



Instructional Methods:

1. Lecturing/ Chalk and Talk Method:

Chalk and talk method is a traditional and effective method for teaching. In this teaching method the focus of approach is an average student and is the most common method of instruction. There are many established methods of instructions, among which, chalk talk method is most acceptable. If the interactive style of learning is there than it will help the student get a better grasp on the subject. We know in general teaching large amount of information is present in which has to be pumped in into student's memory.

Chalk (or drawing) is used for demonstration, to explain a point or illustrate a topic which is prepared with reading resources like books, journal, and brochures. It is a two-way communication method. This will not interfere for any power interruption



Fig: Faculty teaching using chalk and talk method

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2. Power point presentation:



Fig: Use of ICT tool presentation using PPT enhances the teaching learning

- All the class rooms in the department are equipped with overhead projectors.
- Projectors in the class rooms are used to teach the students using power point presentations.
- Also students use Power Point to present their technical seminars, projects etc. Relevant Technical videos, simulations, animations, were thought using the ICT tool

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3. Simulations or Models or Real time examples

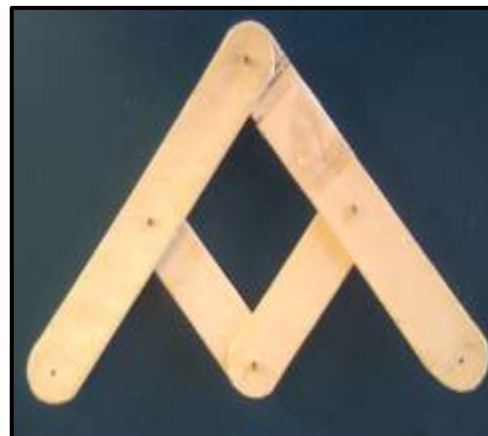
The mechanisms in kinematics of machines are difficult to visualize. The models shown below are used for demonstration for particular mechanism. This increases the creativity ideas for the students.



Aucellier Mechanism



Four Bar Mechanism



Pantograph

Figure: Mechanism Models helps students to understand concepts of Kinematics of Machines

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4. Collaborative learning and Group discussions:

- Students conduct experiments in groups in various laboratories during their course.
- This collaborative method allows students to actively participate in learning process.
- Final year students carry out a group project as a part of the curriculum, which is an example of collaborative teaching method.
- This helps teacher to assess student's abilities to work as a team, leadership and presentation skills.



Student demonstrating the project in Project Exhibitions

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5. QUIZ:

Students will aware of objectives question and intellectual ability due to quiz competitions. The confidence of student will also be improved. The frequently asked questions in competitive exams can be framed as quiz questions. So that students will be benefited for GATE, GRE, PG CET and other competitive exam.



Figure: Students are listening instructions for technical quiz in final round.

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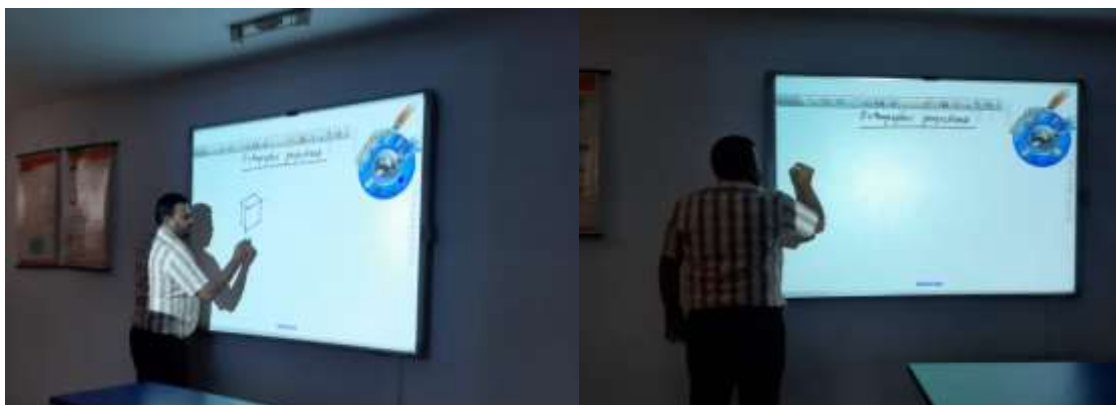


INSTRUCTIONAL METHODS AND PEDAGOGICAL ACTIVITIES

6. Smart Class or Smart Board usage in class rooms:

The smart classroom is an enhanced classroom of technology that improves teaching and learning opportunities by group action learning technologies, like computers, special software and audio / visual capabilities. Nowadays the faculties can give instruction with PowerPoint introductions, PDF's, and videos. The department is equipped with one smart classroom and each class rooms are provided with a projector and a WI-FI dongle, through which a faculty can show videos, PPT's or any other digital content through a smart phone or a laptop.

The smart classroom is equipped with a Smart Board from Elucido Media Networks, a projector and audio system. With the help of the Dual Smart Pen and Smart Board, the faculties can write on the board, on PPT presentation, he can also use the Smart Pen to operate software like Solid Edge which is used for teaching drafting engineering drawing. The sample images of the use of smart class are shown below.



Prof. Rakesh R teaching Orthographic Projections for 3rd semester students.



Prof. Panduranga B P teaching Fluid Mechanics for 4th semester students.

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INSTRUCTIONAL METHODS AND PEDAGOGICAL ACTIVITIES

7. Relevant Technical Videos through *television in department corridor* :



Fig: Use of ICT tool - Television in corridor to stream technical videos and information

- At the corridor of the department we have a television.
- Every day different technical videos are streamed on it.
- Students walking past it stop to have a look at the interesting videos and help them to understand the concepts of the mechanical engineering.
- The videos streamed on the television are from wide variety of fields such as Automotive, Aerospace, Production industry, Robotics, Mechatronics. etc.
- Above figure shows technical video being streamed on the television

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INSTRUCTIONAL METHODS AND PEDAGOGICAL ACTIVITIES

8. Demonstrating models or charts (In Class or Lab):

Demonstration helps to prove a fact through a combination of visual evidence and associated reasoning. Demonstrations help to raise student interest and reinforce memory retention because they provide connections between facts and real-world applications of those facts. Demonstrating instruction method means teaching through examples or experiments.

- At the department while teaching Computer Aided Engineering Drawing 3D shapes (ex. Pyramids, Prisms) and are used to convey the concepts of drawing.
- It is the practice at the department faculty to carry the models to the drawing class and explain the concepts.
- This practice helps the students to visualize the problem

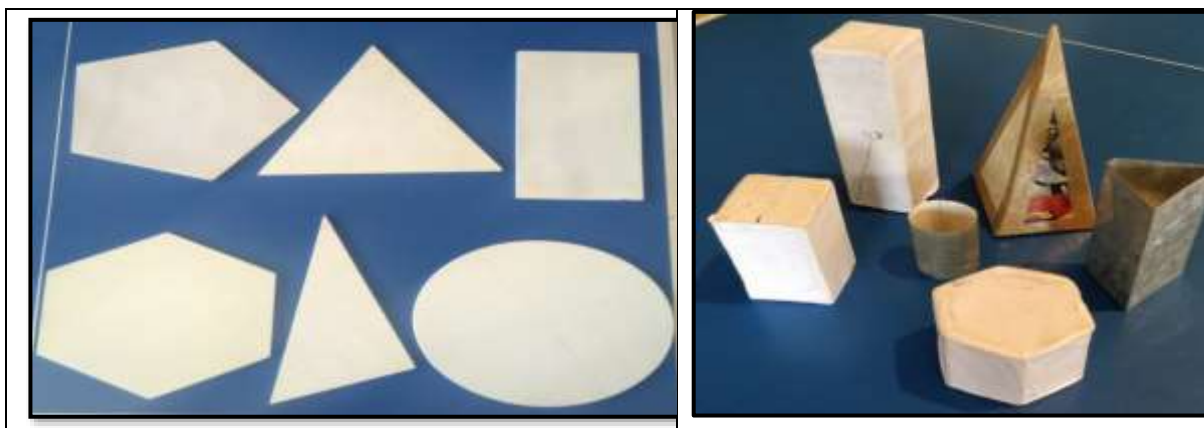


Figure: 2D and 3D Shapes help to convey the Engineering Drawing Concepts to students



Figure: Automotive axel and Components of engine parts helps to convey automotive concepts effectively

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9. Technical competitions

The technical competitions are conducted in order to enhance their skills by producing a model. Mechismos club is the platform where numbers of technical competitions are conducted. The competition like build it up make it move, Conjoint drawing, disassembly and assembly of vehicles, mechgriculture, triprix etc.

In build it up and make it move, the participant will build the components which will provide particular motion Eg. Robots, links, RC vehicles, drone etc.

Mechanical engineers must know the dynamics of vehicle and their parts. Disassembly and assembly of some vehicle parts will be done as technical competitions.

In conjoint drawing, the mechanical component drawing in 2D view is to be drawn by a team on a drawing sheet which will be provided on spot. The participants hand is tied with a cloth rope in such a way that, right hand of one participant will be tied with left hand of other participant.

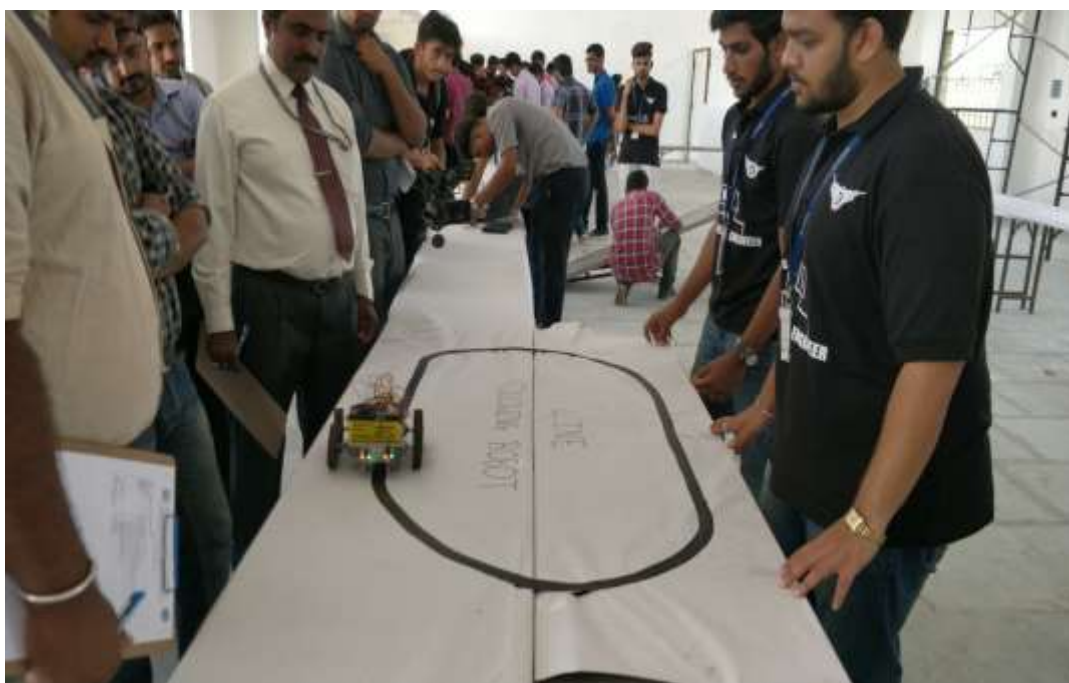


Figure: Student showing product in build it up and make it move competition

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10. Industrial visits

There are many fields in Mechanical Engineering. Students can choose any of the fields like thermal, design, manufacturing, automation, management, sales and marketing, software development etc. In order to encourage the students to expose better knowledge regarding fields of engineering and also in their academics, industrial visits are organized. The objectives of arranging Industrial visits are:

- To orient the perception of students with regard to professional environment.
- To expose the students to technologies used in the industry.
- To enhance the organizational knowledge of students.
- To provide a platform for students to relate the academics to industry.
- To facilitate the importance of safety and standards.



Figure: Students are taken to railway workshop Mysore

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11. Workshops and Training Programs

In view of ensuring that students are facilitated with comprehensive education that would propel them in professional growth, the department has well laid plan of organizing vocational courses at the break of odd semesters. Different training programs like Solid Modeling using Catia V5, Mechatronics, CNC Training, Hydraulics and pneumatics, Robotics, course in automobile technology are effectively organized by the department.



Figure: Students are conducting pneumatics experiment during vocational training program

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12. Online QUIZ:

Students will aware of objectives question and intellectual ability due to quiz competitions. The online e quiz is flexible to attend for students. It can be conducted in many online platforms like Google form, Kahoot etc. The participation certificate can be obtained through online based on minimum criteria scores. The confidence of student will also be improved. The frequently asked questions in competitive exams can be framed as quiz questions. So that students will be benefited for GATE, GRE, PG CET and other competitive exam.



Figure: E quiz on different online platforms

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INSTRUCTIONAL METHODS AND PEDAGOGICAL ACTIVITIES

13. Online Class

The smart classroom is an enhanced classroom of technology that improves teaching and learning opportunities by group action learning technologies, like computers, special software and audio / visual capabilities, applications etc. Nowadays the faculty members can give instruction with PowerPoint introductions, PDF's, and videos through online apps. Due to pandemic situation, online classes were made compulsory through various android applications like zoom, Google meet, etc. All the subjects were taught using online teaching using zoom application. The sample images of the online class are shown below.

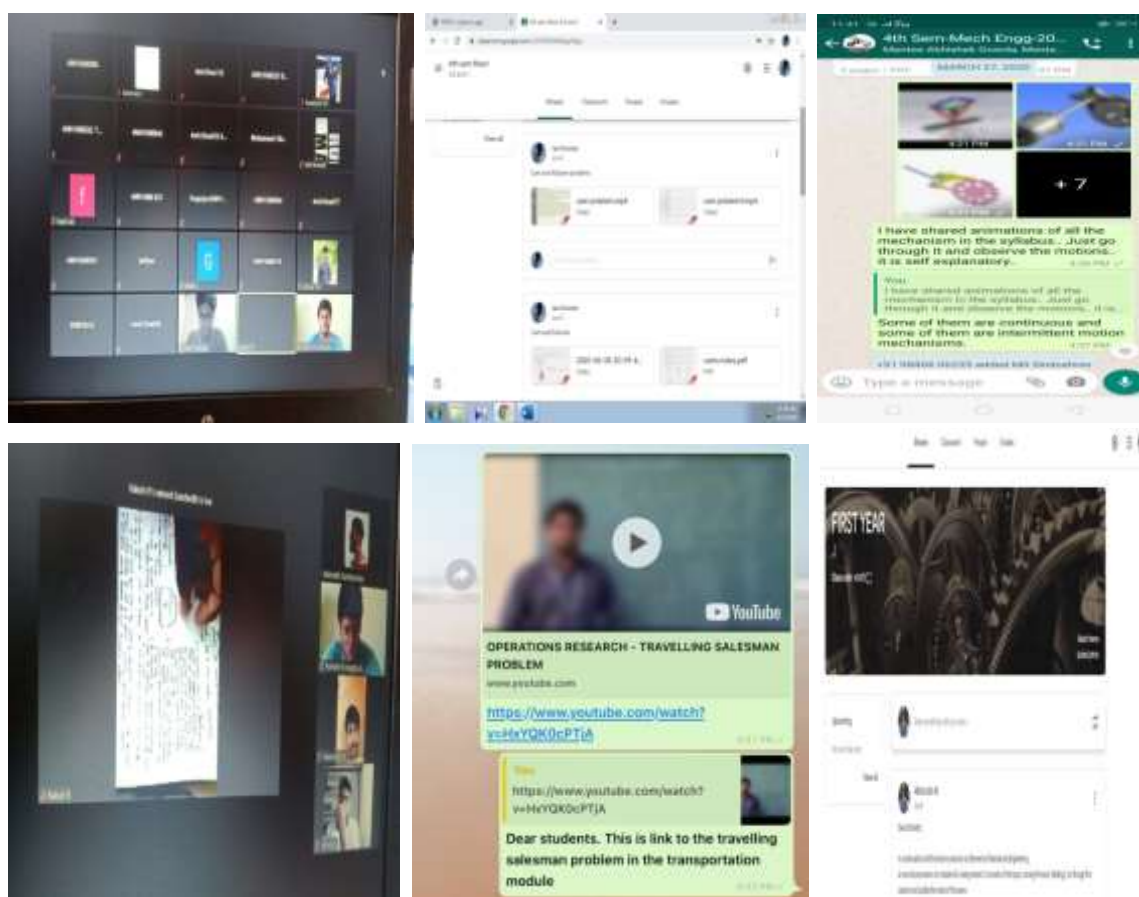


Fig: Online class by faculty member

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INSTRUCTIONAL METHODS AND PEDAGOGICAL ACTIVITIES

14. Studio Equipped with High Resolution Camera to Record Lecture Video

During Pandemic with the aim of reaching the students using ICT tools, at the department the faculty captured the video lectures at specially set up studio with high resolution camera. Most of the lecture sessions of different subjects were edited later and same were uploaded on to Department of Mechanical Engineering *Youtube* channel where a separate playlist were created for each of the subjects. The channel link is shared among the students.

The following pictures shows a screen capture of such video recorded session streamed on *Youtube*. The link for the department YouTube videos lectures is as follows:

<https://www.youtube.com/channel/UCbh7S6dctPn5SNxfMRmuH1A>

Fig: Prerecorded video lecture sessions streamed through *Youtube*

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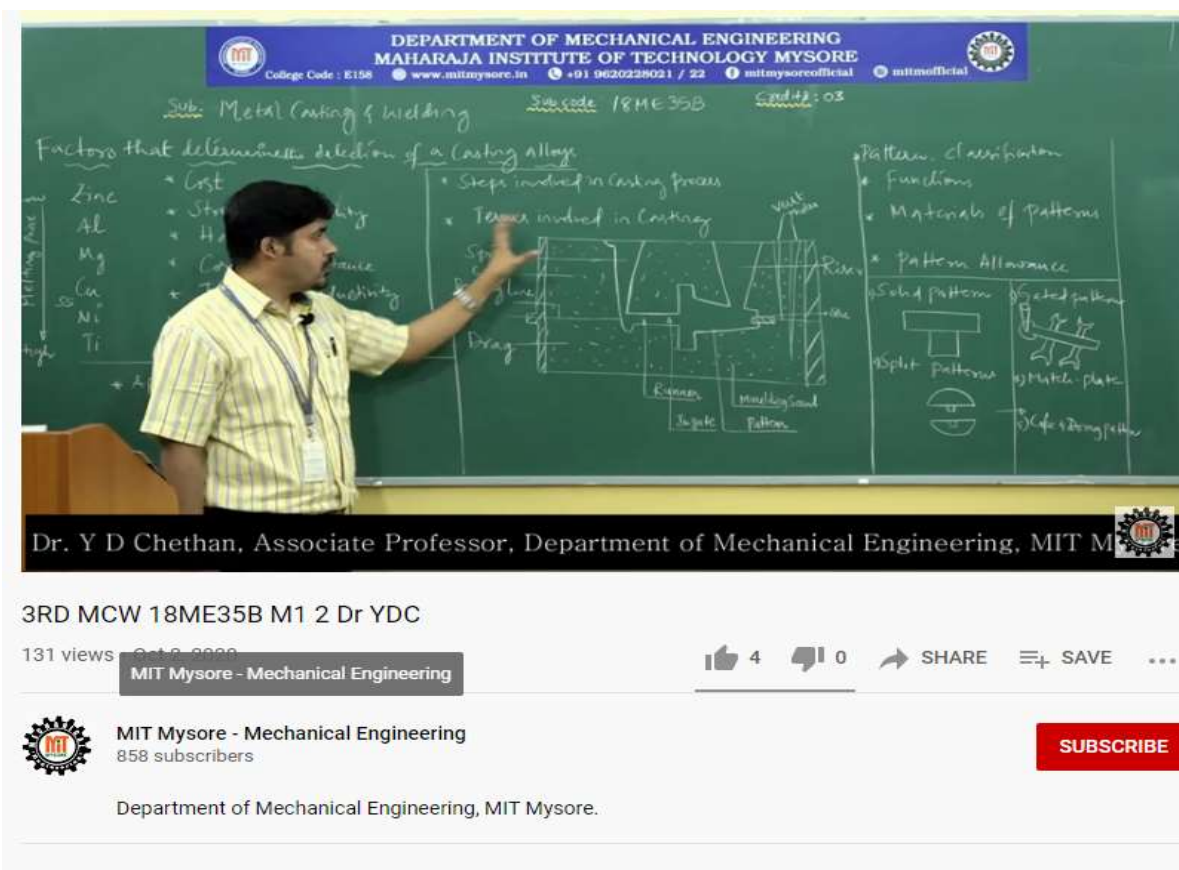


Fig: Prerecorded video lecture sessions streamed through YouTube



Figure: Faculty Recording a Video Lecture Session at Studio Equipped with High Resolution Camera



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INSTRUCTIONAL METHODS AND PEDAGOGICAL ACTIVITIES

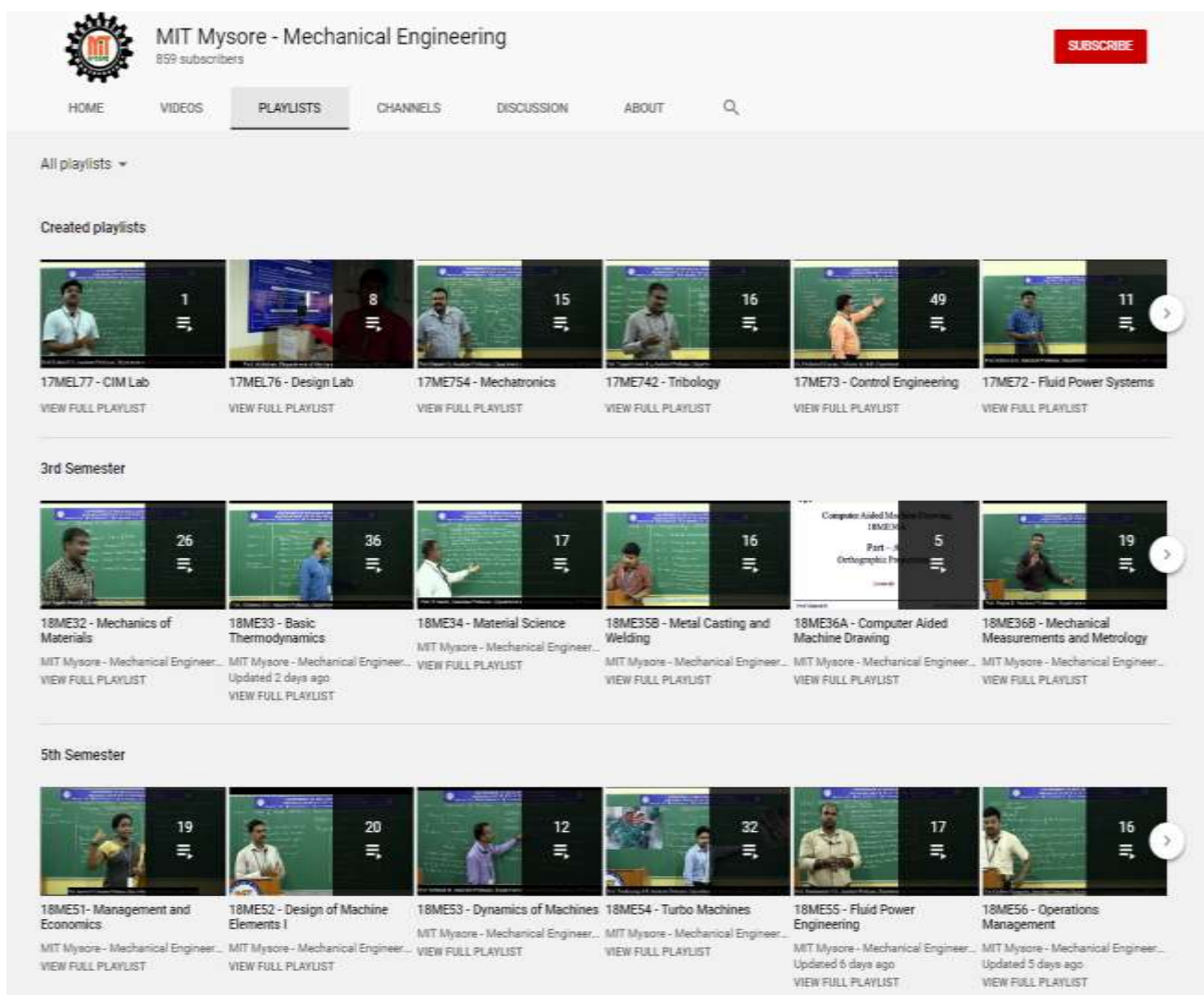


Fig: Semester wise lecture videos uploaded on department *YouTube* channel

The link for the department digital notes is as follows:

<https://drive.google.com/drive/u/1/folders/1r4pKFE3zQWajIxnO6KupsyYuZ-9cdGG3>

The link for the department YouTube videos is as follows:

<https://www.youtube.com/channel/UCbh7S6dctPn5SNxfMRmuH1A>



INSTRUCTIONAL METHODS AND PEDAGOGICAL ACTIVITIES

15. Google Classroom as ICT Tool

Google Classroom is a free web service developed by Google for schools that aims to simplify creating, distributing, and grading assignments. The primary purpose of Google Classroom is to streamline the process of sharing files between teachers and students.

At the Department of Mechanical Engineering Google learning tool *Google classroom* were created to reach the students during Pandemic. The student semester wise and corresponding faculties were added to the classroom. The Google Classroom are used to share the lecture notes online. The assignments were shared online through classroom and same were collected and evaluated

The screenshot displays the Google Classroom interface for a class named "Heat Transfer". The left sidebar shows a list of materials shared in the class, including assignments and lecture notes. The right sidebar shows the list of participants, categorized into Teachers and Students.

Class: Heat Transfer

Materials:

- Share with your class...
- New material: 2nd Assignment (19 Jun 2020)
- Add class comment
- New material: Heat and Mass Transfer by D K Dixit (18 Jun 2020)
- Add class comment
- New material: Fundamentals of Heat and Mass Transfer by M. Thiru... (18 Jun 2020)
- Add class comment
- New material: Heat Exchangers problems (6 Jun 2020)
- Add class comment
- New material: NTU-EFFECTIVENESS derivation for concentric tube heat ... (5 Jun 2020)
- Add class comment
- New material: LMTD derivation for concentric tube heat exchanger (5 Jun 2020)
- Add class comment
- New material: Transient Conduction problems with Bi > 0.1 (16 May 2020)

Teachers:

- Panduranga B P
- Yogesh K J Kumar

Students:

- puneethsb@gmail.com (invited)
- mallikarjuna542@gmail.com (invited)
- dprajwalgowda975@gmail.com (invited)
- pramodnb99@gmail.com (invited)
- dmanoj213@gmail.com (invited)
- shekarroshan1997@gmail.com (invited)
- ravindrarr461980@gmail.com (invited)
- monsmanjunath@gmail.com (invited)
- ibrahimguddu97@gmail.com (invited)

Fig: Participants and Lecture notes shared through Google classroom



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INSTRUCTIONAL METHODS AND PEDAGOGICAL ACTIVITIES

16. Online Classes Conducted During Pandemic through Google Meet Platform:

Google Meet is a video-communication service developed by Google. During pandemic the classes were conducted through online using *Google Meet*. A monthly schedule has been prepared and classes were conducted according to the schedule.

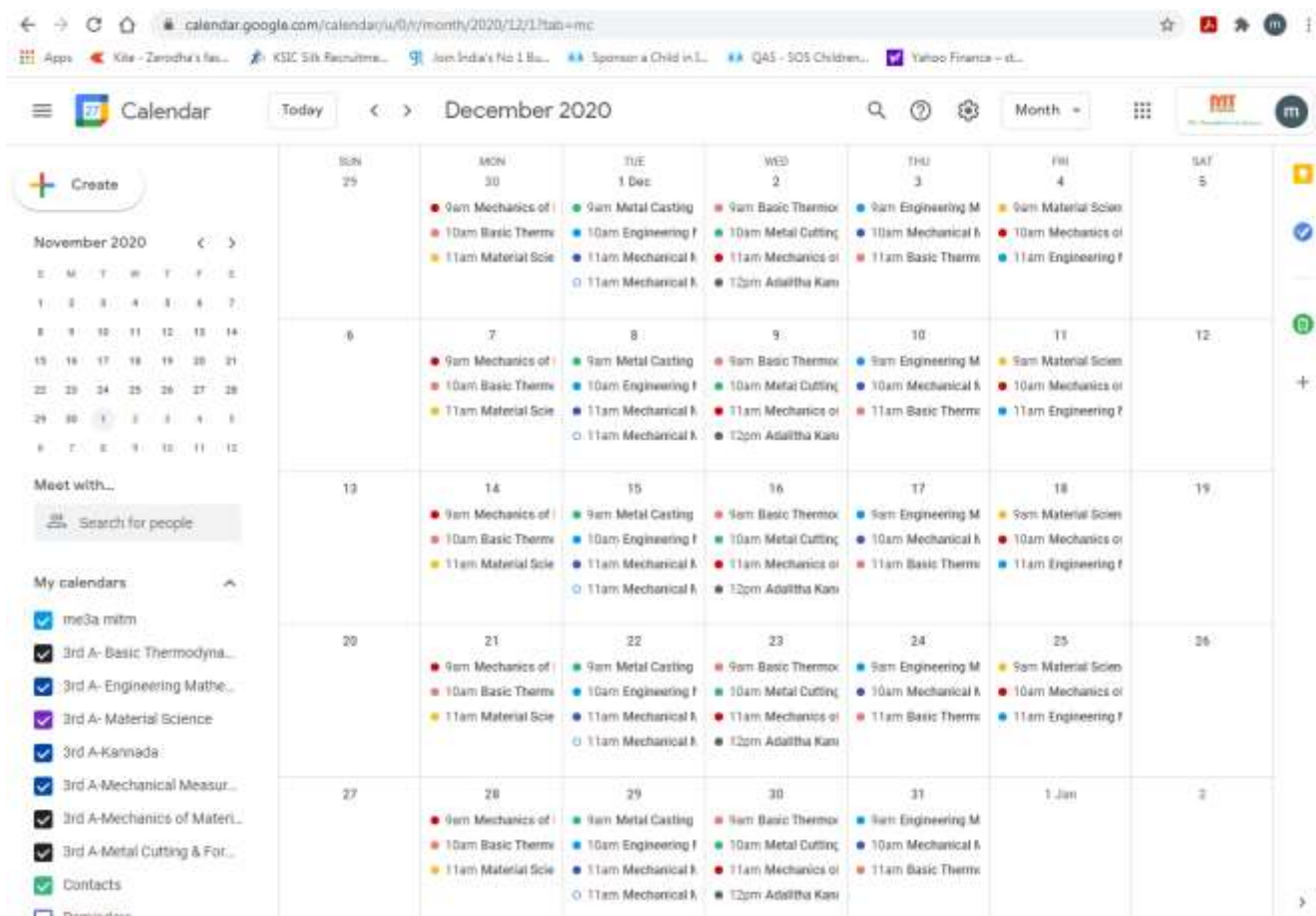


Fig: Monthly Schedule for online classes conducted on Google Meet

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