

MECHANISTIC MARVEL

2nd Edition
JUNE-2021



BUILDERS ENGINEERING COLLEGE

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

ISO 9001:2015 Certified Institution & Accredited by NAAC with B++ Grade

Erode Road, Nathakadaiyur, Kangayam, Tirupur - 638 108, Tamil Nadu.

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PREFACE

The e-magazine is a quarterly magazine published by the mechanical department. In this edition poems from students, research papers from the faculty and articles on latest technological advancement are included. In addition to it magazine also provides space for the inclusion of various technical and cultural activities happened in the department during past three months.

The previous edition of this magazine was first initiative of the department towards publishing of department activities in electronic form and hence some typing /miscellaneous errors remained. This edition was far more crucially scrutinized and checked by some of the best faculties not of this department but also from through the college.

Hope this magazine becomes the reflection of mechanical department and will cater all the needs of readers.

Thank you!

Mr.C.SIVARAJ

Assistant Professor

Department of Mechanical Engineering

BEC.

CHAIRMAN's MESSAGE

Thiru. N. RAMALINGAM
CHAIRMAN - BEC



Erode Builder Educational Trust (EBET) has been founded by a group of like-minded visionaries who felt the need for an apex academic and professional educational institution, committed to deliver through a number of institutes, schools and colleges, high standards of academic excellence for enriching lives through value based education. Builders Engineering College (Formerly Erode Builder Educational Trust's Group of Institutions) was founded in the year 2009 by EBET.

As world evolves, all the people need to evolve for survival. To be evolved we provide a holistic environment and create opportunities. Our Institution attained the richest fame by the world-class Infrastructure, technological advancements, and human resources in a short span. The objective is to educate the rural young students to reach the dream destination. The tremendous support from all the stakeholders helped us to be successful in our vision.

CEO's MESSAGE

Dr. C. VENKATESH
CHIEF EXECUTIVE OFFICER



Students learn through academic and experiential learning. As a teacher, instilling the passion for learning lies in our hands. Let us travel together to attain the pinnacle of success.

BEC is approved by AICTE, New Delhi and affiliated to Anna University, Chennai. It is accredited by NAAC with B++. The campus is eco-friendly and equipped with excellent infrastructure, qualified and well experienced faculty members who strive hard to attain academic excellence in higher education by empowering students with knowledge, wisdom and experience.

PRINCIPAL's MESSAGE

Dr.S.GOPALAKRISHNAN
PRINCIPAL



It gives me an immense pleasure in welcoming you to Builders Engineering College (BEC), Nathakadaiyur, Tirupur 638 108. BEC (Formerly Erode Builder Educational Trust's Group of Institutions) was founded in the year 2009 by Erode Builder Educational Trust (EBET) with a vision to impart quality higher education to rural aspirants through innumerable institutions. It has been promoted by a group of likeminded visionaries with the unique objective of offering value based education to the students for a prosperous career.

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HoD's MESSAGE

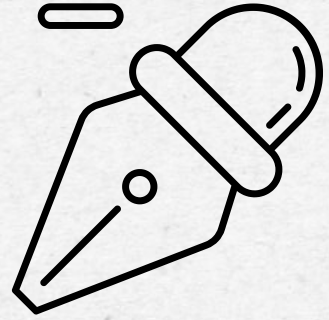
Mr.S.RAVI

**HEAD OF MECHANICAL ENGINEERING
DEPARTMENT**



The Department of Mechanical Engineering was started in the year 2009 with an intake of 60 students in the UG programme. The department aims to develop mechanical engineers who are innovative, entrepreneurial and equipped to become global leaders in research and technology. The objective of the department is to graduate individuals who can design systems, components or processes to meet desired needs within the realistic constraints such as economic, environmental, social, health, safety and manufacturability.

EDITORS NOTE



R.ARUN KUMAR
FINAL YEAR



K.ARUN
FINAL YEAR



G.AKASH
FINAL YEAR



B.AJAY
FINAL YEAR

DEPARTMENT VISION

- To be a leading light in, and renowned for, Mechanical Engineering and Research.

DEPARTMENT MISSION

- To maintain state of the art research facilities to provide collaborative environment that stimulates students and faculty members with opportunities to create, analyse, apply and disseminate knowledge.

PROGRAM SPECIFIC OUTCOMES (PSOs):

- PSO1: Apply the knowledge gained in Mechanical Engineering for design and development and manufacture of multi-disciplinary engineering systems and projects.
- PSO2: Use the knowledge acquired to investigate research problems in mechanical engineering with due consideration for environmental and social impacts.

SALIENT FEATURES of OUR DEPARTMENT:

- Exemplary Placement Record.
- Hands on Workshop on Trending Technology.
- Academic Incentives for Top Performers.
- Empowered Faculty Members and Grabbed National and International Awards.
- Strong Industry Tie-Ups.
- Smart Class Rooms & Learning Management Systems.
- Students are given Opportunity to Organize Major Events of the Department.
- National level Champions in Sports and Games.

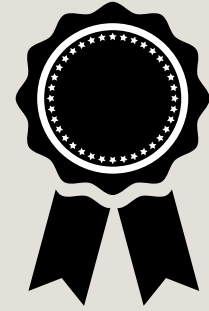
MoU:

- Schwing Stetter India Pvt. Ltd., Chennai.
- Harita Techserv (TVS Group), Chennai.
- Trimble Solutions India Pvt. Ltd., Mumbai.
- Simem Constructions & Environmental Engineering Pvt . Ltd., Gujarat.

PROGRAM OUTCOMES:

- Apply the knowledge gained in Mechanical Engineering for design and development and manufacture of multi-disciplinary engineering systems and projects.
- Use the knowledge acquired to investigate research problems in mechanical engineering with due consideration for environmental and social impacts.

MECHANICAL ENGINEERING





FACULTY ARTICLES

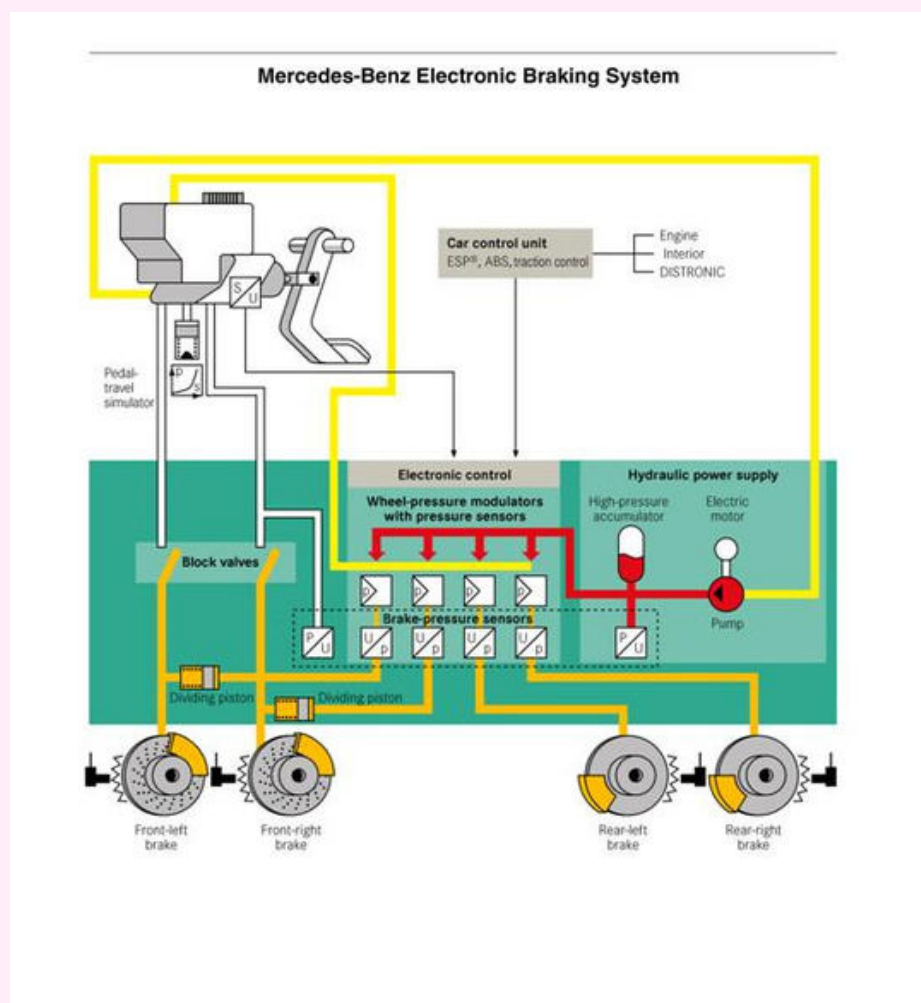
SENSOTRONIC BRAKE CONTROL SYSTEM

-Mr.R.SENTHIL

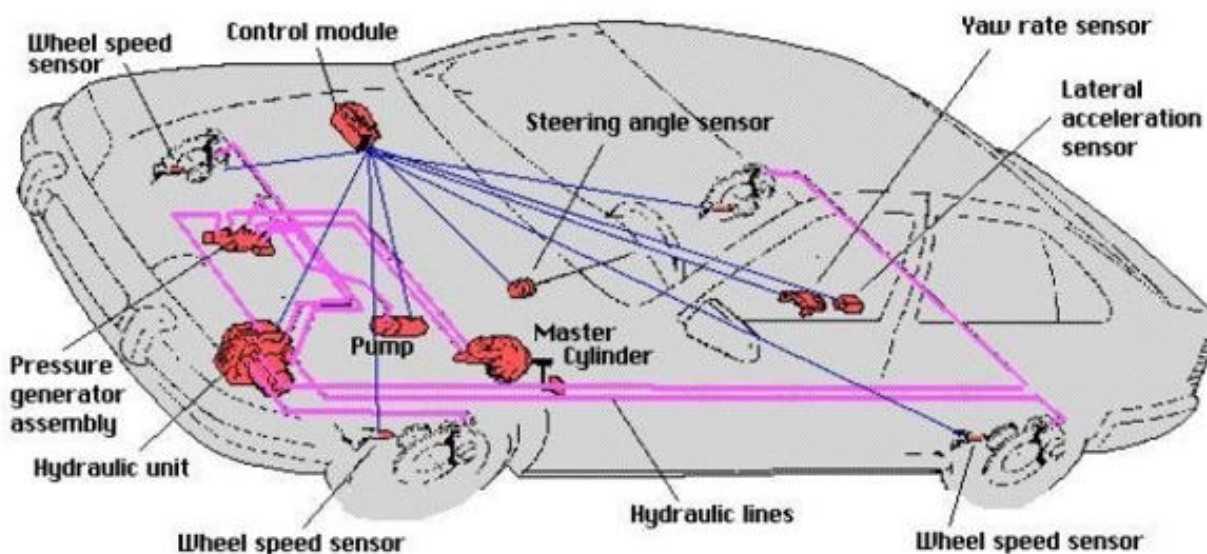
Assistant Professor

When drivers hit the brake pedal today, their foot moves a piston rod which is linked to the brake booster and the master brake cylinder. Depending on the pedal force, the master brake cylinder builds up the appropriate amount of pressure in the brake lines which – in a tried and tested interaction of mechanics and hydraulics – then presses the brake pads against the brake discs via the wheel cylinder. By contrast, in the Mercedes-Benz Sensotronic brake. The brake booster will not be needed in future either. Instead sensors gauge the pressure inside the master brake cylinder as well as the speed with which the brake pedal is operated, and pass these data to the SBC computer in the form of electric impulses To provide the driver with the familiar brake feel, engineers have developed a special simulator which is linked to the tandem master cylinder and which moves the pedal using spring force and hydraulics. In other words: during braking, the actuation unit is completely disconnected from the rest of the system and serves the sole purpose of recording any given brake command. Only direct hydraulic link between the brake pedal and the front wheel brakes in order to decelerate the car safely The central control unit under the bonnet is the centrepiece of the electrohydraulic brake. This is where the interdisciplinary interaction of mechanics and electronics provides its greatest benefits – the microcomputer, software, sensors, valves and electric pump work together and allow totally novel, highly dynamic brake management: In addition to the data relating to the brake pedal actuation, the SBC computer also receives the sensor signals from the other electronic assistance system

the antilock braking system (ABS) provides information about wheel speed, while Electronic Stability Program (ESP) makes available the data from its steering angle, turning rate and transverse acceleration sensors. The transmission control unit finally uses the data highway to communicate the current driving range. The result of these highly complex calculations is rapid brake commands which ensure optimum deceleration and driving stability as appropriate to the particular driving scenario. What makes the system even more sophisticated is the fact that SBC calculates the brake force separately for each wheel.



the SBC pedal from the rest of the brake system and the proportional pressure control using mechatronics serve to increase brake comfort – particularly during sharp deceleration or when the antilock braking system is operational. The usual vibration of the brake pedal when ABS sets in does not occur, which, Mercedes engineers have found, is not only a comfort feature of the new system but also offers measurable safety benefits. Their research in DaimlerChrysler's Berlin driving simulator has revealed that almost two thirds of all drivers are startled when ABS pulsation sets in: they do not increase the brake force further and are even prone to taking their foot off the brake pedal for a short while, thereby lengthening the stopping distance of their vehicle – in the driving simulator by an average of 2.10 metre's – 7 feet – during ABS braking from 60 km/h – 37 MPH – on a snow-covered road surface. Mechatronics – a new term is gaining popularity within the automotive industry and is rapidly developing into the catchword of a quiet technological revolution which in many fields stands century-old principles on their head. Mechatronics brings together two disciplines which in many cases were thought to be irreconcilable, namely mechanics



which hitherto worked purely mechanically and partly with hydraulic assistance will in future be controlled by high-performance microcomputers and electronically controllable actuators. These either replace the conventional mechanical components or else enhance their function. The mechatronic interplay therefore opens up hitherto inconceivable possibilities to further raise the safety and comfort levels of modern passenger cars. For example: it was only possible through mechatronics that an electronically controlled suspension system which instantly adapts to prevailing conditions when driving off, braking or cornering thus providing a totally new driving experience became a reality



MAGNETIC FUEL ENERGIZER

-Mr.C.SIVARAJ
Assistant Professor

Fossil fuels leave a natural deposit of carbon content that choke carburetor, fuel injector, leading to decrease the mileage and wastage of fuel. In this era of increasing fuel price, here a device called 'Fuel Energizer' helps us to Reduce Petrol/Diesel/Cooking gas Consumption up to 28%, or in other words this would be equal to buying the fuel upto 28% cheaper prices. When fuel flows through powerful Magnetic field created by Magnetic Fuel Energizer, The Hydrocarbon change their orientation and molecules in them change their configuration.

The Result is Molecules get realigned, and actively interlock with oxygen during combustion to produce a near complete burning of fuel in combustion chamber. This seminar focuses on the idea of 'Magnetic Fuel Energizer', its working principle, components, installation technique, Comparison between the Catalytic Converter and the Magnetizer, its utility, benefits, recent developments etc. The Fuel Energizer has been tested and developed for the Indian Market. The fact that taken into account a vehicle's performance is often affected by the level of adulteration in the fuel used.

The Fuel Energizer has been adapted and developed with Indian conditions in mind and it is the first such device in India that can make this claim. "FUEL ENERGIZER" helps to reduce fuel consumption up to 30%.

When fuel flows through powerful magnetic field created by Magnetizer inter molecular FUEL INLET FUEL OUTLET forces is considerably reduced or depressed hence oil particles are finely divided. This has the effect of ensuring that fuel actively interlocks with oxygen producing a more complete burn in the combustion chamber.

This result in higher engine output, better fuel economy and a reduction in the exhaust emission of hydrocarbons, carbon monoxide and oxides of nitrogen through the muffler. The magnetic ionization of the fuel also helps to dissolve the carbon build-up in carburetor jets, fuel injectors and combustion chambers and thus keeping the engine in a cleaner condition. It was established in 1994 by an English Scientist.' FUEL ENERGIZER ' Reduce fuel consumption upto 28%.Magnetizer Fuel Energizer, the hydrocarbon molecules change their configuration due to magnetic field.

Fuel actively interlocks with oxygen producing complete burning in the combustion chamber. Magnetizer fuel energizer (Neodymium super conductor – NSCM) is installed immediately before carburetor or injector on fuel line. On home cooking gas system it is installed just before burner. Most IC Engine fuels are liquid, but liquid fuels does not combust until they are vaporized and mixed with air.

Motor Vehicles Exhaust consist of unburned hydrocarbon, carbon monoxide, The ionization of the fuel also helps to dissolve the carbon build-up in carburetor jets, fuel injectors and combustion chambers, keeping the engine clean. Conversion of para to ortho hydrogen occurs. Declustering of hydrocarbons resulting in effective mixing with oxygen. Oxygen can effectively react with carbon in hydrocarbons under high intensity magnetic field. One of the chief reasons for the Magnetizer to have possibility to lower the NO₂ level, as reported elsewhere, is due to the low reactivity of nitrogen gas.



STUDENT ARTICLES



Current Trends in Robotics Development

–GOKUL P
Final Year

- Robots typically help humans perform repetitive, dangerous or unergonomic tasks and have become an integral part of today's industrial environment. Depending on the robot, they offer a range of advantages that a human being cannot provide to such an extent. They can move with great speed and precision and perform their tasks with consistently high quality.
- With today's challenges, such as the shortage of specialized workers and changing market demands, robotics is becoming an increasingly important factor influencing business success. This is where various research projects within the scope of the "Center for Digitization and Technology Research of the German Armed Forces" (dtec.bw) come in and attempt to facilitate the integration of robots in the industrial domain



- The paper is structured as follows. In the next section, current trends in robotics are described, which are examined in more detail in the dtec.bw research projects, and their advantages and disadvantages are discussed. The trends considered in this paper include established industrial robots, lightweight robots, and mobile robots. In addition, other trends that include drones and modular robotics are summarized. The paper concludes with a summary and outlook.

- Industrial robots represent a subfield of automation technology and, as universally programmable motion machines, enable the handling and processing of workpieces. Regarding kinematics, industrial robots can be divided into serial and parallel kinematics. In serial kinematics, the structure is serial, to an open kinematic chain. However, parallel kinematics involves a parallel, closed kinematic chain that couples axes of motion together. In the following, we will focus on serial kinematics, which is most represented in industrial robots.
- The advantage of industrial robots is the high degree of automation, which combines high time utilization with consistent work quality, leading to increased efficiency. The high repeatability and flexibility are further advantages of industrial robots. Furthermore, industrial robots enable safe working in areas that are potentially dangerous for humans. However, industrial robots have disadvantages, such as high acquisition, operating costs, and expertise required for proper setup and programming. Due to high forces and possible injury risks from the end effector, protective devices (fences) are required. In addition, the advantage of high flexibility includes the disadvantage of low specialization. For example, absolute accuracies are always a disadvantage compared to specialized machine tools.

Efficiency of Thermal Power Plants in India

– PRAVEENKUMAR M
Final Year

- Electricity is a key element of infrastructure and is vital to a country's economic development and growth. It is an essential input in various sectors of the economy such as industry, agriculture as well as commercial and domestic sectors.
- During the past two decades, the power industry, usually a public monopoly, has been subject to wide-scale structural, institutional, and regulatory reforms in many developed and developing economies.¹ In most of these countries, there is a growing disenchantment with the state's ability to supply electricity efficiently either due to paucity of resources or for want of accountability and incentives in management of resources.
- The reforms have focused largely on the 'unbundling' of power generation, transmission, and distribution systems to allow private firm participation in the power industry (Rao; Kalirajan and Shand, 1998).

Thermal Power Plants in India:

- Policy distortions also affect the production of power plants. These distortions include a high tariff on import of superior quality coal that has virtually banned coal imports into India. Washed coal has not been available to power plants because the nationalized coal industry has not been allowed to set up coal washeries and private investment in washeries has been prohibited. However, the Indian government has recently initiated economic reforms in the coal sector which have led to a lower import duty on coal and deregulated and increased domestic prices of coal (TERI, 2002). As a consequence, a large number of coal-based thermal power plants have started importing coal. The Indian government has also allowed private investment in coal washeries and several coal washeries are being constructed (Khanna and Zilberman, 1999).
- Lastly, policymakers can use the latest available estimates of plant-specific technical efficiency provided by this study to improve the performance of thermal power plants in India.



- Various parametric restrictions lead to a number of interesting cases. Setting the mean value (μ) equal to zero reduces the model to the traditional halfnormal distribution model¹⁰. Similarly, setting the fraction of variation in output explained by the residual term (γ) equal to zero gives rise to the full TE case. If the unknown parameter (ρ) equals zero, then TE is time-invariant (i.e. plants never improve their TE)".

Development of Mechanical Engineers Skills for an Emerging Electric Vehicles Industry

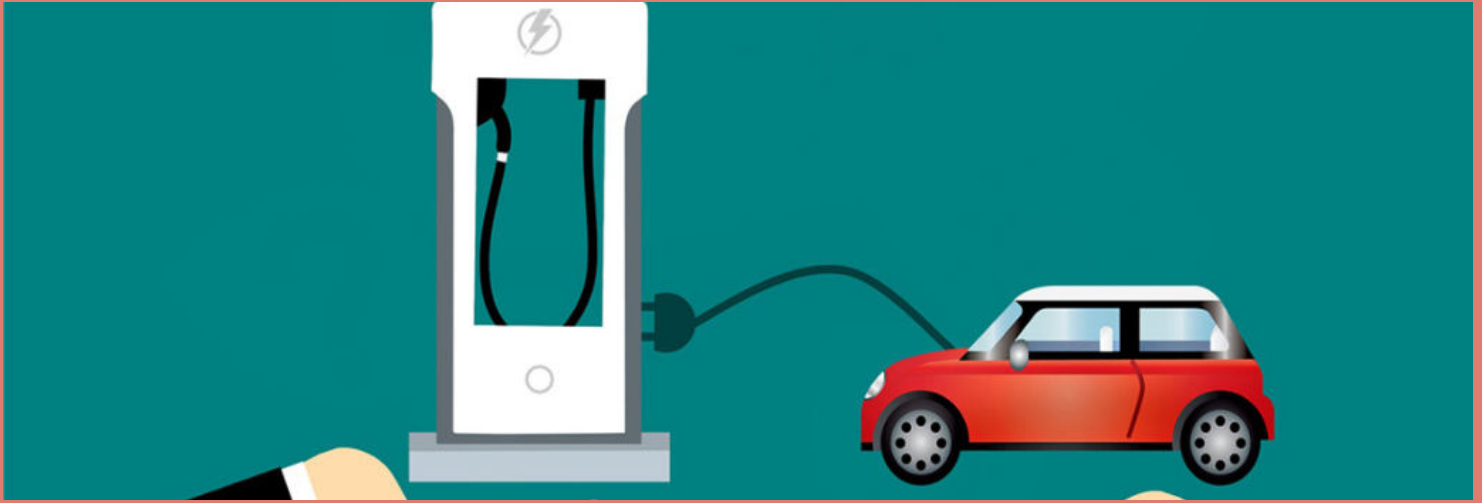
– VAISHNAVI S
Final Year

The last ten years have seen a steady stream of inventive and beneficial advances in the field of electric vehicles (EVs), which may help society in a variety of ways, from improved quality of life to economic and environmental benefits.

The market for plug-in electric vehicles for passengers is growing significantly. In 2021, a total of 6.75 million electric vehicles were sold. In 2021, more EVs were sold in a single week than were sold in the entire year of 2012. In the first half of 2022, a total of 4,3 million new EVs were delivered, an increase of +62% over the first half of 2021 . In the following years, it is expected that this tendency will continue.

The governments of KSA and the UAE are making significant investments in the Gulf area to achieve a 30% EV penetration rate by 2030 .

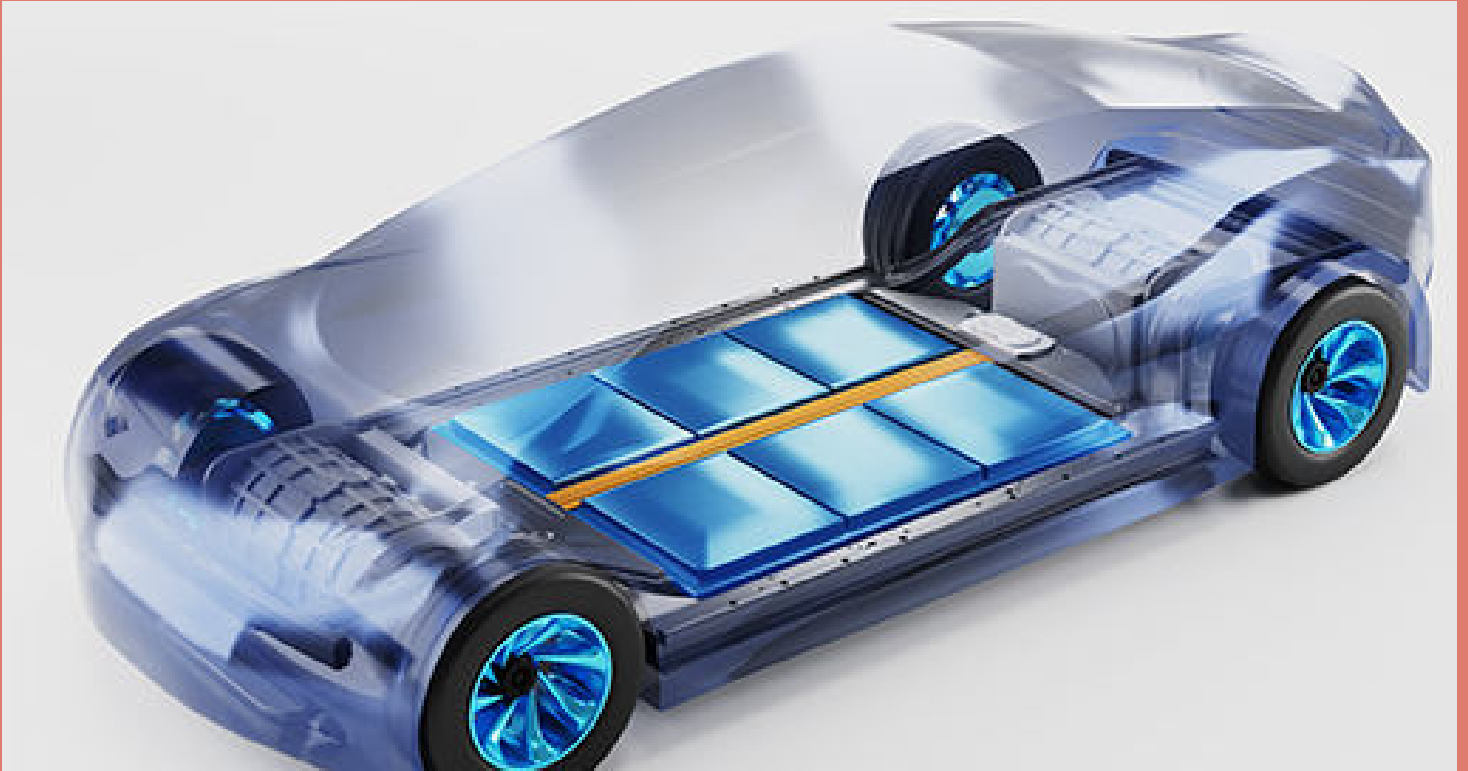
By putting money into EVs and renewable energy sources, KSA and the UAE have demonstrated a progressive approach to the adoption of EVs.



The ecosystem of smart electric transportation includes more than just electric vehicles. New electric mobility technologies will undoubtedly alter the demands of the labor market in cities. A wider and more adaptable set of skills are necessary for highly qualified professionals .

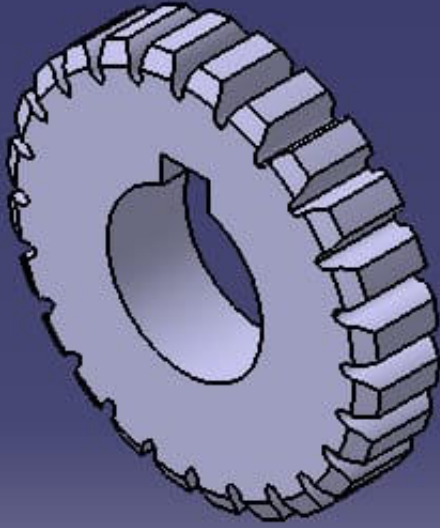
In order to keep up with trends in the business and in the field of research, academic programs must incorporate new technologies.

The authors of focused on challenges related to electric mobility to identify acceptable educational approaches that would be helpful when teaching about electric mobility at various educational levels. The improvement of graduate curricula in advanced automobile industry has been covered in earlier works. The experiences from global initiatives created through partnership with students from various colleges around the world have been recounted in .



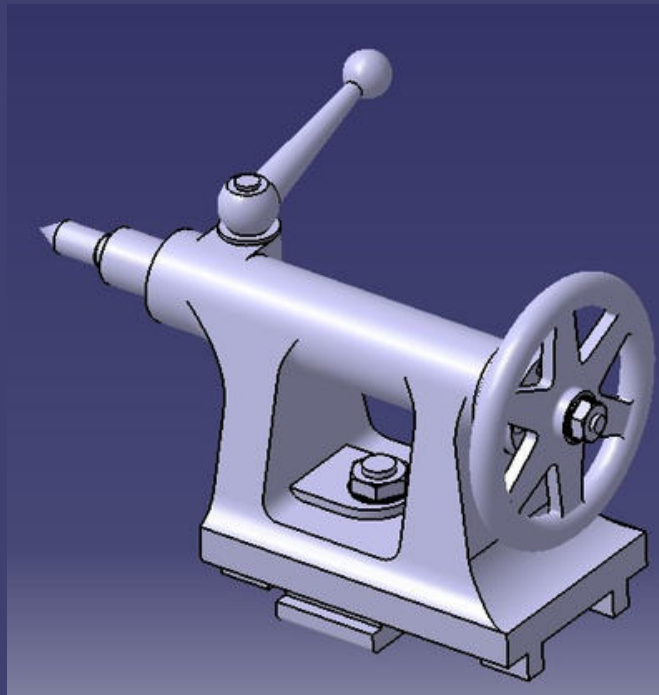
The analysis produced a classification of the job duties, technical abilities, and engineering tools necessary for a mechanical engineering graduate to pursue a career in the field of EVs and EM. This analysis might be helpful for designing new courses, adding existing ones, or revising existing programs domain of electric vehicles

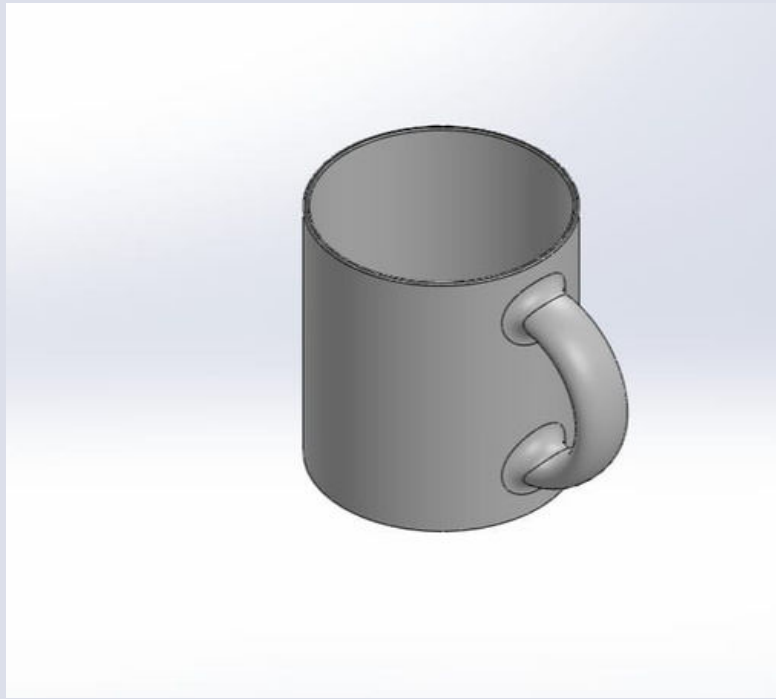
CAD Models



**S.VIVEK
FINAL YEAR**

**G.GOWERI SANKAR FINAL
YEAR**





V.VIGNESH
FINAL YEAR

