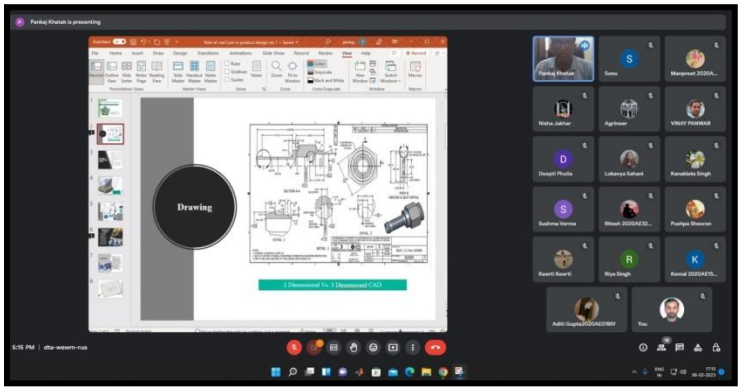
Training on CAD/CAM

Lecture 1 on "Role of CAD-CAM in product design" on 06th-08th Feb. 2023 & 20th-22nd Feb. 2023

Dr. Pankaj Khatak is presently working as Professor in the Department of Mechanical Engineering at GJUS&T, Hisar. Dr. Khatak has completed the Doctorate (Ph.D.) GJUS&T, Hisar, Haryana, India and Master's from Indian Institute of Technology Delhi, India. He has done his Bachelor's in Mechanical Engineering from NIT, Kurukshetra. Computer-aided design (CAD) involves creating computer models defined by geometrical parameters. These models typically appear on a computer monitor as a three-dimensional representation of a part or a system of parts, which can be readily altered by changing relevant parameters. CAD systems enable designers to view objects under a wide variety of representations and to test these objects by simulating real-world conditions.

Computer-aided manufacturing (CAM) uses geometrical design data to control automated machinery. CAM systems are associated with computer numerical control (CNC) or direct numerical control (DNC) systems.



Lecture 1 scheduled on 06th Feb. 2023 at 5 PM.

CAD and CAM both use computer-based methods for encoding geometrical data, it is possible for the processes of design and manufacture to be highly integrated. Computer-aided design and manufacturing systems are commonly referred to as CAD/CAM. CAD/CAM gave the designer much more direct control over the production process, creating the possibility of completely integrated design and manufacturing processes. The rapid growth in the use of CAD/CAM technologies after the early 1970s was made possible by the development of mass-produced silicon chips and the microprocessor, resulting in more readily affordable computers. As the price of computers continued to decline and their processing power improved, the use of CAD/CAM broadened from large firms using large-scale mass production techniques to firms of all sizes. The range of operations to which CAD/CAM was applied expanded as well. In addition to parts-shaping by traditional machine tool processes such as stamping, drilling, milling, and grinding, CAD/CAM has come to be used by firms involved in producing consumer

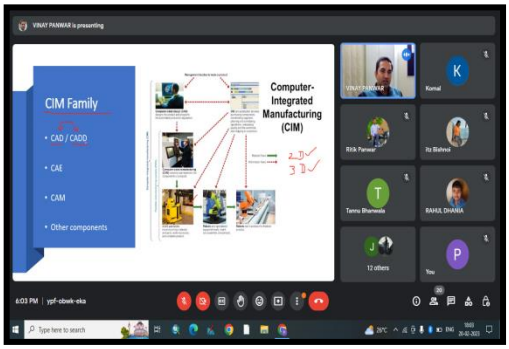
electronics, electronic components, molded plastics, and a host of other products. Computers are also used to control a number of manufacturing processes (such as chemical processing) that are not strictly defined as CAM because the control data are not based on geometrical parameters. CAD/CAM software is used to design and manufacture prototypes, finished parts, and production runs. CAD/CAM systems also facilitate communication among those involved in design, manufacturing, and other processes. This is of particular importance when one firm contract with another to either design or produce a component.

Lecture 2 scheduled on 20th Feb. 2023 at 5 PM

Lecture 2 on "CAD/CAM/CIM: Implementation in Manufacturing Sector" by Dr. Vinay Panwar, Assistant Professor, Department of Mechanical Engineering, NSUT, New Delhi dated 6thFeb. and 20th Feb., 2023. Dr.Vinay Panwar is presently working as Assistant Professor in the Mechanical Engineering Department at Netaji Subhas University of Technology, Dwarka, New Delhi – 110078, India. Dr.Panwar has completed the Doctorate (Ph.D.) from Indian Institute of Technology Roorkee, India in December 2017 and Master's from Indian Institute of Technology Kanpur, India in 2013. He has done his Bachelor's in Mechanical Engineering, in 2010. The contents of this lecture were designed to clarify the integrity and relationship among various constituents of computer-integrated manufacturing (CIM), i.e., design, simulation, manufacturing, process planning, quality, testing, etc., aided by computer technology. The physical implementation of computer-aided manufacturing (CAM) in NC/CNC machines, as well as the use of a mechatronic approach, has been included to educate students on the significance of these technologies in real-world manufacturing industries. The implementation of these technologies in the present scenario using smart manufacturing, digital manufacturing, artificial intelligence, and the internet of things has been discussed, and the possibility of extension in this area towards cloud-based manufacturing has also been explored. It is believed that the lecture will help the audiences understand the importance of computer technology in the area of manufacturing and

differentiate between the closely related terms, e.g., CAD, CAM, CIM, CAPP, etc. The discussion on present and future aspects of using this technology motivates students to pursue related research and job opportunities by learning in this area and upgrading themselves.

Lecture 1 scheduled on 06th Feb. 2023 at 6 PM.

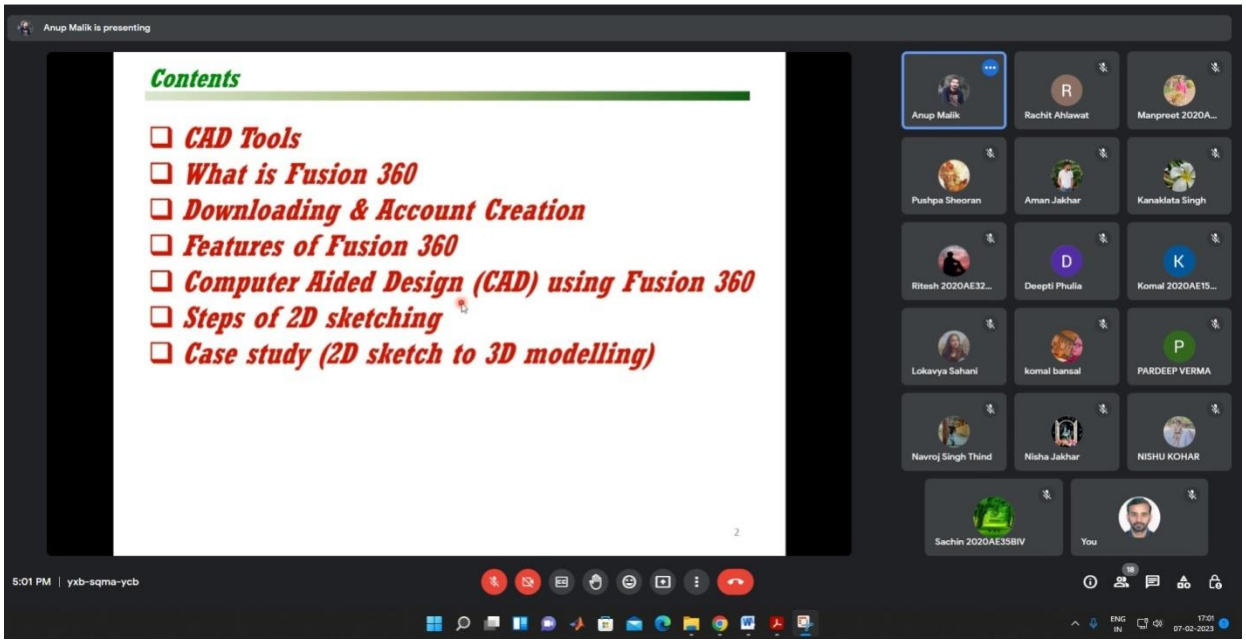


Lecture 2 scheduled on 20th Feb. 2023 at 6 PM.

3. Lecture on "2D Sketching in Autodesk Fusion 360" by Dr. Anup Malik, Assistant Professor, Department of Mechanical Engineering, MNIT, Jaipur dated 7thFeb. and 21st Feb., 2023

Dr. Anup Malik is presently working as Assistant Professor in the Mechanical Engineering Department at MNIT, Jaipur. Dr. Anup Malik is actively working in the field of Advanced Manufacturing Processes, Micro-Fluidic Devices, and Surface Engineering of Materials. His Current activities include Improving the surface characteristics of metallic implants using hybrid machining processes; Design, Model and Development of Micro-Fluidic Devices, Development and Characterization of Carbon-Kevlar Hybrid Composites.

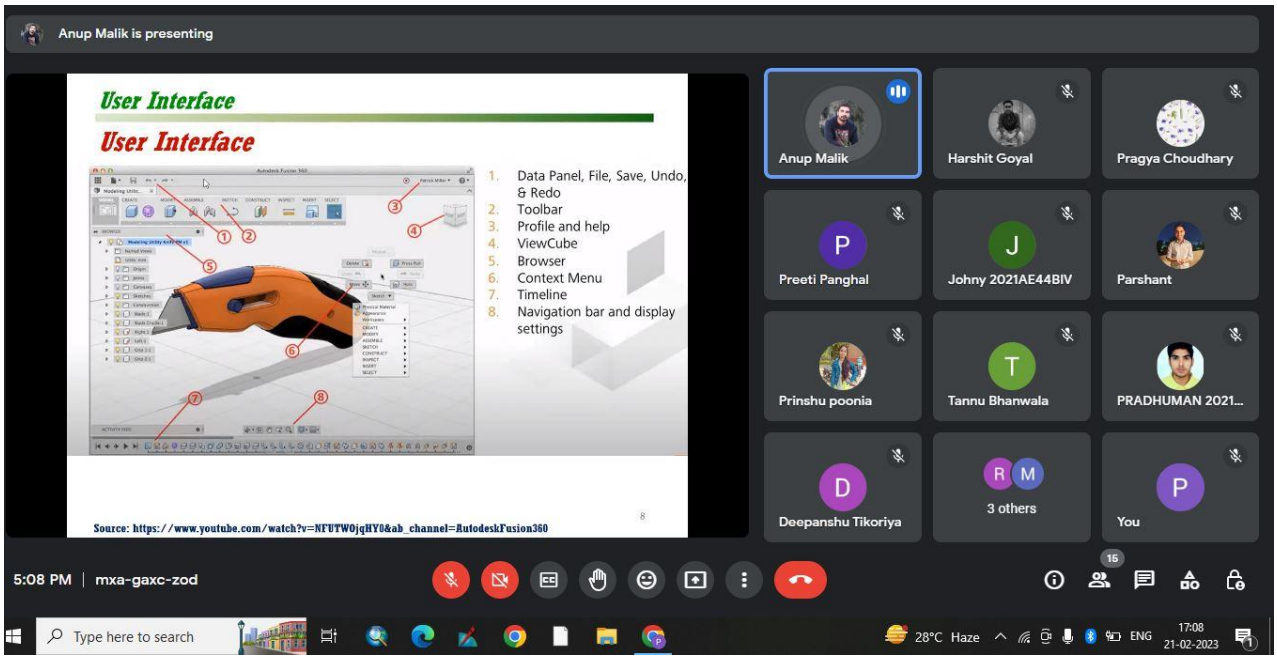
Autodesk Fusion 360 is a computer-aided design, computer-aided manufacturing, and computer-aided engineering software developed by Autodesk in 2013. It is cloud based software. Fusion 360 is a complete package that combines the modelling of organic shapes with mechanical design, and manufacturing. Fusion 360's combined concept-to-production toolkit makes it simple and quick to explore design concepts. It can control production procedures like milling, turning, cutting, and additive manufacturing. Additionally, it has electronic design automation (EDA) tools like component management, PCB design, and schema design. Fusion 360 aids in bringing together design teams for cooperative product creation. Since all of your ideas are kept in the cloud, you and your team can always access the most recent information. Fusion also tracks versions of your design as you work. Each version can be viewed in your online browser using Autodesk 360, and you can upgrade an older version to the most recent one. Finally, monitor design activity by using Fusion 360 to share your designs. You can give someone who does not have an Autodesk ID restricted access to your design.



Lecture 1 scheduled on 07th Feb. 2023 at 5 PM.

With 2D drawings, you can select which sections or the entire assembly you want to document, which views you want to include, and then move those views associatively with the parent view. You also have access to the usual dimensioning and annotation tools 2D sketching in Fusion 360 is the process of creating 2-dimensional sketches of a design that can be used to create 3D models. These sketches can be used to define the basic shape and dimensions of a part or assembly, and they can be modified and refined as needed.

To begin a 2D sketch in Fusion 360, you first need to create a sketch plane. This is a flat surface on which you will draw your sketch. You can create a sketch plane by selecting a face or surface of an existing 3D model or by creating a new construction plane. Fusion 360 provides a range of sketching tools, including lines, arcs, circles, rectangles, polygons, splines, and more. You can also use constraints and dimensions to define the size and position of your sketch elements. Once you have completed your 2D sketch, you can use it to create a 3D model by extruding or rotating it. You can also use the sketch as a starting point for creating more complex shapes and features.

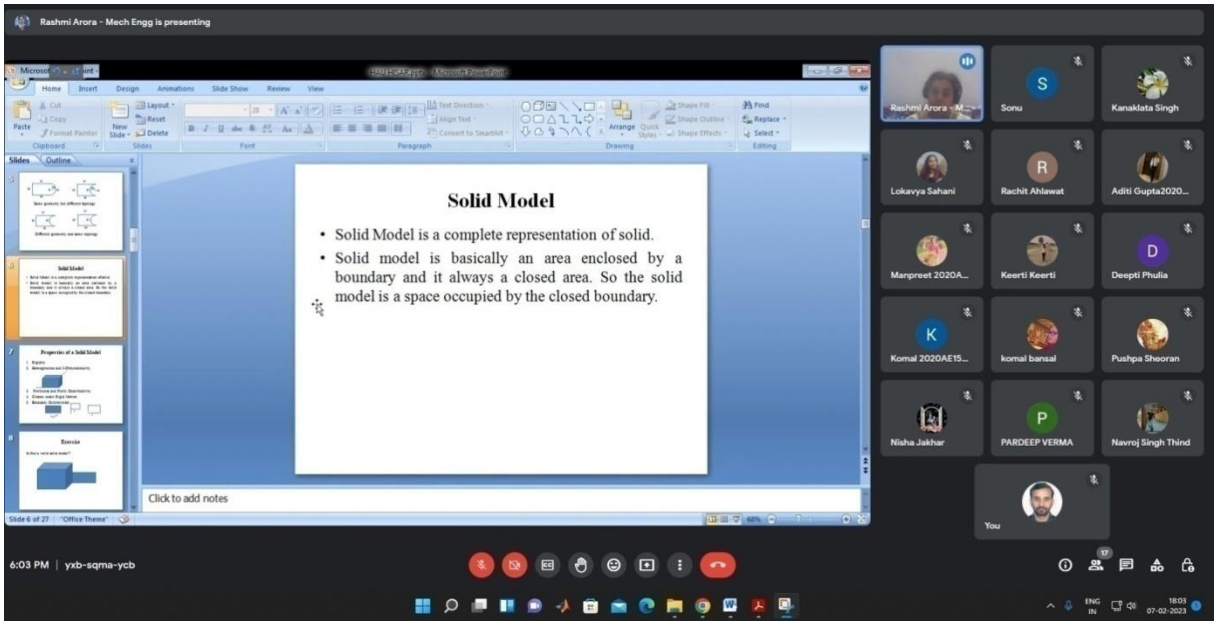


Lecture 2 scheduled on 21st Feb. 2023 at 5 PM.

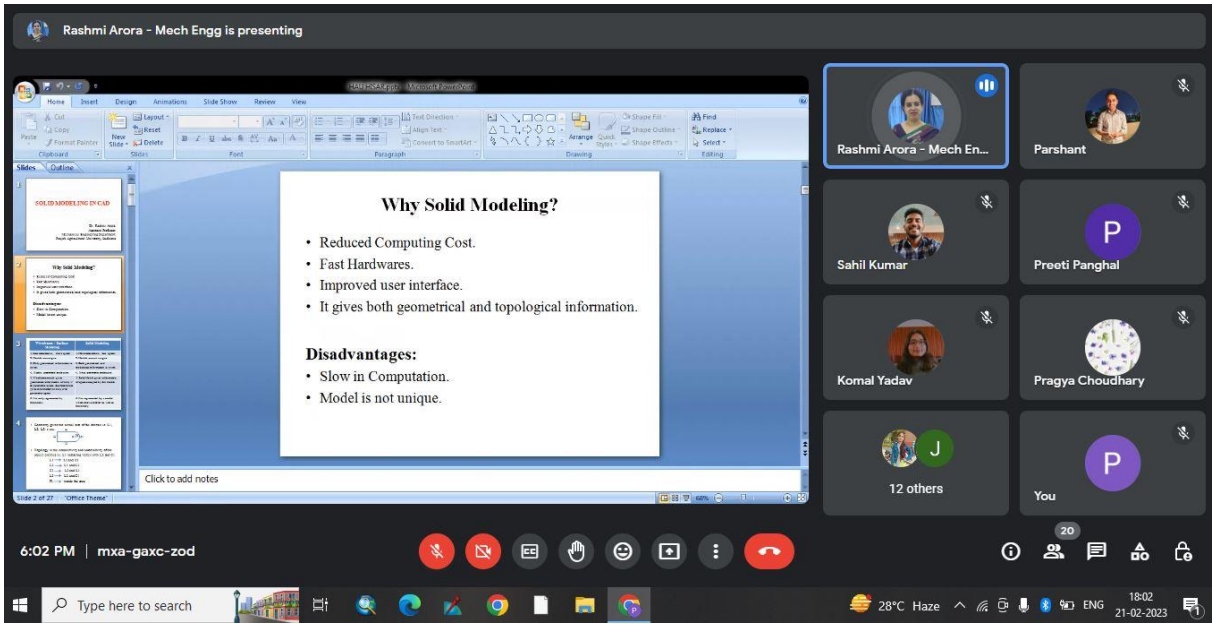
4. Lecture on "Solid Modeling in CAD" by Dr. Rashmi Arora, Assistant Professor, Department of Mechanical Engineering, PAU Ludhiana dated 7thFeb. and 21st Feb., 2023

Dr. Rashmi Arora is presently working as Assistant Professor in the Mechanical EngineeringDepartment at PAU Ludhiana. Dr. Arora has completed the Doctorate (Ph.D.) and Master's from Thapar Institute of Engineering and Technology, Patiala. He has done his Bachelor's in Mechanical Engineering, in 2010.

This lecture was about the types of CAD models. This led me to learn about the basic concept of solid modeling, along with its advantages and disadvantages. On paper or in 2D CAD, a designer creates drawings of different views of an object. They imagine how the front, top, and side views work together to describe the actual three-dimensional object. Solid modelling transforms that 2D designer's understanding into a 3D electronic representation. This lecture will also go into detail about the different representation schemes used in solid modelling software and their practical applications. An introduction to basic 3D part modelling in solid works software will also be given.



Lecture 1 scheduled on 07th Feb. 2023 at 6 PM.

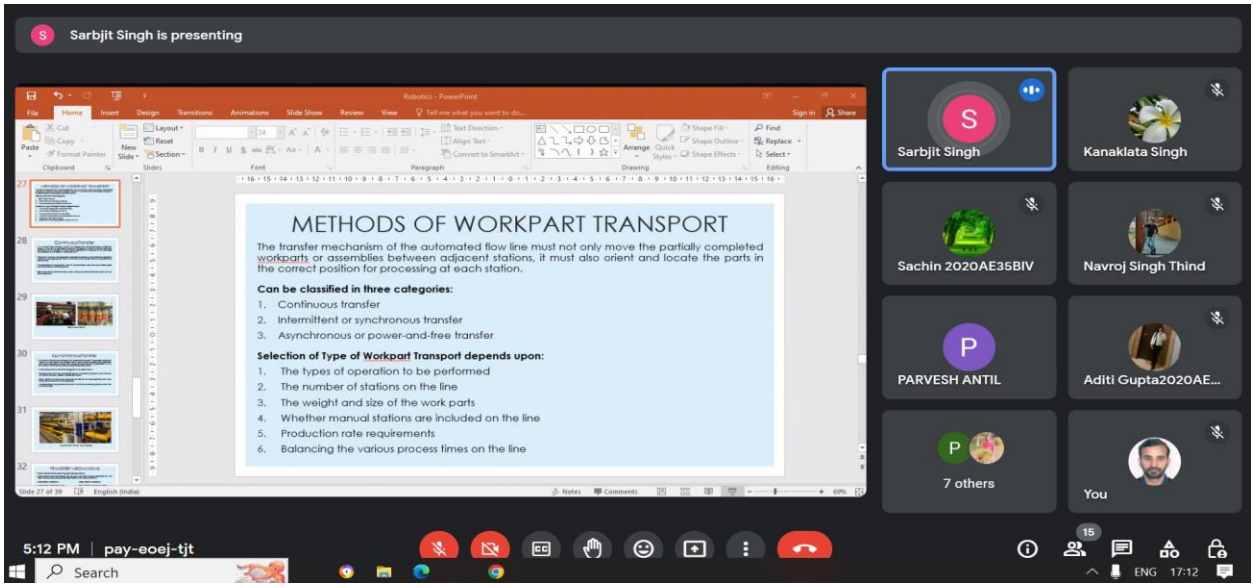


Lecture 2 scheduled on 21st Feb. 2023 at 6 PM.

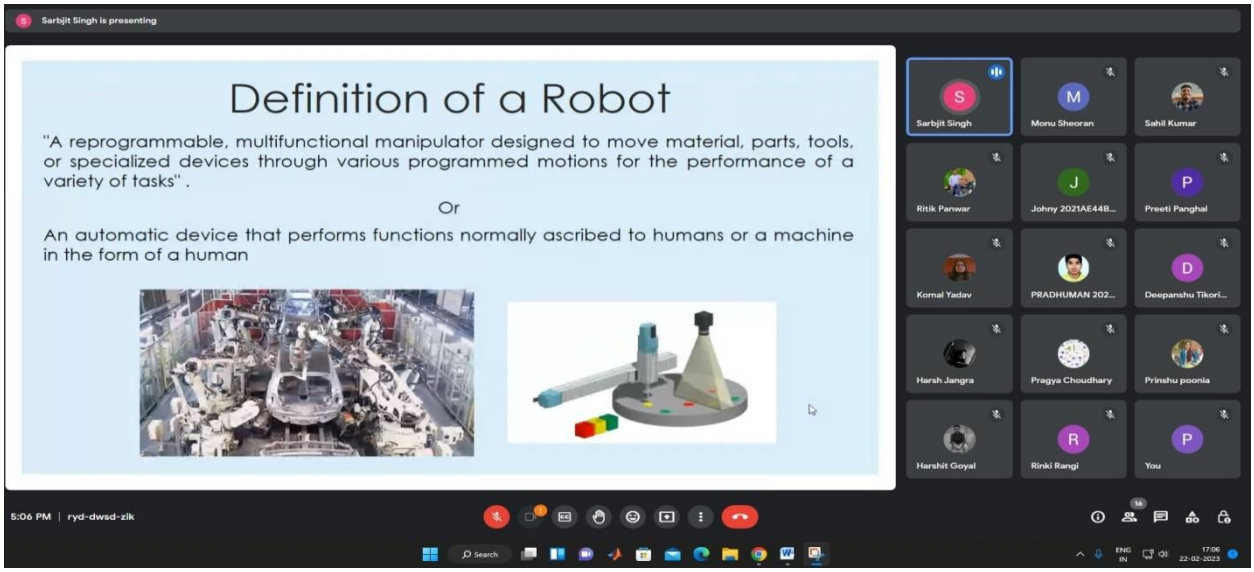
5. Lecture on "Role of CAD/CAM/CIM in Robotics" by Dr. Sarbjit Singh, Associate Professor, Department of Mechanical Engineering, PEC Chandigarh dated 8thFeb. and 22nd Feb., 2023

Dr. Sarbit Singh is presently working as Associate Professor in the Mechanical EngineeringDepartment at Punjab Engineering College, Chandigarh, India. Dr. Singh has completed the Doctorate (Ph.D.) from Indian Institute of Technology Roorkee. Dr Singh has published more than 50 research paper in reputed journals. His area of expertise lies in domain of composites, micro machining and robotics.

Dr. Singh discussed the role of CAD/CAM in the domain of robotics. CAD/CAM software is most often used for the machining of prototypes and finished parts. CAM refers to the use of various software packages to create tool paths and NC code to run a CNC-controlled machine based on 3D computer model (CAD) data. When the two are used together, this is generally referred to as "CAD/CAM." An assessment of CAD/CAM and related areas is given, including various aspects of automated manufacturing and robotics. Flexible manufacturing systems, the forerunner of the factory of the future, are discussed in some detail. Some perspectives are given on the developments and prospects in artificial intelligence. Robotics and CAD/CAM are probably two technologies today that have made a tremendous impact in the manufacturing field. This impact has resulted in an increase in job opportunities for people with expertise in robotics and the CAD/CAM area. The demand will continue to rise as the technology develops further and is implemented on a much wider scale than in its current state.



Lecture 1 scheduled on 08th Feb. 2023 at 5 PM



Lecture 2 scheduled on 22nd Feb. 2023 at 5 PM

6. Lecture on "CAPP: The Linkage Between CAD &CAM" by Dr. Mukul Kataria, Assistant Professor, Department of Mechanical Engineering, PEC Chandigarh dated 8th Feb. and 22nd Feb., 2023

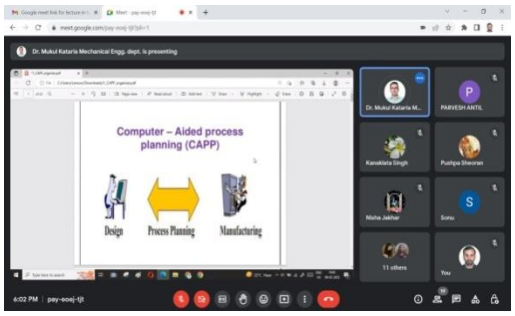
Dr. Mukul Kataria is currently an assistant professor at PEC, Chandigarh, in the department of mechanical engineering. He has completed his master's and PhD from PEC, Chandigarh. Dr.Kataria is actively working in the field of surface finishing through rheological fluids.

Dr.Mukul Kataria had delivered expert lecture on the topic Computer Aided Process Planning (CAPP) - The linkage between CAD &CAM. The content of the lecture included and elaborated following main points:

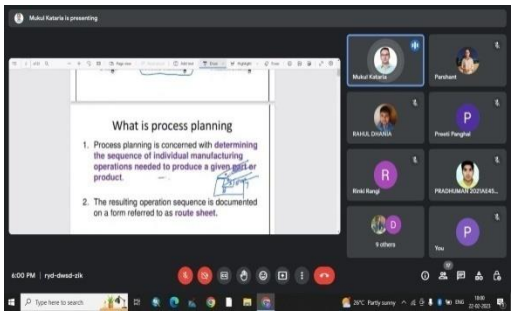
- Process Planning
- Computer Aided Process Planning
- Types of Computer aided process planning
- Feature recognition problem in computer aided process planning
- Attributed Adjacency Graph approach for feature recognition
- Computer generated time standards

The lecture helped students to understand the conversion of Computer Aided Design to Computer Aided Manufacturing and the process of execution. The lecture gave the basic concept of modern Computer

Integrated Manufacturing System (CIMS). The session was very interactive and ended with many students requesting for more such sessions.



Lecture 1 scheduled on 22nd Feb. 2023 at 6 PM



Lecture 2 scheduled on 22nd Feb. 2023 at 6 PM