Rayat Shikshan Sanstha's

KARMAVEER BHAURAO PATIL POLYTECHNIC, SATARA

NEWSLETTER

ODD SEMESTER 2023-24

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Official Newsletter of

DEPARTMENT OF MECHANICAL ENGINEERING

OUR TRIBUTE

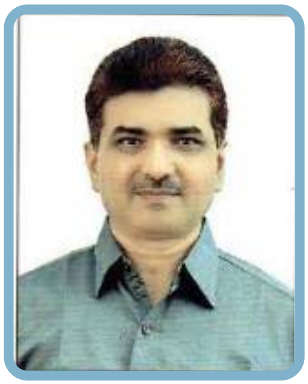
Dr.Karmaveer Bhaurao Patil
Founder,
Rayat Shikshan Sanstha,
Satara

Sou. Laxmibai Bhaurao Patil
Rayat Mauli

OUR DESK'S

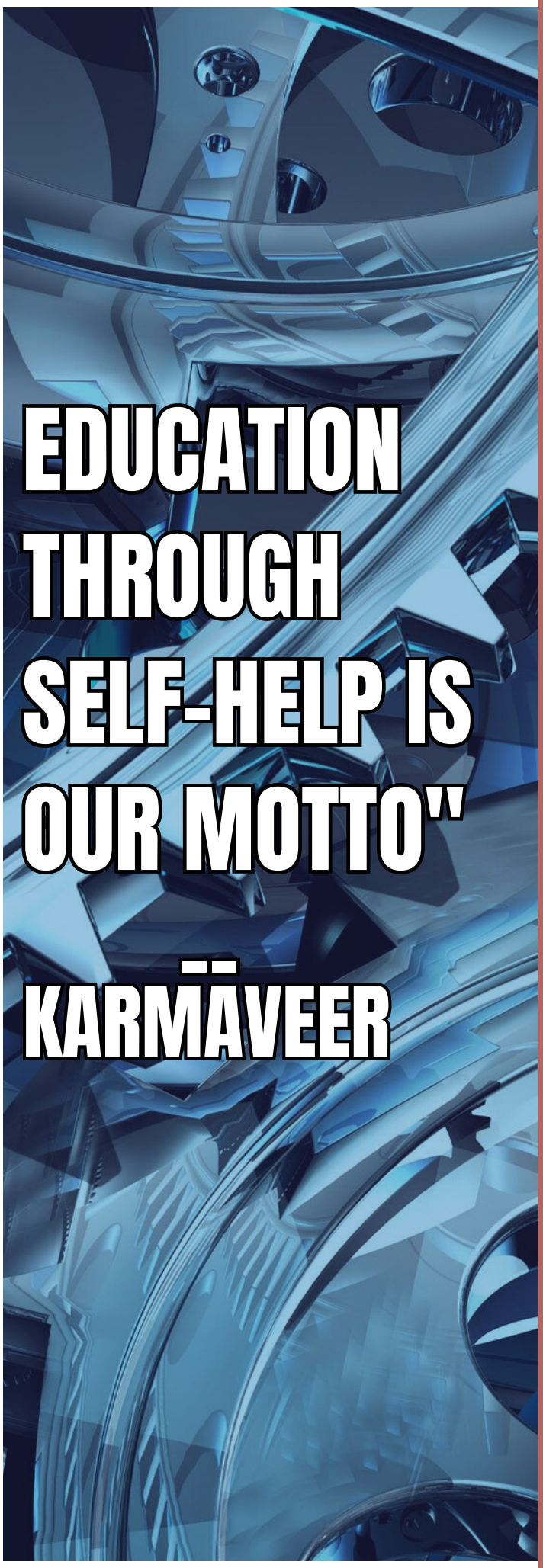
Hon'ble Chandrakant Dalvi,
IAS(Retd)
Chairman
Rayat Shikshan Sanstha,
Satara

Hon'ble Shri.Vikas Deshmukh,
IAS(Retd)
Secretary
Rayat Shikshan Sanstha,
Satara



Hon'ble Prin. Dr.Dnyandev Mhaske
Joint Secretary
Rayat Shikshan Sanstha,
Satara

Hon Dr. K. C. Shaikh
I/c Principal
Karmaveer Bhaurao Patil Polytechnic
Satara



VISION

Mechanical engineering department strives to provide quality technical education and to provide the best and efficient technicians for meeting day to day challenges of industries.

MISSION

To empower the mechanical human resource at grass root level through strengthening technical education

IN THIS ISSUE

Karmaveer Bhaurao Patil Polytechnic , Satara Received “Best Polytechnic” Award in satara Region from Er. Rupesh Mahamuni Vice President Engg. Deptt. Legacy Life Spaces, Pune on occasion of Engineer's Day 2023 arranged by BAI, Satara Centre.

Certificate Of Honor

BUILDERS ASSOCIATION OF INDIA
SATARA CENTRE

THIS CERTIFICATE HAS BEEN AWARDED TO
KARMAVEER BHAURAO PATIL POLYTECHNIC, SATARA

as “BEST POLYTECHNIC”

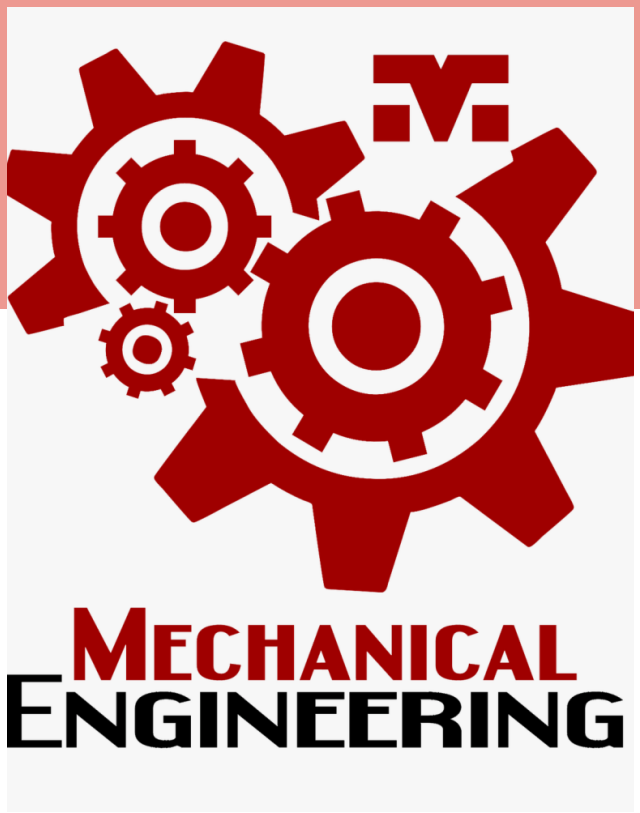
IN SATARA REGION ON
ACADEMIC PERFORMANCE FOR YEAR 2022-23
Date : 15th September 2023

Kaustubh More
Secretary

Anil Datir
Chairman

Certificate of Honor Awarded by Builders Association of India (Satara Region) for Academic Performance for 2022-23

ABOUT MECHANICAL ENGINEERING DEPARTMENT



Mechanical engineering is one of the oldest branches of engineering. It is also referred to as the mother branch of engineering. Another appealing feature of mechanical engineering is that the application base of this field of study is extremely broad and diverse. Almost all inventions during the ancient period and a vast majority in the modern era are direct contributions of one or the other application of mechanics. Traditionally, mechanical engineers have to deal with concepts such as mechanics, thermodynamics, robotics, kinematics, structural analysis, fluid mechanics and many others. These concepts are applied in the process of designing state-of-the-art manufacturing units, different types of motor vehicles, aircraft and aerospace parts and a vast assortment of industrial machinery. Mechanical engineers also contribute in the development of various engines, power plant equipment, heating and cooling systems and other simple and complex machinery. Mechanical engineers not only design new mechanical systems but they are also responsible for testing, maintaining and manufacturing them. The aforementioned are the conventional roles and responsibilities of mechanical engineers.

However, times have changed. Nowadays the scope of mechanical engineering is expanding beyond its traditional boundaries. Mechanical engineers are focusing their attention towards new areas of research such as nanotechnology, development of composite materials, biomedical applications, environmental conservation, etc. The ever increasing scope of this particular job profile now requires professionals to get into financial and marketing aspects of product development and even into people and resource management. All in all mechanical engineering offers a wide bouquet of job options to students who are looking for a stable and stimulating career.

PROGRAM OUTCOMES (PO'S) OF MECHANICAL ENGINEERING DEPARTMENT

At the entry point of the industry soon after successful completion of the diploma program, students will be able to

PO 1 – Basic and Discipline specific knowledge: Apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems.

PO 2 – Problem analysis: Identify and analyse well-defined engineering problems using codified standard methods.

PO 3 – Design/ development of solutions: Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.

PO 4 – Engineering Tools, Experimentation and Testing: Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.

PO 5 – Engineering practices for society, sustainability and environment: Apply appropriate technology in context of society, sustainability, environment and ethical practices..

PO 6 – Project Management: Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.

PO 7 – Life-long learning: Ability to analyse individual needs and engage in updating in the context of technological changes

PROGRAM SPECIFIC OUTCOMES (PSO'S) OF MECHANICAL ENGG. DEPARTMENT

At the entry point of the industry soon after successful completion of the Mechanical Engineering Diploma program, students will be able to

PSO 1 – Modern Software Usage: Use latest Mechanical engineering related software's for simple design, drafting, manufacturing, maintenance and documentation of mechanical engineering components and processes.

PSO 2 – Equipment and Instruments: Maintain equipment and instruments related to Mechanical Engineering.

PSO 3 – Mechanical Engineering Processes: Manage Mechanical engineering processes by selecting and scheduling relevant equipment, substrates, quality control techniques, and operational parameters

PRINCIPAL'S DESK

Dear students and faculty members,

It brings me immense joy to introduce the latest edition of our Mechanical Engineering Department Newsletter, a platform that encapsulates the vibrancy and ingenuity of our department's activities.

Through this newsletter, we aim to provide a glimpse into the remarkable achievements of our students and faculty.

I encourage each one of you to actively engage with the content presented in this newsletter, to explore new ideas, and to participate in the ongoing dialogue that shapes our collective journey towards excellence. Let us seize the opportunities that technology presents us with, and let us continue to push the boundaries of what is possible.

DR. K. C. SHAIKH

I/C PRINCIPAL
KARMAVEER BHAURAO PATIL POLYTECHNIC, SATARA

HOD'S DESK

As the Head of the Mechanical Engineering Department at Karmaveer Bhaurao Patil Polytechnic, Satara, I am delighted to welcome you to the latest edition of our technical newsletter.
Our diploma program provides a comprehensive education in mechanical engineering, and our faculty and staff are dedicated to providing you with practical training and the necessary skills to succeed in the industry. I am proud to see our students excel in various events

The department has a rich tradition of pursuing academic excellence and providing congenial environment for the overall development of its students. This newsletter provides a panoramic view of the academic, co-curricular activities and achievements of the faculty and students of this Department. I congratulate the editorial team for their sincere effort to bring out the news letter in time. This issue of newsletter should inspire all of us for a new beginning; enlighten us with hope, confidence and enthusiasm towards the road ahead.

MR. N. B. DEVI

I/C HEAD OF DEPARTMENT (MECHANICAL ENGINEERING)

EDITOR'S DESK

Mr. P.V. ZORE **Lecturer (Mechanical Engineering)**

Welcome to latest edition of Newsletter published by Department of Mechanical engineering . At the outset, let me deeply and whole-heartedly thank our Principal, Head of Department and all my colleagues who have extended their kind and timely support for the release of this newsletter.

This issue is a fountain of information on the various activities and triumphs of our Department during the last semester. Be sure to read it all to gain an even better insight of our prestigious department. Enjoy reading. As always, we welcome your comments.

ABOUT D-MESA

Diploma Mechanical Engineering Student Association (DMESA) is an Association formed by the students of Mechanical Engineering Department to foster the growth of knowledge. With the support and guidance of the faculty, Technical and Nontechnical events are organized for assisting students to increase their knowledge and skills in planning, delegating, decision making and to develop a more positive and realistic attitude toward themselves, their peers and the institute. It provides opportunities for social interaction among organization members. Under DMESA we have conducted various events as paper presentation, industrial visits, guest lectures, soft-skills development programs, welcome function to all new comers of the entire Mechanical Engineering Department.

OUR FACULTY MEMBERS

SR. NO	NAME	DESIGNATION	QUALIFICATION	Experience In Years
1	MR. N. B. DEVI	HEAD OF DEPARTMENT	M. E. (MECHANICAL – PRODUCTION)	36
2	MR. S. G. SHERKAR	WORKSHOP SUP.	M. E. (MECHANICAL – PRODUCTION)	35
3	MR. P. V. ZORE	LECTURER	B. E. (MECHANICAL)	11
4	MR. S. S. YEWALE	LECTURER	M. E. (MECHANICAL – HEAT POWER)	11
5	MR. K. B. DHANAWADE	LECTURER	M. E. (MECHANICAL – HEAT POWER)	10
6	MR. R. V. KUMBHAR	LECTURER	B. E. (PRODUCTION)	9
7	MISS K. H. SAKHARE	LECTURER	B. E. (MECHANICAL)	8
8	MR. R. S. MANE	TPO	B. E. (PRODUCTION)	9
9	MISS. P. R. YADAV	LECTURER	M. E. (PURSUING)	5

DMESA COMMITTEE

SR. NO	POST	CLASS	NAME
1	PRESIDENT	TY	MULANI PALAK SHAFIUDDIN
2	VICE – PRESIDENT	SY	CHIPLUNKAR YASH MILIND
4	TREASURER	TY	GUJAR AKSHAY SHIVAJI
5	TREASURER	SY	LOHAR ATUL SUNIL
6	AUDITOR	TY	BHANDIRGE OMKAR BALASAHEB/ DHURGUDE SUYASH ARUN
7	AUDITOR	SY	DOUND ATHARV ANKUSH
8	CLASS REPRESENTATIVE	TY	DESHMUKH SANKET TANAJI
9	CLASS REPRESENTATIVE	SY	KACHARE ATHARV SACHIN
10	LADIES REPRESENTATIVE	TY	THORAT ARYA AKASH
11	LADIES REPRESENTATIVE	SY	GAIKWAD SAMRUDDHI SANTOSH
12	CLASS REPRESENTATIVE	FY	HARSHVARDHAN MOHAN RATHOD

DEPARTMENTAL ACTIVITIES

EXPERT'S LECTURE

Expert Guest Lecture delivered by Mr. Satwadhir Pawar from Sungrace Computers Pvt Ltd. Pune on topic of CAD/CAM/CIM on 07 October 2023 for SYME and TYME Students.

EXPERT'S LECTURE

Expert Guest Lecture delivered by Ms. Neha Pendse from Cummins Technologies India on topic of Cummins Scholarship Program on 23 September 2023 for FY and SY Students.

DEPARTMENTAL ACTIVITIES

EXPERT'S LECTURE

Expert Guest Lecture delivered by Prof. R. N. Dhane from SVERI College of Engineering, Pandharpur on topic of CNC Part Programming on 21 October 2023 for TYME Students.

EXPERT'S LECTURE

Expert Guest Lecture delivered by Mr. Vaibhav Raut from Maharashtra Scooters on topic of Opportunities for Mechanical Engineering on 15 September 2023 for TYME and SYME Students.

WELCOME FUNCTION

The Mechanical Engineering department organized a welcome function for first-year and direct second year students on 13 October 2023. The event aimed to introduce the students to the polytechnic environment and provide them with a warm welcome. The function included various cultural activities, games, and interactions with senior students and faculty members. Event was successfully coordinated by Mr. S. S. Yewale

PARENTS-TEACHER-STUDENTS MEET 2023-24

Venue : Auditorium

Parents-Teachers-Students Meet Organised by Mechanical Engineering Department on 07 OCT 2023 for parents whose ward are in Second Year and Third year of Mechanical Engineering Diploma.

Outline of Meeting

1.Overview of Mechanical Department

2. Academic Activities 2023-24

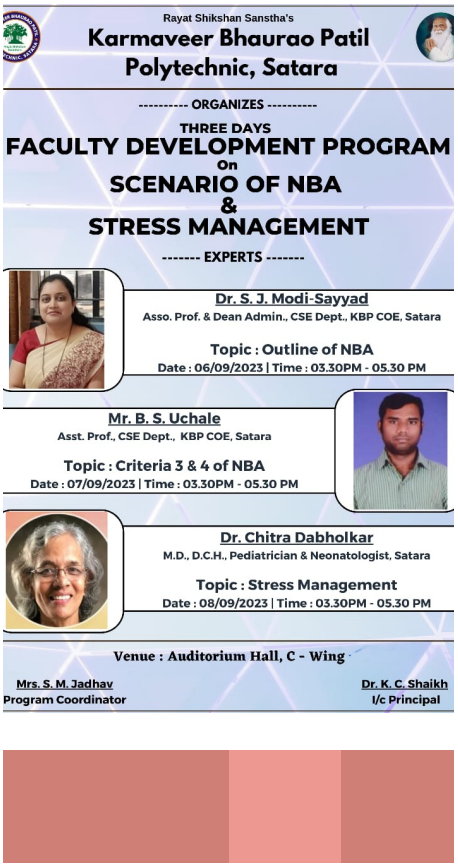
3. Class Test and MSBTE Exam

4. Feedback of Parents

EXTRA CURRICULAR ACTIVITIES

Active Participation in Various Extra Curricular and Co-Curricular activities Organised By Other Departments

FACULTY DEVELOPMENT PROGRAM



Active Participation in Various FDP For NBA Organised in Our Institute

INDUSTRIAL VISIT

INDUSTRIAL VISIT 01

Industrial Visit of THIRD YEAR STUDENTS WERE ORGANISED AT Vishwakarma Engineering, Dhamner, Satara ON 28TH October 2023

INDUSTRIAL VISIT 02

Industrial Visit of THIRD YEAR STUDENTS WERE ORGANISED AT Krishna links, Satara ON 06 NOVEMBER 2023

INDUSTRIAL VISIT 03

Industrial Visit of THIRD YEAR Students were organised at ST Stand Workshop ON 10 october 2023

INDUSTRIAL VISIT 04

Industrial Visit of SECOND YEAR MECHANICAL ENGINEERING STUDENTS WERE ORGANISED AT welflow engg company satara ON 06 NOVEMBER 2023

MASTERING THE ART OF DECISION MAKING: A GUIDE TO BETTER CHOICES

Dr. Karim. C. Shaikh
I/c Principal
Karmaveer Bhaurao Patil Polytechnic, Satara

FACULTY DESK

Introduction: Decision-making is a ubiquitous aspect of human life, influencing outcomes both minor and monumental. From mundane daily choices to life-altering decisions, our ability to navigate options effectively determines our success and fulfillment.

Understanding Decision-Making: Decision-making involves a complex process of gathering information, evaluating alternatives, and making choices. However, it's not always a purely rational process; cognitive biases, emotions, and environmental factors often influence our decisions.

Psychological Influences: Psychological factors like confirmation bias and anchoring bias can distort our judgment. Confirmation bias leads us to seek information that confirms our existing beliefs, while anchoring bias makes us overly reliant on initial information, skewing our perspective. Recognizing and addressing these biases is crucial for making sound decisions.

Emotional Factors: Emotions play a significant role in decision-making, sometimes clouding our judgment. Fear can lead to risk aversion, preventing us from taking necessary but uncertain actions

Common Pitfalls: Several common pitfalls hinder effective decision-making. Procrastination, analysis paralysis, and decision fatigue are prevalent challenges. Procrastination occurs when we delay decisions due to fear or discomfort, while analysis paralysis happens when we're overwhelmed by options. Decision fatigue sets in after making numerous choices, leading to decreased decision quality over time.

Strategies for Improvement: To enhance decision-making skills, consider the following strategies:

1. **Define Clear Objectives:** Clearly articulate your goals to guide the decision-making process and maintain focus.
2. **Gather Relevant Information:** Collect pertinent information without succumbing to information overload, ensuring a comprehensive understanding of the decision's context.
3. **Evaluate Risks and Benefits**: Assess the potential risks and rewards associated with each option, weighing short-term and long-term consequences.
4. **Trust Your Intuition:** While rational analysis is essential, intuition can offer valuable insights. Trust your instincts while remaining aware of biases.
5. **Seek Diverse Perspectives:** Consult with others to gain different viewpoints and insights, expanding your understanding and identifying blind spots.
6. **Embrace Flexibility:** Be open to adapting decisions based on new information or changing circumstances, remaining agile in your approach.

Conclusion: Improving decision-making skills empowers individuals to navigate life's complexities with confidence and clarity. By understanding psychological influences, recognizing common pitfalls, and implementing practical strategies, individuals can make more informed and effective choices, ultimately shaping their destinies with intentionality and purpose.

BLOCKCHAIN TECHNOLOGY

FACULTY DESK

Mr. Narendra. B. Devi
M.E. (Mechanical-Production Engg.)
Head of Mechanical Engg. Department

What is blockchain technology?

Blockchain is a method of recording information that makes it impossible or difficult for the system to be changed, hacked, or manipulated. A blockchain is a distributed ledger that duplicates and distributes transactions across the network of computers participating in the blockchain.

Blockchain technology is a structure that stores transactional records, also known as the block, of the public in several databases, known as the "chain," in a network connected through peer-to-peer nodes. Typically, this storage is referred to as a 'digital ledger.'

Every transaction in this ledger is authorized by the digital signature of the owner, which authenticates the transaction and safeguards it from tampering. Hence, the information the digital ledger contains is highly secure.

In simpler words, the digital ledger is like a Google spreadsheet shared among numerous computers in a network, in which, the transactional records are stored based on actual purchases. The fascinating angle is that anybody can see the data, but they can't corrupt it

Blockchain technology is an advanced database mechanism that allows transparent information sharing within a business network. A blockchain database stores data in blocks that are linked together in a chain. The data is chronologically consistent because you cannot delete or modify the chain without consensus from the network.

As a result, you can use blockchain technology to create an unalterable or immutable ledger for tracking orders, payments, accounts, and other transactions. The system has built-in mechanisms that prevent unauthorized transaction entries and create consistency in the shared view of these transactions.

Blocks:

A block in a blockchain is a combination of three main components:

1. The header contains metadata such as a timestamp which has a random number used in the mining process and the previous block's hash.
2. The data section contains the main and actual information like transactions and smart contracts which are stored in the block.
3. Lastly, the hash is a unique cryptographic value that works as a representative of the entire block which is used for verification purposes.

Block Time:

Block time refers to the time taken to generate a new block in a blockchain. Different blockchains have different block times, which can vary from a few seconds to minutes or may be in hours too. Shorter block times can give faster transaction confirmations but the result has higher chances of conflicts but the longer block times may increase the timing for transaction confirmations but reduce the chances of conflicts.

ACTIVE AERODYNAMICS

Faculty Desk

Mr.Kishor .B. Dhanawade
M.E.(Heat Power)
Lecturer (Mechanical Engg. Department

Introduction

The automotive landscape is undergoing a revolutionary transformation with the integration of active aerodynamics. Departing from static aerodynamic features, active systems dynamically adjust vehicle components like spoilers and diffusers in response to driving conditions. This technology optimizes airflow, enhancing stability, fuel efficiency, and handling, while heralding a new era of sustainable mobility.

Fuel Efficiency

Active aerodynamics offer tangible benefits, notably in fuel efficiency. By minimizing drag during highway driving, these systems optimize airflow, resulting in cost savings for drivers and reduced emissions. This aligns with global sustainability goals, making active aerodynamics a pivotal tool in fostering eco-friendly transportation solutions.

Enhanced Stability and Handling

Moreover, active aerodynamics significantly improve vehicle stability and handling, especially at high speeds and during challenging maneuvers. Dynamic adjustments to downforce distribution ensure superior traction and grip, enhancing both performance and safety standards on the road.

Synergy with Electric Vehicles (EVs)

The synergy between active aerodynamics and electric vehicles (EVs) is particularly noteworthy.

As EVs prioritize maximum range on a single charge, minimizing energy consumption becomes paramount. Active aerodynamics play a crucial role by reducing aerodynamic drag, thereby extending the vehicle's range and optimizing energy efficiency. This convergence exemplifies the industry's commitment to sustainable mobility solutions.

Challenges and Solutions

However, widespread adoption of active aerodynamics presents challenges. Implementation costs, maintenance complexities, and the need for robust control systems pose significant hurdles. Nevertheless, meticulous design and engineering efforts are underway to ensure seamless integration across diverse vehicle platforms.

conclusion

active aerodynamics epitomize the fusion of cutting-edge technology with automotive ingenuity, revolutionizing vehicle design and performance. By dynamically optimizing airflow, enhancing fuel efficiency, and augmenting driving dynamics, active aerodynamics enrich driving experiences while paving the way for a more sustainable automotive future. As innovation continues to drive the industry forward, active aerodynamics stand as a beacon of progress, reshaping the very contours of mobility as we know it.

REVOLUTIONIZING HEAVY VEHICLE PERFORMANCE: THE ROLE OF COMPOSITE MATERIALS IN PROPELLER SHAFT DESIGN

FACULTY DESK

Ms. Pranali Ravindra Yadav
Lecturer (M.Tech (Pursuing))
Mechanical Engg. Department

In the evolving landscape of the automotive industry, the quest for efficiency, performance, and sustainability has led to significant innovations, especially in the realm of heavy vehicles. A pivotal development in this arena is the adoption of composite materials in the design and manufacturing of propeller shafts. This strategic shift not only addresses the inherent challenges posed by traditional materials but also propels the capabilities of heavy vehicles to new heights.

The Traditional vs The Innovative

Traditionally, propeller shafts for heavy vehicles have been constructed from metals such as steel or aluminum. While these materials provide the necessary strength and durability, they also introduce substantial weight, contributing to greater fuel consumption and emissions. In contrast, composite materials, such as carbon fiber and E-glass epoxy, offer a compelling alternative that melds lightweight characteristics with exceptional strength and stiffness.

Composite Materials: A Game-Changer for Propeller Shafts

Composite materials have ushered in a new era for propeller shaft design, primarily due to their high strength-to-weight ratio. For heavy vehicles, this translates into several tangible benefits:

Reduced Weight: Composite propeller shafts are significantly lighter than their metal counterparts, which directly translates to reduced fuel consumption and lower emissions. This is crucial for heavy vehicles that operate over long distances, as even marginal improvements in fuel efficiency can lead to substantial cost savings and environmental benefits.

Corrosion Resistance: Unlike metal shafts that are susceptible to corrosion, composite materials are inherently resistant to rust and degradation. This property ensures a longer service life for the propeller shaft, reducing maintenance costs and downtime for heavy vehicles.

Enhanced Performance: The superior strength and stiffness of composite materials ensure that propeller shafts can withstand the rigorous demands of heavy vehicle operations without compromising on performance. This resilience against torsional and bending stresses enhances the vehicle's overall driveability and longevity.

Vibration Damping: Composite materials exhibit excellent vibration damping properties, leading to smoother operations and reduced wear on other vehicle components. This improves the comfort levels for the operator and extends the lifespan of the vehicle's drivetrain components.

The Path Forward: Challenges and Opportunities

Despite the clear advantages, the adoption of composite materials in heavy vehicle propeller shafts is not without challenges. The high cost of composite materials, compared to traditional metals, can be a barrier to widespread adoption. Additionally, the repair and recycling of composite materials require specialized processes that are not as straightforward as those for metal components.

However, ongoing advancements in composite material technology and manufacturing processes are gradually reducing these barriers.

Conclusion

The integration of composite materials in the design and manufacturing of propeller shafts represents a significant leap forward for the heavy vehicle industry. By offering unmatched strength-to-weight ratios, corrosion resistance, and vibration damping properties, composite propeller shafts not only enhance the performance and efficiency of heavy vehicles but also contribute to the broader goals of sustainability and environmental stewardship. As the industry continues to innovate, the role of composite materials in propeller shaft design is set to become even more pivotal, driving the future of heavy vehicle technology.

IMPORTANCE OF PROFESSIONAL COMMUNICATION AT WORKPLACE

Mrs. Vaishali Navnath Gawade
Lecturer (M.A. B.Ed)
Department of Science and Humanities

Mrs. Saba Imtiyaz Shaikh
Lecturer (M.A. English)
Department of Science and Humanities

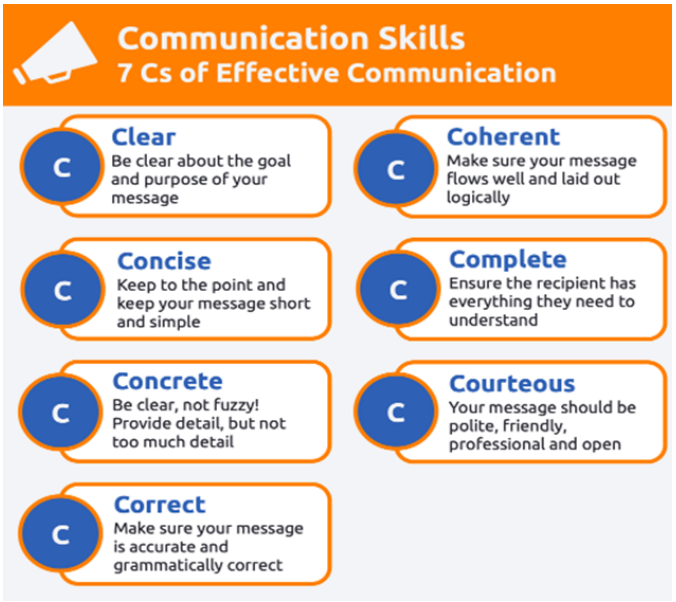
In this scenario English language and professional communication plays and important role in day to day activity and corporate industry. English is an international language which emphasizes on learning different major dialect forms, register communicate effectively. In professional communication active listening, note taking, passive listening, office drafting, writing skills and report writing all these points are very important. Good communication in the workplace ensures employees have the information. They need to perform well, builds a positive work environment, and eliminates inefficiencies. Effective communication should accurately convey information while maintaining or improving human relationships.

“Professional communication is defined as oral, written, digital, or visual forms of information delivery in a workplace.” Professional communication also involves various forms of speaking, writing, and responding within and beyond the workplace environment.

Leaders often deliver one-way communications to their teams. The goal may be to inform or update, such as a memo about a new company policy or a change in direction. Leaders also often communicate to persuade, encourage, and inspire commitment. They often communicate through stories more than data.

Honest and effective communication can create a strong team. Great communication contributes to the growth of the business, which goes hand in hand with your career. It eliminates uncertainties and speeds up the process of policies to ensure there is a smooth delivery of projects. If there’s an open line of communication between supervisors and staff members, they’re encouraged to be more creative and innovative within the workplace, and they’re likely to put forth new and creative ideas. Being able to communicate tactfully and effectively at work can help increase overall productivity, especially for small businesses. When you have a good line of communication with management, you’re naturally going to be more loyal to the organization. You’ll feel comfortable discussing any professional or personal issues, and you’ll be more committed to the company.

For proper communication we should also follow 7 C's of communication. The 7 Cs of Communication helps you to communicate more effectively. The 7 C's Stand for: clear, concise, concrete, correct, coherent, complete, and courteous. Effective communication is the backbone of any successful business, organization, or personal relationship. However, communication is not just about what you say; it is also about how you say it. By following these principles, you can improve your communication skills and build stronger relationships with your audience. Whether you are communicating with colleagues, clients, or family members, the 7 Cs of communication can help you achieve your communication goals.



TIPS TO IMPROVE COMMUNICATION SKILLS

1.Practice active listening
2.Be receptive to feedback
3.Ask for feedback
4.Be clear and concise
5.Body language matters
6.Know your audience
7.Emotional intelligence
8.Empathy
9.Make Eye Contact

CONCLUSION

Communication is an essential component of business. While communication is a natural part of the human experience, it's important to consider how you will communicate in a positive and effective manner that aligns with your responsibilities and reputation as a business professional.

FRACTURE MECHANICS AND MECHANICAL FAULT DETECTION BY USING ARTIFICIAL INTELLIGENCE

Mr. Bharat Arvind Kadam
Technical Assistant (D.M.E)
Mechanical Engineering Department

Faculty Desk

Introduction

In all mechanical systems, not only the mechanical behavior of materials, but also the response of the parts and the structures are important issues. Mechanical failure may occur for many different reasons. Environment, loading and stress, defects in materials and poor-quality design are counted as causes of mechanical failure. Thus, study, research and investigation on mechanical failures of parts and structures seem necessary to avoid extra cost and downtime. Successful early applications of fracture mechanics supported this new field in the engineering community. During the last three decades, demands on reliability and safety of technical systems are significantly growing. It led to many types of research in the area of fault detection and failure analysis.

Artificial intelligence (AI) began in ancient history, but from the appearance of AI, researchers have tried to use it in a variety of applications and sciences. AI by definition of is “the art of creating machines that performs functions that require intelligence when performed by people”.

AI is also defined based on the eight textbooks between human and rationality centered approaches which are organized into four categories:

a) Systems that think like humans,
b) Systems that act like humans,
c) Systems that think rationally, and
d) Systems that act rationally.

In fact, intelligent approaches and systems have been applied in wide range of industries and commercial fields. Expert systems performed in some limited domain such as failure analysis and mechanical fault diagnosis. Although there are different definitions for expert systems, it emulates work of human experts in computer model or program by five main components: knowledge base, working memory, inference engine, external inference and user inference. Two decades ago, proficiency of AI approach and particularly expert system to solve problems in the area of fracture mechanics. The researchers described an idea of creating an expert system on the domain of linear elastic fracture mechanics and the validity of the technique is also exhibited. At the same time, ability of knowledge based systems on determining of fracture characteristic of materials and structures are shown. Twenty years ago, the author asked about the capability of handbooks to solve problems with the rapid change of technology during the next thirty years. Liebowitz predicted intelligent black boxes would be one of the substitutes for some handbooks. Now, after two decades, obviously it can be seen that AI and knowledge-based systems are developed and utilized in different fields of science and technology. It leads to users add knowledge to the existing applications and systems to make them smarter and more applicable. Despite some positive experiences of intelligent systems on failure identification, fracture mechanics and fault detection,

because of some reasons, application of expert systems could not continue on this area. In fact, experiences show that knowledge extraction as a challenging and time-consuming process. In reality, lots of resistances from human experts are recognized when there is a request to import their expertise in an expert system. Indeed, the human experts are worry that be replaced by these systems. Moreover, the expert system has these limitations, common sense, inspiration or intuition and flexibility to apply in the semi-relevant field. Experts decide based on their overall view of the occurred problem, but expert system has not enough information. In the other hand, experts know their lack of knowledge and the limits of their information in dealing with new problems, but expert systems have narrow knowledge domain and just work when they are developed for specific or very specific problems. Therefore, they cannot generalize and still need the commitment of experts. Finally, for achieving the performed outputs and results require regular maintenance and update which has its costs. As an output of these systems is highly depended on the inputs, the above-mentioned condition could be considered as major reasons which didn't allow them to grow. Thus since the beginning of the 1990s artificial intelligence and machine learning methods are used significantly to develop such systems automatically.

Over the years, AI applications indicated not only that AI can contribute major aspects to mechanical engineering, but also an investigation of AI on various domains can develop and improve in fracture mechanics. AI methods are applied in this field to reduce the failures and solve the problems. However, there are still unsolved problems and improvement opportunities. Therefore, our goals for this survey are as follows:

- Describing the procedure and mechanism of reviewed AI methods
- Categorizing the existing systems and works
- Explaining the methodology of current applications and systems
- Analyzing the advantages and limitations

Investigations on fracture mechanics, including performing experimental tests and computational methods are not always an easy task and are quite time consuming, but also a high level of technical expertise is required. Indeed, fracture mechanics and failure analysis is one of the extreme complex engineering fields. There are many challenges for detecting failures and faults of mechanical machinery, parts and systems. The main issues based on the existing works in fracture mechanics domain is as follows:

- Identifying failure mode
- Identifying failure mechanism
- Monitoring of fault diagnosis process
- Monitoring of damage and failure diagnosis process
- Early detection of faults
- Early detection of damages and failures
- Predicting of fracture parameters

Therefore, for achieving our goals and objectives in this survey, we have searched keywords in the scientific databases based on these challenges in fracture mechanics. According to these challenges, different AI methods are able to support solving the complex mechanical fracture problems. Material toughness characterization, damage detection, fault diagnosis, failure mode identification and crack detection are various aspects of fracture mechanics which are surveyed by different approaches of AI. The lack of review paper which reviewed and evaluated applications of AI methods in fracture mechanics led to the collective preparation of the current review paper. To address these issues, we analysed literature based on a classification of five earlier methods and techniques of AI:

Bayesian Network (BN), Artificial Neural Network (ANN), Genetic Algorithms (GA), Fuzzy Logic (FL) and Case-Based Reasoning (CBR). In this paper, the main concepts and mechanisms of these methods are highlighted. Moreover, it is explained how they are applied on sub-domains of fracture mechanics: failure mode and failure mechanism identification, fault and error detection and diagnosis, damage and failure detection and diagnosis, and mechanical fracture and fracture parameters. This contribution could provide some ideas on future perspectives of research in this field.

Computational methods are not always an easy task and are quite time consuming, but also a high level of technical expertise is required. Indeed, fracture mechanics and failure analysis is one of the extreme complex engineering fields. There are many challenges for detecting failures and faults of mechanical machinery, parts and systems. The main issues based on the existing works in fracture mechanics domain is as follows:

- Identifying failure mode
- Identifying failure mechanism
- Monitoring of fault diagnosis process
- Early detection of damages and failures
- Predicting of fracture parameters

Artificial intelligence approaches in fracture mechanics

During the past decades, many structural failures have been predicted by fracture mechanic approach. Research on fracture and failure showed that saving in time and cost can be obtained by focusing on two major areas which are materials and structures. In fact, predict and prevent failure load have been interesting topics of research in the past years. There are different AI methods which are applied in variety domain of mechanical engineering. In this section, five different intelligence

Applied artificial intelligence methods on sub-domains of fracture mechanics

For technology in mechanical engineering, not only supervising of processes, but also study, investigations and analysis of different sub-domains of engineering fracture mechanics of the systems are important. These parameters are able to improve process and system performance. the five mentioned AI methods are reviewed which are applied in sub-domains of fracture mechanics. These sub-domains are

- Failure mode and mechanism identification
- Damage and failure

Hybrid intelligent techniques

Similar to any particular intelligent approach, hybrid intelligent systems are also used in a wide variety of applications. In an intelligent hybrid system, two or more AI methods are combined to overcome the limitations of individual method. In other words, hybrid intelligent systems are computational systems which integrated different intelligent approaches.

Discussion and future research directions

The various types of researches are conducted to monitor the mechanical parts and engineering structures and predict failure load, crack direction and detect the mechanical faults. They diagnosed the mechanical faults at the earlier possible time and stage. Results of the researches proved that by using AI approaches, prediction time for fault detection and diagnosis is reduced in compare with other methods such as experimental tests and computational method

Conclusion

In the present paper, the focus has been made to give an overview of five different AI methods used in fracture mechanics. The reviewed AI techniques including Bayesian Networks, Artificial Neural Networks, Genetic Algorithms, Fuzzy Logic and Case Based Reasoning developed across the globe during last decades.

E - LEARNING INITIATIVES BY GOVERNMENT OF INDIA

FACULTY DESK

Ms. Kirti P. Bhoite
BA, M.lib & I Sc., SET
Librarian

Introduction-

In the twenty-first century, one of the most important technologies is the power of digitization. There has been a shift from a knowledge based society to a Technology based society. Digitalization is a word that defines the future.We live in a world where everything is available at our fingertips. India's digital education is a creative and significant step forward for improved learning, structural development, and knowledge acquisition through the use of digital services and technology. The need for technology-based education in India was augmented due to the COVID-19 pandemic, which temporarily disturbed the Indian education system. Digital Education in India is the way forward to learning and gaining knowledge with the help of technology. With the shift towards the knowledge society, the change of working conditions and the high-speed evolution of information and communication technologies, peoples' knowledge and skills need continuous up-dating. Learning, based on collaborative working, creativity, multidisciplinary, adaptiveness, intercultural communication and problem solving, has taken on an important role in everyday life. The learning process is becoming pervasive, both for individuals and organizations, in formal education, in the professional context and as part of leisure activities. Learning should be accessible to every citizen, independent of age, education, social status and tailored to his/her individual needs.

Now let's explore the list of free e-learning platforms which are executed by the Government of India.

Audio-Video e-content

1. SWAYAM (https://swayam.gov.in/)

SWAYAM is an online academic resource platform sponsored and developed by The Ministry of Human Resource Development and based on the principles of "access, equality and quality": [4]. The primary objective of SWAYAM is to deliver education to the remotest of places and the less advantaged groups of people who are yet not touched by digital revolution, [4]. SWAYAM platform is to offer an awesome learning experience to everyone who wants to learn. SWAYAM platform embodies the majority of the courses which are taught in the class from Class 9 till post-graduation.

2.e-Shodhsindhu (https://ess.inflibnet.ac.in/

e-ShodhSindhu is the biggest archival which inculcates a series of well-versed journals which were reviewed by experts to evaluate the quality of content. This platform encompasses 10,000 reviewed journals. Further, it encapsulates a variety of references, bibliography, citations, and accumulated credible and authentic data for its members of institutions. Interested candidates can access e-ShodhSindhu by browsing ess.inflibnet.ac.in. All information is provided on the website in a curated manner for new visitors.

3. NPTEL (https://nptel.ac.in/)

NPTEL stands for National Programme on Technology Enhanced Learning which was introduced by IIT Bombay, IIT Delhi, IIT Kanpur, IIT Kharagpur, IIT Madras, IIT Guwahati, IIT Roorkee accompanied by the Indian Institute of Science Bangladesh in 2003. It offers different online courses in the field of engineering, other than that, it inculcates other core science subjects for everyone.

4. National Digital Library (NDL) (https://ndl.iitkgp.ac.in/)

National Digital Library of India (NDLI) is a virtual repository of learning resources which is not just a repository with search/browse facilities but provides a host of services for the learner community. It is sponsored and mentored by Ministry of Education, Government of India, through its National Mission on Education through Information and Communication Technology (NMEICT). Filtered and federated searching is employed to facilitate focused searching so that learners can find the right resource with least effort and in minimum time. NDLI provides user group-specific services such as Examination Preparatory for School and College students and job aspirants. Services for Researchers and general learners are also provided. NDLI is designed to hold content of any language and provides interface support for 10 most widely used Indian languages. It is built to provide support for all academic levels including researchers and life-long learners, all disciplines, all popular forms of access devices and differently-abled learners. It is designed to enable people to learn and prepare from best practices from all over the world and to facilitate researchers to perform inter-linked exploration from multiple sources. It is developed, operated and maintained from Indian Institute of Technology Kharagpur.

5.Shodhganga (https://shodhganga.inflibnet.ac.in/#)

Theses and dissertations are known to be the rich and unique source of information, often the only source of research work that does not find its way into various publication channels. Theses and dissertations remain an un-tapped and under-utilized asset, leading to unnecessary duplication and repetition that, in effect, is the anti-theses of research and wastage of huge resources, both human and financial.

Accelerated Hands on learning

1. e-Yantra (https://www.e-yantra.org/)

e-Yantra is a robotics outreach program funded by the Ministry of Education and hosted at IIT Bombay. The goal is to harness the talent of young engineers to solve problems using technology across a variety of domains such as : agriculture, manufacturing , defence, home, smart - city maintenance and services industries.

2. FOSSEE (https://fossee.in/)

FOSSEE (Free/Libre and Open Source Software for Education) project promotes the use of FLOSS tools to improve the quality of education in our country. We aim to reduce dependency on proprietary software in educational institutions. We encourage the use of FLOSS tools through various activities to ensure commercial software is replaced by equivalent FLOSS tools. We also develop new FLOSS tools and upgrade existing tools to meet requirements in academia and research.

The FOSSEE project is part of the National Mission on Education through Information and Communication Technology (ICT), Ministry of Education (MoE), Government of India.

3.Spoken Tutorial https://spoken-tutorial.org

Spoken Tutorial is a multi-award winning educational content portal. Here one can learn various Free and Open Source Software all by oneself. Our self-paced, multi-lingual courses ensure that anybody with a computer and a desire for learning, can learn from any place, at any time

4. Virtual Labs (http://www.vlab.co.in/)

Virtual Labs project is an initiative of Ministry of Human Resource Development (MHRD), Government of India under the aegis of National Mission on Education through Information and Communication Technology (NMEICT). This project is a consortium activity of twelve participating institutes and IIT Delhi is coordinating institute. It is a paradigm shift in ICT-based education. For the first time, such an initiative has been taken-up in remote-experimentation. Under Virtual Labs project, over 100 Virtual Labs consisting of approximately 700+ web-enabled experiments were designed for remote-operation and viewing. The intended beneficiaries of the projects are:

·All students and Faculty Members of Science and Engineering Colleges who do not have access to good lab-facilities and/or instruments.
·High-school students, whose inquisitiveness will be triggered, possibly motivating them to take up higher-studies. Researchers in different institutes who can collaborate and share resources.
·Different engineering colleges who can benefit from the content and related teaching resources.
Virtual Labs do not require any additional infrastructural setup for conducting experiments at user premises. The simulations-based experiments can be accessed remotely via the internet

5. NEAT (HTTPS://NEAT.AICTE-INDIA.ORG/)

MoE has announced a National Educational Alliance for Technology (NEAT) as a Public-Private partnership model between the Government (through its implementing agency AICTE) and the Education Technology companies of India. Through an open invitation and screening, companies are invited to showcase their products on a National Portal developed for the learners, who may procure them based on their requirements.

The aim of NEAT is to bring the best technological Products in education pedagogy on a single platform for the convenience of learners. Technology Products using Artificial Intelligence for customized learning or e-content in niche areas having highly employable skills would be identified for showcasing on the portal.

CONCLUSION –

This paper has explained the importance of eLearning as a knowledge transfer tool on OP. E-Learning is not only beneficial for students but also helpful for teachers and professionals to upgrade their knowledge and skills.

MODERN TRENDS IN THE AUTOMOTIVE

Mr.ATHARV GOVIND SALUNKHE
TYME

STUDENT'S CORNER

Abstract

The automobile industry is undergoing a transformative phase driven by technological advancements. This research paper explores the modern trends in the automobile sector, focusing on key aspects such as self-driving cars, connected vehicles, electric and hybrid technologies, and Hydrogen Fuel Cell Vehicles (FCEVs). Each of these trends plays a significant role in reshaping the automotive landscape, offering new possibilities for safety, efficiency, and sustainability. This paper provides a comprehensive overview of these trends, discussing their current status, challenges, and potential impacts on the industry.

Three trends that are driving the transformation of the automotive industry.

- **Self-Driving Connected Vehicle**
- **Hydrogen Fuel Cell Vehicles (FCEVs)**
- **Electric Hybrid Vehicle (HVEs)**

1. Self-Driving Connected Vehicle

Self-driving cars, also known as autonomous vehicles (AVs) or driverless cars, are vehicles that can navigate and wheel or pressing the brakes. operate without human input. They use a variety of sensors, including cameras, radar, and LiDAR, to perceive their surroundings and make decisions about how to move. Self-driving cars have the potential to revolutionize transportation, making it safer, more efficient, and more accessible.

How do self-driving cars work

Self-driving cars use a complex system of sensors, software, and actuators to operate. The sensors collect data about the car's surroundings, such as the presence of other vehicles, pedestrians, and objects. The software then processes this data and makes decisions about how to control the car, such as steering, braking, and accelerating. The actuators carry out the decisions made by the software, such as turning the steering

Challenges of self-driving cars

Some challenges need to be addressed before self-driving cars can become a reality. One challenge is the development of the technology itself. Self-driving cars need to be able to reliably perceive their surroundings and make decisions in complex situations. Another challenge is regulation. There are currently no laws or regulations governing the use of self-driving cars on public roads. Finally, there are ethical concerns about self-driving cars, such as who is responsible for accidents caused by these vehicles.

Future of self-driving cars

The future of self-driving cars is still uncertain. However, many experts believe that they have the potential to revolutionize transportation. Self-driving cars could make roads safer, improve traffic flow, and make transportation more accessible. As the technology continues to develop and the challenges are addressed, self-driving cars could become a common sight on our roads.

Some additional details about self-driving cars:
Self-driving cars are classified into six levels of automation, ranging from Level 0 (no automation) to Level 5 (full automation).

Connected Car

Imagine a car that talks. Not just to you, but to other vehicles, to the road itself, and even to the internet. This is the world of connected cars, where connectivity transforms traditional vehicles into rolling information and communication hubs.

2. Hydrogen Fuel Cell Vehicles (FCEVs)

Imagine a car that runs on water. Not as a coolant, but as the actual fuel powering its journey. This futuristic scenario is becoming a reality with hydrogen fuel cell vehicles (FCEVs), emerging as a promising alternative to traditional gasoline-powered cars and even electric vehicles.

Hydrogen Fuel Cell Technology:

At the heart of an FCEV lies a fascinating technology called a fuel cell. Unlike an internal combustion engine that burns gasoline, a fuel cell chemically combines hydrogen and oxygen, generating electricity to power the electric motor. The only by product of this reaction is water, making FCEVs truly emission-free at the tailpipe

3. Electric Hybrid Vehicles (HEVs)

Hybrid Electric Vehicle is a type of vehicle that uses a combination of an Internal Combustion (IC) engine and electric propulsion system in Vehicle. The electric powertrain may enhance fuel efficiency, increase performance, Generate electricity from regenerative breaking, and independently propel the vehicle on pure electric power, depending on the type of hybrid system Al.

HEV is a vehicle that comprises a conventional fuel engine and an electric powertrain, wherein the electric motor assists the engine to extract more performance and better fuel economy, depending on the type of the system.

Benefits of HEVs:

- Improved fuel economy: HEVs offer significantly better fuel economy than gasoline vehicles, reducing fuel costs and emissions.
- Longer range: HEVs don't rely solely on batteries, offering extended range and eliminating the need for frequent charging.
- Smooth transition: HEVs provide a familiar driving experience for those accustomed to gasoline cars.
-

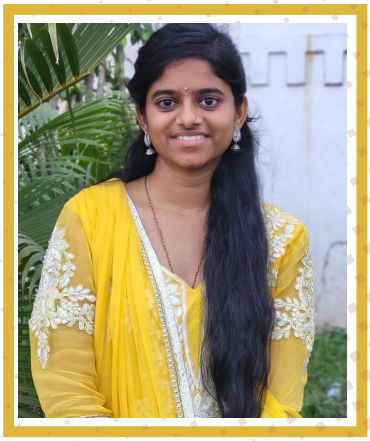
Looking Ahead:

The future of electric hybrid vehicles is bright. Advancements in battery technology are increasing range and reducing costs while charging infrastructure is rapidly expanding. As these technologies continue to evolve, and government policies promote sustainable transportation, HEVs are poised to become mainstream choices for a cleaner and greener future.

CONCLUSIONS

In conclusion, the main trends driving the transformation of the automotive industry are self-driving connected vehicles, hydrogen fuel cell vehicles (FCEVs), and electric hybrid vehicles (HEVs). These trends have the potential to revolutionize transportation, making it safer, more efficient, and more sustainable. Self-driving cars can improve road safety and accessibility, connected cars can enhance traffic flow and personalized driving experiences, FCEVs offer zero emissions and fast refueling, and HEVs provide improved fuel economy and longer range. Despite challenges such as infrastructure development and higher costs, the future of these trends looks promising with advancements in technology and increasing support for sustainable transportation.

RENEWABLE ENERGY



Student's Corner

Miss. PATIL AKANKSHA BHUSHAN
TYME

How Mechanical Engineers Lead Advances in Renewable Energy.

The renewable energy industry has seen impressive, global growth over the last decade, and mechanical engineers have played a key role in enabling the world's transition to clean energy and more sustainable practices. In 2018, for example, mechanical engineers looked at ways of improving the design of wind turbines, and mechanical engineering has led to similar improvements in solar and geothermal power, as well as every stage of renewable energy development. Many of the key skills that mechanical engineers learn and develop in mechanical engineering graduate programs have a wide range of applications for renewable energy engineering. Knowledge of thermodynamics, fluid mechanics and heat transfer, for example, is essential for solving the wind power challenge outlined above, but the same expertise is also critical in designing hydropower infrastructure, optimizing cooling systems and developing new energy storage technology such as thermochemical batteries and solar fuel for long duration energy storage.

Renewable Energy Industry Overview

The renewable energy sector has benefitted from considerable growth – both from advances in technology that make it possible to harness new sources of energy and from global pressure to shift to clean energy. In the U.S. alone, renewable energy made up 17% of electrical power generation in 2017, and when looking at the sector globally, 24% of electricity generation came from renewables in 2016.

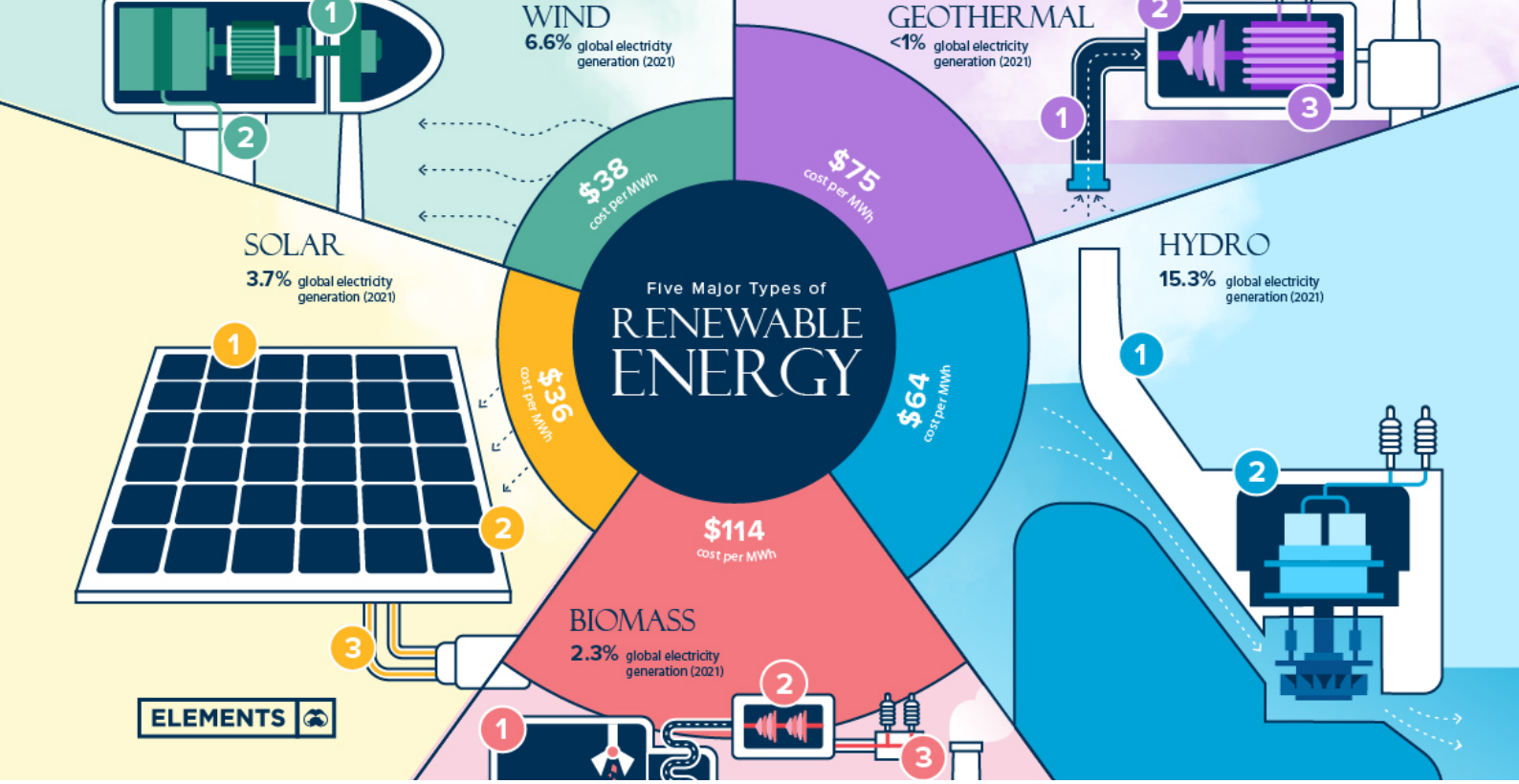
A few key factors have led to increased adoption:

- Improvements in technology that make it more efficient to procure, store and distribute renewable energy, and less expensive to build renewable energy infrastructure.
- New multinational, national and regional legislation that mandates transitions to clean energy sources.

A growing number of studies have been published that support the economic benefits of renewable energy, which in turn help to support local, state and national policies that are friendly to renewable energy development.

Essential Responsibilities: Mechanical Engineering in Renewable Energy

Like most modern areas of technology, the energy sector is a highly multidisciplinary field, with contributions from mechanical, electrical, chemical, systems and other types of engineers helping to drive advances in renewable energy infrastructure. Mechanical engineers can work in every stage of renewable energy development and distribution. From developing methods that lower the cost of manufacturing silicon for solar panels to designing more optimal ways to construct wind farms, mechanical engineers are critical to lowering the cost of renewable energy infrastructure and making advancements in efficiency and power generation. While not a comprehensive list, some of the essential duties of mechanical engineers in renewable energy include:



- Optimize existing renewable energy technology so that it becomes more cost efficient to develop related infrastructure.
- Systems integration of different renewable energy technologies
- Research different materials and study material interactions for use in renewable energy, potentially leading to the development of new systems, technologies and infrastructure for generating and distributing power.

In addition to their contributions in the development of infrastructure and day-to-day operations of renewable energy, mechanical engineers make numerous contributions to the sector through research and development, addressing problems like how to reliably store energy for long periods of time and how to improve the design of equipment ranging from cooling systems to wind turbines.

FACULTY ACHIEVEMENTS

FDP/STTP/CONFERENCE/WORKSHOP ETC. ATTENDED

Sr. No	*TITLE*	*FACULTY*	*VENUE*
01	FDP ON SCENARIO OF NBA AND STRESS MANAGEMENT	Mr. N.B. Devi	KBP POLY SATARA
02	FDP ON SCENARIO OF NBA AND STRESS MANAGEMENT	Mr. S. G. Sherkar	KBP POLY SATARA
03	FDP ON SCENARIO OF NBA AND STRESS MANAGEMENT	Ms P.R. Yadav	KBP POLY SATARA
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09	FDP ON SCENARIO OF NBA AND STRESS MANAGEMENT	Mr. R.V. Kumbhar	YSPM
10	FDP ON EFFECTIVE TEACHING AND LEARNING USING ACTIVE LEARNING METHODS	Ms P.R. Yadav	JSPM PUNE
11	ADVANCED TRENDS IN MECHANICAL ENGG	Ms P.R. Yadav Mr. P. V. Zore	AMP, Vathar

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TYME

Salunkhe Atharv Govind
89.14%

Sanket Tanaji Deshmukh
87.81%

Bhandirge Omkar Balasaheb
85.24%

Thorat Arya Akash
81.33%

Dhanawade Vedant Sandip
77.62%

Karandikar Swapnil Shailesh
76.86%

Mujawar Saied Riyaj
76.48%

Mulani Palak Shafiuddin
75.00%

MSBTE EXAM WINTER 2023 TOPPERS

SYME

Jadhav Priyanka Prakash
66.42%

Hitesh Kanhaiyalal Kumawat
63.79%

Thengil Sangram Shivaji
63.79%

Gurav Aditya Bhimaji
63.37%

FYME

HARSHVARDHAN MOHAN RATHOD
78.24%

GAIKWAD SIDDHANT DIPAK
73.41%

SALUNKHE SAI CHANDRAKANT
73.41%

JAGTAP SHREYASH SANTOSH
73.18%

OUR ACHIEVEMENTS

Academic Year	MSBTE Department Rating
2011-12	**Excellent**
2012-13	**Excellent**
2013-14	**Excellent**
2014-15	Very Good
2015-16	Very Good
2016-17	Very Good
2017-18	**Excellent**
2018-19	**Excellent**
2019-20	Very Good
2021-22	Very Good
2022-23	**Excellent**

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THANK YOU

Reporting of departmental activities and events is the main objective of this newsletter. It will be as good as your contribution and participation in helping us in collecting and organizing data and information pertinent to your portfolio. We hope you would appreciate this endeavor of ours and enrich us with your valuable feedback, comments and suggestions.

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