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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
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UG Programs(ECE, EEE, Mech, Civil, CSE & IT),
MBA & MCA Programs Permanently Affiliated

News Letter

Department of Mechanical Engineering

"The object of education is to prepare the young to educate themselves throughout their lives."

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 is with immense pride that I extend my warm greetings to all the students, faculty, and stakeholders of the Department of Mechanical Engineering at St. Xavier's Catholic College of Engineering.

The past semester has been marked by significant achievements. Our faculty members have published impactful research papers in reputed journals, covering topics ranging from tribological behavior and mechanical properties of composites to advances in thermal analysis. These contributions not only enrich the body of knowledge but also serve as inspiration for our budding engineers.

MEGX has been instrumental in organizing a series of webinars and seminars, including sessions on "Automotive Aerodynamic Simulation," "3D Modeling and Engineering Design," and "3D Printing in Industrial Applications." These events provided a platform for our students to engage with industry experts and gain insights into emerging technologies.

Our students have also brought laurels to the department by securing funding for innovative projects through the Tamil Nadu State Council for Science and Technology. Notably, projects on IoT- based water level control and microalgae cultivation using polluted air and water were recognized and rewarded.

Furthermore, the department continues to emphasize practical learning through industrial visits to prominent industries, enhancing the students' ability to correlate theoretical concepts with real-world applications. I encourage all our students to embrace the opportunities provided and strive for excellence in their academic and professional pursuits.

ABOUT THE DEPARTMENT

The Department of Mechanical Engineering, one of the oldest at St. Xavier's Catholic College of Engineering, is home to a team of highly experienced and qualified faculty members, many of whom hold Ph.Ds or are actively pursuing them. Committed to maintaining the highest standards of education, our faculties engage in impactful research projects and frequently present their findings at prestigious conferences. Their dedication plays a key role in shaping a dynamic, forward-thinking curriculum that encourages practical application and creative problem-solving, empowering students to explore and excel in their areas of interest.

Editors

Dr. Y. Balto
Dr. G. Antony Miraculas
Mr. Felix P (III Mech.)
Ms. Joshi Sieana E (IV Mech.)

Research Publication

Our faculty and researchers continue to make significant contributions to the fields of material science, engineering, and energy technologies. The following publications, featured in reputed international journals and publishing houses, highlight the innovative research undertaken by our scholars.

'Effect of Silicon Carbide on Wear Characteristics of Fibre Reinforced Polymer Matrix Composites', T. Michelraj - AIP Publishing (2022): This study explores the impact of silicon carbide on the wear resistance of fibre-reinforced polymer matrix composites. The research provides valuable insights into the development of materials with enhanced durability and mechanical properties.

'Optimization of WEDM Control Parameters for Machining of Functionally Graded Al6061-10% Al2O3 Composite', D.X. Tittu George, M. Maria Jebin - Elsevier (2022): This paper investigates the optimization of Wire Electrical Discharge Machining (WEDM) parameters for machining functionally graded aluminum composites. The findings contribute to improving machining efficiency and product quality in manufacturing industries.

'Tribological Behavior of AA7075 Nanohybrid Composites at High Temperature', M. Ajin, J. Moses - Edizioni Nuova Cultura (2022): The research examines the tribological properties of AA7075 nanohybrid composites under high-temperature conditions. The study is crucial for applications requiring materials that maintain their structural integrity under extreme conditions.

Investigation of Mechanical and Electrical Properties of Carbon Filler Reinforced Epoxy Composites, T. Michael Raj, Jebeen Moses, M. Gerald Arul Selvan, Edizioni Nuova Cultura (2022): This publication presents an in-depth analysis of how carbon fillers enhance the mechanical and electrical properties of epoxy composites. The findings pave the way for developing advanced composite materials for industrial applications.

'Physico-Chemical Properties of Alkali Treated Cellulosic Fibers from Fragrant Screw Pine Prop Root', Gerald Arul Selvan - Journal of Natural Fibers, Taylor & Francis (2022): This study investigates the physico-chemical properties of alkali-treated cellulosic fibers extracted from fragrant screw pine prop roots, aiming to enhance their application in sustainable material development.

'Experimental Optimization of Biodiesel Synthesis from Nonedible Feedstock Ceiba Pentandra Using Nanocatalyst', Ajith J. Kings - Edizioni Nuova Cultura (2022): The research focuses on optimizing biodiesel synthesis using non-edible Ceiba Pentandra feedstock and nanocatalysts, contributing to sustainable biofuel production.

'Studies on Hydrogen Production for Enhancing Performance of Spark Ignition Engine', F. Adritowin, V. Christus Jeya Singh - Springer Nature Singapore (2022): This paper explores hydrogen production methods and their application in spark ignition engines to enhance efficiency and reduce emissions. The research has implications for developing cleaner and more sustainable energy solutions.

These publications reflect the department's commitment to advancing knowledge and fostering impactful research across diverse areas of mechanical engineering.

Association Activities

The Mechanical Engineers' Guild of Xavier's (MEGX), the association of the Department of Mechanical Engineering, successfully organized several impactful events during the semester:

An online webinar on "Automotive Aerodynamic Simulation using Ansys FLUENT" was conducted on 7th August 2022 (Friday), from 11:30 AM to 12:30 PM. The session was delivered by Prof. B. Prince Abraham, M.E., (Ph.D.), Assistant

Professor, Department of Mechanical Engineering, National Engineering College, Kovilpatti. The webinar provided valuable insights to participants from various sectors.

Another insightful webinar on "3D Modeling and Engineering Design" was held on 29th September 2022 (Wednesday), from 11:00 AM to 12:00 PM. The session was conducted by Er. B. Beniesh, B.E., Design Engineer, Task and Drafting Company. Students from the final and third year of the mechanical engineering department greatly benefited from this interactive session.

A seminar titled "3D Printing: An Industrial Revolution" took place on 30th September 2022 (Thursday), from 11:00 AM to 12:00 PM in the CAD lab. The session was led by Er. S. Vimal Kumar, M.E., Creative Design Engineer, ASVA3D World Company, and Er. T. Gopala Krishnan, B.E., Technical Engineer. The seminar enriched the knowledge of final and third-year mechanical engineering students regarding the latest advancements in 3D printing technology.

A one-day enrichment program on "Piping Design and Engineering Stress Analysis" was conducted on 19th July 2022 in the CAD lab of the Department of Mechanical Engineering. The session was led by Er. S. Sherin, an esteemed alumnus, who provided valuable knowledge and practical insights to the participants.

Dr. S. Julyes Jaisingh, Associate Professor and Head of the Department of Mechanical Engineering, delivered an inspiring motivational talk titled "Success Secrets" to the students and faculty members of SCAD Polytechnic College through the online platform Google Meet.

These events equipped the students with practical exposure and enhanced their understanding of emerging technologies, aligning with the department's commitment to nurturing industry-ready professionals.

Workshops and Seminars Attended

Dr. G. Shanthos Kumar attended a workshop on "Electric Vehicle" organized by the Department of Automobile Engineering at KLN Engineering College on 8th October 2022. He also participated in a seminar on "Recent Trends in HVAC" conducted by the ISHRAE Madurai Chapter at SXCCE on 12th November 2022.

Technical Seminars Conducted

A seminar on "3D Printer in Automotive Industry" was organized on 20th October 2022 to enhance the knowledge of mechanical engineering students on 3D printing technologies. The session was conducted by Er. M. Vinish, CAD Engineer, CAD Desk, Nagercoil.

Another seminar titled "New Product Design & Development using Solid Works" was conducted on

15th November 2022 by the Department of Mechanical Engineering to equip students with expertise in Solid Works software. The session was led by Er. M. V. Magesh, Technical Head, CAD POINT, Marthandam.

Student Achievements – Project Grants

Project: "Water Level Identification and Control of Water Supply Switch Using IoT"

A team of four final-year mechanical engineering students — Devarenjan J., Aswanth G. S., Ajith Vasanth M. S., and Harish Kumar J. M. — mentored by Dr. Anand Rajkumar, Assistant Professor, Department of Mechanical Engineering, successfully developed a project titled "Water Level Identification and Control of Water Supply Switch Using IoT." Their project was awarded a grant of Rs. 4,500 by the Tamil Nadu State Council for Science and Technology (TNSCST), DOTE Campus, Chennai.

The project aimed to develop an automated water level monitoring and control system using Internet of Things (IoT) technology. The system was designed to detect the water level in storage tanks and automatically switch the water supply on or off based on real-time data, thereby preventing water wastage and ensuring efficient water management.

Key features of the project include:

- Use of IoT-based sensors to monitor water levels continuously.
- Automated control of the water supply switch to prevent overflow and optimize water usage.
- Real-time data transmission to a mobile or web-based application for remote monitoring and control.
- Implementation of an alert system to notify users in case of abnormal water levels.

The project not only demonstrated the students' technical expertise in IoT applications but also addressed a critical issue related to water conservation and efficient resource management. Their innovative approach and dedication were recognized by the TNSCST, which awarded them funding to further develop and refine their solution.

Project: "Design and Fabrication of Photo Bio Reactor and Micro Algae Cultivation Using Polluted Air and Water"

Another team of four final-year mechanical engineering students — Shambu S. Krishna, V. N. Pranav, Ajith S. Vivek, and P. Stalin Vijay — under the guidance of Dr. Ajith J. Kings, Assistant Professor, Department of Mechanical Engineering, developed a project titled "Design and Fabrication of Photo Bio Reactor and Micro Algae Cultivation Using Polluted Air and Water." This innovative project was awarded a grant of Rs. 7,500 by the Tamil Nadu State Council for Science and Technology (TNSCST), DOTE Campus, Chennai.

The project focused on designing and fabricating a photo bio reactor (PBR) to cultivate microalgae using polluted air and wastewater as nutrient sources. Microalgae have the potential to act as bio-remediators by absorbing harmful pollutants from the environment while simultaneously producing biofuels, biomass, and other valuable by-products.

Key highlights of the project include:

- Design and fabrication of a photo bio reactor optimized for microalgae cultivation.
- Utilization of polluted air and wastewater as growth media, enhancing environmental sustainability.

- Effective absorption of carbon dioxide (CO_2) and other pollutants from the air, contributing to cleaner surroundings.
- Production of biofuels and useful biomass as a by-product, offering potential for sustainable energy solutions.

The successful execution of this project not only demonstrated the students' innovative thinking and technical skills but also highlighted their commitment to addressing environmental challenges through sustainable technologies. The recognition and financial support provided by TNSCST further validate the significance and potential impact of their work.

These projects reflect the department's dedication to fostering innovation, technical excellence, and sustainability among its students, empowering them to contribute effectively to solving real-world challenges.

Resource Person

Dr. Ananth Rajkumar, Assistant Professor, Department of Mechanical Engineering, delivered a technical talk on "Failure and Deformation Mechanism" for the mechanical engineering students of Stella Mary's College of Engineering on 11th November 2022.

Industrial Visits

The second year mechanical engineering students underwent an Industrial Visit to visit the sun press industry, Madurai and wind generating station, Kayathar on 21/10/2022 to correlating ideas based on their subject. Mr. Tittu George, Mr. J. Gnana Rajan, Mr. Maria Jebin M, Mr. Jehan were accompanied with the students.

The third-year mechanical engineering students embarked on an industrial visit to Sun Press Industry, Madurai, and the Wind Generating Station, Kayathar, on 3rd November 2022. The visit was organized to provide the students with practical exposure and help them correlate theoretical concepts learned in the classroom with real-time industrial applications.

Sun Press Industry, Madurai, specializes in manufacturing and supplying a variety of press components and assemblies, offering students an opportunity to observe the functioning of advanced machinery and understand the intricacies of press operations, material processing, and quality control techniques.

At the Wind Generating Station, Kayathar, students explored the process of wind energy conversion, focusing on turbine operation, power generation, and the technical aspects of wind energy systems. This visit enabled them to gain valuable insights into renewable energy technologies and their significance in the current energy landscape.

The students were accompanied and guided by Mr. Tittu George and Mr. Anitto Joe Xavier, who provided detailed explanations and facilitated

meaningful discussions, enhancing the students' understanding of industrial practices and technological advancements.

Product Development

A team of three final-year mechanical engineering students, under the guidance of Dr. Ananth Raj Kumar, Assistant Professor, Department of Mechanical Engineering, successfully developed an innovative three-wheel electric vehicle (EV) designed to enhance mobility within large infrastructure environments.

The project aimed to create an eco-friendly and efficient mode of transportation to address the challenges of navigating through expansive indoor spaces. The three-wheel electric vehicle was designed with a compact and lightweight structure, ensuring ease of maneuverability in confined areas.

Their efforts not only addressed practical transportation challenges but also aligned with the global push towards green technology and eco-friendly mobility solutions.