MECHONS'24

2024 Edition

DMI COLLEGE OF ENGINEERING

DMI

FULLY HUMAN

CHENNAI

Annual Magazine
Department of
Mechanical Engineering

VISION OF THE DEPARTMENT

To produce mechanical engineering graduates with high standards, and making them as committed professionals with ethical values.

MISSION OF THE DEPARTMENT

DM1: To impart quality technical education and to compete successfully in today's Industrial requirements.

DM2: To develop the professional potential that leads to pursue research and higher studies.

DM3: To improve and sustain the professional behaviour and ethical values.

PROGRAM EDUCATIONAL OBJECTIVES

PEO I: Employability Skills:

To prepare the students with strong foundation in Science, Mathematics and Engineering according to industrial needs so as to enable them to have successful career in core and interdisciplinary industries.

PEO II: Research and Higher Studies:

To provide the opportunities on research and development, promote higher education and zeal for life-long learning.

PEO III: Entrepreneurship:

To develop awareness on entrepreneurship and start-ups in order to succeed in social, technical and business challenges.

PEO IV: Ethical Values:

To promote the graduates inculcate with ethical values in professional practices.

PROGRAM SPECIFIC OUTCOMES

At the end of this program, graduate will be able to:

PSO I: Design and Manufacturing Skills:

Apply the knowledge of design and analysis, manufacturing and quality assurance in the field of automotive manufacturing, mechatronics and robotics.

PSO II: Problem Solving Abilities:

Apply the knowledge acquired in the domains of thermal, fluid and solid mechanics to solve the problems related to their equipment and evaluating the performance.

PSO III: Managerial Skills:

Apply the managerial skills to work effectively in a team and in a society by following ethical and environmental practices.

PROGRAM OUTCOMES

PO1: Engineering Knowledge:

Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis:

Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/Development of Solutions:

Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct Investigations of Complex Problems:

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage:

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and

modeling to complex engineering activities with an understanding of the limitations.

PO6: Engineer and Society:

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and Sustainability:

Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics:

Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team Work:

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication:

Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project Management and Finance:

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-Long Learning:

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

TABLE OF CONTENTS

CHAIRMAN MESSAGE

Wishes From the Founder

Dear Friends,

DMI and MMI are Congregations of Catholic Religious Sisters and Priests known for their service to humanity in many parts of the world.

Self respect through Self sustenance, Self sustenance through Capacity building, Capacity building through knowledge based technical skills, knowledge based technical skill towards respectable employment, and respectable employment towards the realization of one's ability to market one's own ideas, skills and products is our vision for those whom we serve.

To groom well disciplined, humanly motivated, intellectually enlightened, technically oriented citizens with stamina built in to face the changing world and a committed and strong spiritual base is our goal.

All our educational and developmental services are oriented towards this goal which is to be achieved through the collective effort of consecrated Religious, committed collaborators, dedicated staff, receptive students and all others concerned.

We pray and hope that every person who passes through our hands is nourished and enriched in every way, not only to face the future but also to shape his or her own future and that of our country and the universe.

May God bless you!

Rev. Fr. Dr. J. E. Arul Raj
Founder and Chairman

CORRESPONDENT MESSAGE

Greetings !

DMICE is a warm and welcoming learning community, committed to creating the best possible educational experience for every Student. We aim to enable all students to reach their full potential.

We have a talented, dedicated, caring team of staff, each of whom works very hard to ensure that the abilities of the Students in our care are nurtured and carefully developed. Our Faculty and teaching assistants are experienced, and work as a team to make the College a very special place, every day, for your child.

At DMICE we aim to provide a broad, well balanced and relevant curriculum. We encourage positive social behavior, emphasizing respect for others. We believe that every Student has the right to work in a calm, orderly, safe and secure environment. We value every student and have the highest possible expectations in the areas of achievement and behavior. DMICE provides a stimulating and enriched environment so that the students can enjoy all aspects of their learning. We value regular contact with parents/ guardians, and regard the home- school partnership as an essential part of the education process. We are always looking for new ways to involve parents in the life of the school and to keep them informed of the things we are doing.

Wishing you all the very best ……..

Rev.Sr.M.K. TERESA, M.A., M.Phil.,
Coresspondent,
DMICE

ADMINISTRATOR MESSAGE

Blessings to All,

"Now a days human learning process has been passing through tremendous changes. Changes can be seen as evolutionary and dynamic with an emphasis on continuous learning and adaptation".

DMICE has a good reputation in the field of education around CHENNAI and nearby places . This center of learning concentrates on overall development of the students and to connect them to the rest of the world. Our aim is to help the students to develop their potential academically, socially, emotionally, physically, morally, spiritually and aesthetically.

We create a challenging learning environment that encourages high expectations for success. Our college promotes a safe, clean,calm,orderly, caring and supportive environment free from all distractions of the city. We are providing all academic excellence with very good laboratory and library.

Students are encouraged to meet all the challenges with openness, enthusiasm and capacity to force and solve problems . The staff of the college is well qualified , experienced and committed. We welcome all students who are looking forward for their bright future.

Rev.Sr.B.Hamlet
Administrator
DMICE

PRINCIPAL MESSAGE

Dear Readers,

The success story of any Institution or any individual is a gradual growth of every single step that is kept that makes a giant leap of achievement….

To watch the graph ascend really makes me privileged…

'Catch them young' is a popular phrase that emphasizes that right education should be given at the right time to make a living…

Education is an investment that would give returns in proportion to the value added….DMI believes in value based education of high standard in order to ensure that every product of DMI is well organized by the industry. We not only groom our students to become excellent engineers but also equip with interpersonal skills to work in corporate and companies…

The responsibility that is taken by the Staff members to every individual student is fruitful. They are the second parents who care and share for the wellbeing of the student community…

A spark makes a flame…

A flame lights a candle…

A candle enlightens many …

A flame flames into a blaze ..

A blaze ends a forest fire…

DMI kindles the sparks of knowledge and spreads its name and fame for years to come…

Dr.N.AZHAGESAN, M.Tech, Ph.D,
Principal,
DMI College of Engineering

HOD MESSAGE

Dear Readers,

It gives me immense pleasure to pen a few words for *MECHONS-23*, the official magazine of the Department of Mechanical Engineering. This platform reflects the vibrant academic and co-curricular culture of our department and showcases the remarkable achievements of our students and faculty.

Mechanical Engineering, being one of the oldest and most versatile branches of engineering, continues to evolve with the rapid advancements in technology. From traditional core sectors to cutting-edge innovations in robotics, additive manufacturing, renewable energy, and AI-integrated systems, our department is committed to nurturing engineers who are not only technically sound but also ethically grounded and socially responsible.

Over the past months, our students and faculty have demonstrated excellence through research publications, participation in national-level competitions, industrial collaborations, and community outreach. Their dedication and hard work make us proud and reaffirm our mission of fostering holistic development.

I congratulate the editorial team of *MEVOLUTION* for their efforts in bringing out this edition. I encourage all readers to actively engage with the newsletter, contribute their ideas, and stay connected with the ever-evolving world of Mechanical Engineering.

Let us continue to innovate, inspire, and transform the future—together.

Warm regards,

Dr. A Amala Mithin Minther Singh M.E., MBA., Ph.D.
Head of the Department
Mechanical Engineering

ABOUT THE DEPARTMENT

The Department of Mechanical Engineering is established as a full-fledged department offering B.E course from the year 2009 with an intake of 60 and in the year 2012 intake has been increased to 120 and from 2014 onwards the intake is 180 students.

The Department has excellent infrastructure facilities in keeping with latest trends and requirements and well reputed faculty members. It aims at preparing the students to face the challenge of the materially-conscious and technologically fast-developing world. It means to transform the students into young engineers with sound technical knowledge, leadership skills and decision-making abilities. This preparation results from the discipline and commitment of the students, leadership of the management and distinction of the faculty.

The Department periodically conducts Guest lectures, Industrial visits, Symposiums, Seminars etc. through its parent body **"Association of Radiant Mechanical Youngsters (ARMY)"** for the benefit of students. The efforts of our committed faculty members are really towards producing the students with excellence in knowledge and character. The department periodically organizes conferences,

FDPs, workshops, hands-on training and value added courses in coordination with AICTE, ISTE, Anna University, SAE, TEDA and reputed industries etc., for the benefit of both the academic and industrial community.

The department has recently installed 3D Printing Facility which is a recent technology in manufacturing. Ours is one among few colleges which is having such a facility.

Industrial visits and internships are arranged every year for the benefit of our students in some of the following industries.

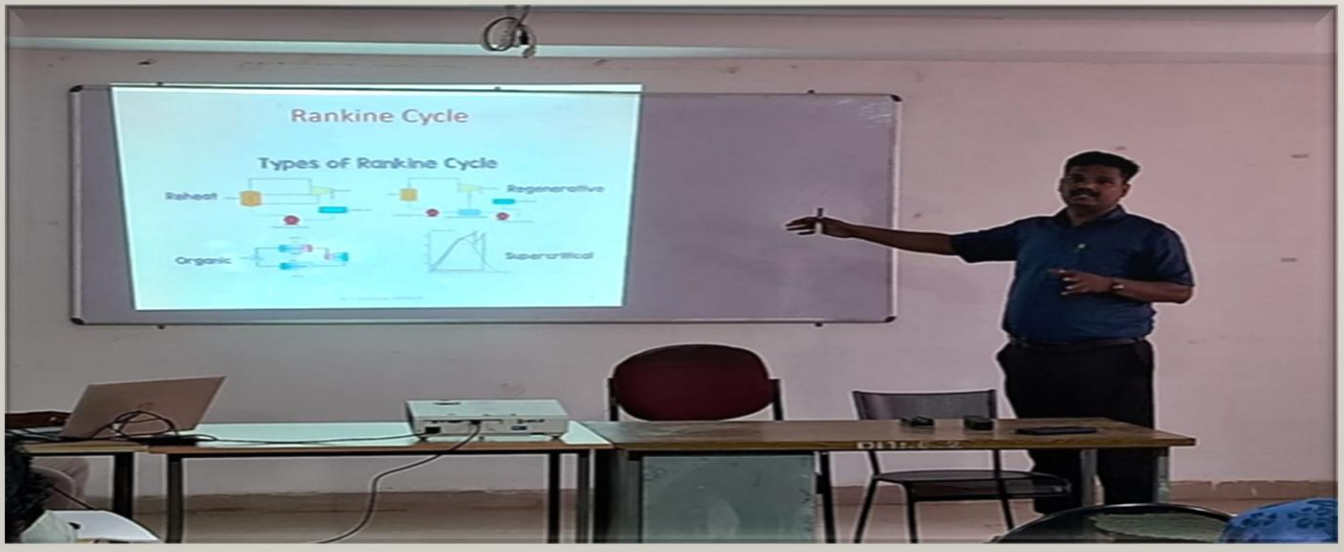
- Mitsubishi heavy Industries Ltd, Ranipet.
- Hinduja Foundries
- Chennai Fort Trust
- North Chennai Power Plant
- Delphi TVS
- Rane TRW
- Brakes India and etc.

Our Students are placed in reputed industries every year through on and off campus placement drives, some of the core companies are,

- Hero Motors
- Mercury fittings
- SMR Industry
- Veltech Industries
- Indian Navy
- Boston India Pvt Ltd
- Avalon Technologies
- Petrofac
- Maruti Suzuki
- L&T
- Hyundai and etc.

DEPARTMENT ACTIVITIES

GUEST LECTURE ON NON TRADITIONAL MACHINING PROCESS



The Department of Mechanical Engineering at DMI College of Engineering organized a highly insightful **Guest Lecture on "Non-Traditional Machining Process"** on **30th November 2023**. The session was conducted by the distinguished resource person, **Dr. P. Arul Franco, Associate Professor, Department of Mechanical Engineering, University College of Engineering, Nagercoil**.

The lecture began with a warm welcome address by the faculty coordinators and an introduction of the resource person. Dr. Franco shared his vast knowledge and experience in the field of manufacturing and machining technologies. He emphasized the growing importance of non-traditional machining methods in modern industries where conventional machining techniques often face limitations in terms of precision, material hardness, and complex geometrical requirements.

The session covered various non-traditional machining processes such as **Electrical Discharge Machining (EDM), Laser Beam Machining (LBM), Ultrasonic Machining (USM), Electrochemical Machining (ECM), and Water Jet Machining (WJM)**. Each process was explained with its working principle, advantages, limitations, and industrial applications. Special emphasis was placed on the role of these processes in aerospace, medical, automotive, and defense industries where advanced materials like superalloys, ceramics, and composites are widely used.

Students actively participated by asking questions related to the feasibility, cost-effectiveness, and future scope of these technologies. Dr. Franco also highlighted the significance of research and innovation in machining processes to meet the demands of next-generation manufacturing.

The lecture concluded with a vote of thanks, expressing gratitude to the resource person, management, and faculty for organizing this enriching session. Overall, the guest lecture served as an excellent knowledge-sharing platform, motivating students to explore the vast potential of non-traditional machining in their academic and professional pursuits.

GUEST LECTURE ON MECHATRONICS

The **Department of Mechanical Engineering, DMI College of Engineering**, successfully organized a **Guest Lecture on "Mechatronics"** on **6th November 2023 at 9:30 AM**. The session was delivered by the esteemed resource person, **Dr. G. R. Jinu, Assistant Professor, Department of Mechanical Engineering, University College of Engineering, Nagercoil**.

The event commenced with a welcome note, followed by the introduction of the speaker. Dr. Jinu began his lecture by explaining the fundamentals of **Mechatronics**, which integrates mechanical engineering, electronics, computer science, and control systems to design and develop smart systems and advanced products. He emphasized the interdisciplinary nature of the field and its growing significance in modern industries.

The lecture highlighted key applications of mechatronics in areas such as **automation, robotics, manufacturing, biomedical engineering, and intelligent systems**. Dr. Jinu provided practical insights into the role of sensors, actuators, microcontrollers, and control algorithms in developing efficient and intelligent machines. He also illustrated real-world examples, including robotics, CNC machines, autonomous vehicles, and smart appliances, to make the session highly relatable and engaging for students.

Students actively interacted with the speaker, posing questions about career opportunities, current industrial trends, and the future of mechatronics in the era of **Industry 4.0** and **Artificial Intelligence integration**. The resource person encouraged students to embrace research, innovation, and practical learning to excel in this rapidly advancing field.

The lecture concluded with a **vote of thanks**, acknowledging the efforts of the staff coordinator **Mr. P. Saravanan**, and the guidance of **Dr. Amala Mithin Minther Singh, HOD/Mechanical**, along with the continuous support of the management. Overall, the session was highly informative and inspired students to explore interdisciplinary domains in engineering

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

This document is an announcement for a guest lecture organized by the Department of Mechanical Engineering at DMIC College of Engineering, Palanchur, Chennai. The event focuses on the topic of "Artificial Intelligence & Machine Learning," highlighting the relevance of these advanced technologies even to core engineering disciplines like Mechanical Engineering.

The lecture will be delivered by Dr. Prtga L, a Professor and Head of the Information Technology department at Rajalakshmi Engineering College. The inclusion of an external expert from an IT background suggests an interdisciplinary approach, aiming to provide mechanical engineering students with valuable insights into the applications of AI and ML.

The announcement also lists the dignitaries associated with the event, including the Correspondent, the Principal (Dr. N. Azhagesan), and the NOD/Mechanical (Mr. Pradeep E M), indicating institutional support. A staff coordinator, Dr. A. Amala Mithin Minther Singh, is named, who is likely responsible for organizing the event.

In essence, this flyer promotes an educational session designed to bridge the gap between traditional mechanical engineering and cutting-edge digital technologies. Its purpose is to inform students and faculty about this learning opportunity, underscoring the college's commitment to providing a modern and comprehensive curriculum that prepares students for evolving industry demands. The lecture aims to equip attendees with knowledge of how AI and ML are transforming the engineering landscape.

HANDS ON TRAINING ON

NEW MATERIALS FABRICATION

DMI COLLEGE OF ENGINEERING

Palanchur, Chennai - 600 123

(AN AUTONOMOUS INSTITUTION)

Department of Mechanical Engineering

Organizes

Date
22-03-2024

Hands-on Training
on

INSTITUTION'S INNOVATION COUNCIL
(Ministry of Education Initiative)

NEW MATERIALS FABRICATION

Rev.Sr.M.K. Teresa	Dr.N. Azhagesan	Dr.A.Amala Mithin	Staff Coordinators
Correspondent	Principal	HOD/Mechanical	Mr. Saravanan P Mr. Pradeep E M

A hands-on training program on "New Materials Fabrication" was successfully conducted on March 22, 2024, by the Department of Mechanical Engineering at DMI College of Engineering, Palanchur. The event was organized under the auspices of the Institution's Innovation Council (IIC), aligning with its mission to promote practical innovation and skill development among students.

The primary objective of the session was to provide participants with direct, practical exposure to advanced techniques in the fabrication and processing of new engineering materials. The training moved beyond theoretical concepts, allowing students to engage with modern methodologies that are critical in contemporary manufacturing and research sectors.

The program was held under the guidance of the Head of the Mechanical Engineering Department, Mr. Saravanan P, and was efficiently coordinated by the staff coordinators, Mr. Pradeep E M and Dr. A. Amala Mithin. Their efforts ensured the session was well-structured and impactful. The event enjoyed the full support of the institution's leadership, with Principal Dr. N. Azhagesan and Correspondent Rev. Sr. M.K. Teresa endorsing the initiative.

In conclusion, the training proved to be highly beneficial, effectively bridging the gap between academic knowledge and industrial application. It successfully enhanced the participants' technical competencies and fostered an innovative mindset, contributing meaningfully to their professional development. The session was a valuable addition to the department's efforts to provide a comprehensive and industry-relevant education

WORKSHOP ON DRONE DEVELOPMENT AND ENTREPRENEUESHIP

This document serves as a summary of the team's recent participation in a significant academic event. The team, comprising five members from the Department of Mechanical Engineering at DMI College of Engineering, successfully took part in a comprehensive two-day workshop focused on "Drone Development and Entrepreneurship." The workshop was hosted and conducted by the Department of Information Technology at the Jeppiaar Institute of Technology on March 6th and 7th, 2024.

The event provided an intensive, hands-on learning experience that combined technical instruction with business acumen. The curriculum was strategically designed to cover the end-to-end process of drone creation, from the fundamental principles of assembly and programming to the critical aspects of commercializing the technology. This dual focus equipped the team with not only the engineering skills required for drone development but also the strategic mindset needed to identify market opportunities and viable business models in the burgeoning unmanned aerial vehicle sector.

The workshop was held under the esteemed chief patronage of Dr. N. Marie Wilson and Dr. G.R. Suresh, indicating the high level of institutional support and quality associated with the program. For the five-member team, this participation represented a valuable interdisciplinary initiative, allowing mechanical engineering students to gain crucial insights from the field of information technology. The knowledge acquired is directly applicable to advanced projects and future entrepreneurial ventures, significantly enhancing the team's collective technical proficiency and innovative capacity. The certificate of participation formally acknowledges this successful engagement in a collaborative and forward-thinking educational activity.

WORKSHOP AT JAYASAKTHI ENGINEERING COLLEGE

DEPARTMENT OF MECHANICAL ENGINEERING

INDIAN SOCIETY OF MECHANICAL ENGINEERS

JAYA EDUCATIONAL TRUST INDIA

JAYA SAKTHI ENGINEERING COLLEGE

NAAC

MSME TEJAVU

CERTIFICATE

OF PARTICIPATION

SHARON RAJ.E

DMI COLLEGE OF ENGINEERING

has actively participated in the "ONE DAY WORKSHOP" titled as "3D PRINTING - "A REVOLUTIONARY TECHNOLOGY" on 03rd of November 2023, at JAYA SAKTHI ENGINEERING COLLEGE, Thiruninravur, Chennai 602024 in association with TEJAVU.

CONVENOR HOD / MECH PRINCIPAL CHAIRMAN

DEPARTMENT OF MECHANICAL ENGINEERING

INDIAN SOCIETY OF MECHANICAL ENGINEERS

JAYA EDUCATIONAL TRUST INDIA

JAYA SAKTHI ENGINEERING COLLEGE

NAAC

MSME TEJAVU

CERTIFICATE

OF PARTICIPATION

VICTOR.K

JAYA DMI ENGINEERING COLLEGE

has actively participated in the "ONE DAY WORKSHOP" titled as "3D PRINTING - "A REVOLUTIONARY TECHNOLOGY" on 03rd of November 2023, at JAYA SAKTHI ENGINEERING COLLEGE, Thiruninravur, Chennai 602024 in association with TEJAVU.

CONVENOR HOD / MECH PRINCIPAL CHAIRMAN

The Department of Mechanical Engineering facilitated the participation of its second, third, and fourth-year students in a workshop titled "3D Printing - A Revolutionary Technology." This event was hosted by Jayasakthi Engineering College in Chennai on November 3rd, 2023. The primary objective of this participation was to provide students across multiple academic levels with cutting-edge knowledge and practical exposure to additive manufacturing, a critical technology shaping the future of engineering and production.

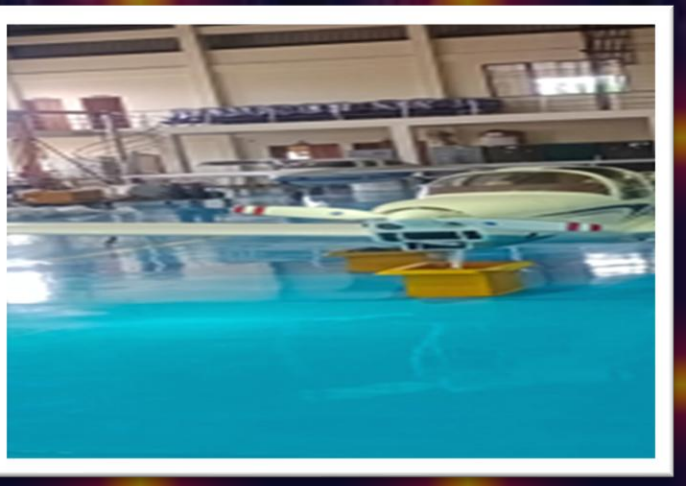
The workshop offered a comprehensive overview of 3D printing, covering its fundamental principles, various printing methodologies, and the diverse range of materials used. For the students, this was a valuable opportunity to bridge theoretical concepts learned in courses like Computer-Aided Design (CAD) and Manufacturing Technology with their real-world applications. The session likely included demonstrations and hands-on activities, allowing students to witness the transformative potential of creating complex geometries and functional prototypes directly from digital models.

Exposing students from different years to this technology served distinct yet complementary purposes: it introduced second-year students to advanced manufacturing early in their academic journey, while providing third and fourth-year students with deeper insights relevant to their projects and career aspirations. Engaging with peers and faculty from another institution also fostered a healthy exchange of ideas and perspectives.

This initiative underscores the department's commitment to ensuring its curriculum remains relevant to industry trends. By providing access to such specialized workshops, the department successfully enhanced the students' understanding of advanced manufacturing processes, equipping them with knowledge that is essential for their academic and professional development in the modern engineering landscape.

INDUSTRIAL VISIT

INDUSTIAL VISIT IN BENGALURU



The Department of Mechanical Engineering successfully organized a two-day industrial visit to Bengaluru for its third and final-year students from September 22nd to 23rd, 2023. The primary objective of this educational expedition was to provide students with practical exposure that complements their academic curriculum, bridging the gap between theoretical knowledge and industrial application.

The first day's itinerary featured a visit to the Visvesvaraya Industrial and Technological Museum. This segment of the visit aimed to instill an appreciation for the history and evolution of engineering in India. Students engaged with interactive exhibits demonstrating fundamental principles of mechanics, energy, and communication, fostering a deeper understanding of engineering concepts.

On the second day, the cohort visited the National Aerospace Laboratories (NAL), a premier center for aerospace research and development. This segment offered an invaluable insight into state-of-the-art technologies, advanced materials, and the rigorous processes involved in aerospace design and testing. It provided students with a clear perspective on the real-world challenges and innovations within a high-technology industry.

The visit was highly beneficial, achieving its goal of enhancing the students' learning experience. It effectively exposed them to both the foundational legacy of engineering and its cutting-edge frontiers. The firsthand exposure to NAL's research environment is anticipated to inspire interest in research and development careers. The institution believes such initiatives are crucial for developing a well-rounded, industry-ready graduate profile, and this visit marks a significant step in that ongoing endeavor. The program concluded fruitfully, contributing to the students' professional and academic growth.

INDUSTRIAL VISIT IN HOIST INDUSTRY

The Department of Mechanical Engineering organized a one-day industrial visit for its second-year students to Hoist Industry on November 2nd, 2023. The primary objective of this visit was to provide students early exposure to a live manufacturing environment, allowing them to connect their foundational classroom learning with practical industrial processes.

The visit served as a crucial introductory experience for the students, offering a firsthand look at core manufacturing operations. At the facility, students observed the fabrication, assembly, and quality control processes involved in the production of industrial hoists and related material handling equipment. This direct observation helped demystify theoretical concepts related to production technology, machine design, and workshop practices.

The interaction with industry professionals provided valuable insights into shop floor management, safety protocols, and the workflow within a functioning industrial unit. Students gained a practical understanding of the application of engineering principles in the design and manufacturing of heavy machinery.

This exposure is a key component of the department's strategy to build industry-academia relationships and orient students toward the practical demands of the engineering profession from an early stage in their academic journey. The visit was successfully coordinated by the department faculty and was well-received by the students, who reported a significant enhancement in their comprehension of manufacturing concepts. The initiative aligns with the institution's commitment to providing a holistic and application-oriented education, effectively bridging theoretical knowledge with real-world industrial practice.

INDUTRIAL VISIT IN COIMBATORE

The Department of Mechanical Engineering successfully organized a comprehensive three-day industrial and educational trip to Coimbatore and Ooty from April 11th to 13th, 2024. The delegation consisted of forty-five students accompanied by two faculty members, aiming to provide a multifaceted learning experience that combined advanced manufacturing exposure with insights into automotive history and agro-processing.

The itinerary was strategically designed to cover a diverse range of industries. The visit to **Laser Craft Technologies** and **Mills Tech CNC Applications** in Coimbatore provided students with invaluable, firsthand exposure to state-of-the-art manufacturing processes, including laser cutting, engraving, and advanced computer numerical control (CNC) machining. This directly complemented their curriculum in manufacturing technology and automation.

A visit to the **GD Naidu Car Museum** offered a unique perspective on the evolution of automotive engineering and innovation, celebrating the legacy of a renowned Indian inventor. To broaden the scope of industrial applications, the trip also included a visit to a **Tea and Coffee Making Factory** in Ooty. This segment illustrated the engineering principles behind large-scale food processing, packaging, and plant automation.

The trip proved to be an immensely beneficial initiative, successfully achieving its objective of providing students with a holistic view of mechanical engineering's applications across different sectors. It effectively bridged theoretical knowledge with practical, on-ground industrial processes, enhancing the students' understanding and sparking curiosity for innovation. Such exposure is integral to the department's commitment to fostering well-rounded, industry-ready engineers, and the program concluded as a resounding success.

TECHNICAL SYMPOSIUMS

MEVOLUTION 2K23

The Department of Mechanical Engineering at DMI College of Engineering successfully organized a series of technical events under the banner of its technical fest, "B-MEDI-BRB," for the academic year 2022-2023. The fest was designed to provide a platform for students to showcase their technical prowess, innovation, and competitive spirit, aligning with the department's objective of fostering practical skills and intellectual curiosity beyond the standard curriculum.

The events, which included competitions such as "Majoration," "Super Metal," and "Royal," covered a diverse range of mechanical engineering domains. These activities were strategically planned to challenge participants' understanding of core concepts, problem-solving abilities, and creativity in areas like machine design, material science, and automotive technology. The competitive environment encouraged hands-on learning and teamwork among the students.

The successful execution of the fest was made possible through the dedicated efforts of the student coordinators, Mr. R. Singaravel and Mr. Mich Kirayanswamy, who played a vital role in the planning and on-ground management. They were ably guided by the staff coordinator, Mr. E.M. Pradeep, whose mentorship ensured the events were conducted smoothly and met their educational objectives.

The initiative received the full support and patronage of the institution's leadership, including the Correspondent, Rev. Sr. M.K. Teresa, and the Principal, Dr. N.A. Azhagesan. The technical fest proved to be a significant success, effectively stimulating intellectual engagement and providing a valuable avenue for students to apply their theoretical knowledge in a dynamic and competitive setting. It underscored the department's commitment to holistic student development and promoting a culture of innovation.

SYMPOSIUM AT ALPHA ENEINEERING COLLEGE

We are proud to share that our third- and fourth-year Mechanical Engineering students actively participated in the Technical Symposium organized by **Alpha College of Engineering, Chennai**, on **1st November 2023**. The symposium provided a vibrant platform for students from various institutions to showcase their technical skills, innovative thinking, and problem-solving abilities through diverse competitions and events.

Our students demonstrated exemplary enthusiasm, teamwork, and technical knowledge throughout the symposium. They competed in multiple technical and non-technical events such as paper presentations, project demonstrations, design challenges, and quizzes. Their performance not only reflected their academic learning but also highlighted their ability to apply engineering concepts in practical and innovative ways.

It is a matter of great pride that our students secured **various prizes across different categories**, bringing laurels to the institution. Their success stands as a testament to their dedication, consistent efforts, and the quality of training imparted by the department.

The institution sincerely appreciates the guidance and mentorship extended by the faculty members, whose encouragement and support enabled the students to perform with confidence. We also acknowledge the continuous motivation from our management, which has always emphasized holistic student development beyond classroom learning.

This achievement not only enhances the reputation of our institution but also inspires other students to actively engage in such opportunities. We congratulate the winners and participants for their outstanding accomplishments and encourage them to continue striving for excellence in future endeavors.

TECHNICAL SYMPOSIUM AT S.A COLLEGE OF ENGINEERING

The Department of Mechanical Engineering is pleased to report the active participation and notable achievement of our students in the Technical Symposium hosted by SA Engineering College in Chennai on November 9, 2023. This event provided an excellent platform for students to showcase their technical expertise, innovative thinking, and competitive spirit while engaging with peers from other institutions.

The symposium featured a series of challenging technical events, competitions, and knowledge-sharing sessions designed to test participants' understanding of core engineering concepts and their practical applications. Our students demonstrated remarkable proficiency and enthusiasm throughout the various activities, reflecting the strong foundational training and practical orientation they receive through our curriculum.

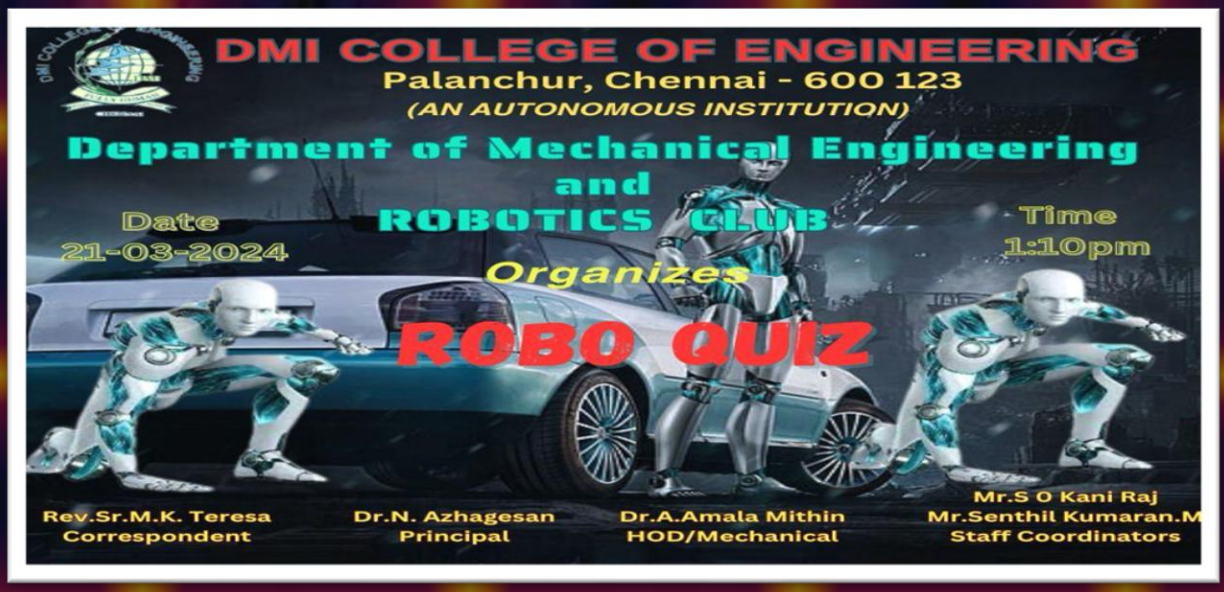
We are proud to announce that our students' exceptional performance was recognized with the **Second Prize** in the symposium competitions. This achievement not only highlights their individual capabilities but also underscores the quality of education and mentorship provided by our department. The success of our students in such a competitive environment speaks volumes about their dedication, problem-solving skills, and ability to apply theoretical knowledge to real-world challenges.

Participation in inter-collegiate events like this symposium plays a crucial role in fostering a spirit of healthy competition and innovation among students. It provides them with valuable exposure to emerging trends in the field of mechanical engineering while helping them develop essential soft skills such as teamwork, communication, and presentation.

The department remains committed to encouraging and supporting student participation in such external events as part of our holistic approach to engineering education. This accomplishment will serve as an inspiration for other students to actively engage in similar opportunities for academic and professional growth.

CLUB ACTIVITIES

AUTO GENOUS AND ROBO QUIZ



The Department of Mechanical Engineering at DMI College of Engineering successfully organized two consecutive technical events - "Auto Geneous" and "ROBO Quiz" on March 21st and 22nd, 2024. These events were collaboratively hosted by the SAE Club and Robotics Club of the department, reflecting the institution's commitment to promoting interdisciplinary learning and hands-on technical education.

The ROBO Quiz, held on March 21st, 2024, at 1:10 PM, challenged participants' knowledge in robotics and automation technologies. This was followed by Auto Geneous on March 22nd, which focused on automotive engineering principles and applications. Both events were strategically designed to complement the academic curriculum and provide students with platforms to demonstrate their technical aptitude and problem-solving skills.

The events received strong institutional support under the patronage of Correspondent Rev. Sr. M.K. Teresa and Principal Dr. N. Azhagesan. The initiative was guided by HOD/Mechanical Mr. Senthil Kumaran.M and efficiently coordinated by staff coordinator Dr. A. Amala Mithin, with Mr. S O Kani Raj serving as the event organizer.

These competitions successfully fostered healthy competition among students while enhancing their understanding of emerging technologies in automotive and robotics fields. The club-based approach to organizing these events effectively promoted student leadership and organizational capabilities. The enthusiastic participation and competitive spirit displayed by students underscored the relevance of such extracurricular technical activities in complementing classroom learning.

The department remains committed to organizing such knowledge-enhancing events that bridge theoretical concepts with practical applications, preparing students for evolving industry demands in automotive and robotics sectors. The successful execution of these events highlights the institution's dedication to providing holistic technical education and fostering innovation among engineering students.

AUTOCENTUS QUIZ

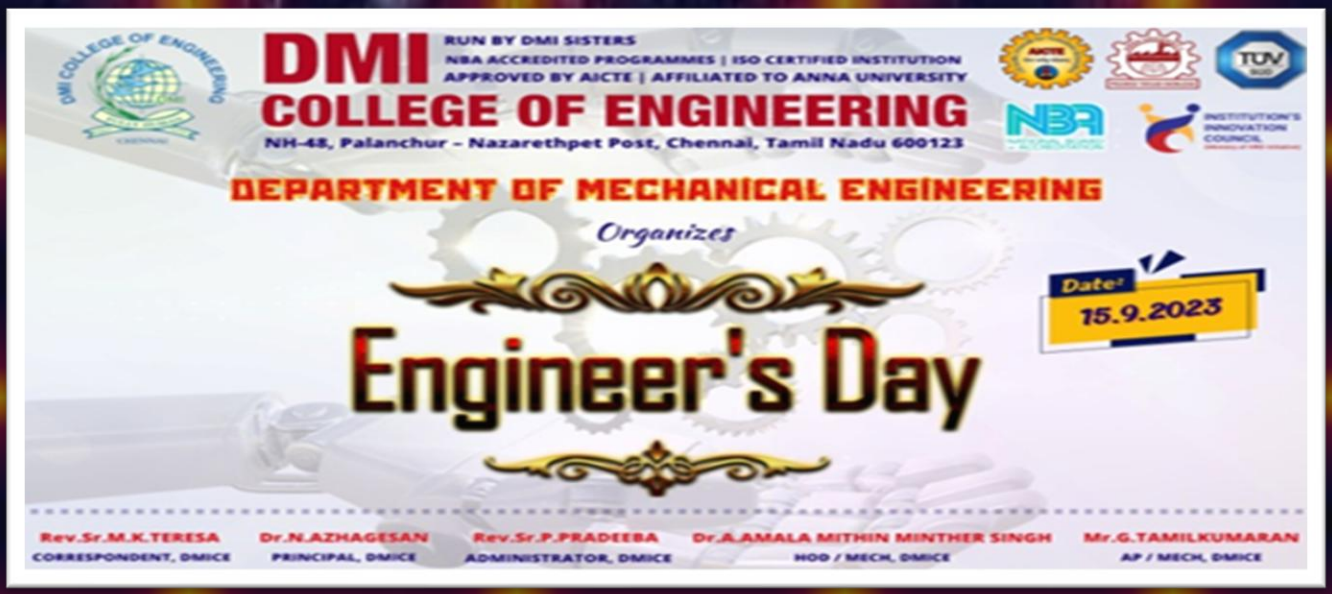
The Department of Mechanical Engineering at DMI College of Engineering successfully organized the "Autocentus Quiz" as part of its ongoing initiatives to promote technical knowledge and competitive learning among students. Conducted under the banner of the institution's technical clubs, this event aimed to stimulate intellectual curiosity and reinforce conceptual understanding in automotive engineering domains.

Held on the college premises in Palanchur, Chennai, the quiz competition witnessed active participation from students across various academic years. The event was designed to test participants' knowledge in areas including automotive systems, vehicle dynamics, engine technologies, and emerging trends in the automobile industry. The competitive format encouraged students to engage in thorough preparation and collaborative learning.

As an autonomous institution, DMI College of Engineering maintains a strong focus on creating supplementary learning opportunities that complement the formal curriculum. The Autocentus Quiz effectively served this purpose by providing a platform for students to apply theoretical knowledge in a dynamic, competitive setting. The department faculty provided guidance and oversight to ensure the event's academic rigor and smooth execution.

The successful organization of this quiz reflects the department's commitment to fostering a comprehensive learning environment that extends beyond conventional classroom teaching. Such initiatives play a crucial role in enhancing students' subject-specific knowledge while developing their quick-thinking abilities and confidence. The department remains dedicated to organizing similar knowledge-enhancing activities that bridge theoretical concepts with practical applications, ultimately contributing to the holistic development of future engineering professionals.

ENGINEER'S DAY



The Department of Mechanical Engineering at DMI College of Engineering successfully organized the Engineer's Day celebration to commemorate the remarkable contributions of engineers to society. The event was held with great enthusiasm and witnessed active participation from students, faculty members, and technical staff.

The celebration featured various technical activities, guest lectures, and student presentations that highlighted the significance of engineering innovation and its impact on national development. The program provided an excellent platform for students to showcase their technical skills and creative thinking while honoring the legacy of eminent engineers.

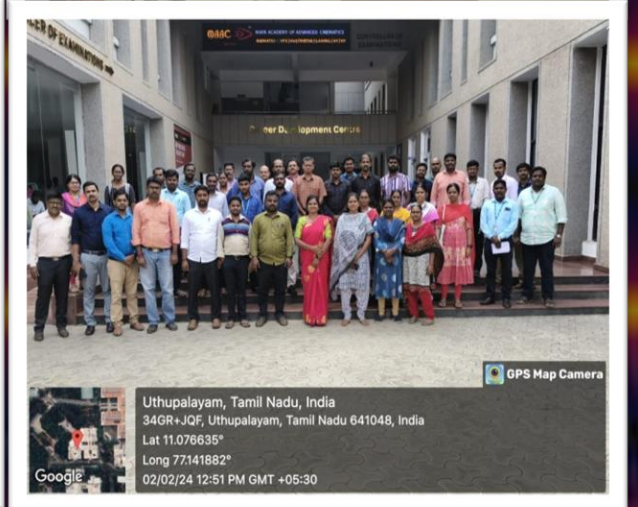
The event was conducted under the esteemed guidance of Rev. Sr. M.K. Teresa, Correspondent, and Dr. N. Azhagesan, Principal, reflecting the institution's strong commitment to promoting engineering excellence. The organizing committee, led by Dr. A. Amala Mithin Minther Singh and Mr. G. Tamilkumaran, ensured the smooth execution of all activities.

As an NBA-accredited programme and ISO-certified institution, DMI College of Engineering maintains high standards in technical education. This Engineer's Day celebration effectively complemented the academic curriculum by inspiring students to embrace innovation and professional ethics. The event successfully fostered a spirit of scientific temper and reinforced the importance of engineering in addressing contemporary challenges.

The department remains committed to organizing such meaningful events that not only honor the engineering profession but also motivate students to become competent professionals capable of contributing to technological advancement and societal progress.

STAFF ACHIEVEMENTS

FACULTY DEVELOPMENT INITIATIVES



The Department of Mechanical Engineering has demonstrated a strong commitment to academic excellence and continuous professional development during the academic year 2023-2024. It is noteworthy that all faculty members of the department actively participated in at least one Faculty Development Program (FDP) or workshop throughout the year, reflecting the institution's dedication to maintaining high standards of teaching and research.

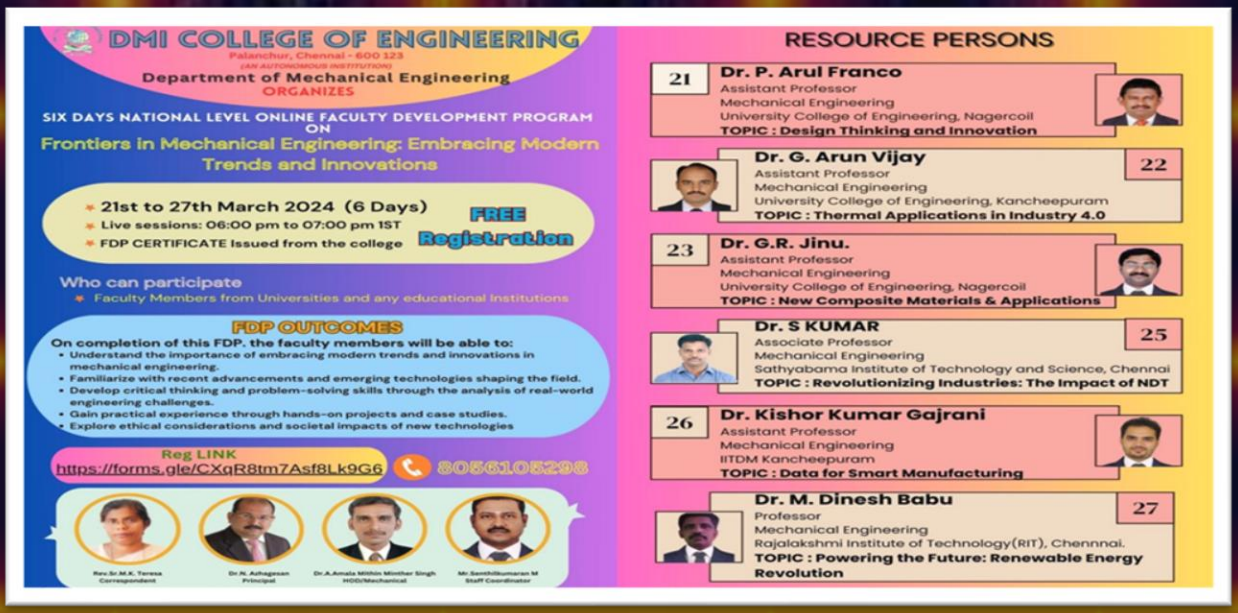
These professional development initiatives covered a diverse range of emerging topics in mechanical engineering, including advanced manufacturing technologies, renewable energy systems, computational fluid dynamics, industrial automation, and innovative pedagogical methods. The programs were conducted by premier institutions, industry partners, and professional bodies, ensuring exposure to both theoretical advancements and practical applications.

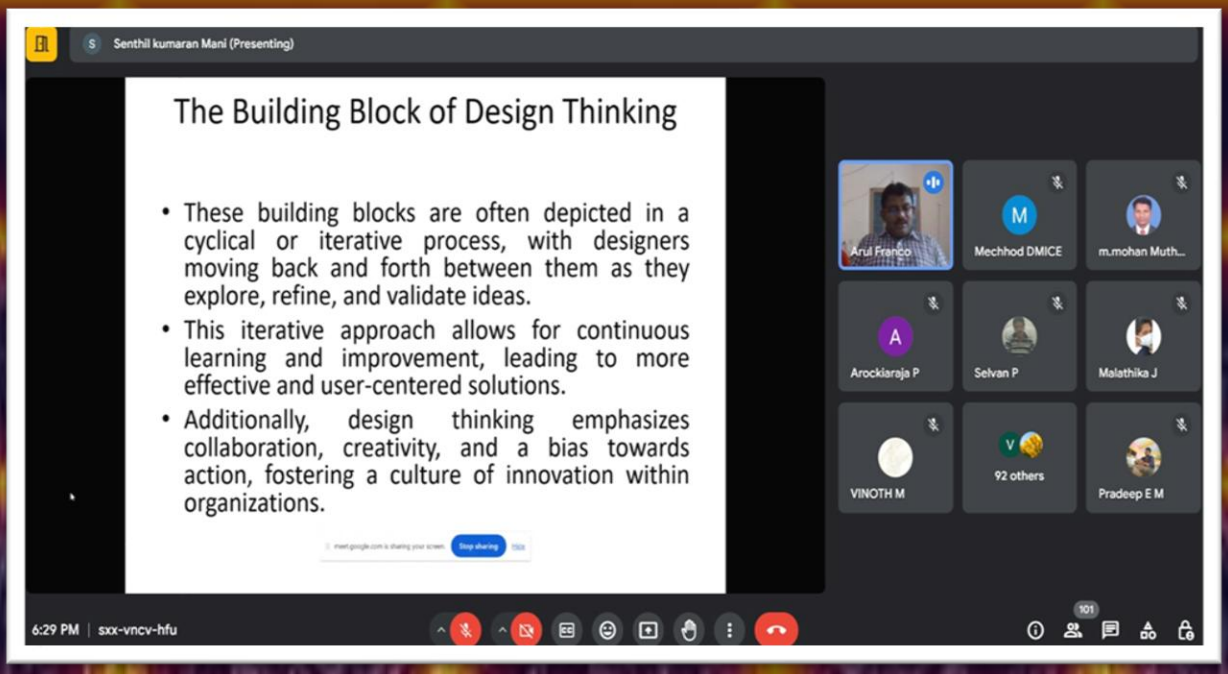
The comprehensive participation of faculty members in these programs has significantly enhanced the department's academic delivery capabilities. The acquired knowledge and skills have been effectively integrated into the curriculum, laboratory practices, and research projects, thereby enriching the learning experience for students. Furthermore, these initiatives have fostered stronger industry-academia relationships and promoted interdisciplinary research collaborations.

The department's focused approach to faculty development aligns with the institution's vision of providing quality technical education and maintaining NBA-accredited standards. This collective effort toward continuous improvement has contributed to updating the knowledge base of the faculty, ultimately benefiting the academic ecosystem and ensuring that students receive education that is relevant to current industry trends and technological advancements.

The department remains committed to sustaining this culture of professional growth and plans to continue such initiatives in the forthcoming academic years.

SIX DAYS NATIONAL LEVEL FACULTY DEVELOPMENT PROGRAM





The Department of Mechanical Engineering at DMI College of Engineering successfully conducted a Six-Day National Level Online Faculty Development Program (FDP) on "Frontiers in Mechanical Engineering: Embracing Modern Trends and Innovations" from March 21st to March 27th, 2024. This comprehensive program was designed to enhance the professional capabilities of faculty members from various educational institutions across the country.

The FDP featured live sessions held daily from 6:00 PM to 7:00 PM IST, covering a wide spectrum of contemporary topics essential for modern mechanical engineering education. Distinguished resource persons from premier institutions including IITDM Kancheepuram, University College of Engineering, and other renowned engineering colleges delivered expert lectures on cutting-edge subjects. The technical sessions encompassed crucial areas such as Design Thinking and Innovation, Thermal Applications in Industry 4.0, New Composite Materials & Applications, Non-Destructive Testing methodologies, Smart Manufacturing technologies, and Renewable Energy systems.

The program successfully achieved its objectives of enabling participants to understand emerging trends, develop critical thinking skills, and gain practical insights through real-world case studies. Participants received FDP certificates from the college, recognizing their active engagement and successful completion of the program. The event attracted significant participation from faculty members nationwide, reflecting its relevance and quality.

This initiative underscores the department's commitment to promoting academic excellence and fostering a culture of continuous learning among engineering educators. By focusing on current industry trends and innovative practices, the FDP effectively contributed to enhancing the quality of technical education and preparing faculty members to address the evolving challenges in the field of mechanical engineering.

FACULTY ACHIEVEMENT IN PROFESSIONAL DEVELOPMENT

No: 11/2023/1/MB/68627

अखिल भारतीय तकनीकी शिक्षा परिषद्

प्रमाणपत्र

प्रमाणित किया जाता है कि

एनआईटीटीटी पंजीयन क्रमांक :20222119564

ने

राष्ट्रीय तकनीकी शिक्षक प्रशिक्षण पहल

के अंतर्गत

मॉड्यूल 8 : संस्थागत प्रबंधन और प्रशासनिक कार्यविधि

को सफलता पूर्वक पूर्ण किया।

All India Council for Technical Education (AICTE)

Certificate

This is to certify that

AMALA MITHIN MINTHER SINGH A

NITTT Registration No: 20222119564

has successfully completed

Module 8 : Institutional Management and Administrative Procedures

of

National Initiative for Technical Teachers Training

Director NITTTR, Bhopal | Director NITTTR, Chandigarh | Member Secretary AICTE | Director NITTTR, Chennai | Director NITTTR, Kolkata

FEBRUARY 2023

No: 11/2023/1/M1-MB/43128

अखिल भारतीय तकनीकी शिक्षा परिषद्

प्रमाणपत्र

प्रमाणित किया जाता है कि

एनआईटीटीटी पंजीयन क्रमांक :20222119564

ने

राष्ट्रीय तकनीकी शिक्षक प्रशिक्षण पहल के अंतर्गत

को सफलता पूर्वक पूर्ण किया।

All India Council for Technical Education (AICTE)

Certificate

This is to certify that

AMALA MITHIN MINTHER SINGH A

NITTT Registration No: 20222119564

has successfully completed

of

National Initiative for Technical Teachers Training

Director NITTTR, Bhopal | Director NITTTR, Chandigarh | Member Secretary AICTE | Director NITTTR, Chennai | Director NITTTR, Kolkata

SEPTEMBER 2023

The Department of Mechanical Engineering is pleased to announce a significant professional accomplishment by Dr. A. Amala Mithin Minther Singh, Head of the Department and Dean (Research). Dr. Singh has successfully completed an extensive eight-module course offered by the National Initiative for Technical Teachers Training (NITTR), an initiative of the All India Council for Technical Education (AICTE).

This comprehensive training program, which includes a critical module on "Institutional Management and Administrative Procedures," is designed to equip technical educators with advanced skills in academic leadership, governance, and contemporary educational administration. The successful completion of this rigorous course underscores Dr. Singh's deep commitment to continuous professional growth and excellence in academic leadership.

This achievement is not only a personal milestone but also a significant asset to the institution. The enhanced expertise in institutional management and administrative protocols directly contributes to the effective leadership and strategic development of the department and the college as a whole. It reinforces our institution's commitment to maintaining high standards of academic administration and governance, aligning with the best practices advocated by AICTE.

Dr. Singh's dedication to professional development sets a commendable example for the faculty and strengthens the department's leadership capabilities. This accomplishment enhances our capacity for innovative institutional management and furthers our mission of delivering high-quality technical education.

NATIONAL RECOGNITION FOR FACULTY ACHIEVEMENT IN NPTEL

HIGHEST NUMBER OF NPTEL COURSE TAKERS - JAN 2022- JULY 2023 (4 SEMS)

Name	Role	College Name	City	State	No. of courses
Chidananda G	Faculty	Bapuji Institute Of Engineering & Technology	Davanagere	Karnataka	23
Chemmanur Frince Thomas	Faculty	Dharmsinh Desai University,nadiad	Anand	Gujarat	22
Koneru Gopala Krishna	Faculty	Bits-pilani, Wilp Division	Hyderabad	Telangana	22
Dr S Henry Kishore	Faculty	Sri Krishna Arts And Science College	Coimbatore	Tamil Nadu	21
Mathias Yaw Kamperi Geyer	Other	Other	Chennai	Tamil Nadu	21
N C Balaji	Faculty	The National Institute Of Engineering	Mysore	Karnataka	20
Satyanarayana B	Faculty	Institute Of Aeronautical Engineering	Hyderabad	Telangana	20
Aswini B	Faculty	Bhaktavatsalam Memorial College For Women, Chennai	Tiruvallur	Tamil Nadu	19
Kuljeet Singh Kohli	Employed	Bt Global Services India Pvt. Ltd.	Chandigarh	Punjab	19
Asheesh Kumar	Faculty	Mahatma Gandhi Institute Of Technology	Hyderabad	Telangana	18
Nithyananda Sastry Darbha	Faculty	Kle College Of Pharmacy, Belagavi	Belgaum	Karnataka	18
Dr Prashant B Daigavane	Faculty	Government College of Engineering,nagpur	Nagpur	Maharashtra	18
Balachandra Kumaraswamy	Faculty	Bms College Of Engineering	Bengaluru	Karnataka	17
Dr A K Subramani	Faculty	Saveetha School Of Management	Chennai	Tamil Nadu	17
S Lakshmana Kumar	Faculty	Sona College Of Technology	Salem	Tamil Nadu	17
Dr Jayashree Agarkhed	Faculty	Poojya Doddappa Appa College Of Engineering	Gulbarga	Karnataka	17
Shaik Jakeer Hussain	Faculty	Vignans Foundation For Science,technology And Research	Guntur	Andhra Pradesh	17
Dr A Amala Mithin Minther Singh	Faculty	Dmi College Of Engineering	Chennai	Tamil Nadu	17
Santosh Kumar Mohapatra	Employed	Water Resources Department	Berhampur	Odisha	17
Dr Nalini A	Faculty	All India Institute Of Medical Sciences	Hamirpur	HP	17

There are learners taking 5 or 6 courses in every semester for the last 2 years.

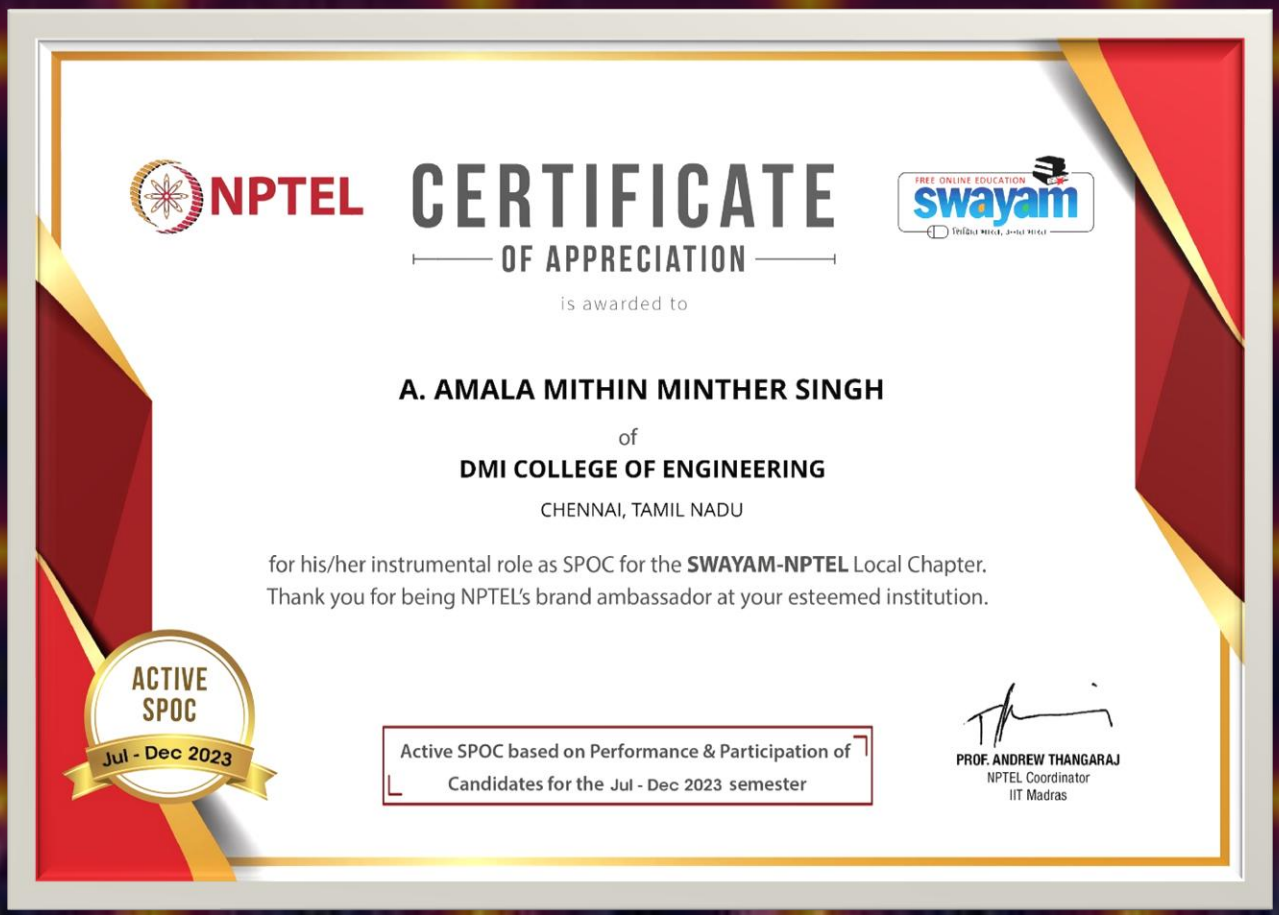
The Department of Mechanical Engineering takes great pride in announcing that Dr. A. Amala Mithin Minther Singh, Head of the Department and Dean (Research), has been nationally recognized for exceptional performance in continuous professional development. Dr. Singh has secured the **7th position at the national level** for the highest number of NPTEL courses completed between January 2022 and July 2023, a period spanning four semesters.

This remarkable achievement, with a total of 17 NPTEL courses successfully completed, places Dr. Singh among the top faculty members in India recognized by the NPTEL program. The accomplishment highlights an extraordinary commitment to self-directed learning and academic excellence, demonstrating consistent engagement with advanced educational content over an extended period.

This national ranking reflects not only individual dedication but also brings significant prestige to the institution. It underscores the faculty's active pursuit of knowledge and alignment with national educational standards. Dr. Singh's accomplishment serves as an inspiration to both colleagues and students, embodying the institution's core values of lifelong learning and academic rigor.

The department celebrates this outstanding achievement, which reinforces our commitment to fostering a culture of continuous improvement and academic excellence. Such recognition at the national level enhances the institution's reputation and motivates other faculty members to engage in similar professional development initiatives. This accomplishment stands as a testament to the high-quality academic leadership within the Department of Mechanical Engineering.

RECOGNITION AS NPTEL ACTIVE SINGLE POINT OF CONTACT (SPOC)



NPTEL

CERTIFICATE

OF APPRECIATION

FREE ONLINE EDUCATION swayam

is awarded to

A. AMALA MITHIN MINTHER SINGH

of

DMI COLLEGE OF ENGINEERING

CHENNAI, TAMIL NADU

for his/her instrumental role as SPOC for the **SWAYAM-NPTEL** Local Chapter.
Thank you for being NPTEL's brand ambassador at your esteemed institution.

ACTIVE SPOC
Jul - Dec 2023

Active SPOC based on Performance & Participation of Candidates for the Jul - Dec 2023 semester

PROF. ANDREW THANGARAJ
NPTEL Coordinator
IIT Madras

The Department of Mechanical Engineering is pleased to announce that Dr. A. Amala Mithin Minther Singh, Head of the Department and Dean (Research), has been honored with a **Certificate of Appreciation as an Active Single Point of Contact (SPOC)** for the SWAYAM-NPTEL Local Chapter by IIT Madras. This prestigious recognition is for his instrumental role and outstanding performance during the July - December 2023 semester.

As the SPOC, Dr. Singh served as the key liaison between the institution and the NPTEL program, acting as a brand ambassador and effectively promoting the initiative among students and faculty. The award specifically acknowledges his exceptional efforts in driving candidate participation and ensuring the successful engagement of the college with the national online learning platform.

This accolade, conferred by Prof. Andrew Thangaraj, NPTEL Coordinator at IIT Madras, highlights the significant contribution made by Dr. Singh in fostering a culture of continuous learning and academic excellence within the institution. His dedicated leadership has been crucial in encouraging widespread enrollment and successful completion of NPTEL courses, thereby enhancing the skills and knowledge base of the academic community.

This national recognition not only celebrates Dr. Singh's individual commitment but also brings considerable prestige to the institution, underscoring our active participation in high-quality, technology-enabled education initiatives.

PRESTIGIOUS NPTEL STAR AWARDS ACHIEVEMENT

The Department of Mechanical Engineering takes immense pride in announcing that Dr. A. Amala Mithin Minther Singh, Head of Department and Dean (Research), has achieved exceptional recognition from the National Programme on Technology Enhanced Learning (NPTEL) by securing **three distinct Star Awards** in recognition of outstanding contributions to technology-enhanced learning. This remarkable accomplishment demonstrates extraordinary commitment to academic excellence and professional development.

Dr. Singh has been honored with the following prestigious awards:

1. **NPTEL Believer Award** for consistent completion of 5 NPTEL courses
2. **NPTEL Discipline Star Award** for dedicated engagement spanning 132 weeks of course participation
3. **NPTEL Evangelist Award** for remarkable achievement in completing 25 NPTEL courses

These awards represent a comprehensive acknowledgment of Dr. Singh's sustained dedication to continuous learning, depth of knowledge acquisition across disciplines, and exceptional contribution to promoting the NPTEL initiative. The Discipline Star Award, in particular, highlights an extended commitment to learning spanning multiple academic years, while the Evangelist Award recognizes the role as a champion of online education.

This triple recognition places Dr. Singh among an elite group of academic professionals nationwide who have demonstrated such comprehensive excellence in professional development. The achievement not only brings honor to the individual but also significantly enhances the institution's reputation as a center for academic excellence and innovative learning practices.

The department celebrates this extraordinary accomplishment, which serves as an inspiration to both faculty and students, reinforcing our commitment to fostering a culture of continuous learning and academic excellence.

ACADEMIC ACHIEVEMENT OF THE PRINCIPAL

Biomass Conversion and Biorefinery
https://doi.org/10.1007/s13399-023-04846-x

ORIGINAL ARTICLE

Exploring seashell and rice husk waste for lightweight hybrid biocomposites: synthesis, microstructure, and mechanical performance

A. Amala Mithin Minther Singh[1] · P. Arul Franco[2] · N. Azhagesan[1] · V. Sharun[3]

Received: 5 June 2023 / Revised: 31 August 2023 / Accepted: 3 September 2023

Abstract
Hybrid composites are made by fusing together, typically using resin, a matrix material (typically metal), a fiber, and a filler component. Fibers and particles are encased in a matrix of another material to create modern composites. Natural fiber composites are becoming increasingly popular due to rising awareness of their many practical applications. The debris produced by the seashell farming becomes serious environmental threat. Recent research has centered on the potential applications of this seashell waste. The purpose is to reduce seashell waste that pollutes the coast near Kanyakumari. Agricultural waste, such rice husk, is more accessible than other types of biomass. Conventional materials are weighed more, so lightweight materials can be used as alternatives for the structural components of an automobile. This swatch is made from combination of biocomposite and repurposed seashells. Mechanical tests, including tensile, flexural, impact, and hardness testing, were performed on the prepared samples. The morphological analysis shows good laminar and interfacial connections throughout the structure. The EDAX spectrum shows the presence of elements like silicon, sulfur, and zinc. The EDAX spectrum of C5 hybrid biocomposites (40% rice husk + 10% seashell + 50% polyester resin) has more zinc than silicon. The C2 (10% rice husk + 40% seashell + 50% polyester resin) hybrid composite outperforms other composites in tensile strength (51.47 MPa), Brinell hardness (132BHN), Rockwell hardness (62RHN), impact energy (51.4 J), flexural strength (203.03Mpa), and water absorption (1%). Based on research investigations, hybrid biocomposites made of bio seashell and bio rice husk are superior than standard biocomposites without sacrificing the eco-friendliness of the automobile.

Keywords Bio seashell · Tensile · Impact · Hardness · Rice husk · SEM

1 Introduction

Rotator cuff tears are commonly repaired using biodegradable suture anchors; however, these devices have a number of drawbacks, including weak mechanical strength, poor osteon integration, and the generation of acidic breakdown byproducts [1]. Composites are defined macroscopically as a heterogeneous combination of two or more materials with distinct chemical, morphological, and physical properties. The goal is to produce materials having novel characteristics that cannot be manufactured using conventional methods alone [2]. There is a need for materials with better mechanical, tribological, and biological qualities [3, 4] to replace polyethylene in artificial joint applications. There has been a rise in interest in the usage of sustainable biocomposites in recent years [4] as a result of the environmental burden caused by the use of non-renewable carbon or glass fiber composites. Natural fibers have been utilized in various architectural and structural applications. In recent times, there has been a growing utilization of cellulosic products and wastes as fillers in polymers, mostly driven by the objective of achieving cost savings and introducing favorable characteristics. The utilization of numerous natural fiber reinforcements in hybridization has been acknowledged as a promising method for the production of composites.

✉ A. Amala Mithin Minther Singh
mithinlites2011@gmail.com

[1] Department of Mechanical Engineering, DMI College of Engineering, Chennai, Tamil Nadu, India
[2] Department of Mechanical Engineering, University College of Engineering, Nagercoil, India
[3] Department of Mechanical Engineering, Panimalar Engineering College, Chennai, India

Published online: 09 September 2023

Springer

THE PATENTS ACT 1970 (39 of 1970)
and THE PATENTS RULES, 2003
APPLICATION FOR GRANT OF PATENT
(See section 7, 54 and 135 and sub-rule (1) of rule 20)

Application No.	
Filing date:	
Amount of Fee paid:	
CBR No:	
Signature:	

1. APPLICANT'S REFERENCE / IDENTIFICATION NO. (AS ALLOTTED BY OFFICE)

2. TYPE OF APPLICATION [Please tick (✓) at the appropriate category]

Ordinary (✓)		Convention ( )		PCT-NP ( )	
Divisional ( )	Patent of Addition ( )	Divisional ( )	Patent of Addition ( )	Divisional ( )	Patent of Addition ( )

3A. APPLICANT(S)

Name in Full	Nationality	Country of Residence	Address of the Applicant	
DMI College of Engineering	Indian	India	Address	DMI College of Engineering, Palanchur, Nazarethpet Post, Chennai – 600 123.
			E-mail id	azhagesannainar@gmail.com

3B. CATEGORY OF APPLICANT [Please tick (✔) at the appropriate category]

Natural Person (✔)	Other than Natural Person		
	Small Entity ( )	Startup ( )	Others (✔)

4. INVENTOR(S) [Please tick (✔) at the appropriate category]

Are all the inventor(s) same as the applicant(s) named above?	Yes ( )		No (✔)	
Dr. N. Azhagesan	Indian	India	Address	Professor, Department of Mechanical Engineering, DMI College of Engineering, Palanchur, Nazarethpet

The institution takes great pride in announcing the significant academic accomplishments of Dr. N. Azhagesan, Principal of DMI College of Engineering. Demonstrating exemplary leadership in research and innovation, Dr. Azhagesan has recently achieved two notable milestones that underscore his commitment to advancing knowledge in his field.

Dr. Azhagesan has successfully published a research paper in a Science Citation Index (SCI) journal, a recognition that highlights the high quality, originality, and impact of his scholarly work. Publication in an SCI journal is a globally acknowledged benchmark of research excellence, indicating that the work has undergone rigorous peer review and contributes meaningfully to the scientific community.

Concurrently, Dr. Azhagesan has also secured a patent for an invention, showcasing his ability to translate innovative ideas into tangible intellectual property with potential industrial applications. This achievement reflects a strong focus on applied research and technological development.

These accomplishments not only enhance the academic stature of our Principal but also bring considerable prestige to the institution. They exemplify the high standards of research and innovation that DMI College of Engineering strives to uphold. By leading through example, Dr. Azhagesan inspires both faculty and students to engage in cutting-edge research, reinforcing our institution's commitment to fostering an ecosystem of academic excellence and innovation. This dual success in publishing and patenting significantly contributes to the institution's growing reputation as a center for advanced research and development.

RESEARCH ACHIEVEMENT OF
Dr. T. SENTHILKUMAR

LOYOLA INSTITUTE OF TECHNOLOGY
Palanchur,Chennai-600123, Tamilnadu
An ISO 9001:2015 Certified Institution
(Approved by AICTE,New Delhi, Affiliated to Anna University,Chennai)

Certificate of Participation

This is to certify that Dr. / Mr. / Ms. SENTHIL KUMAR.T of DMI COLLEGE OF ENGINEERING *presented a paper titled,* "EXPERIMENTAL ANALYSIS OF FAN BLADE MADE BY SUGARCANE BAGASSE COMPOSITE" *in the AICTE Sponsored International Conference on "RECENT ADVANCES & INNOVATIONS IN SCIENCE, TECHNOLOGY, ENGINEERING & MANAGEMENT" conducted at Loyola Institute of Technology, Palanchur, Chennai held on 04-Oct-2023 & 05-Oct-2023.*

CO-CONVENER | PRINCIPAL | ADMINISTRATOR | CORRESPONDENT

THE PATENTS ACT 1970 (39 of 1970)
and THE PATENTS RULES, 2003
APPLICATION FOR GRANT OF PATENT
(See section 7, 54 and 135 and sub-rule (1) of rule 20)

	Application No.	
	Filing date:	
	Amount of Fee paid:	
	CBR No:	
	Signature:	

1. APPLICANT'S REFERENCE / IDENTIFICATION NO. (AS ALLOTTED BY OFFICE)

2. TYPE OF APPLICATION [Please tick (✓) at the appropriate category]

Ordinary (✓)		Convention ( )		PCT-NP ( )	
Divisional ( )	Patent of Addition ( )	Divisional ( )	Patent of Addition ( )	Divisional ( )	Patent of Addition ( )

3A. APPLICANT(S)

Name in Full	Nationality	Country of Residence	Address of the Applicant	
DMI College of Engineering	Indian	India	Address	DMI College of Engineering, Palanchur, Nazarethpet Post, Chennai – 600 123.
			E-mail id	azhagesannainar@gmail.com

3B. CATEGORY OF APPLICANT [Please tick (✓) at the appropriate category]

Natural Person (✓)	Other than Natural Person		
	Small Entity ( )	Startup ( )	Others (✓)

4. INVENTOR(S) [Please tick (✓) at the appropriate category]

Are all the inventor(s) same as the applicant(s) named above?	Yes ( )		No (✓)	
Dr. N. Azhagesan	Indian	India	Address	Professor, Department of Mechanical Engineering, DMI College of Engineering, Palanchur, Nazarethpet

The Department of Mechanical Engineering is pleased to acknowledge the significant research contributions of Dr. T. Senthilkumar, who has demonstrated exceptional scholarly output by securing one patent and presenting two research papers at an international conference. These accomplishments highlight his dedication to advancing knowledge in his field and contribute substantially to the institution's research profile.

The grant of a patent underscores Dr. Senthilkumar's innovative capabilities and his success in developing a novel solution with potential industrial applications. This achievement reflects the practical relevance and translational value of his research, aligning with the institution's emphasis on innovation that addresses real-world challenges.

Additionally, the presentation of two research papers at an international conference indicates the quality and recognition of his work on a global platform. International conferences provide a critical forum for scholarly exchange, and his participation facilitates valuable academic networking and collaboration opportunities, while also enhancing the visibility of the department's research efforts.

These achievements collectively strengthen the department's research culture and support the institution's commitment to academic excellence. Dr. Senthilkumar's work serves as an inspiration to colleagues and students, encouraging further research initiatives and reinforcing the importance of contributing to both intellectual discourse and practical applications in mechanical engineering.

PUBLICATION IN A PRESTIGIOUS JOURNAL

Renewable and Sustainable Energy Reviews 197 (2024) 114372

Contents lists available at ScienceDirect

Renewable and Sustainable Energy Reviews

journal homepage: www.elsevier.com/locate/rser

Solar photovoltaic cooling using Paraffin phase change material: Comprehensive assessment

Prabhu B [a,*], Valan Arasu A [b], Gurusamy P [c], Amala Mithin Minther Singh A [d], Arunkumar T [a]

[a] Centre for Additive Manufacturing, Chennai Institute of Technology, Chennai, India
[b] Department of Mechanical Engineering, Thiagarajar College of Engineering, Madurai, India
[c] Department of Mechanical Engineering, Chennai Institute of Technology, Chennai, India
[d] Department of Mechanical Engineering, DMI College of Engineering, Chennai, India

ARTICLE INFO

Keywords:
Photovoltaics
Paraffin
Cooling
Performance
Efficiency
Solar energy

ABSTRACT

Cooling with phase change material has been identified as one of the most promising cooling approaches for lowering solar photovoltaic module temperature and enhancing system performance. To the best of the authors' knowledge, the specific contribution of Paraffin based phase change material with its prospective thermal enhancement strategies in solar photovoltaic cooling systems has not been reported. This study comprising four phases aims to provide a comprehensive assessment of the use of Paraffin-based phase change materials, an active cooling approach and metal oxide-based nanoparticles in solar photovoltaic cooling systems through the use of recent and relevant research studies. The comprehensive and comparative discussions, in contrast to former reviews, are provided at the end of each phase to summarize their technical considerations. Furthermore, for each examined study, limitations and implications are discussed in order to identify research gaps for further improvements. This comprehensive assessment findings show that a Paraffin-based phase change material cooling approach can cope with a greater drop in solar photovoltaic module temperature ranging from 3 to 26.6 °C, which stimulates an increase in module electrical efficiency ranging from 1 to 56 %. Challenges and environment impact of the existing systems are summarized. Opportunities and future perspective in this field pave the way for utilizing the possibilities for developing more thermal efficient and economic viable solar photovoltaic cooling systems for a sustainable environment.

1. Introduction

Since they have been acknowledged as the most effective and efficient solutions for reducing greenhouse emissions, the utilization of renewable energy resources worldwide and their long-term planning on sustainability have grown significantly [1–5]. Solar energy is the most abundant, and environmentally beneficial source of energy because it is 1000 times more abundant than the entire quantity of energy used by all sources (about 1.8×10^{11} MW) [6–8]. Solar thermal collectors can be used to use solar energy for thermal uses, while SPV systems can be used to generate electricity [9–11]. The IEA analysis estimates that, SPV module installations will account for 16% of the world's electricity generation in near future. Fig. 1 depicts the great potential of SPV systems utility in electricity capacity additions among various renewables [12]. As a result, photovoltaic energy will be a demandable, sustainable, and clean mode of generating electricity [13]. Irradiance, operating temperature, dust, humidity and others variables affect the electrical conversion efficiency of a SPV module [14,15]. Among the various factors affect the performance of a SPV module, higher operating temperature of module will be a threat for electricity generation. The fill factor and open circuit voltage of a SPV module decreased as the temperature of the module increased, resulting in a drop in $\eta_{electrical}$ [16–18]. A SPV module's efficiency is decreased by 0.3–0.65 % per K [19]. For better performance of a SPV module, its surface temperature needs to be maintained about 25 °C [20].

This factor has motivated researchers to develop an efficient and effective thermal management solution for SPVS. PCM-based SPVS are very appealing and advantageous in terms of techno-economic considerations. These systems are used to observe and store the waste heat exhausted by a SPV module in a thermal storage medium for better thermal management in electricity generation. The various thermal management systems of PCM based SPVS are shown in Fig. 2.

In general, LHESS is the most promising system for storing thermal

* Corresponding author.
E-mail address: prabhub@citchennai.net (P. B).

https://doi.org/10.1016/j.rser.2024.114372
Received 23 August 2023; Received in revised form 12 January 2024; Accepted 18 March 2024
Available online 22 March 2024

The Department of Mechanical Engineering is pleased to announce a significant research publication by Dr. A. Amala Mithin Minther Singh, Head of the Department and Dean (Research), in collaboration with fellow researchers. Their paper, titled "Solar Photovoltaic Cooling Using Paraffin Phase Change Material: Comprehensive Assessment," has been published in the esteemed journal *Renewable and Sustainable Energy Reviews* (March 2024), a high-impact SCI journal.

This comprehensive review paper addresses the critical challenge of temperature management in solar photovoltaic (PV) systems, where elevated operating temperatures significantly reduce electrical efficiency. The research provides a detailed assessment of using paraffin-based phase change materials (PCMs) as a passive cooling mechanism for solar PV modules. The study systematically analyzes how this approach can lower module temperatures by 3°C to 26.6°C, subsequently increasing electrical efficiency by 1% to 56%.

The publication consolidates existing research, identifies technical considerations, and discusses limitations and future perspectives for developing more efficient and economically viable solar PV cooling systems. This contribution is highly relevant to the global pursuit of sustainable energy solutions and enhances the renewable energy research profile of the institution.

This achievement underscores the department's commitment to advancing knowledge in sustainable technologies and contributes significantly to the institution's research output. It also reinforces the department's expertise in thermal management and renewable energy applications, providing valuable insights for academics and industry professionals working on enhancing solar energy system performance.

FACULTY ACHIEVEMENT IN PROFESSIONAL CERTIFICATION

NPTEL Online Certification

(Funded by the MoE, Govt. of India)

This certificate is awarded to

DR A AMALA MITHIN MINTHER SINGH

for successfully completing the course

Automation in Manufacturing

with a consolidated score of 67 %

Online Assignments	20.6/25	Proctored Exam	46.5/75

Total number of candidates certified in this course: 1610

Jul-Oct 2023

(12 week course)

Prof. T. V. Bharat
Head, Centre for Educational Technology
NPTEL Coordinator, IIT Guwahati

Indian Institute of Technology Guwahati

swayam

Roll No: NPTEL23ME105S103346607 To verify the certificate No. of credits recommended: 3 or 4

NPTEL Online Certification

(Funded by the MoE, Govt. of India)

This certificate is awarded to

DR A AMALA MITHIN MINTHER SINGH

for successfully completing the course

Fundamentals of Manufacturing Processes

with a consolidated score of 53 %

Online Assignments	16.56/25	Proctored Exam	36/75

Total number of candidates certified in this course: 520

Prof. Kaushik Ghosh,
Professor(Chemistry)
Coordinator CEC

Jul-Oct 2023

(12 week course)

Prof. Ranjana Pathania,
Professor (BSBE)
Coordinator (NPTEL)

Indian Institute of Technology Roorkee

swayam

Roll No: NPTEL23ME131S833410717 To verify the certificate No. of credits recommended: 3 or 4

NPTEL Online Certification

(Funded by the MoE, Govt. of India)

This certificate is awarded to

DR A AMALA MITHIN MINTHER SINGH

for successfully completing the course

Teaching and Learning in General Programs: TALG

with a consolidated score of 60 %

Online Assignments	17.5/25	Proctored Exam	42/75

Total number of candidates certified in this course: 429

Prof. G. L. Sivakumar Babu
Chairman, Center for Continuing Education
IISc Bangalore

Jul-Aug 2023

(4 week course)

Prof. L. Umanand
NPTEL Coordinator
IISc Bangalore

Indian Institute of Science Bangalore

swayam

Roll No: NPTEL23GE45S35327670 To verify the certificate No. of credits recommended: 1 or 2

NPTEL Online Certification

(Funded by the MoE, Govt. of India)

This certificate is awarded to

DR A AMALA MITHIN MINTHER SINGH

for successfully completing the course

Manufacturing Systems Technology I & II

with a consolidated score of 56 %

Online Assignments	17.5/25	Proctored Exam	38.45/75

Total number of candidates certified in this course: 135

Prof. B. V. Ratish Kumar
Chairman, Centre for Continuing Education
IIT Kanpur

Jul-Oct 2023

(12 week course)

Prof. Satyaki Roy
NPTEL Coordinator
IIT Kanpur

Indian Institute of Technology Kanpur

swayam

Roll No: NPTEL23ME86S533408800 To verify the certificate No. of credits recommended: 3 or 4

The Department of Mechanical Engineering takes great pride in announcing a significant professional accomplishment by Dr. A. Amala Mithin Minther Singh, Head of the Department and Dean (Research). Dr. Singh has successfully completed a demanding 12-week advanced certification program offered through the NPTEL platform, an initiative funded by the Ministry of Education, Government of India.

This certification, administered by the prestigious Indian Institutes of Technology (IITs), signifies a deep commitment to continuous learning and mastery of contemporary technological domains. Dr. Singh achieved a commendable consolidated score, demonstrating a strong grasp of the course material through rigorous online assignments and a proctored examination. The certification places Dr. Singh among a selective group of professionals nationwide who have undergone this specialized training.

This accomplishment underscores the faculty's dedication to staying abreast of current industry trends and enhancing their expertise beyond the conventional curriculum. It directly contributes to enriching the academic delivery within the department, ensuring that students receive education aligned with cutting-edge technological advancements. The successful completion of this program not only enhances Dr. Singh's professional profile but also brings considerable prestige to the institution, reflecting our commitment to fostering a culture of academic excellence and continuous improvement. This achievement strengthens our department's capability to provide high-quality, industry-relevant education.

FACULTY DEVELOPMENT PROGRAM COMPLETION

KPR Institute of Engineering and Technology
Learn Beyond (Autonomous, NAAC "A")

Department of Mechanical Engineering

Great Place To Work. Certified

CERTIFICATE
OF COMPLETION

This is to certify that

A. AMALA MITHIN MINTHER SINGH

of AMI COLLEGE OF ENGINEERING

for completing Two Days Workshop on "AI Tools in Scientific Writing" conducted by the KPR Institute of Engineering and Technology, Coimbatore from 02.02.2024 to 03.02.2024.

B. Arul 3/2/24
Faculty Coordinator
Dr. B. Arulmurugan

S. Gokul 3/2/24
Faculty Coordinator
Dr. S. Gokulkumar

3/2/24
Head of the Department
Dr. S. Ramesh Babu

kpriet.edu.in /KPRIETonline

The Department of Mechanical Engineering is pleased to acknowledge the active participation of Dr. A. Amala Mithin Minther Singh, Head of the Department and Dean (Research), in a specialized two-day workshop focused on the application of artificial intelligence in academic research. The program, titled "AI Tools in Scientific Writing," was conducted by the Department of Mechanical Engineering at KPR Institute of Engineering and Technology, Coimbatore, from February 2nd to 3rd, 2024.

This workshop provided comprehensive training on leveraging advanced AI technologies to enhance the quality and efficiency of scientific publications. Participants gained practical insights into using AI-assisted tools for literature review, data analysis, manuscript preparation, and plagiarism checks. The session emphasized ethical considerations and best practices in AI-integrated academic writing.

Dr. Singh's participation in this program underscores a commitment to integrating contemporary digital tools into academic and research practices. The knowledge acquired will significantly contribute to improving research output quality, mentoring students in scholarly publication, and promoting innovative methodologies within the department's research ecosystem.

This engagement aligns with the institution's objective of fostering continuous professional development and adopting technological advancements in education. Such initiatives enhance the faculty's capability to guide students in modern research techniques, ultimately strengthening the department's academic reputation and research productivity. The certification awarded stands as a testament to the faculty's dedication to maintaining excellence in scholarly activities.

FACULTY PARTICIPATION IN NATIONAL IP AWARENESS MISSION

INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS | GEOGRAPHICAL INDICATIONS

सत्यमेव जयते

NIPAM
NATIONAL IP AWARENESS MISSION

Government of India
Ministry of Commerce and Industry
Department for Promotion of Industry and Internal Trade
Office of the Controller General of Patents, Designs and Trade Marks

CERTIFICATE

This is to certify that, **DR. AMALA MITHIN MINTHER SINGH , FACULTY** of **DMI COLLEGE OF ENGINEERING** has successfully participated in IP Awareness/Training program under

NATIONAL INTELLECTUAL PROPERTY AWARENESS MISSION

on October 16,2023

Azadi Ka Amrit Mahotsav

Organized by
Intellectual Property Office, India

Date:October 19,2023

(Prof. (Dr) Unnat P. Pandit)
CONTROLLER GENERAL OF
PATENTS, DESIGNS & TRADE MARKS

The Department of Mechanical Engineering is pleased to acknowledge the active participation of Dr. A. Amala Mithin Minther Singh, Head of the Department and Dean (Research), in the National Intellectual Property Awareness Mission (NIPAM) organized by the Intellectual Property Office, India. This program was conducted under the auspices of the Ministry of Commerce and Industry, Government of India, on October 16, 2023.

The National IP Awareness Mission is a significant initiative aimed at enhancing knowledge and understanding of intellectual property rights among academicians, researchers, and students across the country. Dr. Singh's successful participation in this program underscores a commitment to staying updated with national policies and frameworks related to IPR, which are crucial for fostering innovation and research within the institution.

This training has equipped Dr. Singh with valuable insights into the processes of patent filing, design registration, and trademark protection, thereby strengthening the ability to guide and mentor students and fellow faculty members in protecting their inventions and creative works. The certification, issued by the Office of the Controller General of Patents, Designs, and Trade Marks, adds considerable credibility to the department's efforts in promoting a robust innovation ecosystem.

Such initiatives align with the institution's goal of integrating IP awareness into the academic curriculum and research activities, ultimately contributing to the creation of valuable intellectual assets and supporting the nation's broader objectives of becoming a global innovation hub.

FACULTY DEVELOPMENT PROGRAM ACHIEVEMENT

NPTEL-AICTE
Faculty Development Programme

(Funded by the MoE, Govt. of India)

This certificate is awarded to

DR A AMALA MITHIN MINTHER SINGH

for successfully completing the course

Teaching and Learning in General Programs: TALG

with a consolidated score of 60 %

Prof. Andrew Thangaraj
NPTEL Coordinator
IIT Madras

(Jul-Aug 2023)

The Department of Mechanical Engineering is pleased to acknowledge the successful completion of a specialized Faculty Development Programme by Dr. A. Amala Mithin Minther Singh, Head of the Department and Dean (Research). The program, titled "Teaching and Learning in General Programs (TALG)," was conducted under the joint initiative of NPTEL and AICTE, funded by the Ministry of Education, Government of India, during July-August 2023.

This four-week intensive course focused on enhancing pedagogical skills and modern educational methodologies essential for effective teaching in technical education programs. Dr. Singh successfully completed the program with a commendable performance, demonstrating a strong understanding of contemporary teaching-learning practices and educational technologies.

The certification, awarded by IIT Madras through the NPTEL platform, signifies Dr. Singh's commitment to continuous professional development and excellence in academic delivery. This achievement reflects the faculty's dedication to adopting innovative teaching methodologies that can significantly improve student learning outcomes and engagement in the classroom.

Participation in such nationally-recognized faculty development programs strengthens our institution's academic capabilities and contributes to the overall quality of technical education imparted to students. Dr. Singh's enhanced expertise in educational methodologies will benefit both students and fellow faculty members, promoting a culture of effective teaching and learning within the department.

This accomplishment aligns with the institution's commitment to maintaining high standards of academic excellence and continuous faculty improvement, ultimately contributing to the development of a more dynamic and effective learning environment for mechanical engineering students.

PARTICIPATION IN INTERNATIONAL FACULTY DEVELOPMENT PROGRAM

CERT NO: MITS/ME/2024/INTLFDP/308

Madanapalle Institute of Technology & Science

(UGC-Autonomous Institution)

Accredited by NBA & NAAC 'A+', Affiliated to JNTUA, Ananthapuramu

CERTIFICATE OF PARTICIPATION

This is to certify that Dr. A AMALA MITHIN MINTHER SINGH from **DMI College of Engineering** has actively participated in the 5 Day International Virtual FDP on **Global Conversations in Mechanical Engineering: Bridging Innovation and Sustainability** from 19th to 23rd February 2024, organized by the **Department of Mechanical Engineering, Madanapalle Institute of Technology & Science**, Andhra Pradesh, India.

Dr. Anantha Raman L.	Dr. Prithivirajan R.	Dr. S. Baskaran	Dr. C. Yuvaraj
Coordinator	Convener	HoD - ME	Principal
Asst. Professor, ME, MITS	Asoc. Professor, ME, MITS	MITS	MITS

The Department of Mechanical Engineering is pleased to acknowledge the active participation of Dr. A. Amala Mithin Minther Singh, Head of the Department and Dean (Research), in a Five-Day International Virtual Faculty Development Program. The program, titled "Global Conversations in Mechanical Engineering: Bridging Innovation and Sustainability," was organized by the Department of Mechanical Engineering at Madanapalle Institute of Technology & Science, Andhra Pradesh, from February 19th to 23rd, 2024.

This international FDP provided a platform for academicians and researchers to engage in discussions on integrating innovative technologies with sustainable practices in mechanical engineering. The program focused on emerging global trends, research methodologies, and pedagogical approaches that address contemporary challenges in the field while promoting environmental sustainability.

Dr. Singh's participation in this international program underscores a commitment to engaging with global academic communities and staying updated with worldwide advancements in mechanical engineering education and research. The certificate of participation, issued by an NBA-accredited and NAAC A+ graded institution, validates the successful engagement in this knowledge-sharing initiative.

This participation has enriched Dr. Singh's understanding of current international perspectives in mechanical engineering, which will significantly contribute to enhancing the department's curriculum development, research initiatives, and teaching methodologies. The exposure to global best practices in sustainability and innovation will benefit both students and faculty members, fostering a more internationally-aligned academic environment within the department.

The department recognizes the value of such international engagements in promoting academic excellence and innovation, and encourages continued participation in global knowledge exchange platforms to maintain our competitive edge in technical education.

ARTICLES

3D Printing: Transforming the Future of Manufacturing

3D printing, also known as additive manufacturing, is one of the most revolutionary technologies of the 21st century. Unlike traditional manufacturing methods that involve cutting, drilling, or molding materials, 3D printing builds objects layer by layer from a digital model. This process allows for the creation of complex shapes and customized designs with remarkable precision and minimal material wastage.

The technology has found applications across diverse fields. In healthcare, 3D printing is used to produce prosthetics, dental implants, and even bio-printed tissues. In the automotive and aerospace industries, it enables the development of lightweight components that enhance performance and reduce fuel consumption. Architects and designers also benefit from 3D printing by producing prototypes and intricate models in a cost-effective way.

One of the greatest advantages of 3D printing is rapid prototyping, which allows engineers and innovators to quickly test and refine their ideas. Additionally, it supports on-demand production, reducing the need for large inventories and transportation costs.

Although challenges such as limited material options and high initial costs remain, 3D printing continues to evolve rapidly. With ongoing advancements, it is set to revolutionize manufacturing, making production more sustainable, efficient, and accessible worldwide.

SUBMITTED BY,

Y.HUDSON SAFIN

II YEAR (MECH)

Fossil Fuels: Powering the World at a Cost

Fossil fuels, such as coal, oil, and natural gas, are the primary sources of energy used across the globe. They are formed from the remains of plants and animals that lived millions of years ago. Over time, heat and pressure transformed these remains into carbon-rich fuels, which today serve as the backbone of industrial and economic growth.

Fossil fuels play a vital role in generating electricity, powering vehicles, and driving industries. Their high energy content makes them reliable and efficient sources of power. For decades, they have fueled progress, enabling advancements in transportation, communication, and modern living.

However, the extensive use of fossil fuels comes with significant challenges. Burning them releases carbon dioxide and other greenhouse gases, which contribute to global warming and climate change. Additionally, mining and drilling activities harm ecosystems, while oil spills and air pollution pose threats to human health and the environment.

With reserves being finite, fossil fuels are not a sustainable long-term solution. This has led to a growing focus on renewable energy sources such as solar, wind, and hydro power. While fossil fuels remain dominant today, the future of energy lies in cleaner, greener alternatives to protect both people and the planet.

SUBMITTED BY,

A.NARENDRAN

II YEAR (MECH)

Heat Exchangers: Essential Devices in Thermal Systems

A heat exchanger is a device designed to transfer heat between two or more fluids without mixing them. It is widely used in industries and daily applications where heating or cooling is required. The basic principle involves allowing hot fluid to pass its heat to a cooler fluid, thus saving energy and improving efficiency.

There are different types of heat exchangers, such as shell-and-tube, plate, finned-tube, and air-cooled exchangers. Each design is chosen based on the application, type of fluids, and desired heat transfer rate. For example, shell-and-tube exchangers are common in power plants and refineries, while plate exchangers are popular in food processing and refrigeration systems.

Heat exchangers play a vital role in many industries. In power plants, they are used in boilers, condensers, and cooling towers. In automobiles, the radiator acts as a heat exchanger to cool the engine. Air conditioners and refrigerators also rely on heat exchangers to regulate temperature.

The efficiency of a heat exchanger depends on surface area, flow arrangement, and materials used. With growing demand for energy conservation, modern heat exchangers are being designed to be compact, efficient, and environmentally friendly, making them indispensable in today's world.

SUBMITTED BY,

I.DHANUSH

III YEAR (MECH)

Composite Materials: Engineering the Future

Composite materials are engineered materials made by combining two or more distinct substances to create a new material with superior properties. Typically, a composite consists of a **matrix** (such as plastic, metal, or ceramic) and a **reinforcement** (such as fibers, particles, or sheets) that provide strength and stiffness. Together, these components result in materials that are lightweight, durable, and highly versatile.

One of the most common examples is **fiber-reinforced composites**, like carbon fiber and fiberglass. These are widely used in aerospace, automotive, and sports industries because they offer high strength-to-weight ratios. For instance, aircraft and high-performance cars use carbon fiber composites to reduce weight while maintaining structural integrity.

In construction, composites such as reinforced concrete (concrete with embedded steel rods) are used to build bridges, buildings, and highways. Similarly, in medical applications, composite materials are used to manufacture prosthetics and implants, ensuring both strength and comfort.

The key advantages of composite materials include corrosion resistance, design flexibility, and long service life. However, they may be costly to produce and difficult to recycle. With ongoing research, composites are becoming more sustainable and affordable, making them essential for the future of engineering and technology.

SUBMITTED BY,

G.MANOJKUMARAN

III YEAR (MECH)

Mechatronics: Integrating Mechanics and Electronics

Mechatronics is a multidisciplinary field that combines **mechanical engineering, electronics, computer science, and control engineering** to design and develop advanced systems. The main goal of mechatronics is to create intelligent machines and products that are efficient, reliable, and user-friendly.

At its core, mechatronics integrates mechanical components with sensors, actuators, microcontrollers, and software. This combination allows machines to sense, process, and respond to changes in their environment. For example, a modern washing machine automatically adjusts water level and spin speed using mechatronic systems, improving both performance and energy efficiency.

Applications of mechatronics are found in almost every industry. In **automobiles**, mechatronics enables technologies like anti-lock braking systems (ABS), automatic gear shifting, and airbag deployment. In **robotics**, it allows robots to perform precise tasks in manufacturing and healthcare. In **aerospace and defense**, mechatronic systems enhance navigation, control, and safety. Everyday devices such as printers, drones, and smart home appliances are also products of mechatronic engineering.

. As industries increasingly adopt automation and artificial intelligence, the importance of mechatronics continues to grow, making it a key driver of innovation in the modern technological world.

SUBMITTED BY,

JACOB

IV YEAR (MECH)

Autonomous Vehicles: Driving into the Future

Autonomous vehicles, also known as self-driving cars, are advanced systems capable of navigating and operating without direct human control. They rely on a combination of sensors, cameras, radar, LiDAR, GPS, and artificial intelligence to perceive their surroundings, make decisions, and safely move from one place to another.

The technology behind autonomous vehicles is designed to reduce human error, which is a leading cause of road accidents. By analyzing real-time traffic conditions and detecting obstacles, these vehicles can improve road safety, enhance traffic flow, and reduce fuel consumption. They also provide mobility solutions for people who are elderly, disabled, or unable to drive.

Autonomous vehicles are categorized into different levels, ranging from Level 0 (no automation) to Level 5 (full automation, with no driver needed). Currently, most commercial systems, such as advanced driver assistance and autopilot features, fall between Levels 2 and 3, where the driver still shares control with the vehicle.

However, challenges remain. Issues such as cybersecurity, legal regulations, high costs, and unpredictable road conditions must be addressed before large-scale adoption. Despite these hurdles, autonomous vehicles are expected to revolutionize transportation, making travel safer, smarter, and more sustainable in the near future.

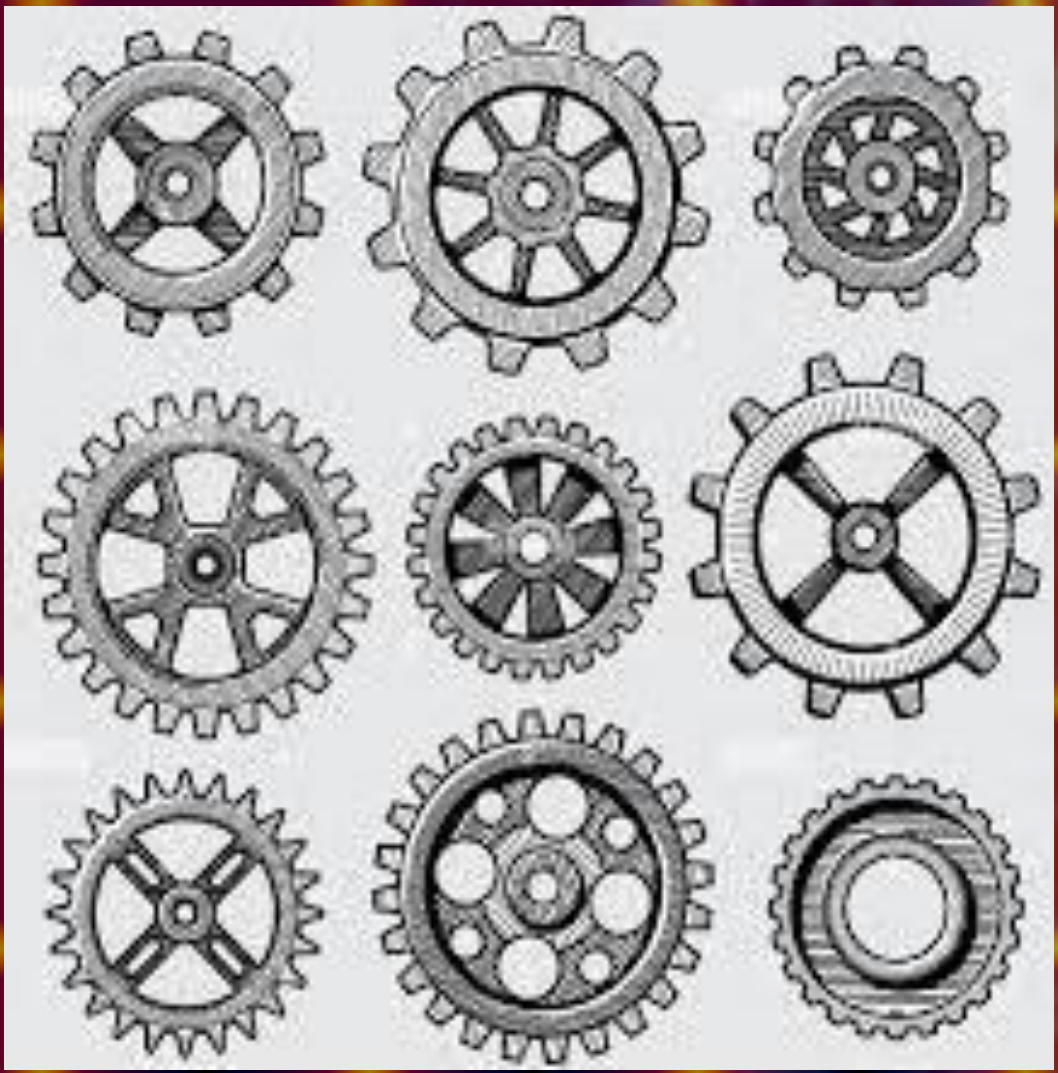
SUBMITTED BY,

MANO DAVID

IV YEAR (MECH)

ARTS

BY IIND MECH

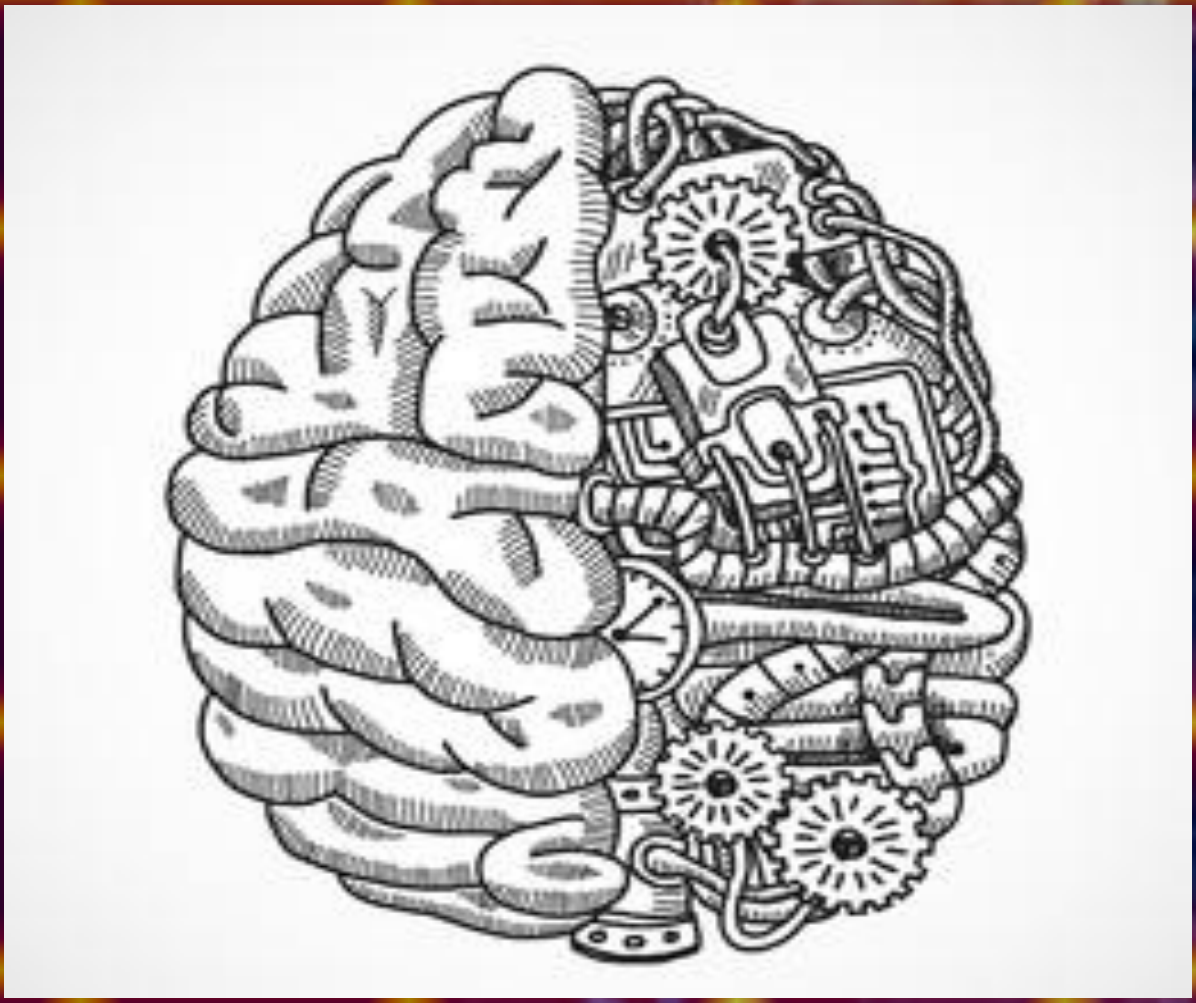


ART BY,

P.PRAVEEN RAJ

II YEAR (MECH)

BY IIIND MECH

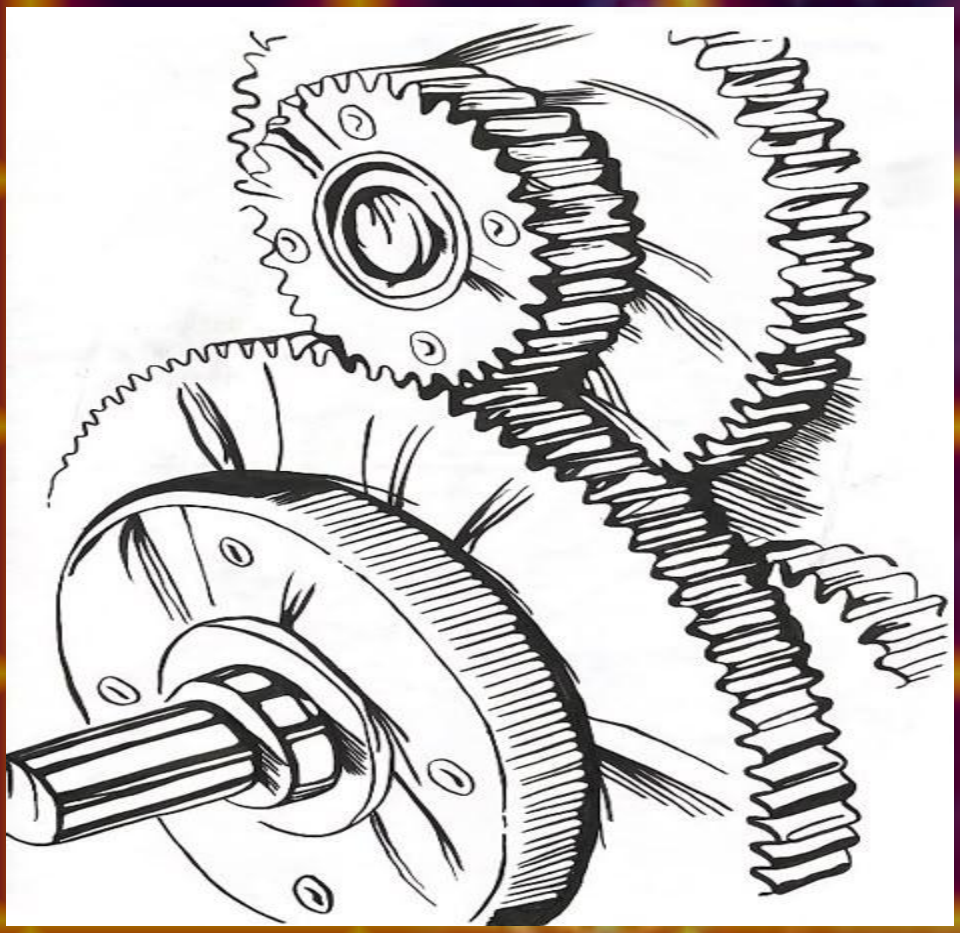


ART BY,

SHARON RAJ

III YEAR (MECH)

BY IVND MECH



ART BY,

THOMAS ALVA EDISON

IV YEAR (MECH)