



Pimpri Chinchwad Education Trust's  
**Pimpri Chinchwad College of  
Engineering & Research**



***Department of Mechanical Engineering***

***E-MAGAZINE***

**Academic Year: 2023-2024**

**Sem-1**

**DIVE INTO THE TREASURE OF ART AND ACADEMICS.**

## **ABOUT TRUST**

Pimpri Chinchwad Education Trust (PCET) was established in 1990 by visionary Late. Shri. Shankarrao B. Patil, Late. Smt. Lilatai Shankarrao Patil, Shri. Dnyaneswar P. Landage, Shri. Vitthal S. Kalbhor, Shri. Shantaram D. Garade, Late. Shri. Bhajjan Kazi with an idea of providing quality education from K.G. to P.G. Its sole mission was aimed at serving society, the industry and all stakeholders through value-inculcating, quality education in the area of schooling, as well as professional tutelage in the fields of engineering, management and computer applications.

PCET has always been committed to its mission by creating, communicating, preserving and applying knowledge, art and academic values.

At the campus at Akurdi, Pune, near 7,200 students are being groomed in specialised courses like Engineering, MBA, MCA & PGDM by professional and passionate instructors. The campuses at Ravet are school to 1,200 would-be graduates at the College of Engineering, around 800 pupils at the Junior College, and approximately 2,500 students at the Public School, all amounting to a total of 11,700-odd students

## **Our Inspiration:**



Late shri. Shankarrao B Patil  
Founder President  
Pimpri Chincwad Education Trust



Late Smt Lilatai Shankarrao Patil  
Ex President  
Pimpri Chincwad Education Trust

## **Board of Trustees:**



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Dr. Girish Desai  
Executive Director, PCET

## Principal's Desk



At the very outset, I extend a very warm welcome to all of you! It is indeed an honor and pleasure as the principal, to introduce you to Pimpri Chinchwad Education Trust's (PCET's) Pimpri Chinchwad College of Engineering & Research (PCCOER). Established in the year 2014, PCCOER has made an incredible progress in academics, research and placements in a very short period of time and has made its presence felt vividly in the educational circles of not only the University but of the entire State. I attribute this remarkable success to the tremendous efforts of faculty and students of the Institute and to the strong and continuous guidance, motivation and support from PCET.

Young friends, India today stands as world's third largest economic power, its economy growing at around 8%. Indian entrepreneurs are emerging as global entrepreneurs. Indians are increasingly appearing in the list of the richest persons in the world. India's knowledge, skills and man-power are making India a preferred destination for outsourcing service needs. India is fast emerging as a hub for world class R&D and Innovation Centers. These are the signs of a brighter tomorrow for India and its citizens. You must, therefore, be highly excited to make your own contributions to the growth and development of your dream India.

As Engineering Institute, we are committed to contribute in the overall growth of the Nation by providing Outcome Based Education (OBE) to our students. We, at PCCOER, endeavor for an overall development in you, while academic excellence remains to be our strong fort. The spectrum of social, cultural, co-curricular and extra-curricular events at PCCOER is as intellectually stimulating, as is overwhelming! We do not turn you into book-worms or scholarly puppets but into competent professionals and genuine humans. At PCCOER, we have a tradition of nurturing leadership qualities, along with, developing abilities to comprehend the state of art technologies. This we do by inspiring you to partake a whole lot of innovative projects, being pursued by the inspired student's community, under the guidance of their faculty mentors. We let you empower yourself with the Wings of Knowledge and Power of Innovation. We imbibe in you a positive attitude and proactive thinking, a caring concern for humanity and nature and above all, an eagerness to serve and excel in your chosen domain. You come here with a passion; we convert that passion into your profession. Life in PCCOER and I am sure that you will enhance the pride and prestige of this illustrious Institution by giving your best and achieving your best! And my dear faculty and students members, we together have to play our role in Nation building by contributing wholeheartedly towards academics, research and innovation, a gigantic task which, I am observing you are succeeding in competently, skillfully and effortlessly.

Prof. Dr. Harish U. Tiwari,  
ME (IITR), PhD. (Mech),  
Principal,  
PCCOE&R, Ravet, Pune.

## HOD's Desk



A hearty welcome to the Department of Mechanical Engineering at Pimpri Chinchwad College of Engineering and Research (PCCOE&R), Ravet, Pune.. The department vision is to be a premier department of Mechanical Engineering and research to serve the need of the society and all the stakeholders. The Department is student centric and focused for overall development of students in the context of new emerging trends in the market and making the students competitive and strongly equipped with the various technical and professional skills. Different programs like Industrial Training program, Aptitude Training Program, SAE BAJA, SUPRA, TIFAN and Go-Cart activities are planned to equip the students to enhance their technical and professional competence and make them more industry oriented and employable.

The placements in the department are one of the best in the PCMC area. The Industry sponsored laboratories, Internships, experts sessions, Industry sponsored projects, communication skills and soft skills sessions, foreign languages, add on and value added courses are designed and executed so that students are not only market ready but also well trained for higher studies, entrepreneurship and startups. The department provides much needed support to the students' projects having potential for innovation and startups as well as innovations and startups having innovative ideas. We have been able to create

quite a good number of startups and entrepreneurs and have been able to build a very good ecosystem.

The department is a leader in the area of IPR viz. Patents and copyrights. More than 100 patents and 75 copyrights have been led in the department out of which two patents have also been granted in the department. The department has modern and well-equipped laboratories for practical training to its students. All the faculty members are well qualified and experienced. We are committed to the pursuit of excellence. It is our goal to address the varying needs of our young students academically, socially, emotionally and by doing so, provide the highest quality educational experience to all and therefore PCCOE&R is one of the best Mechanical engineering colleges.

Department has strong association with different professional bodies like ISTE (The Indian Society for Technical

Education, QCFI (Quality Circle Forum of India) ASME (The American Society Of Mechanical Engineers.), VLSI, SAE (Society of Automotive Engineers) and the department also has its own student council named as Mechanical Engineering Student Association (MESA). MESA provides a platform to the departmental students to showcase their technical, social and sports skills in inter-departmental as well as inter-college competitions.

On the closing note, it could be cited that - "Destiny is not a matter of chance, it is a matter of choice; it is not a thing to be waited for, it is a thing to be achieved".

Prof. Dr. Gulab D. Shiraskar,  
Associate Professor & Head,  
Department of Mechanical Engineering,  
PCCOER, Ravet, Pune.

## **About the Department**

Mechanical engineering is one of the broadest engineering disciplines. Mechanical engineers design, develop, build and test. They deal with anything that moves, from components to machines to the human body. Mechanical engineering combines creativity, knowledge and analytical tools to complete the difficult tasks of shaping an idea into reality. Mechanical engineers can look for employment in diverse areas, including manufacturing, aerospace, automotive, biomedical, chemical, computer, communications, nanotechnology, power-generation industries, engineering consultancies, energy utilities. government agencies etc.

A Mechanical Engineer can also pursue his/her carrier in the public sector through competitive exams like UPSC, MPSC, IES. They can have placements in various public sector undertakings like Navratna and Maharatna by scoring excellently in GATE. They are having good placement opportunities in National and Multi-National companies by perusing ME/M.Tech/MS in India and abroad. They can also become job providers themselves by turning into entrepreneurs and starting own startups.

The Mechanical Engineering Department at PCCOER has been established in the year 2014 and since then, has progressed steadily towards excellence. The Department works on Outcome Based Philosophy (OBE), wherein the complete focus of the department is to prepare the students in such a way that he/she is oriented towards acquiring knowledge, skills, hands on training and ICT techniques by using various teaching pedagogies, which will lead them toward better placements, higher education and entrepreneurships. The audits of all these initiatives are conducted on regular basis and its execution is checked to ensure that students are getting really benefitted through the process.

The department runs a UG programme in Mechanical Engineering, which is a 4 years, 8 semester's full time programme. Department has adequate number of faculty members and supporting staff, who are well qualified, experienced and dedicated. The department has well equipped 16 no. of state-of-the-art laboratories, spacious classrooms, drawing hall, project and innovation center. The department provides the students with a strong fundamental, scientific and technical knowledge-base, multidisciplinary approach and critical



thinking skills which serve as the foundation for lifelong learning in Mechanical Engineering. The department motivates and supports the students for Industry Sponsored Projects and Industrial Training so that they are well acquainted with the industrial problems and its solutions to be better prepared for the industries. The department also emphasizes on inculcating, professionalism, ethics and true attitude in the students. It also puts more efforts on strengthening communication skills, team work and social awareness among the students.

### **Magazine Coordinators:**



**Prof. Deepak Biradar**  
Faculty Co-ordinator



**Sumeet Gaware**  
Editor



**Omkar Shejwal**  
Editor



**Aditya Sharma**  
Editor



**Dhruv Patil**  
Editor



**Sakshi Sarose**  
Editor

★ **Vision of the Department:**

To be a Premier Department of Mechanical Engineering and research to serve the needs of the society and all the stakeholders.

★ **Mission of the Department:**

**M1:** To provide state of art facilities to impart quality education.

**M2:** To undertake various value added and add on courses to make students technically sound and thorough professionals.

**M3:** To collaborate with the industries and academia and strive to transform the research and innovative aptitude in the students and faculties.

**M4:** To inculcate high moral, ethical values and national pride in students and faculties.

★ **Programme Educational Objectives of the Department**

**PEO1:** To develop well sound students in academic fundamentals to understand, analyze and solve problems related to Mechanical Engineering.

**PEO2:** To meet the employer's requirements at large and prepare them towards quality higher education and entrepreneurship

**PEO3:** To build up student's ability to enhance their competence in research and innovation to design product and process

**PEO4:** To create awareness amid the students about professional ethics, managerial skills, social commitment and lifelong learning.

★ **Programme Specific Outcomes of the Department**

**PSO1:** Develop the knowledge and skills relevant to the field of robotics and automation by undergoing hands-on training.

**PSO2:** Develop and implement new ideas on product design and development with the help of modern computer aided tools, while ensuring best manufacturing practices.

- **Expert Session:**



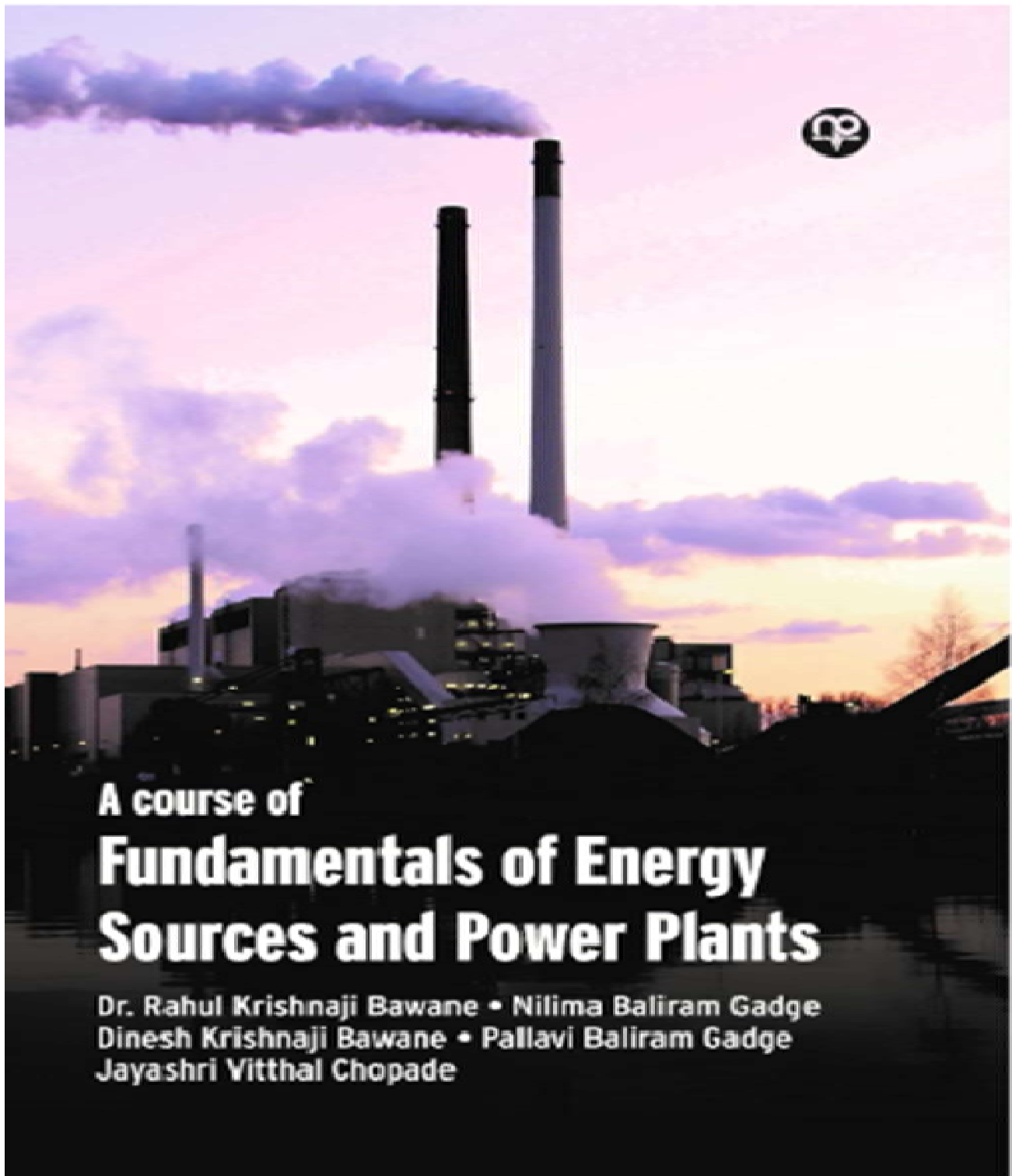
Guest Lecture on “Modern Materials” conducted by Prof. Gulab Shiraskar in the Gubkin Russian State University of Oil and Gas (National Research University) on 27<sup>th</sup> June 2023.

- **Faculty Development Program:**



Dr. Gulab siraskar successfully completed MCCA FDP on EV.

- **Book published**



"Fundamentals of Energy Sources and Power Plants," published in Nimya International Publication By Dr. Rahul Krishnaji Bawane and Mrs. Jayashri Chopade. 2023.

- **International conference**



Paper presented by J.V.Chopade in International Conference at VIT chennai from 20-22 Oct 2023

- **Paper published in Scopus Indexed Journal**



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Original Research Paper

**Savonius Vertical Axis Wind Turbine Design and Analysis with Dimples and Fins**

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Submitted: 24/03/2023

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Accepted: 13/06/2023

**Abstract:** As a solution to the worldwide energy dilemma and growing global emissions, innovative work in the field of environmentally friendly power, eminently wind and sun oriented, has expanded rapidly as of late [1]. A horizontal axis wind turbine is not suitable for residential use. With its ability to produce energy even in low-wind conditions, the Savonius vertical-pivot wind turbine might be a more dependable other option. [2]. The motivation behind this model is to exhibit the upsides of the upward hub wind turbine over the more conventional even pivot plan under an extensive variety of wind conditions and to energize its far reaching reception as a reasonable method for creating power not long from now. [3].

**Keywords:** Vertical Axis Wind Turbine, Savonius Wind Turbine, CFD, Aerodynamic Performance, Dimples and Fins.

**1. Introduction**

Recently, there has been a lot of focus on the topic of alternative or renewable energy. People are increasingly interested in finding contemporary and innovative energy alternatives to complement conventional fuels as a result of technology advancements [4]. In the production of

the cutting edge, permitting it to create more force. For a wind turbine to function properly, lift and drag must be optimized, which, respectively, must be increased and decreased. Dimples and balances of varying sizes and designs are applied to the outer surfaces of wind turbine blades in an effort to increase their efficiency. CFD is used to determine the optimal dimple and balance

Paper published on 13/06/2023 by Prof. Dr. Sham H. Mankar in International Journal of Intelligent Systems and Applications in Engineering.

- **Book Published**



**Prof. (Dr.) Sham H Mankar**



**AG PUBLISHING HOUSE**

Book title “Solid and Liquid Waste Management” published on 22 Nov. 2023 by Prof. Dr. Sham H. Mankar by AGPH Books publishers.

## • Paper Presented and Published

Proceedings of the 5th International Conference on Inventive Research in Computing Applications (ICIRCA 2023)  
IEEE Xplore Part Number: CFP23N67-ART; ISBN: 979-8-3503-2142-5

# Deep learning based Identification of Solid Waste Management in Smart Cities through Garbage Separation and Monitoring

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**Abstract**— The solid waste management is the process of proper decomposition of waste materials within a period of time. This includes the collection of garbage's and then proceeded through certain measures for decomposition. There are various methods adopted in the garbage separation process. This includes the artificial intelligence techniques for the estimation and determination of the solid waste through automatic detection and separation of the garbage waste using control and sensing units. They are integrated with the internet of things to enable the two way communication system. This helps to visualize the functioning of the system adopting the digital platform. The proposed system is implemented through the smart dust bin held in every household that automatically senses the non-biodegradable and biodegradable waste materials. The classification of the waste materials are identified through the image processing techniques.

existing system, the proposed system with automatic decomposition methods are implemented. These waste products are various kinds based upon the materials in which it is built and the category of the usage. Based upon the rise in the global population, the various measures must be taken for the garbage decomposition techniques [1]. The important factor includes the change and shifting of population from the rural areas into urban areas. The accretion of waste leads to rise in the various diseases and constrains in the environment. Due to the process of modernization and industrialization, the areas are occupied for residential and industrial purposes that causes rise in the accumulation of decomposes in the ecosystem [2]. The garbage collected in a home may be considered as minimal amount but if collected across the

Paper Presented and published on 3-5 August 2023 in IEEE Conference ICIRCA 2023 by Prof. Dr. Sham H. Mankar.

## • Paper published in Scopus Indexed Journal

*International Journal on Recent and Innovation Trends in Computing and Communication*  
ISSN: 2321-8169 Volume: 11 Issue: 10  
DOI: <https://doi.org/10.17762/ijritcc.v11i10.8493>  
Article Received: 28 July 2023 Revised: 20 September 2023 Accepted: 03 October 2023

# Formulation and Comparison of Experimental based Mathematical Model with Artificial Neural Network Simulation on Surface Roughness with Burnished Spherical Surface Tool on Aluminum Alloy6351

<sup>1\*</sup>Dnyaneshwar M. Mate, <sup>2</sup>Raju.N. Panchal, <sup>3</sup>Sham H. Mankar, <sup>4</sup>Ramesh K. Rathod <sup>5</sup>Vithoba T. Tale  
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**Abstract:** This paper deals with the effect of burnishing process on the Aluminum Alloy material 6351(HE 15) using Lathe. Surface roughness generated after the turning operation was used to ball burnishing. The surface roughness pattern which was further used to simulate ball burnishing process using ANN. Improvement in the surface roughness values achieved for tool steel after ball burnishing process was 98.2429%.

**Keywords:** Burnishing, Surface Roughness, dimensional analysis, Buckingham's  $\pi$  theorem, regression analysis, Mini-max principle, Sensitivity Analysis.

### 1. Introduction

Inherent irregularities and surface defects like tool marks and

cutting speed and feed rate when the experimental and simulation results were compared.

Paper published 03 October 2023 by Prof. Dr. Sham H. Mankar in International Journal on Recent and Innovation Trends in Computing and Communication.



- **Book Published**

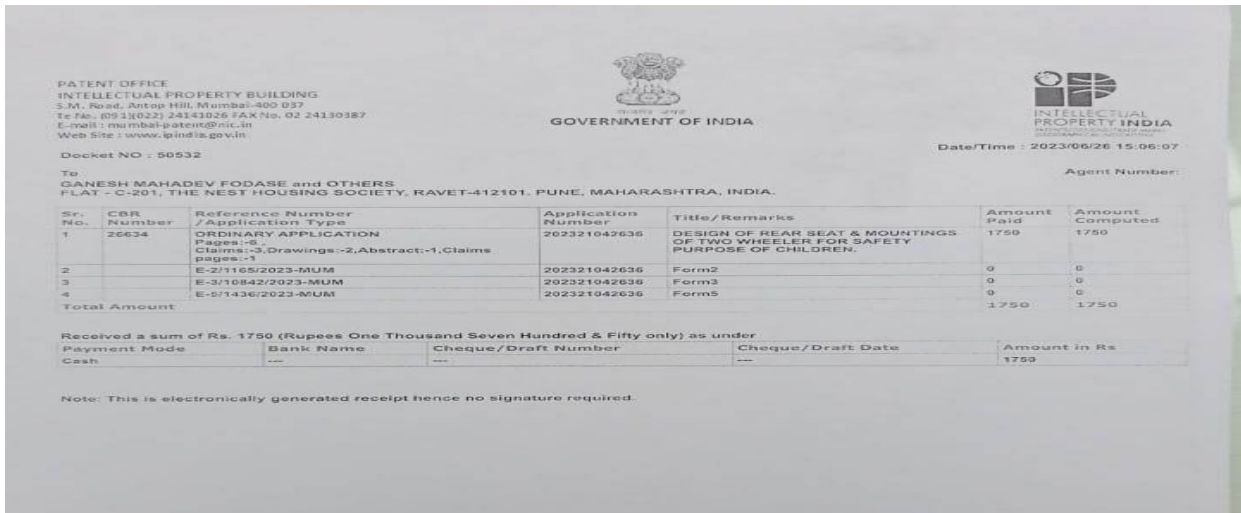


Dr. Ishwar Baburao Ghorude  
Prof. Dr. Sham H Mankar  
Mrs. Jyolhi M R  
Dr. Pranjit Kumar Bhuyan



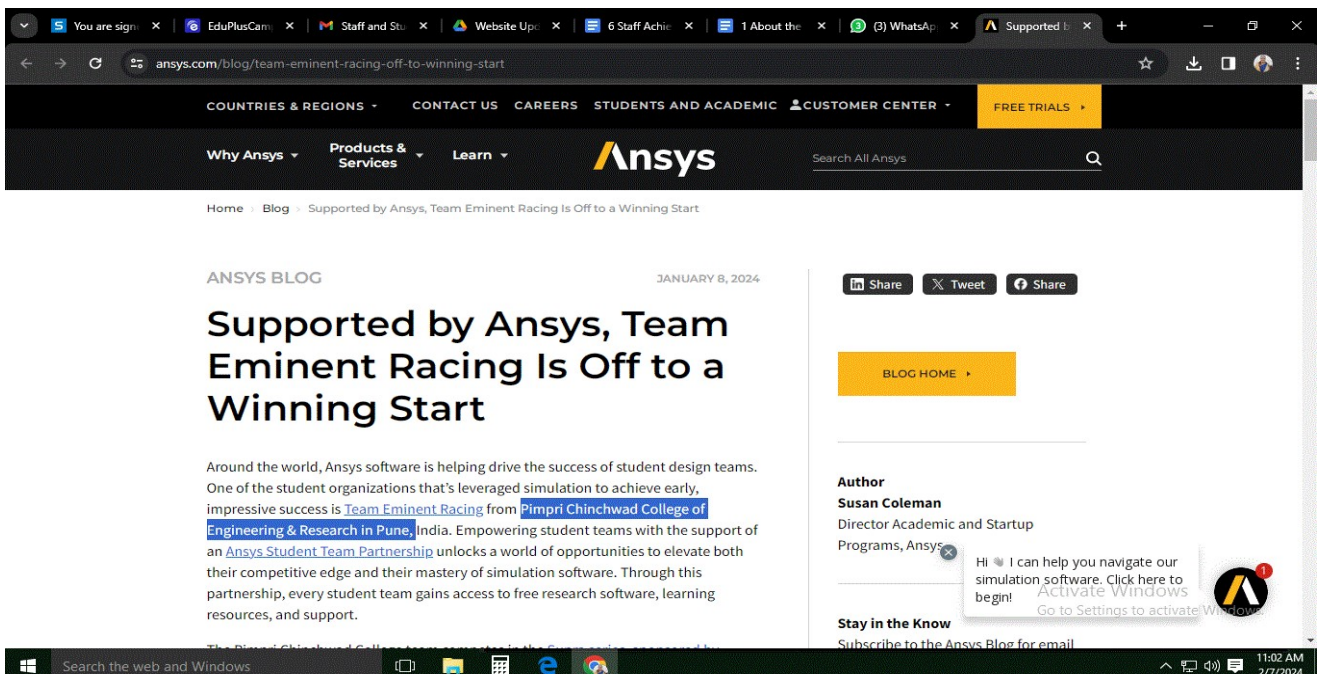
Book title “Solid Waste Management: Problems and Solutions” published 01 Sept. 2023 by Prof. Dr. Sham H. Mankar by AGPH Books Publishers.

- **Patent Published**



Design of Rear Seat and Mountings of two wheeler for safety purpose of children, Application No. 202321042636 Date: 26/06/2023

- **Blog of Interview of the team eminent racing and Prof. Kavidas mate by Ansys Inc.**



Ansys Inc. has a blog on its website. Ansys Inc. interviewed the team eminent racing and Prof. Kavidas Mate for the achievement of the best CAE award using Ansys. The Blog is published on the Ansys website.

<https://www.ansys.com/blog/team-eminant-racing-off-to-winning-start>

- **SAE SUPRA**



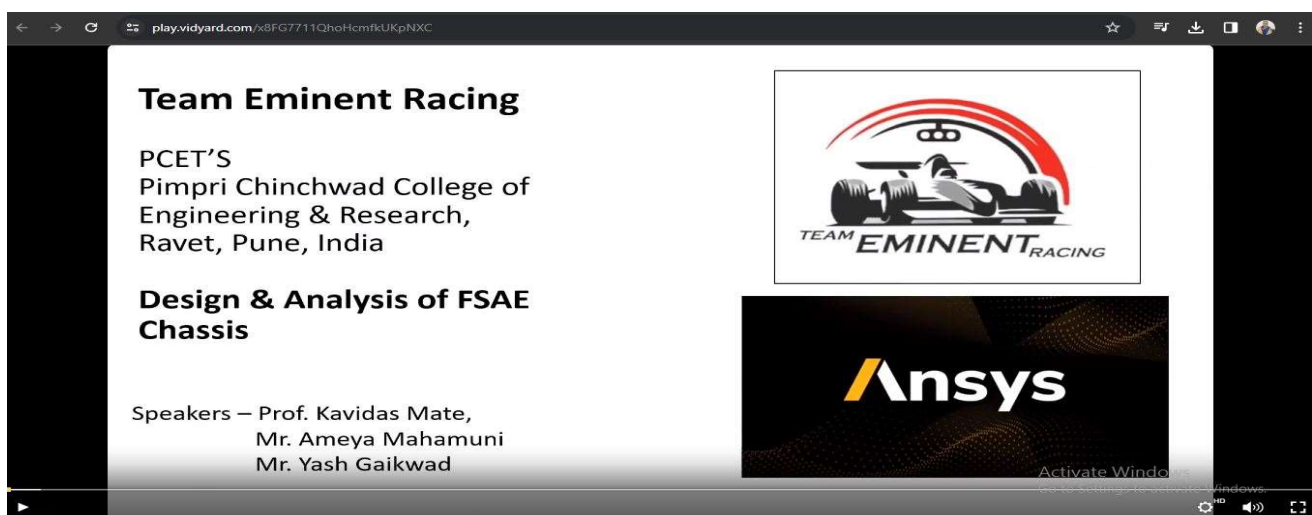
SAE SUPRA is the national level engineering student competition of racing car. Team Eminent has secured AIR 8 in overall event and 2nd prize in CAE Event.

- **MINDSPARK Event 2023**



National level MINDSPARK Technical event was organized at COEP pune and SE Mechanical students Mr. Shardul Kulkarni won the First prize.

- **Webinar at “Ansys Live Webinar Series”**



Prof. Kavidas Mate and the students Ameya Mahamuni & Yash Gaikwad delivered a webinar for formula students to design and analyze the chassis frame at “Ansys Live Webinar Series” which was live globally.

<https://play.vidyard.com/x8FG7711QhoHcmfkUKpNXC>

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