Vol-7

ISSUE 1-2024

Dr. M.G.R.
EDUCATIONAL AND RESEARCH INSTITUTE
DEEMED TO BE UNIVERSITY

University with Graded Autonomy Status

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Periyar E.V.R. High Road, Maduravoyal, Chennai-95. Tamilnadu, India.

FACULTY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING

Vol:7 ISSUE 1-2024

HOD-DESK

MESSAGE

by,
Dr.K.RAJAN,
HOD/Mech Engg.

HOD message:

Greetings!

I am delighted that Dr. MGR University has provided us with the opportunity and vision to support the release of the Newsletter series throughout all quarters of each academic year. This platform serves as a vital forum for connecting with all stakeholders, fostering communication, and celebrating achievements.

I am especially pleased to see our department releasing the Newsletter for the period of January 2024 to March 2024. Wishing for many more successful editions ahead and an enriching reading experience for all!

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MESSAGE

It gives us immense pleasure to be an integral part of this Newsletter—a dynamic and impactful medium of communication designed to meet the needs of our time. It serves as a bridge, delivering key messages, highlighting significant events, and celebrating achievements with all stakeholders. More than just a publication, it plays a crucial role in strengthening the bond among faculty, alumni, and students, fostering a true sense of belonging.

Life doesn't offer rewinds, only flashbacks. Our accomplished alumni, with their vast experience and expertise, serve as an inspiration to current students, guiding them through insightful talks and newsletters, creating a continuous cycle of learning and growth.

We believe our efforts will be truly meaningful when these articles not only inform but also ignite inspiration, encouraging you to contribute even more in future editions. Let's continue this journey of knowledge sharing, collaboration, and innovation together in 2024 and beyond!

EDITORIAL BOARD


REAL

Vol:7 ISSUE 1-2024

ACTION CORNER

SNIPPETS FROM PALS AND OUR UNIVERSITY

JANUARY TO MARCH			
DATE	**EVENT TITLE**	**SPEAKERS**	**EVENT COORDINATE**
15February, 2024	ISR Activity on "Engaging Voter Education Workshop: Inspiring Responsible	A.Manojbabu, Deputy HOD of Mechanical Department, Dr.M.G.R Educational and Research Institute, Chennai	
28 February,2024	Subject Lecture on Engineering Economics Industrial Management	Dr.K.R.Vijaya Kumar Associate Professor, Dr.M.G.R Educational & Research Institute	
22 February,2024	Professional Society Talk on Networking for Success	Dr.S.Gopalakrishnan CEO Active galaxy	
6 February 2024	Subject Lecture on Heat and Mass Transfer	P.Ravichandra Ganesh Dr.M.G.R Educational and Research Institute	

PALS: FEBRUARY

EVENT: PALS INDUSTRY ASSISTED LECTURE - UNMANNED AERIAL VEHICLE (UAV) AND AGRICULTURE SPEAKER: PRANJAL TRIPATHI DATE: 22.02.2024 VENUE: ZOOM

On 22nd February 2024, PALS hosted an Industry-Assisted Lecture on the topic "Unmanned Aerial Vehicle (UAV) and Agriculture." The session was delivered by Pranjal Tripathi, UAV Technical Engineer at AirMPvt. Ltd. The lecture provided valuable insights into the role of UAVs in modern agriculture, discussing their applications in crop monitoring, precision farming, and improving agricultural productivity through cutting-edge technology.

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ARTICLES CORNER

Recent research projects by students and faculty

By,
Mr. Andrew Nallayan,
Asst. Professor/ Mech Engineering.

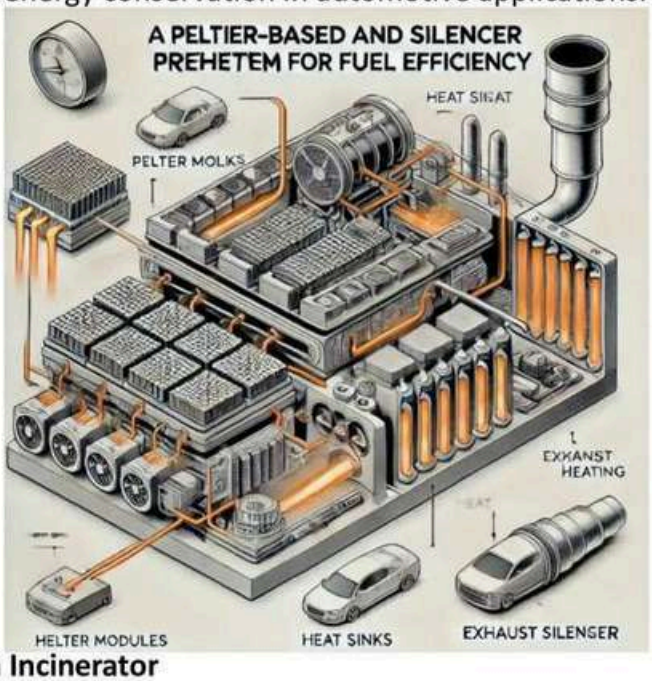
Research and innovation are the driving forces behind academic excellence. Universities and institutions worldwide are constantly engaging students and faculty members in groundbreaking research projects that aim to address real-world challenges and push the boundaries of knowledge. Here is an overview of some of the most recent research projects undertaken by students and faculty in various fields.

1. Smart Helmet with Accident Detection

With road safety being a major concern, a team of students and faculty members has developed a smart helmet that incorporates accident detection and emergency response features. The helmet is equipped with sensors to detect sudden impacts and fall detection mechanisms. It automatically sends alerts to emergency contacts with the rider's location in case of an accident. This project aims to reduce fatalities caused by delayed medical assistance.

2. Peltier-Based and Silencer Preheating for Fuel Efficiency

In response to the growing demand for fuel efficiency, researchers have designed a hybrid system integrating Peltier modules and silencer preheating to optimize fuel combustion. The system harnesses waste heat from the engine, improving fuel efficiency and reducing emissions. This project holds promise for enhancing energy conservation in automotive applications.



3. Domestic Sanitary Napkin Incinerator

Sanitary waste disposal remains a critical issue, particularly in rural and urban settings. A research team has developed a compact and efficient sanitary napkin incinerator. This device ensures hygienic disposal by burning napkins at high temperatures with minimal smoke emission. The incinerator is designed to be cost-effective and eco-friendly, making it an ideal solution for households and public restrooms.

4. Solar-Powered Waste Plastic Collector and Oil Skimmer

To combat water pollution, researchers have engineered a solar-powered waste plastic collector integrated with a drum-type oil skimmer. The system effectively removes floating plastic waste and oil spills from water bodies. This initiative aligns with environmental sustainability goals and provides a practical solution for preserving aquatic ecosystems.

5. Automated Plastic Sorting and Crushing Machine

A team of students and faculty has devised a three-in-one system for waste plastic management. This machine automates the collection, crushing, and sorting of plastic waste. Unlike traditional methods, this system does not rely on Arduino or Raspberry Pi, making it more accessible for cost-conscious industries. The technology enhances recycling efficiency and promotes sustainable waste management.

6. Waste Heat Recovery for Power Generation and Refrigeration

To utilize the untapped energy from internal combustion engines, researchers have proposed a system that converts waste heat into electricity while also providing refrigeration. The project employs thermoelectric generators and absorption refrigeration principles to enhance energy efficiency in industrial applications and transportation.

7. Disc Brake Failure Detection and Automatic Ignition Cut-off

Vehicle safety is a top priority, and to enhance it, a research team has developed a disc brake failure detection system. The system continuously monitors brake performance and automatically cuts off engine ignition in case of a critical failure. This innovation prevents accidents caused by brake malfunctions, ensuring safer roads.

Conclusion

The research projects undertaken by students and faculty members are addressing some of the most pressing global challenges. From automotive advancements to environmental sustainability, these innovations demonstrate the power of academic research in shaping a better future. With continued support and funding, such initiatives can lead to transformative changes in society.

Breakthroughs in Healthcare and Biotechnology: Transforming the Future of Medicine

Dr. Ashok Kumar, Professor MECHANICAL ENGINEERING

The fields of healthcare and biotechnology have seen remarkable advancements in recent years, leading to groundbreaking innovations that are revolutionizing patient care, disease treatment, and medical research. These breakthroughs have the potential to extend human lifespan, enhance the quality of life, and address previously incurable conditions. Here are some of the most significant developments in these fields.

1. Gene Editing and CRISPR Technology

CRISPR-Cas9 has emerged as one of the most powerful tools in genetic engineering, allowing scientists to edit DNA with unprecedented precision. This technology holds promise for treating genetic disorders such as sickle cell anemia, cystic fibrosis, and even some forms of cancer. Recent advancements have also introduced base editing and prime editing, which offer more precise modifications with reduced risks of unintended mutations.

2. Personalized Medicine

Advances in genomics and biotechnology have paved the way for personalized medicine, where treatments are tailored to an individual's genetic makeup. This approach enhances the effectiveness of therapies, particularly in oncology, by identifying specific mutations in tumors and designing targeted drugs to combat them. Precision medicine is also being explored for conditions like Alzheimer's disease and autoimmune disorders.

3. mRNA Vaccines and Therapies

The rapid development of mRNA-based COVID-19 vaccines demonstrated the potential of this technology to revolutionize immunization. Beyond infectious diseases, mRNA therapies are now being explored for cancer treatment, autoimmune diseases, and even genetic disorders. Researchers are working on mRNA-based vaccines for diseases like HIV and malaria, which could drastically reduce global health burdens.

4. Artificial Intelligence in Healthcare

Artificial intelligence (AI) is transforming healthcare by improving diagnostics, drug discovery, and patient care. AI-powered algorithms can analyze medical images, detect early signs of diseases, and assist in surgical procedures. Moreover, machine learning models are being used to accelerate drug discovery, reducing the time required to develop new treatments.

5. Regenerative Medicine and Stem Cell Therapy

Stem cell research has opened new avenues for regenerative medicine, allowing scientists to develop therapies for degenerative diseases such as Parkinson's, diabetes, and spinal cord injuries. Induced

pluripotent stem cells (iPSCs) can be reprogrammed from a patient's own cells, reducing the risk of immune rejection. Tissue engineering and 3D bioprinting are also contributing to the development of lab-grown organs for transplantation.

6. Wearable Health Technologies

The integration of wearable devices in healthcare is enabling continuous health monitoring. Smartwatches and fitness trackers equipped with biosensors can detect irregular heart rhythms, monitor glucose levels, and even predict potential health risks. These devices empower individuals to take proactive steps toward their well-being and provide real-time data for healthcare providers.

7. Nanotechnology in Medicine

Nanomedicine is playing a crucial role in targeted drug delivery, enabling more efficient treatments with fewer side effects. Nanoparticles can be engineered to deliver drugs directly to cancer cells, minimizing damage to healthy tissues. Additionally, nanotechnology is being explored for early disease detection and improving imaging techniques.

8. Bioprinting and Organ Transplantation

3D bioprinting is revolutionizing the field of organ transplantation by enabling the fabrication of artificial tissues and organs. Scientists are developing bioprinted skin, blood vessels, and even functional heart tissues. This technology could eventually address the shortage of organ donors and eliminate transplant rejection issues.

9. Robotics in Surgery

Robotic-assisted surgeries, such as those performed using the da Vinci Surgical System, are enhancing precision and reducing recovery times. These systems allow surgeons to perform minimally invasive procedures with enhanced dexterity and control, leading to improved patient outcomes.

10. Gut Microbiome Research

The human gut microbiome plays a critical role in overall health, influencing digestion, immunity, and even mental health. Recent studies have linked gut bacteria imbalances to conditions such as obesity, diabetes, and depression. Probiotic and prebiotic therapies, as well as fecal microbiota transplants (FMT), are being explored to restore gut health and treat various disorders.

Conclusion

The rapid pace of innovation in healthcare and biotechnology is ushering in a new era of medical advancements. From gene editing and personalized medicine to AI-driven diagnostics and regenerative therapies, these breakthroughs are transforming the way we prevent, diagnose, and treat diseases. As research continues to evolve, the future of medicine holds the promise of longer, healthier lives for individuals worldwide.

The Evolution of Tech and Gadget Reviews: A Consumer's Guide

By: Aravinth.V,

3rd Yr, Mechanical Engg.

Introduction

In today's fast-paced world of technological advancements, staying updated with the latest gadgets is crucial. From smartphones to smart home devices, wearable technology to gaming gear, consumers rely heavily on reviews before making a purchase. This article explores the importance of tech and gadget reviews, what makes a review reliable, and how to distinguish between genuine and biased opinions.

The Importance of Tech and Gadget Reviews

Tech and gadget reviews serve as a bridge between manufacturers and consumers. With countless options available, users need expert opinions to make informed decisions. Reviews help in:

- **Understanding Features:** Detailed reviews break down complex specifications into understandable insights.
- **Comparing Products:** Side-by-side comparisons highlight pros and cons, assisting in decision-making.
- **Identifying Value for Money:** Reviews guide users in determining whether a gadget is worth its price.
- **Recognizing Potential Issues:** Expert reviewers often identify hidden flaws that may not be evident in promotional materials.

Characteristics of a Reliable Review

Not all reviews are created equal. A trustworthy review should have the following attributes:

- **Unbiased Opinions:** Reviews should be based on actual testing rather than promotional incentives.
- **Hands-on Experience:** A credible reviewer should have used the product extensively before sharing insights.
- **Comprehensive Testing:** Performance, durability, usability, and battery life (for electronics) should be evaluated.
- **Transparency:** Clear disclosure of sponsorships or affiliations ensures credibility.

The Rise of Influencers in Tech Reviews

With the growth of digital media, influencers play a significant role in gadget reviews. Platforms like YouTube, TikTok, and Instagram have revolutionized how consumers receive information. While influencers provide engaging content, it's crucial to differentiate between genuine insights and sponsored promotions.

How to Spot Fake or Biased Reviews

- **Overly Positive Reviews:** If a review lacks any criticism, it may be biased.
- **Lack of Technical Details:** A reliable review should cover specifications, real-world usage, and comparison.
- **No Negative User Experiences:** Checking user comments and forums can validate a product's performance.
- **Repetitive Language:** Multiple reviews with identical wording may indicate fake endorsements.

Conclusion

Tech and gadget reviews are indispensable in today's market, ensuring consumers make informed choices. By recognizing the hallmarks of a reliable review and staying cautious of biases, users can confidently invest in technology that suits their needs. Whether from professional reviewers or influencers, a well-researched approach ensures a worthwhile purchase.

INSPIRING PAPER CRAFT - A HOBBY

by, N.V.Parimala Sowmyaa, 3rd Yr, Mechanical Engg.

There's something uniquely satisfying about the humble old newspaper. Whether I'm lost in thought, watching TV, or simply feeling blue, my hands instinctively reach for its crisp pages—rolling, folding, and shaping them into miniature works of art. This readily available material, so effortlessly moulded into the smallest shapes or rolled into the finest cylinders, has become my favourite medium for crafting.

Origami—the timeless art of folding a single sheet of paper into intricate figures—has always fascinated me. With nothing more than imagination, we can transform an ordinary page into an infinite array of forms, breathing life into something so simple yet so full of potential. The possibilities are endless, limited only by our creativity.

Like many, I started my journey with the classic paper boat, but my curiosity soon led me further. I began crafting small gifts—delicate butterflies, intricate dino baskets, and pop-up cards—all made from carefully folded paper rolls. The best part? Witnessing the joy and surprise on the faces of those who received them, especially my mom, who was always my first audience and biggest supporter!

Recently, I've moved beyond simple folds to more structured paper roll sculptures. One of my proudest creations is a fully crafted dining table made entirely from rolled newspaper tubes. I've also experimented with lamp shades, elegant flower vases, and even an outdoor swing—each piece a testament to the beauty, versatility, and resilience of paper. The process is both meditative and rewarding, proving that with a little patience, an eye for detail, and a spark of imagination, paper crafting can yield remarkable creations—all at little to no cost.

I look forward to sharing more of my work, techniques, and creative journey in future issues. If you, too, find joy in shaping paper into something extraordinary, then let's embark on this artistic adventure together!

Success Story of Elon Musk

by, Hari Krishnan D, 3rd Yr, Mechanical Engg

The Success Story of Shiv Nadar: The Visionary Behind HCL

Humble Beginnings

Shiv Nadar, the founder of HCL Technologies, is one of India's most influential billionaires. Born in 1945 in a small village in Tamil Nadu, India, Nadar had a modest upbringing. His early education took place in local schools before he pursued an electrical and electronics engineering degree from PSG College of Technology.

Despite his humble beginnings, he had a grand vision: to revolutionize the Indian technology sector.

The Birth of HCL

In the mid-1970s, India's IT industry was still in its infancy. Nadar, along with a few colleagues, decided to take a leap of faith and establish a tech company. With an initial investment of just ₹187,000 (around $2,500 at the time), they founded Hindustan Computers Limited (HCL) in 1976.

Their goal? To build computers in India at a time when the country relied heavily on imports. HCL started by manufacturing microcomputers, becoming one of the pioneers of the Indian IT industry.

Challenges and Breakthroughs

In the early years, HCL faced significant challenges, including a lack of infrastructure and resistance to technological advancements in India. However, Nadar's strategic foresight led the company to explore global markets.

By the 1980s, HCL was expanding beyond India, tapping into Singapore and other international markets. In the 1990s, as the IT boom accelerated, HCL transitioned into software services, laying the foundation for what would become HCL Technologies—one of the world's largest IT services firms.

HCL's Rise to Global Success

Today, HCL Technologies is a multi-billion-dollar IT services powerhouse, operating in over 50 countries with more than 200,000 employees. Under Nadar's leadership, the company has been at the forefront of digital transformation, AI, cloud computing, and cybersecurity.

His ability to pivot the business model—from hardware to IT services—played a crucial role in HCL's growth. This adaptability has been a key lesson for aspiring entrepreneurs worldwide.

A Legacy Beyond Business

Beyond his business empire, Shiv Nadar is also a noted philanthropist. In 1994, he founded the Shiv Nadar Foundation, which focuses on education and social development. He has donated billions toward building world-class educational institutions, such as the Shiv Nadar University, empowering the next generation of innovators.

Conclusion

Shiv Nadar's journey from a small-town boy to a billionaire tech entrepreneur is a testament to vision, perseverance, and adaptability. His success story proves that with the right mindset and relentless pursuit of excellence, anyone can transform an idea into a global legacy.

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ALUMNI CORNER

My college journey

BY, SATYA BRATA

Mechanical Engineering

May 2008 - December 2011

My College Journey at Dr. MGR University: A Story of Growth, Friendships, and Success

College isn't just about lectures, assignments, and exams—it's a life-changing experience that shapes who we become. My time at Dr. MGR University (May 2008 – December 2011) was an incredible rollercoaster of emotions, learning, and unforgettable memories. From the nervous first day to the thrill of landing my first job, every moment was a mix of challenges, discoveries, and personal growth. Looking back, these years were not just about earning a degree but about building confidence, making lifelong friends, and finding my true path.

The Beginning: A New Chapter in Life

I still remember stepping through the gates of Dr. MGR University on my first day—excited, nervous, and clueless about what lay ahead. Coming from school, where everything was structured and familiar, college felt like an entirely different world. The campus was buzzing with students from different backgrounds, all carrying their own dreams and ambitions.

Figuring out my way around the massive buildings, lecture halls, and canteens was both thrilling and overwhelming. But soon, I realized that college wasn't just about academics—it was about making connections, stepping out of my comfort zone, and shaping myself for the future.

First-Year Challenges and Growth

The first year was a wake-up call. Managing my schedule, adapting to university-level studies, and making new friends wasn't as easy as I had imagined. Balancing lectures, assignments, and personal time was tough, and there were days when I felt completely lost.

Academically, the subjects were intense, pushing me to think differently. I spent long hours in the library, joined study groups, and slowly got the hang of things. Group projects and late-night exam revisions taught me teamwork, discipline, and perseverance. Even though it was challenging, the sense of accomplishment after each semester kept me going.

Beyond Books: Discovering Passion in Extracurricular Activities

College life wasn't just about textbooks—it was also about exploring new interests and finding what truly excited me. Extracurricular activities became a huge part of my journey, making my college life way more fun and meaningful.

• Joining the Society of Mechanical Engineering helped me understand real-world applications of my studies, attend workshops, and meet industry experts. • Being part of the Event Management Club taught me leadership and organizational skills as we planned and executed college events. • Volunteering for community service projects gave me a sense of fulfilment, reminding me of the importance of giving back to society.

Through these activities, I made amazing friends, built my confidence, and developed skills that would later help me in my career.

Memorable Moments and Achievements

One of the best experiences of my college life was participating in a national-level technical competition, where my team worked day and night to build an innovative project. The effort paid off when we secured second place, making all those sleepless nights worth it!

Another proud moment was presenting my research paper at a student conference. Standing on stage, explaining my ideas, and getting recognition from professors and peers was a confidence booster. These achievements weren't just about winning but about proving to myself that I could push my limits and succeed.

The Final Year: The Road to Success

By the time my final year (2011) arrived, I was filled with mixed emotions—excitement for the future but also sadness knowing that my college journey was coming to an end. The pressure was real, with final projects, internships, and, of course, the much-anticipated campus placements.

The placement season was intense. I remember the nervousness before interviews and the endless preparations with my friends. Then came the best moment—getting the offer letter from a top energy company! That feeling of joy, relief, and pride was indescribable. After years of hard work and struggles, this was the moment I had been waiting for.

Gratitude and Looking Ahead

As I stepped into the corporate world in December 2011, I realized how much I had grown during these years. I wouldn't have made it without:

• My professors, whose guidance and encouragement shaped my knowledge and confidence. • My family and friends, who stood by me through all the ups and downs. • Dr.

MGR University, which gave me the platform to learn, explore, and become the person I am today.

College was more than just an education—it was a journey of self-discovery, filled with laughter, challenges, and unforgettable moments. As I move forward, I take with me the values, lessons, and friendships that will always remind me of my time at Dr. MGR University—a place that didn't just prepare me for a career but helped me find my purpose.

PUBLICATIONS

STAFF PUBLICATIONS JAN-MAR 2024

1. PROCEEDINGS OF THE FOURTH INTERNATIONAL CONFERENCE ON ADVANCES IN MANUFACTURING TECHNOLOGY

Preface: Fourth International Conference on Advances in Manufacturing Technology

250 participants pre-registered for the conference representing approximately 50 academic and research institutes across India. Around 60 participants disseminated their findings during 3 parallel sessions held on 25th & 26th March 2022 within the framework of ICAMT 2022. The articles in the proceedings are accepted after a double-blind peer review process.

Finally, we express our gratitude to the contributors of the proceedings, speakers, participants, delegates, and all the internal committee members for their support in the conduction of the event.

Karthikeyan Rajagopal, M.D.Vijayakumar, Kumaresan and Siva Shanmugam
Editor
Proceedings of ICAMT 2022

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PORT INJECTION OF DIESEL, BIODIESEL, AND PETROL IN A COMPRESSION IGNITION DIRECT INJECTION DIESEL ENGINE TO MITIGATE NITROGEN OXIDES AND SOOT EMISSIONS

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ABSTRACT

The internal combustion engine is critical to modern society's development. Spark ignition engine (SI) and compression ignition engine (CI) now use gasoline and diesel as their primary fuels. As a result of burning these fuels, significant amounts of pollutants are released into the atmosphere, resulting in environmental issues. Internal combustion (IC) engines are widely acknowledged as a significant source of environmental air pollution. The engine's fuel oxidation process not only produces useful power, but also produces significant amounts of pollutant emissions such as carbon monoxide (CO), unburned hydrocarbons (HC), nitrogen oxide (NO_x), and particulate matter (PM). When developing a new combustion process, consideration must be given to: lean homogeneous air-fuel mixture, increased compression ratio, and total and instantaneous combustion, all of which result in Port Injection Compression Ignition (PICI), that is a highly efficient and clean method of combustion. The goal of this research is to conduct an experimental investigation of PICI process of compression in a Premixed Charge Compression Ignition (PCCI) mode with Pilot Injection (PI) as the combustion activator. It was found that when compared to the conventional mode, the PICI mode produces cooler exhaust gas temperatures. Temperatures were lower in the PICI mode with biodiesel and petrol as secondary and primary fuels than in the PICI mode with other fuel combinations. In the PICI mode, the HC emission decreases at higher load with all fuels. In the biodiesel conventional mode, HC emission is minimum

OTHER EVENTS IN OUR UNIVERSITY