose Aloysius P., Felix Xavier Muthu M.

"Development of Novel Wear Equation of AA7050/SiC-Steel Interface for High Temperature Application"

Proposes an empirical model to predict wear in composite interfaces under thermal stress.

Materials Science, Medziagotyra, Vol. 30(1).

Jebeen Moses J., Vijumon V.T., Jose Aloysius P., Felix Xavier Muthu M.

"Near Dry Powder Mixed Electric Discharge Machining of AA7050 Hybrid Composites Utilizing Composite Tool Materials"

Examines the efficiency of EDM with near-dry techniques for enhanced material removal.

Materials Science, Medziagotyra, Vol. 30(2), pp. 203–211.

Patent Achievements by Our Faculty

We are proud to announce recent accomplishments in patent filings by our esteemed faculty members. Dr. M. Gerald Arul Selvan and Mr. P. Jose Aloysius have had their international patent titled "Turmeric Harvester Machine" published through Intellectual Property India. Additionally, Dr. M. Felix Xavier Muthu (TS215) has secured a national patent sanction for his innovative project "IoT-Based Solar Agriculture Robot for Pesticide Spraying". These achievements highlight the innovative spirit and research excellence of our staff.

Faculty Awards and Recognitions

We are delighted to highlight the outstanding recognitions received by our faculty members.

Dr. Ajith J. Kings has been internationally acknowledged for his contributions as a Reviewer by Elsevier, Scientific Reports (Springer), and the Journal of Applied Phycology. He also served as Session Chair at Udaya School of Engineering for an international conference.

Dr. Y. Balto was recognized for delivering a Guest Lecture at Universal College of Engineering and Technology.

Mr. Jude Vinoth V was also acknowledged for his Guest Lecture at a local college.

These accolades reflect the academic excellence and commitment of our faculty to knowledge sharing and scholarly contribution.

Faculty Participation in Conferences and FDPs

Our faculty members have actively participated in a wide range of Faculty Development Programmes (FDPs) and conferences, demonstrating their commitment to continuous learning and professional advancement in cutting-edge fields such as energy sustainability, artificial intelligence, soft skills, and advanced materials.

Focus on Energy and Sustainability:

A large group of faculty members including Dr. G. Antony Miraculas, Dr. Ajith J. Kings, Dr. Sergius Joe M, and several others attended the FDP on "Innovations in Energy, Environmental Sustainability & Material Science", hosted by Sri Ranganathar Institute of Engineering and Technology (both in-person and online formats). This recurring programme brought together educators from various institutions to discuss emerging technologies and sustainable practices in engineering.

Soft Skills and Communication Development:

Faculty members Mr. P. Jose Aloysius, Mr. V. Vijumon V.T., Dr. M. Gerald Arul Selvan, and Mr. Anwar Rajesh M.M. engaged in online FDPs focused on Soft Skill Development, offered by prestigious platforms like NPTEL-AICTE and IIT Kharagpur. These programmes spanned over weeks, enhancing their pedagogical and interpersonal communication abilities essential for holistic teaching.

Advanced Technologies in Engineering:

Dr. Sergius Joe M, Dr. G. Shanthos Kumar, and Felix M attended FDPs on AI in Hydrogen and Electric Powered Vehicles, organized by AICTE Training and Learning (ATAL) Academy at BS Abdur Rahman Crescent Institute.

Mr. Anwar Rajesh M.M. participated in Recent Advancements in AI & IoT – Industry Perspective, hosted by Periyar Maniammai Institute of Science and Technology, emphasizing the integration of industrial trends with academic insights.

Leadership and Ethics in Education:

Mr. Adritowin F. attended the international FDP "Ethics and Values for Teaching Professionals and Administrators" co-hosted by RAGCW and Globethics Academy, Geneva. This session highlighted the global perspective on academic integrity and leadership in education.

Industry-Oriented Technical Training:

Mr. Jude Vinoth V participated in a hands-on training and orientation programme on Drone Technology, conducted by Garuda Aerospace Pvt. Ltd., Chennai, fostering real-world industry-academic linkage.

Conferences and Global Engagement:

Dr. Sergius Joe M. represented the institution at ADRIS 2024, an international conference held at Alliance University, Bangalore, presenting and discussing innovative research with global peers.

These diverse and enriching engagements reflect our faculty's dedication to staying ahead in their respective domains and contributing to the advancement of academic excellence and societal innovation.

Department of Mechanical Engineering – Events Report

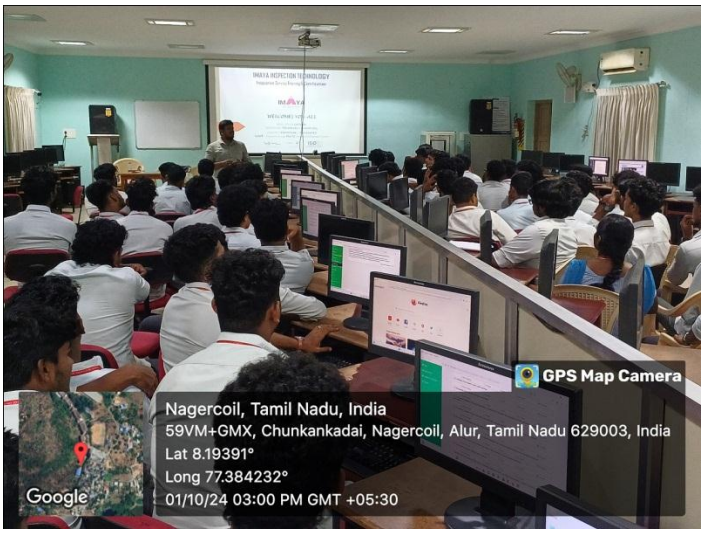
The Department of Mechanical Engineering at St. Xavier's Catholic College of Engineering has always placed strong emphasis on blending technical education with practical skill-building. From July to December 2024, the department organized a series of impactful programs under the MEGX, SAE, and ISHRAE banners that catered to a broad spectrum of student development goals from career orientation and technical competitions to advanced industrial training.

Technical Skill Development and Industrial Relevance

On 8th October 2024, the department hosted a technical enrichment session titled "Advanced QC with NDT Techniques and Applications" conducted by Mr. S. Vimal Kumar from the WQC Institute of NDT and Training

Centre, Marthandam. This session provided 36 participants with in-depth knowledge of non-destructive testing (NDT) methodologies and their application in quality assurance, a critical area for modern manufacturing and safety compliance.

On 1st October 2024, Mr. M. Vinoth of IMAYA Inspection Technology delivered a session on "Safety and Efficiency: NDT Applications", attended by 83 students and staff. The talk focused on how NDT ensures operational efficiency and safety, particularly within the gas industry, highlighting real-life engineering challenges and best practices.



Industrial exposure was a key focus of the industrial visit held on 4th October 2024, coordinated by faculty members Mr. Tittu George, Mr. Adritowin, and Mr. V. Jude Vinoth. 55 participants engaged in on-site learning to better understand live engineering environments, processes, and industrial workflows.

Career Readiness and Industry Alignment

A talk on "Career Options in Software-Based Fields" by Dr. N. Suresh (EduCAD Tech, Nagercoil) on 27th September 2024 introduced students to the power of advanced CAD, simulation, and analysis tools, providing 52 participants with a practical outlook on interdisciplinary roles for mechanical engineers in the software domain.

The career orientation session held on 18th September 2024, led by Mr. E. Vasanth Raj from ECC Academy, aimed at uncovering opportunities in public service and banking sectors for mechanical engineers. With 86 participants, this program broadened the understanding of how core engineering skills translate into non-conventional career paths.

On 29th July 2024, the department welcomed Dr. Prakash, Professor at IIT Madras, for an insightful lecture on "Higher Studies Options for Mechanical Engineers." His talk focused on pursuing research and R&D roles, inspiring 98 participants to explore postgraduate and doctoral opportunities in India and abroad.

Software Training and Product Design Innovation

On 22nd August 2024, Mr. V.G. Manikandan from CAD DESK, Nagercoil, conducted a training session titled "Introduction to Design Software and Applications" for 43 attendees, aiming to familiarize students with the latest engineering tools used in industry.

"Emerging Trends in Product Design", held on 19th August 2024, was led by M. Martin De Boras Pragash and his team from CAD CENTRE, Nagercoil. With 74 participants, the session delved into the latest innovations in product lifecycle design, user-centric development, and aesthetic engineering.

Competitive and Collaborative Spirit

The Engineer's Day Competition, held on 26th September 2024, saw overwhelming participation from 196 students. Organized in collaboration with CAD DESK, this event was designed to encourage creativity, innovation, and technical precision among budding engineers.

A landmark event, the Association Inauguration Ceremony was hosted on 24th September 2024, with Dr. Godwin Glivin (Quality Engineer, Descon Engineering, Qatar) as the chief guest. With over 245 participants, the event fostered a sense of unity, collaboration, and future readiness among mechanical engineering students.

Industry Membership and HVAC Focus

On 14th September 2024, a SAE awareness program was conducted by Dr. Antony Forster Raj, focusing on the benefits of SAE-INDIA membership and how students can leverage it to participate in technical competitions, automotive expos, and international symposiums. This awareness session helped 45 students realize the value of professional affiliation.

On the same day, ISHRAE organized a specialized seminar on "HVAC Components and the Refrigeration Cycle", delivered by Dr. G. Antony Miraculas (HOD/Mechanical) and Mr. D.X. Tittu George. The seminar, attended by 40 participants, covered the evolving landscape of heating, ventilation, and air conditioning technologies and their relevance in building management systems.

Through a thoughtfully structured series of technical sessions, industrial visits, competitions, and awareness programs, the Department of Mechanical Engineering has ensured that its students receive a well-rounded education rooted in practical exposure, innovation, and future-readiness. These programs not only enrich academic learning but also instill confidence and professional competence, preparing students to thrive in diverse engineering careers.

"Crazy Coconut" – MOU

Memorandum of Understanding | 7th February 2024

The Department of Mechanical Engineering at St. Xavier's Catholic College of Engineering signed a significant Memorandum of Understanding (MoU) on 7th February 2024, launching a unique collaborative initiative titled "Crazy Coconut." This MoU marks a strategic partnership between the college and stakeholders in the coconut processing industry, aimed at promoting innovation, sustainable engineering, and hands-on student learning.

The primary objective of the MoU is to foster:

Research and development in coconut-based mechanical systems. Industrial exposure and internships for students in coconut-processing facilities. Workshops, joint projects, and prototype development related to coconut dehusking, coir extraction, and value-added product design.

The event featured a formal signing ceremony, followed by interactive sessions highlighting how traditional agricultural industries can benefit from modern mechanical solutions. The collaboration will pave the way for:

Student-led innovations in automation of coconut processing.

Application of sustainable design principles in local industries.

Development of low-cost, high-efficiency machinery tailored for rural enterprises.

Faculty members, industry representatives, and student teams were all present at the occasion, united by a shared vision of transforming native resources into technological opportunities. The "Crazy Coconut" MoU stands as a testament to the department's proactive approach in linking academia with industry for real-world impact.

Faculty Online Course Completion Report

The faculty of the Department of Mechanical Engineering have actively engaged in continuous learning by successfully completing a range of online certification courses through reputed platforms such as NPTEL, SWAYAM, and Alison. These efforts reflect their dedication to academic enhancement, technical proficiency, and pedagogical excellence.

Key Highlights:

A total of 10 faculty members completed diverse online courses between January and June 2024.

The courses covered technical subjects such as:

- Principles of Casting Technology
- Diesel Engine Cycles, Maintenance & Control
- 3D Printing and Design
- Fundamentals of Welding Science

Faculty also focused on educational development, completing courses on:

- National Education Policy 2020 (NEP)
- Advanced Instructional Methods
- Outcome-Based Pedagogic Principles

Notable Achievements:

Dr. G. Antony Miraculas and Dr. D.X. Tittu George completed the NEP 2020 training via SWAYAM.

Dr. Jebeen Moses and Dr. Gerald Arul Selvan earned Elite certificates for excellence in the Principles of Casting Technology course.

Dr. G. Shanthos Kumar completed an advanced course on Welding Science and Technology offered by IIT Guwahati.

Mr. T. Michel Raj enhanced his teaching methodology through a course on Outcome-Based Pedagogy from IIT Kharagpur.

These online certifications reinforce the department's focus on lifelong learning, staying updated with emerging technologies, and ensuring quality education delivery.

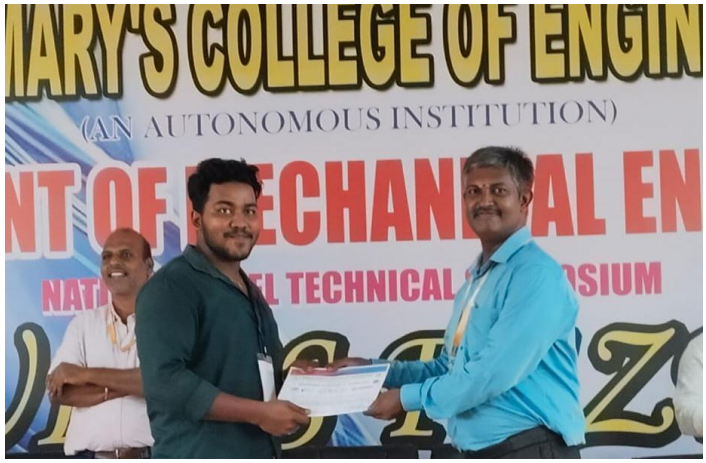
Student Awards and Achievements – 2024–2025

The students of the Department of Mechanical Engineering have demonstrated outstanding technical prowess and co-curricular excellence by actively participating in various national and state-level competitions, symposiums, conferences, and technical events during the academic year 2024–2025. Their remarkable performances have earned them top honors across multiple categories, bringing pride to the institution.

Technical Excellence in National Events

Adhi Krishnan secured First Place in the Off-Road Race held at Annai Vailankanni College of Engineering, showcasing practical engineering and vehicle design skills.

In CAD Modelling and Lathe Master events, Jeffrin Diaz Savio bagged First Place at Nooral Islam University and Stella Mary's College of Engineering, respectively.



Arun J. also excelled with a Third Place in the Lathe Master event and clinched First Place in both the Treasure Hunt and Mr. Mechasm events.

Dominance in Technical Quizzes

Students showcased their analytical acumen in several technical quiz competitions:

Shane Lensar and Vaishnav S.S. achieved First Place at both Nooral Islam University and Stella Mary's College of Engineering.

Laxman, Mithul Sharon, and Sahaya Jebath secured Second Place in team categories at Nooral Islam

University, highlighting their strong subject knowledge and teamwork.

Creative and Communication Skills

Nevin Joe J. displayed exceptional talent by winning First Place in Photography and Second in Poster Presentation at Stella Mary's College of Engineering.

He also participated in a state-level conference organized by Rohini College of Engineering and TNSCST, alongside several other peers who represented the college in academic forums.

Symposium and Conference Participation

Our students also shined at symposiums hosted by DMI Engineering College:

Mithul Sharon earned First Place, Vaishnav S.S. secured Second Place, and Shane Lenser received Third Place.

Many students, including Adhi Krishnan, participated and contributed to discussions in national-level symposiums and state-level conferences, further broadening their academic exposure.

Summary:

- Multiple First Prizes in core technical events like lathe operations, CAD modeling, technical quizzes, and racing events.
- Creative recognition in photography and poster design.
- Representation at state and national conferences, promoting academic discourse and networking.
- Strong showing across institutions including Annai Vailankanni College, Nooral Islam University, Stella Mary's College, DMI Engineering College, and Rohini College of Engineering.

These stellar achievements highlight the department's commitment to holistic student development, emphasizing both technical mastery and innovation. The Mechanical Engineering students continue to uphold the legacy of academic brilliance and practical competence, serving as ambassadors of the college's vision of excellence.