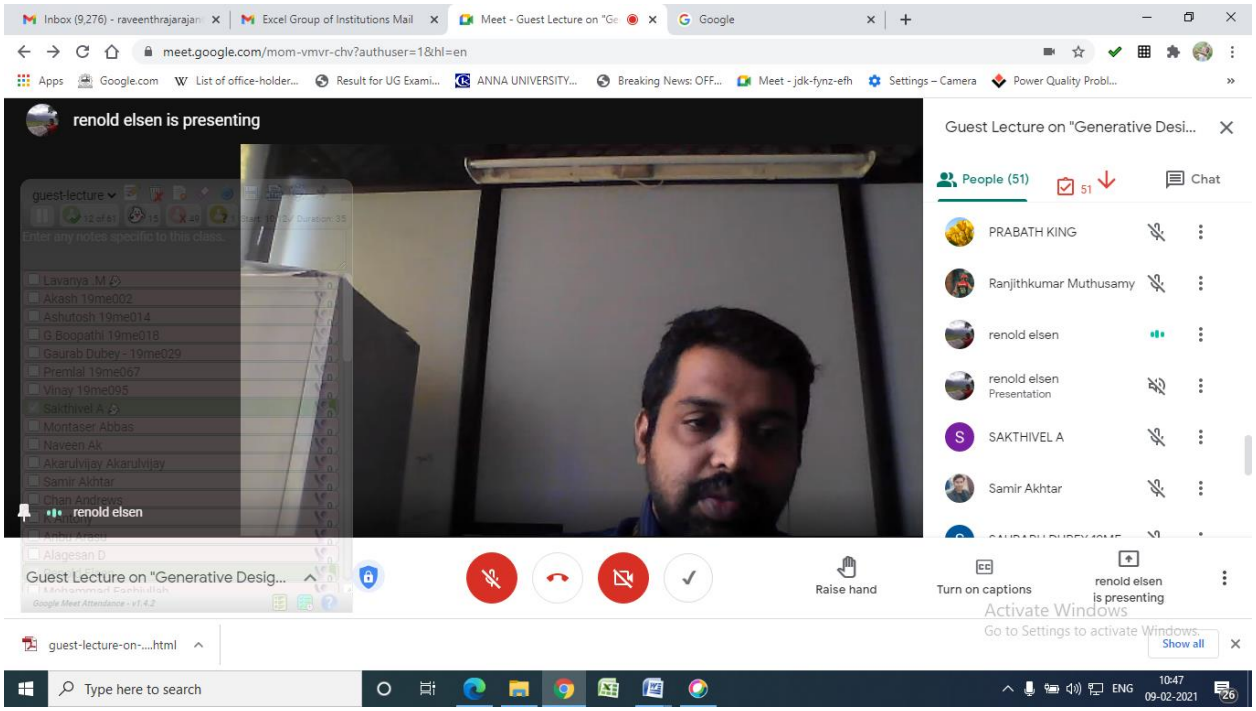
Excel Engineering College, Autonomous

Department of Mechanical Engineering

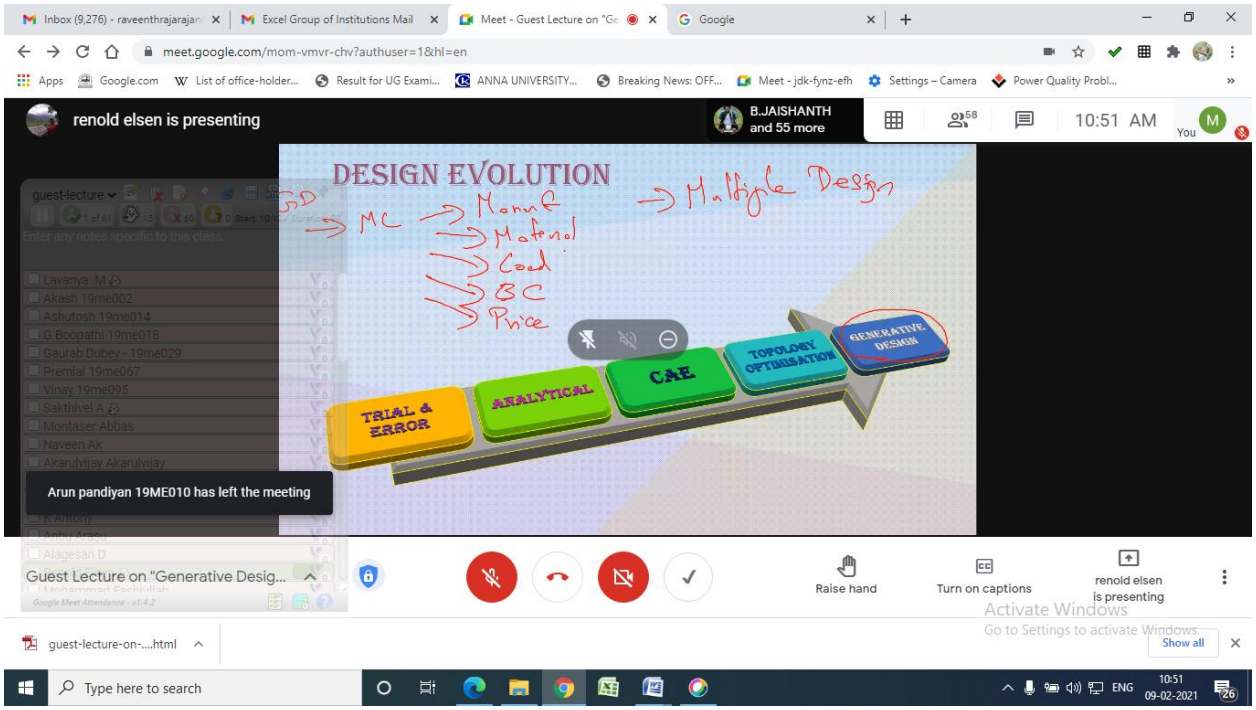
Activity Report AY (2020-21)

Activity Co-ordinator: Mr.N.Tamilselvan, AP/Mech

Name of the Event	Academic Guest Lecture- **Generative Design of Components for Weight Reduction.** By Dr. Renold Elsen, Department of Design and Automation, School of Mechanical Engineering, VIT, Vellore.
Event Date	06.02.2021
about the Event	The generative designing of a bracket that aids in the rotation of a linkage mounted on it with a revolute joint. Generative design is a term that is generally used when we care about weight reduction and performance gain in the manufacturing sector. Optimization is also a similar term. The only difference between the two is that generative design considers stress analysis while optimization considers load paths to give the required result. For a critical analysis of a generative designed bracket, Autodesk Fusion 360 is used, which has in-built functionality of working on the generative design on the cloud, given Preserve and Obstacle geometries, Starting shape and Resolution, Load cases and Constraints, Materials and Manufacturing methods. The generative bracket's iterative solutions are explored and further validated with simulations such as stress simulations, thermal simulations, buckling simulations, and modal frequencies, thus leading to a proper result for forming design and mesh. After post-processing the bracket's design and mesh, its CAD is further converted to CAM to send it for 3D printing under a suitable manufacturing method. The final generative bracket design is linked and employed into the initial assembly to check its proper working with the linkage, machine interface, and joints. The generated design considering various parameters is the best finish for performance enhancement and weight reduction. This will act as a basis for designing parts involving multiple studies and environments that will be a topic of industrial research in future technologies.



EEC/MECH/001.1- Chief Guest addressing all the students



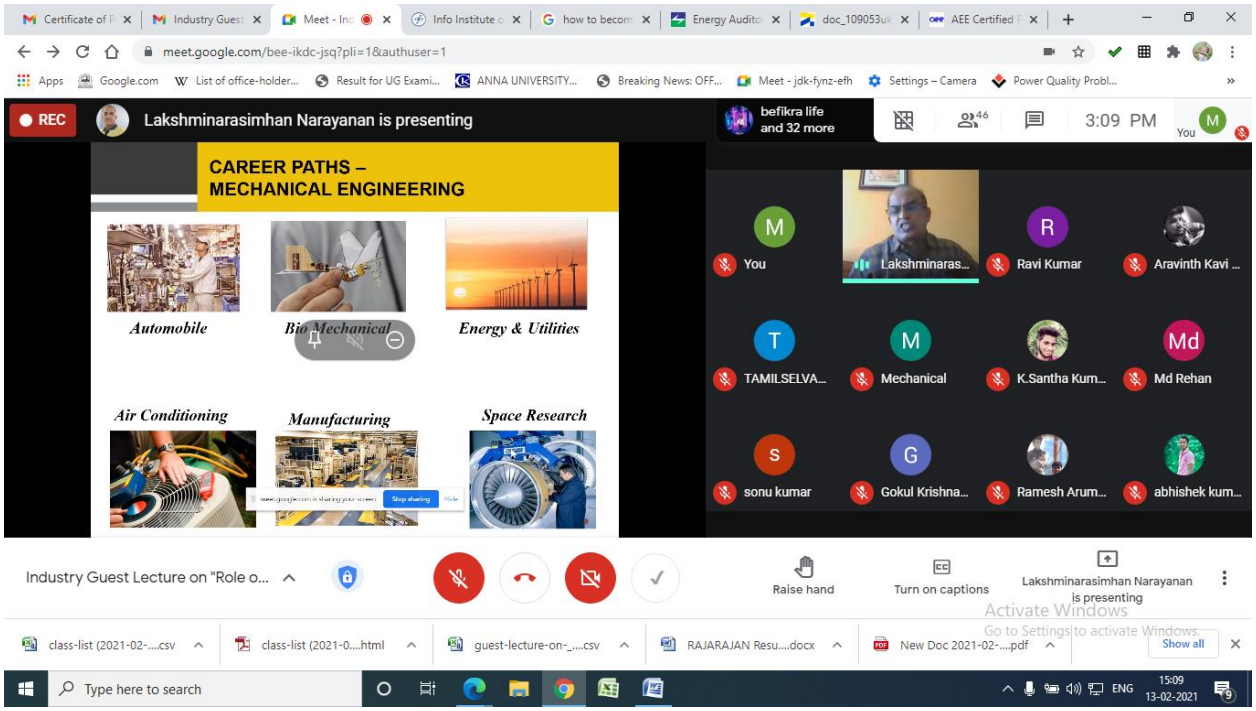
EEC/MECH/001.2- Chief Guest Addressing the Generative Design

Excel Engineering College, Autonomous

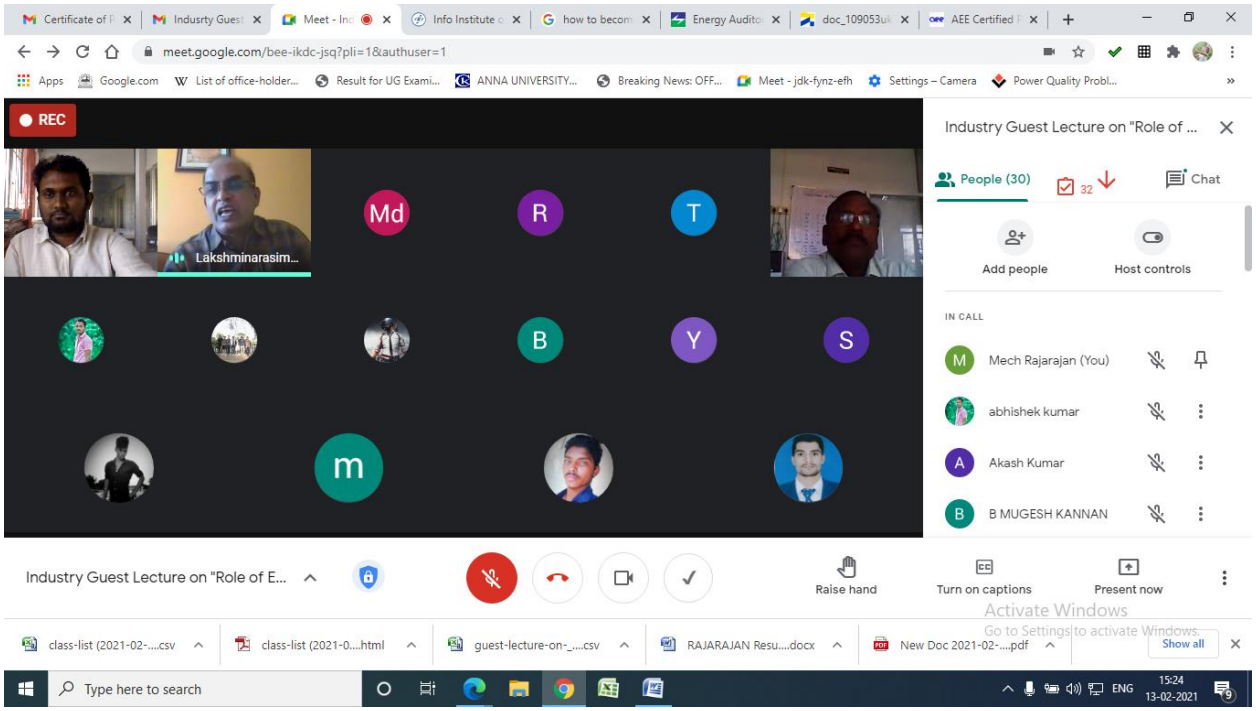
Department of Mechanical Engineering

Activities

Name of the Event	Industry Guest Lecture- **Role of Engineers in the Era of Industry 4.0.** By Mr.N.Lakshminarasimhan, General Manager- HRD, Brakes India Ltd.,- Chennai.
Event Date	13.02.2021
about the Event	The new industry 4.0 era necessities new cross-functional roles with different knowledge and skills that combine IT and production knowledge. The universities and their engineering departments have a vital role in fulfilling this need. There are a number of departments offering these new engineering education requirements, but the characteristics of these departments and how they converge to and diverge from each other are yet to be revealed through objective evaluation. Such evaluation should be based on a precise classification of knowledge and skills areas offered in these departments. Therefore, it is important to understand the characteristics of knowledge and skills provided in these departments to determine the emerging patterns in the delivery of new education requirements of Industry 4.0. The main objectives of this chapter is to define the new education requirements incorporated into Industry 4.0, and reveal the emerging patterns and similarities in engineering education to cover this need.



EEC/MECH/002.2- Chief Guest addressing the Industry 4.0



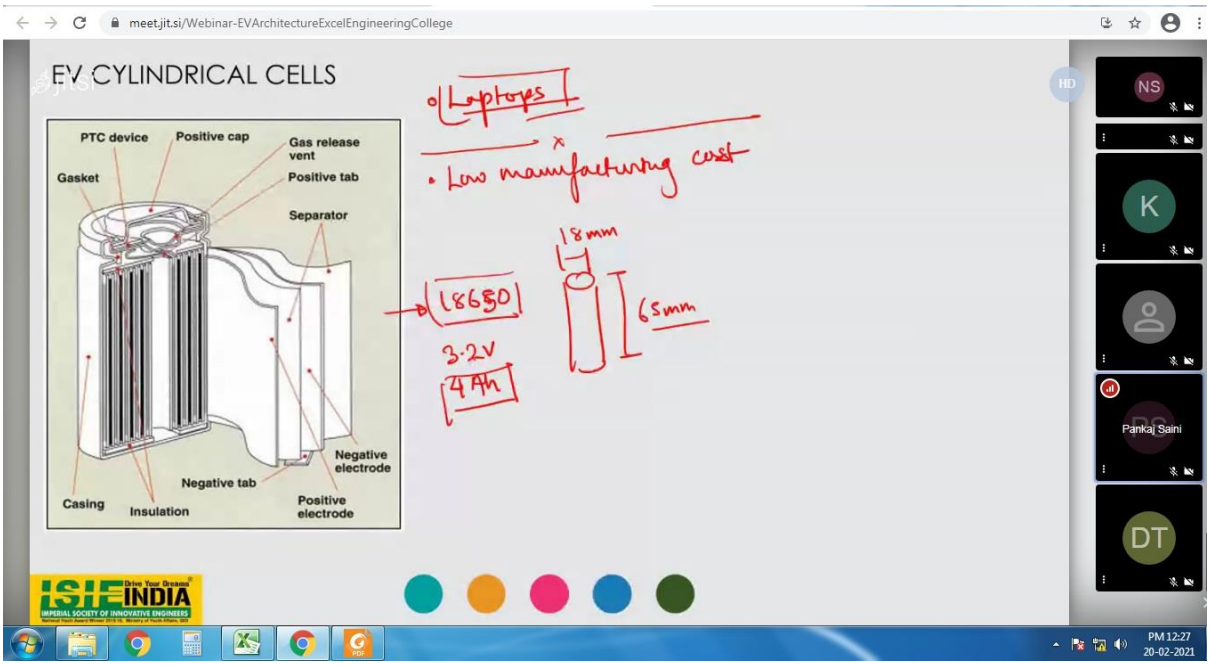
EEC/MECH/002.1- Chief Guest Interaction with students

Excel Engineering College, Autonomous

Department of Mechanical Engineering

Activities

Name of the Event	Seminar- **Electric Vehicle Architecture** by Mr. RAUNAK CHOUDHARY Senior Design Engineer, ISIE INDIA, Noida.
Event Date	20.02.2021
about the Event	Battery Electric Vehicles (BEVs), compared to classic internal combustion engine (ICE) vehicles, are fairly simple and easy to operate. The simplest power train architecture consists in a high voltage battery, an electric motor with power electronics controller and a single speed gearbox. Instead, EVs carry several components for electric power: the motor, the battery, the on-board charger, and the Electric Power Control Unit (EPCU). All are essential components to achieve the conversion of the battery's electricity into the kinetic force that drives the EV forward. The design of a full electric vehicle (or battery electric vehicle (BEV)) requires the development and optimization of a complete electric power train, including battery, power electronics, electric machine, sensors and control system. When designing an electrical platform, from the very beginning of the V-cycle, it is mandatory to rely on modeling and simulation tools in order to drive the main choices and then to optimize the system. This presents an electric power train simulation platform developed with Matlab-Simulink, dedicated to multi physic optimization of the system. As an example, the basic electrical power train architecture first considered in this includes a battery, an inverter, a dc-dc buck converter supplying motor inductor and a wound rotor synchronous machine (WRSM). The purpose is to show how simulation tools can help in comparing different power train control strategies. The present simulation platform is also useful to study physics architecture. To illustrate this point, another electrical architecture is also presented, including a dc-dc boost converter between battery and inverter. This structure must be considered here as an example only in order to show how to optimize control laws taking into account various criteria, including architecture ones. Simulation results are compared for both architectures in terms of power train performances and range.



EEC/MECH/003.1- Chief Guest addressing

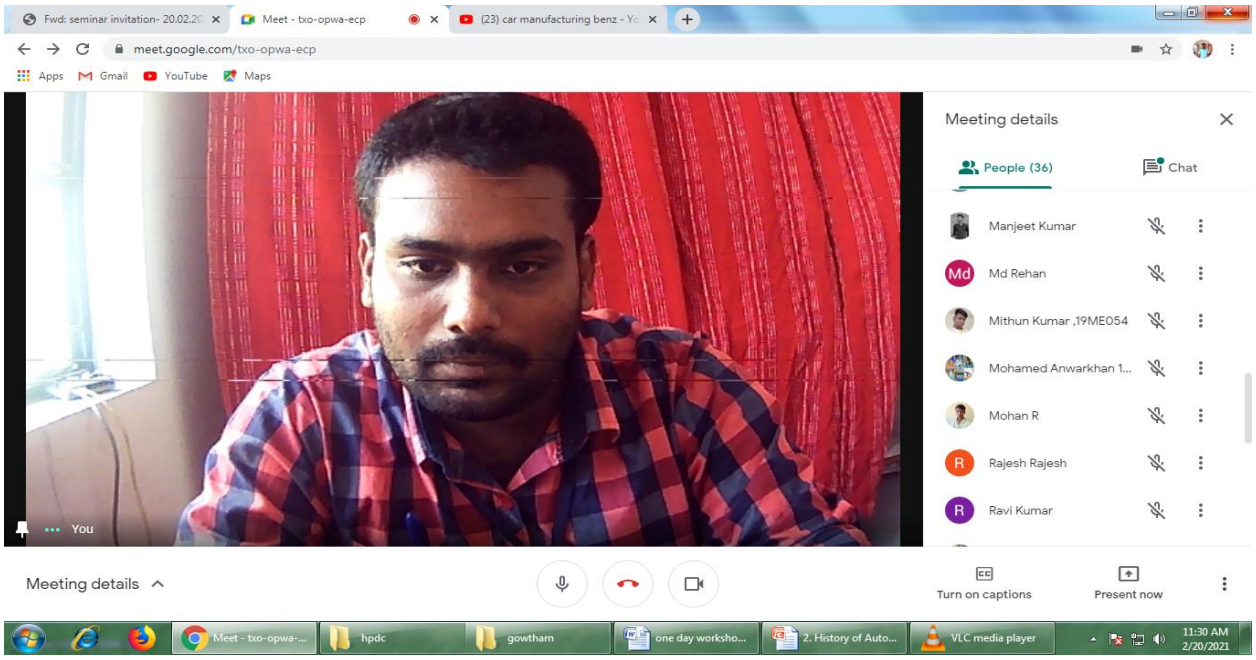
EEC/MECH/003.2- Chief Guest validating the market forecast

Excel Engineering College, Autonomous

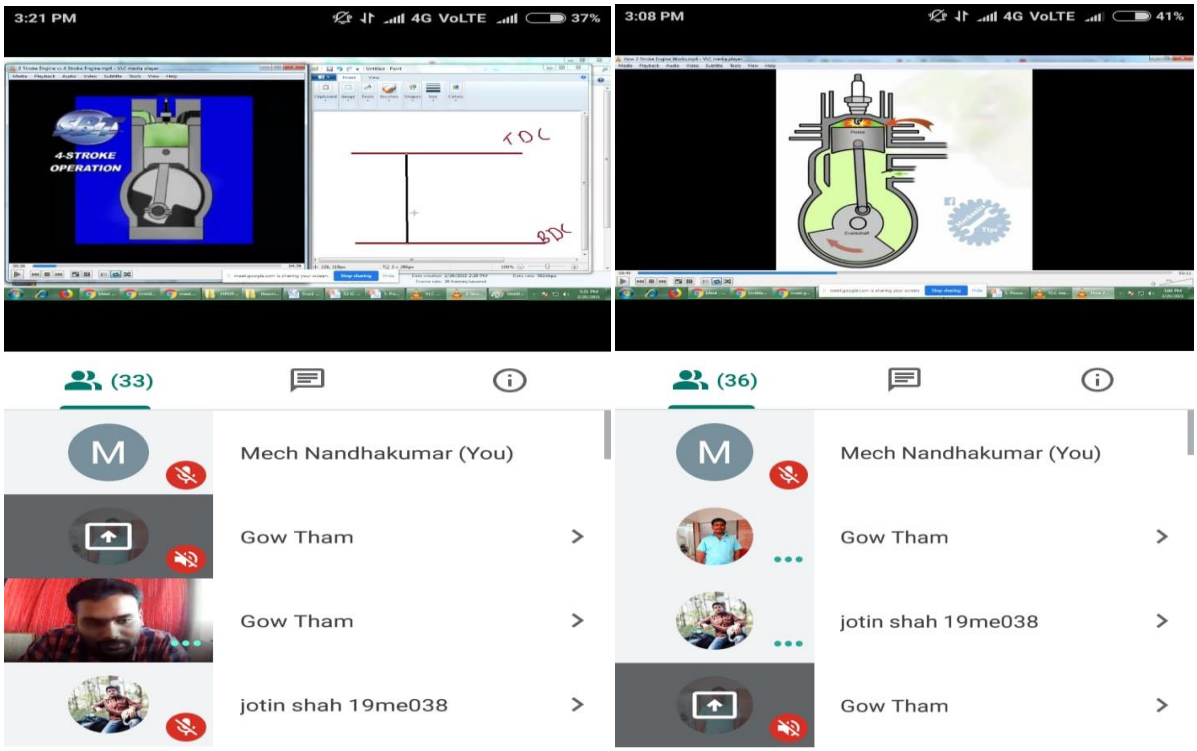
Department of Mechanical Engineering

Activities

Name of the Event	One day Workshop- **Automotive Transmissions,** By Mr.P.P.Gowtham.,ME.AP/Mech, Excel Hyundai Professional Center,Excel Engineering College
Event Date	20.02.2021
about the Event	The modern automatic transmission is by far, the most complicated mechanical component in today's automobile. Automatic transmissions contain mechanical systems, hydraulic systems, electrical systems and computer controls, all working together in perfect harmony which goes virtually unnoticed until there is a problem. This workshop will help you understand the basic of the transmission, about automatic transmission, differences between manual and automatic transmission, the concepts behind what goes on inside these technological marvels and what goes into repairing them when they fail. The transmission is a device that is connected to the back of the engine and sends the power from the engine to the drive wheels. An automobile engine runs at its best at a certain RPM (Revolutions Per Minute) range and it is the transmission's job to make sure that the power is delivered to the wheels while keeping the engine within that range. It does this through various gear combinations. In first gear, the engine turns much faster in relation to the drive wheels, while in high gear the engine is loafing even though the car may be going in excess of 70 MPH. In addition to the various forward gears, a transmission also has a neutral position, which disconnects the engine from the drive wheels, and reverse, which causes the drive wheels to turn in the opposite direction allowing you to back up.



EEC/MECH/004.1- Addressing all the students



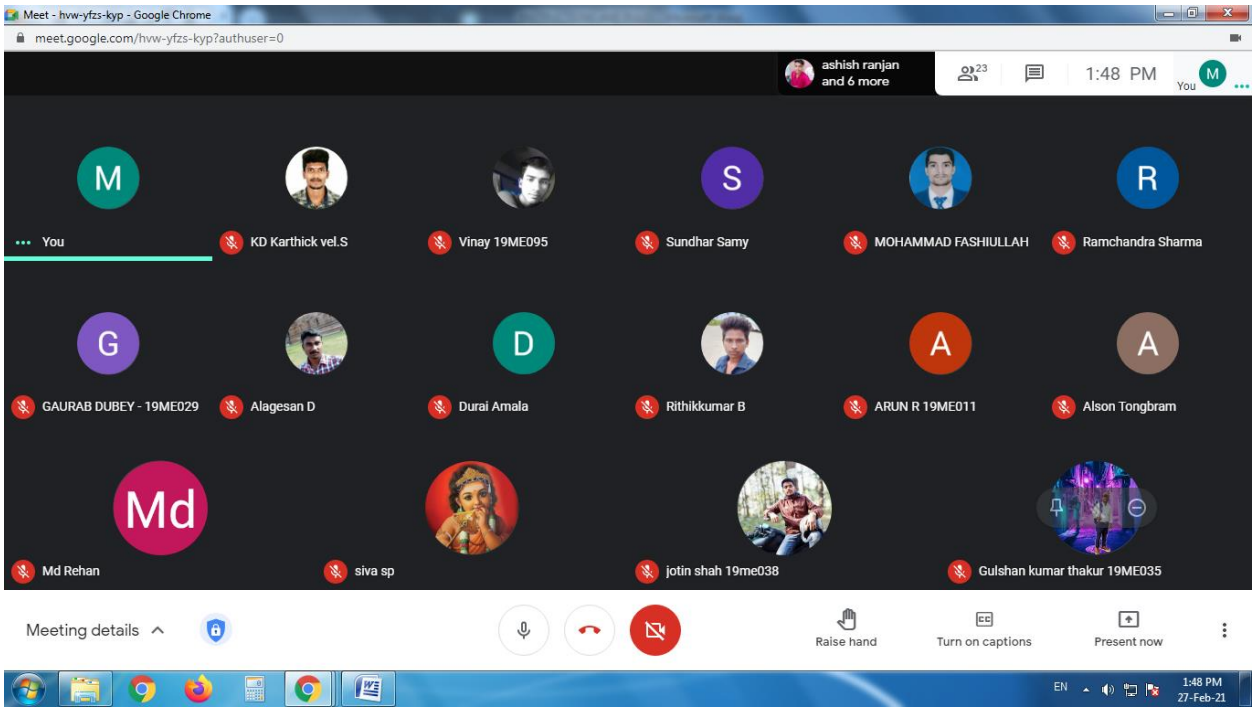
EEC/MECH/004.2- Virtual Lab interaction with students

Excel Engineering College, Autonomous

Department of Mechanical Engineering

Activities

Name of the Event	Design Competition- **Passenger Car Design Contest** by internal Faculty.
Event Date	27.02.2021
about the Event	The Aim of the Car and Land Based Motor Vehicles Design Award is to attract the attention of design media, magazines, and industry leads to your business by means of creating publicity, awareness and dissemination and also to separate you from the rest of the actors in the automotive industry by honoring your institution with a prestigious award. When submitting to the Car and Land Based Motor Vehicles Design competition keep in mind that your car design will be evaluated on multiple dimensions, your design is judged together with its interior and exterior, usage, efficiency and technical design. If applicable report on sustainability can also be submitted as PDF. Applicants should send high-resolution images of the car, together with a PDF presentation. He best automobile designs are selected according to form, functional and emotional aspects of the product; the designs are considered for their degree of innovation, aesthetic qualities, functionality and usefulness in addition to ease of realization and realization efficiency, comfort, ergonomics and human interaction. The students felt very passionate to turn their innovative ideas into reality.



EEC/MECH/005.1- Faculty demonstrating by virtual

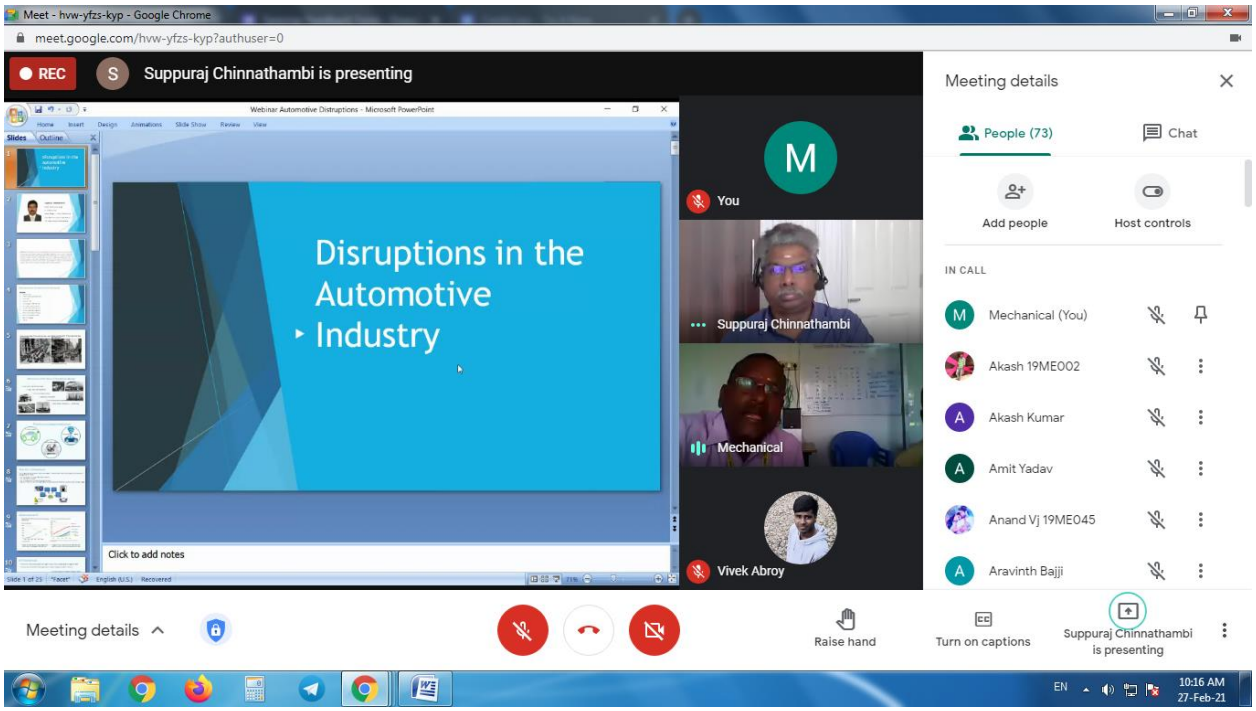
EEC/MECH/005.2- Students developing the prototype model

Excel Engineering College, Autonomous

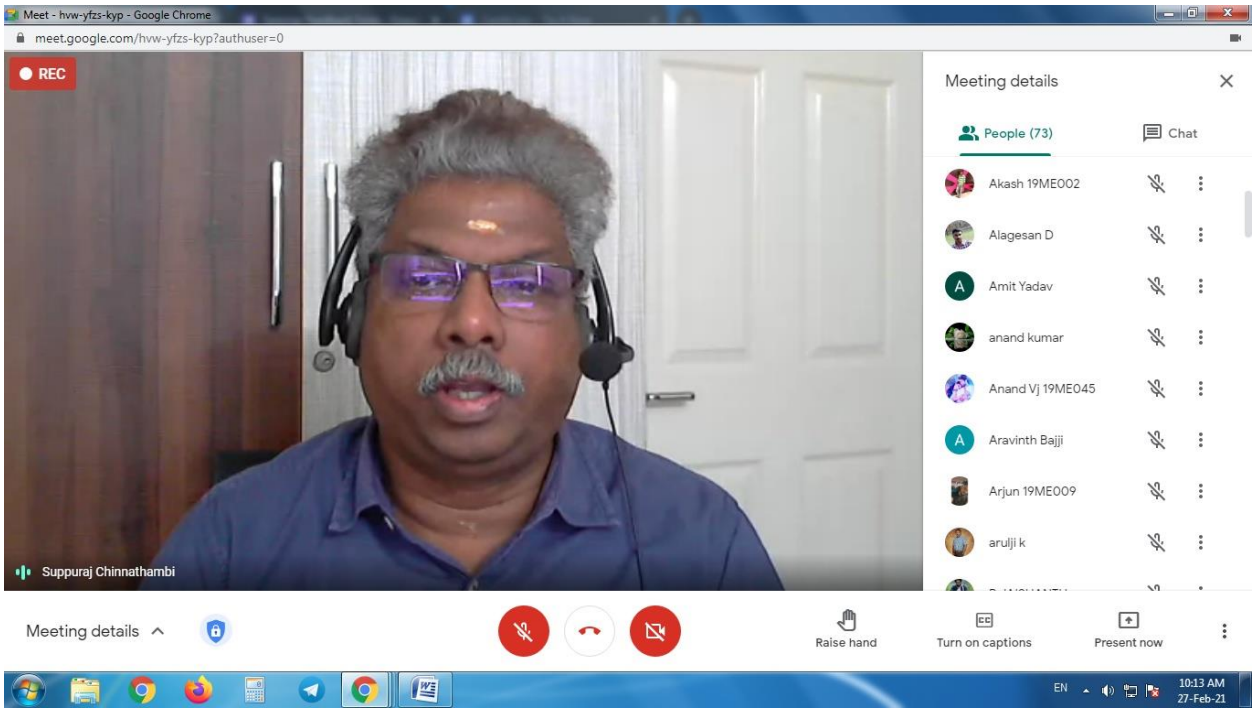
Department of Mechanical Engineering

Activities

Name of the Event	Seminar- **Disruptions in the Automotive Industry,** by Mr.Suppuraj.C General Manager- Product Development, Ford Motor India, Chennai.
Event Date	27.02.2021
about the Event	Most major automakers continue to develop electric vehicles, and the technology continues to advance and be more practical for our society. Several companies, however, are taking the idea of the electric vehicle to a different level, and this could make the technology mainstream and change the way we view human-vehicle interaction. The automotive supply chain for manufacturing cars, trucks and other vehicles is one of the most complexes in the world. It's becoming more global too, second only to the electronics sector for the spread of suppliers, manufacturers and other third parties around the world. Globalization adds some unique complexity to the automotive supply chain, and demands practical solutions from vehicle manufacturers and brands. It's not just globalization that creates difficulties for automotive suppliers and builders. Changes in manufacturing processes, consumer demands and new, disruptive trends all impact on the vehicle supply chain network for raw materials, parts and finished automobiles. Both internal and external factors require automotive supply chain managers to minimize costs, optimize manufacturing and distribution, and ensure that parts and products get to the right organizations at the right time. In this, we explore some of the main challenges facing automobile manufacturers, together with the steps you can take to manage the automotive supply chain and minimize impact. Challenge: Poor Visibility and Routing of Parts Results in Delays to Automobile Manufacturing. The program was highly appreciated by the participants in terms of automotive industry development. The students felt very passionate to turn their innovative ideas into reality.



EEC/MECH/006.1- Chief Guest addressing all the students



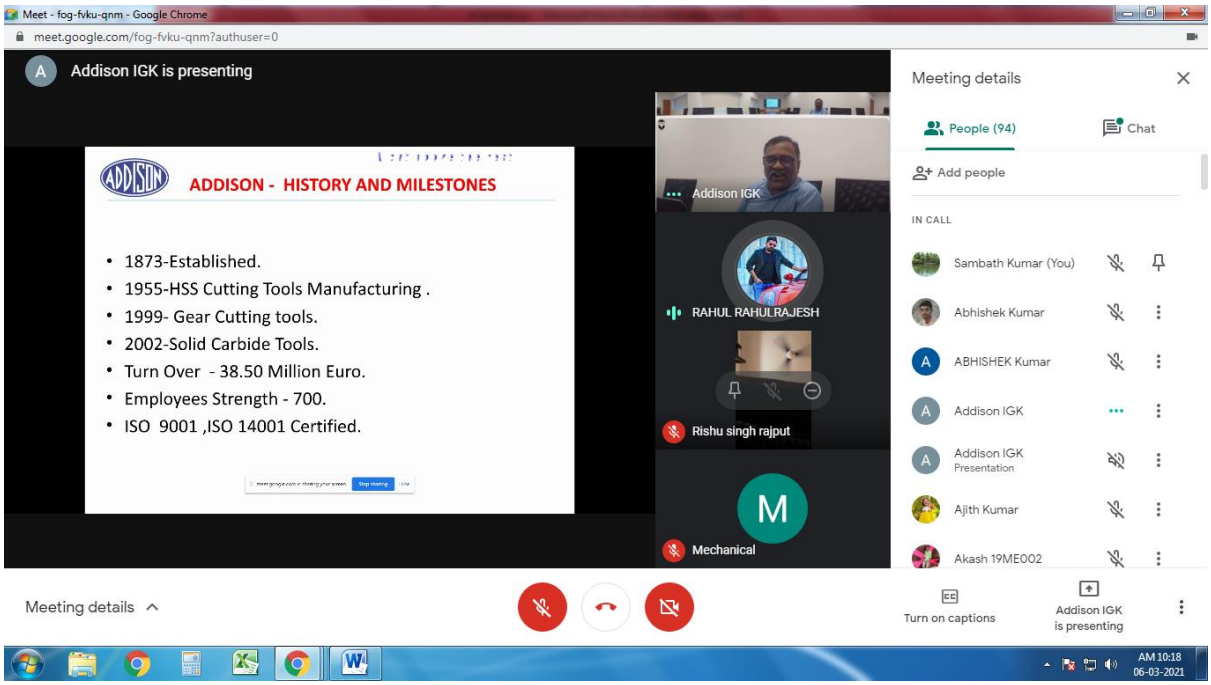
EEC/MECH/006.2- Chief Guest interaction with students

Excel Engineering College, Autonomous

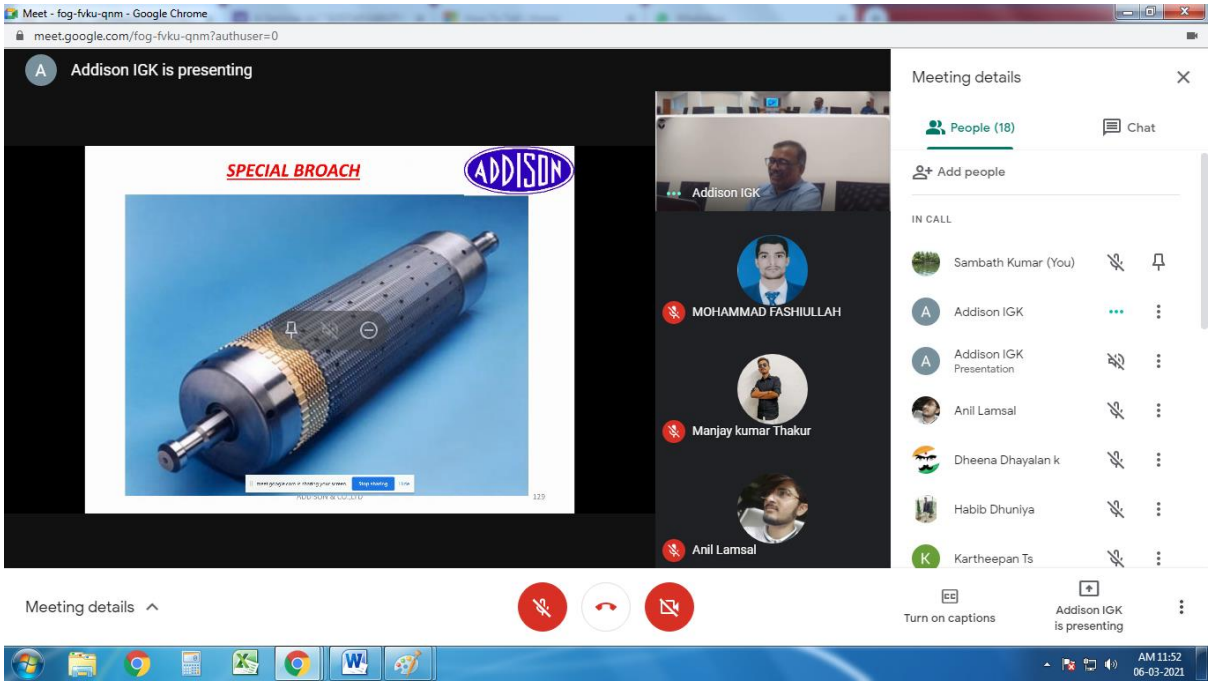
Department of Mechanical Engineering

Activities

Name of the Event	Industry Guest Lecture- **Sustainability of advanced cutting tools for Precision Machining,** by Mr.A.Thinakaran, Head-Quality, Addison & Co., Ltd, Chennai.
Event Date	06.03.2021
about the Event	Expert Says, Environmental, economic and social changes of any significant proportions cannot take place without a major shift in the manufacturing sector. In today's manufacturing processes, economic efficiency is realized through high volumes with the use of specialized machine tools. Change in society, such as in the form of mobility and digitization, requires a complete overhaul in terms of thinking in the manufacturing industry. Moreover, the manufacturing industry contributes over 19 % to the world's greenhouse gas emissions. As a consequence of these issues, a demand for sustainable solutions in the production industry is increasing. In particular, the concept of "cost" in manufacturing processes and thus the "system boundaries" within the production of the future has to be changed. That is, a great number of aspects to the machine tool and production technology industries can be improved upon in order to achieve a more sustainable production environment. Within this chapter, the focus lies on Microsystems technology enhanced modular machine tool frames, adaptive mechatronic components, as well as on internally-cooled cutting tools. An innovative machine tool concept has been developed recently, featuring a modular machine tool frame using Microsystems technology for communication within the frame, which allows for a high level of flexibility. Furthermore, add-on upgrading systems for outdated machine tools—which are particularly relevant for developing and emerging countries—are poised to gain in importance in the upcoming years. The system described here enables the accuracy of outdated machine tools to be increased, thus making these machine tools comparable to modern machine tool systems. Finally, the cutting process requires solutions for dry machining, as the use of cooling lubricants is environmentally damaging and a significant cost contributor in machining processes. One such solution is the use of internally cooled cutting tools. Students are actively Participated and gained knowledge on Cutting Tools.



EEC/MECH/007.1- Chief Guest addressing all the students



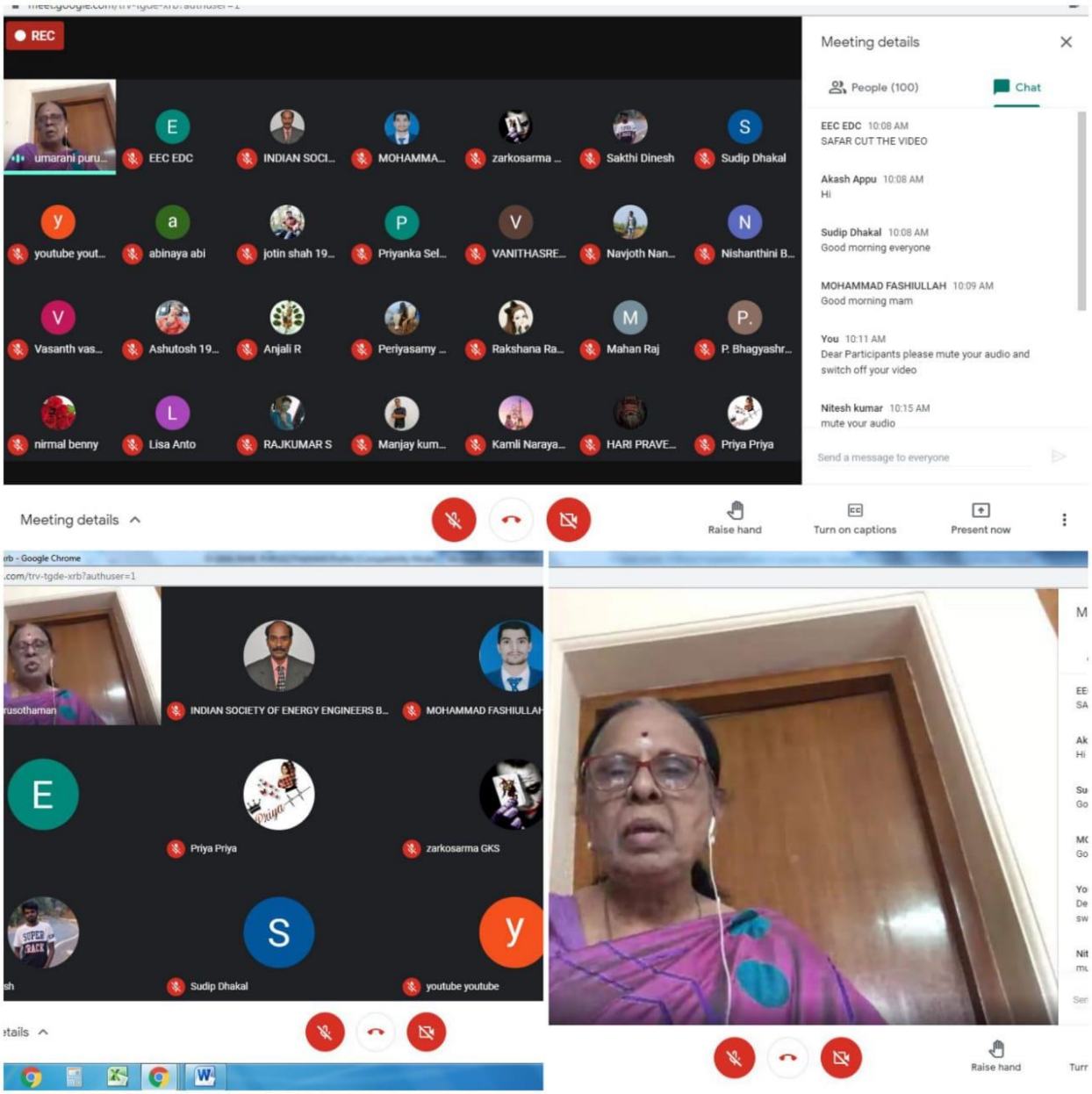
EEC/MECH/007.2- Tools demonstration through virtual lab

Excel Engineering College, Autonomous

Department of Mechanical Engineering

Activities

Name of the Event	Academic Guest Lecture- **Experts Talk on "Need of Advancement through Rural Entrepreneurship"** By Dr.Uma Rani Purusothaman, Mahatma Gandhi National Council of Rural Education Ministry of Human Resource Development Government of India.
Event Date	13.03.2021
about the Event	Rural development is more than ever before linked to entrepreneurship. Now a day's Institutions and individuals promoting rural development see entrepreneurship as a strategic development interference that could speed up the rural development progression. However, entrepreneurship stands as a vehicle to improve the quality of life for individuals, families and communities to sustain a healthy economy and environment. The entrepreneurial point of reference to rural development accepts entrepreneurship as the central force of economic growth and development, without it other factors of development will be wasted. The acceptance of entrepreneurship as a central development force by itself will not lead to rural development and the advancement of rural enterprises. There is an urgent need to enable environment entrepreneurship in rural areas. The existence of such an environment depends on policies promoting rural entrepreneurship. The efficiency of such policies in turn depends on an intangible structure about entrepreneurship, i.e., what it is and where it comes from.



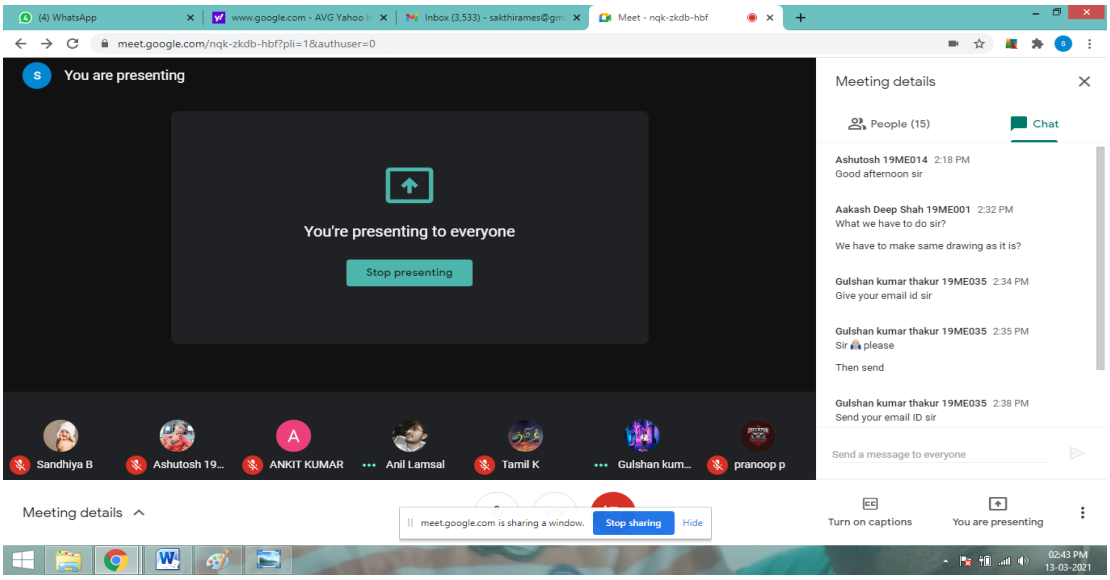
EEC/MECH/008.1- Chief Guest addressing all the students

Excel Engineering College, Autonomous

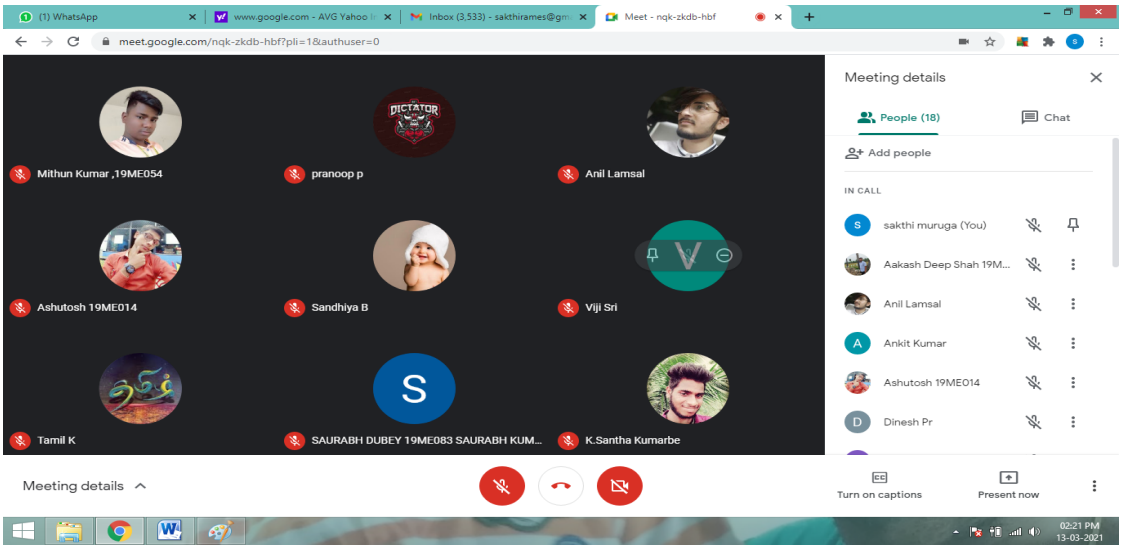
Department of Mechanical Engineering

Activities

Name of the Event	Design Competition- **Visualization of Objects using CAD** T.M Sakthimuruga, Assistant Professor, Department of Mechanical Engineering, Excel Engineering College.
Event Date	13.03.2021
about the Event	Mechanical CAD is the discipline of formulating detailed plans about a product and its mechanical components that visually demonstrate the ideal construction for their effective and flawless functioning. It allows designers and fabricators to bring forth perfect structural CAD representation of mechanical components and their respective calibration. There are a number of terms synonymous to CAD, including: Mechanical Drawing, Mechanical CAD (computer aided design) drafting, CAD Drawing and Mechanical Drafting Mechanical CAD includes multidimensional operations such as structural drawing from a number of abstract sketches, assembly drawing, digitization of a master drawing, piping diagrams, fabrication drawings and so on. While developing any mechanical component, the most obvious first step is to come up with the initial drafting sheet in a standardized format that can be comprehended by virtually anyone involved in the manufacturing process. With CAD, the operational team responsible for a project can concentrate on the decision making processes while the CAD software automates all the essential steps including analysis, fabrication/engineering design, modeling, interference monitor, simulation and so on. In addition, CAD also provides the luxury of maintaining real-time surveillance over the operational limitations of the design and to immediately execute suitable alterations to overcome any inefficiency found.



EEC/MECH/009.1- Faculty addressing all the students



EEC/MECH/009.2- Students Interaction