



DTE Code: EN4139



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Innovative Teaching Learning Method Session : 2024-25

Subject: Kinematic of Machinery (KOM)

Semester: IV

Innovation implemented in: Curriculum delivery in class

Titles of the innovations implemented:

- Showing various GIFs and YouTube Videos
- Demonstration of Working Models
- Usage of 'AutoCAD' to plot ICRs and draw Velocity Diagrams
- Demonstration of open-source software 'Linkage'

Objective:

- To help students to visualize and observe the working of mechanism with the help of GIFs and videos
- To provide hands on experience with working models of few mechanisms
- To help students to understand the importance and usage of modern tools to solve the problem.
- To help students to visualize the motion of various mechanisms, and see the effect of lengths of links on the motion, if changed.

Abstract:

Develop mechanisms to provide specific motion.

Develop and build mechanisms to provide specific motion.

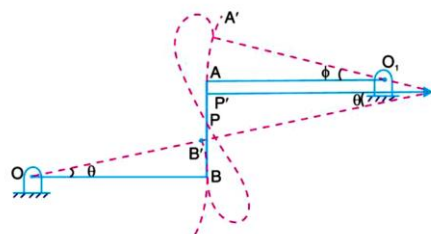
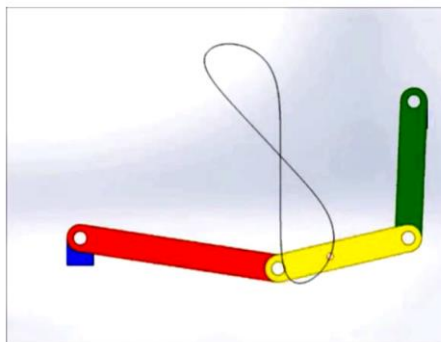
As per the mentioned CO, students are expected to develop a mechanism to provide specific motion. This expects students to take mini project of developing and building a mechanism with specific motion. Before developing and building any physical model, it is necessary to visualize the model, make virtual model, simulate the virtual model to check if the desired output is obtained or not.

Explanation:

Showing various GIFs and YouTube Videos

Inclusion of GIFs and YouTube videos helped students to visualize the motions of each link and to understand the real-life applications of such mechanisms.

Watt's Mechanism



[YouTube Video 1](#)

[YouTube Video 2](#)

Fig. 1.1 GIF and YouTube Links included in the PPT



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Vision: The Mechanical Engineering Department strives for making thorough professionals who are employable through quality education.



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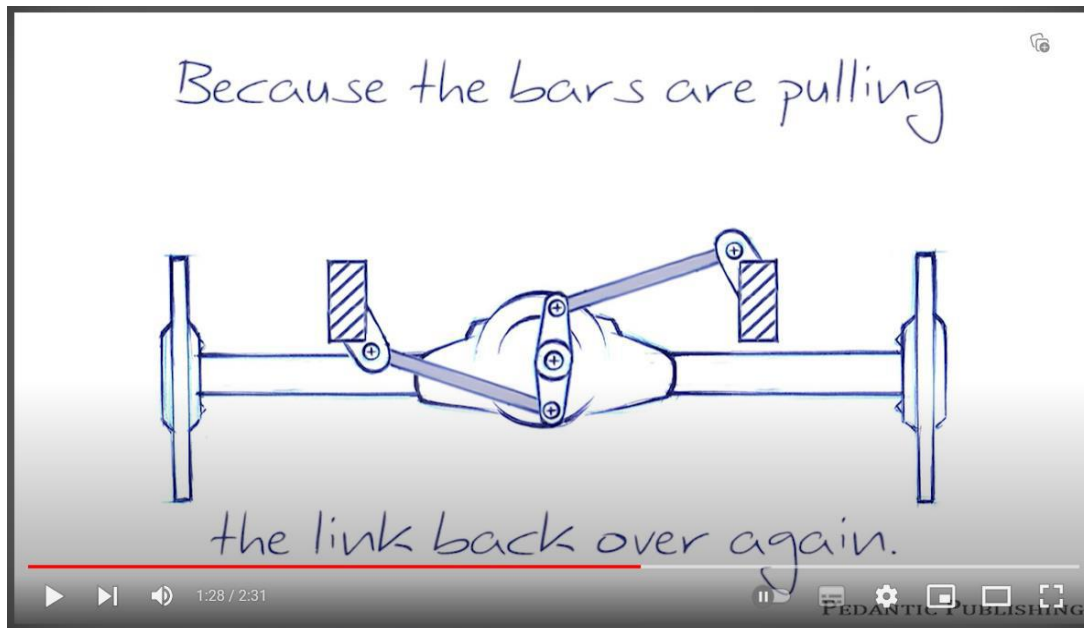


Fig. 1.2 YouTube Video showing the real-life application is included in the PPT

Demonstration of Working Models

The working models of few mechanisms also demonstrated during class sessions for better understanding.

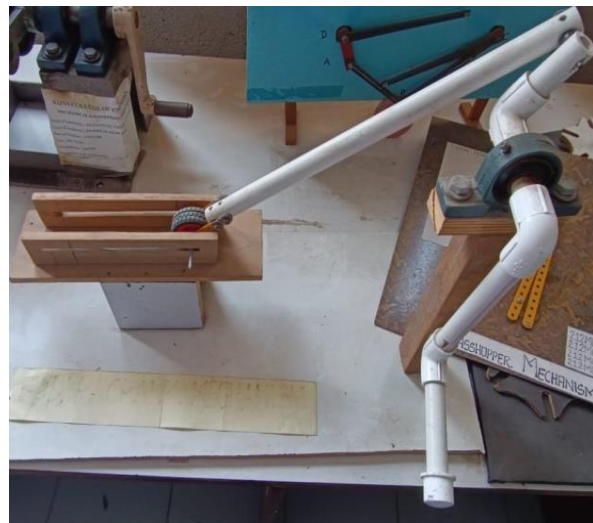


Fig. 1.3 Sample Mechanisms (shown during Class Delivery)

Usage of 'AutoCAD' to plot ICRs and draw Velocity Diagrams

In this activity faculty used AutoCAD to plot ICRs and draw Velocity Diagrams. This helps them to visualise actual locations with true scale. Also encourages students to use modern tools to solve the problems.

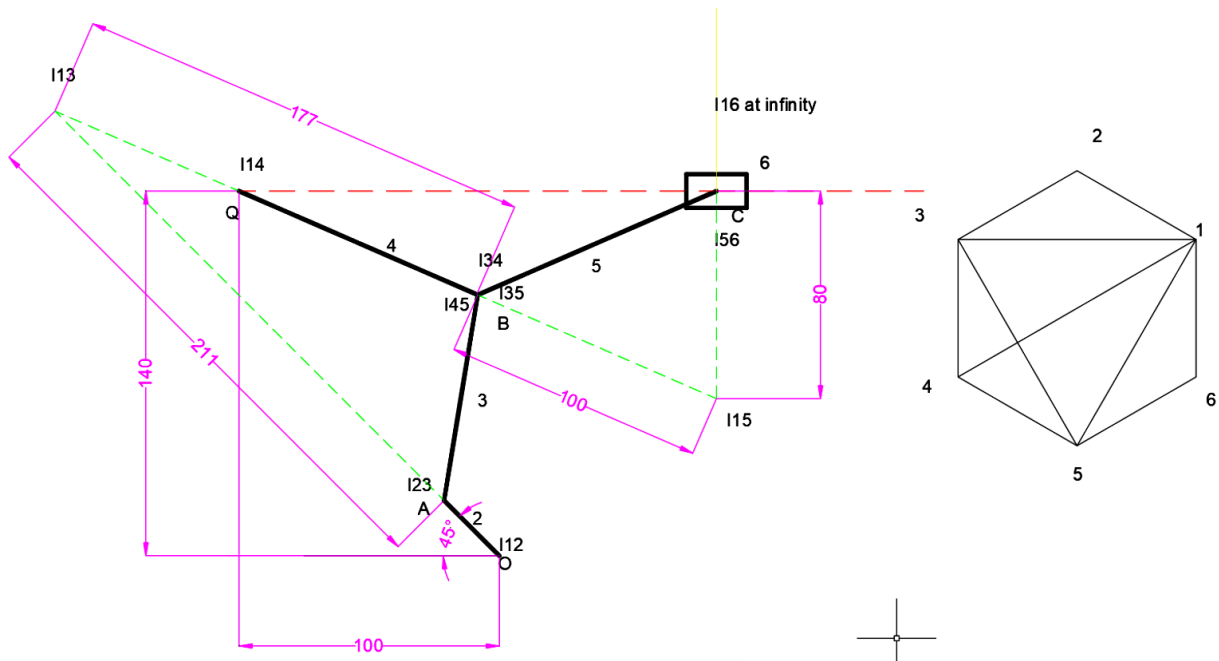


Fig. 1.4 Locating ICRs (shown in AutoCAD)

Demonstration of open-source software 'Linkage'

The goal of this activity was to inculcate the habit of creating and analyzing a virtual model, before developing a physical one.

In this activity, demonstration for the use of software is carried out. Procedure to create connectors, define supports, create links was discussed. Various precautions were also discussed to avoid error of rigid, immovable links. Procedure to lock/constrains the lengths of links was discussed. a slider crank mechanism was created step by step, and then gave its crankshaft a rotation. Once the model motion was simulated, I discussed the ways to plot motion path of various points on the mechanism.

Following are the screenshots from the session:

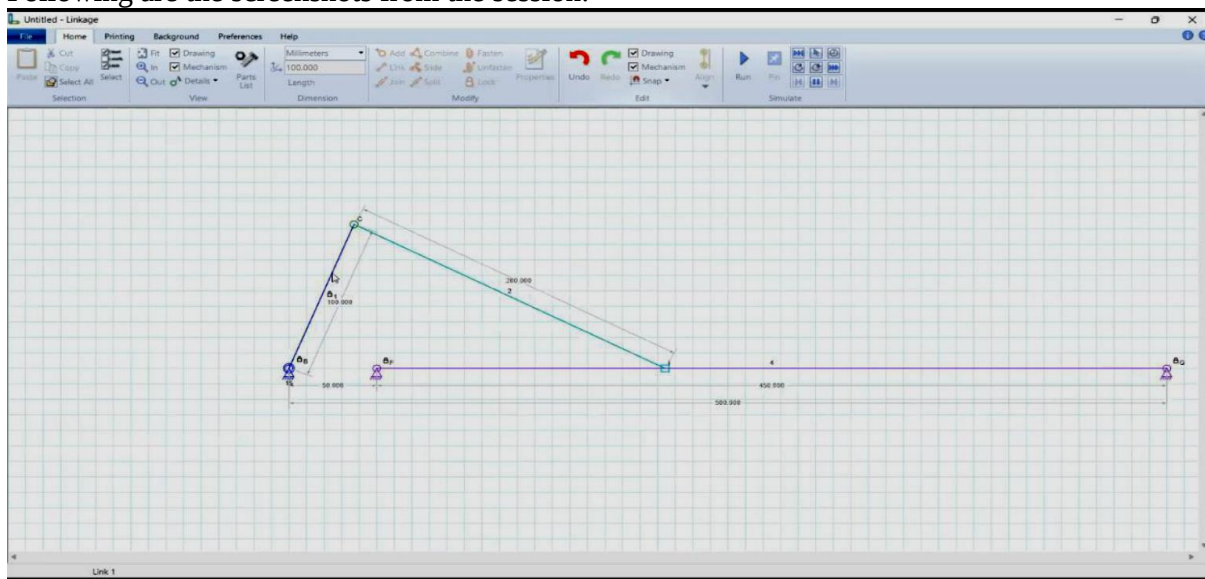


Fig. 1.5: Slider Crank Mechanism



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Innovative Teaching Learning Method Session : 2024-25

Subject : Introduction to Renewable Energy Sources
Semester : VII
Faculty : Dr. Vandita Shahu

Innovation implemented in: Curriculum delivery in class

Suitable title of the innovation implemented: Experiential Learning

Objective/Goal:

- To improve academic outcomes of students.
- To enhance the student logical thinking & lifelong learning skills.
- To improve student engagement and to learn new ideas of solving problems.

Abstract:

Animations are great tool to help students learn and understand topics in an easier and more efficient manner. Watching such animations can demonstrate how theoretical concepts can be applied in real life, helping students make meaningful connections between the theory and practical.

Extent to which objective/goal achieved: Satisfactory

Explanation:

Experiential learning is a teaching methodology that emphasizes the acquisition of knowledge through experience and practice, rather than solely through theory. One innovative way to implement experiential learning is by using animation or GIFs.

During the lecture, I have shown animations for the students, explaining each step and highlighting the important aspects of the Production Processes. I also used real-world examples to illustrate the practical applications of Solar Energy. The innovative teaching method of using animations and videos proved to be highly effective in enhancing the students' understanding of the subject. The experiential learning approach helped the students visualize the working of solar cell, which wouldn't have been as clear through traditional methods.

The above methodology resulted in raising the curiosity of the students which helped make the session more interactive as students had a lot of questions & queries to raise which were attended and answered.



Slide 116 of 189 English (India) Accessibility: Investigate

Solar Cell

RES Module 2 Solar Energy - PowerPoint

Slide 117 of 189 English (India) Accessibility: Investigate

Solar Cell

RES Module 2 Solar Energy - PowerPoint

Slide 119 of 189 English (India) Accessibility: Investigate

Solar System

RES Module 2 Solar Energy - PowerPoint

Solar Photovoltaics

• Solar cells only use made of semi-conductors that generate electrical energy by absorbing the photons that can be released by electrons. Photons are made of electromagnetic radiation. These photons strike the semiconductor and free the electrons from the atom. These free electrons are then used to generate electricity.



Innovative Teaching Learning Method

Session : 2024-25

Subject : Automobile Engineering

Semester : VII

Innovation implemented in: Curriculum delivery in class

Suitable title of the innovation implemented:

Real-time Elaboration and demonstration of various topics in curriculum using demonstration of components and ICT material during delivery

Objective/Goal:

To enhance the understanding of various subsystems of an automobile

Abstract:

Elaboration of various subsystems of a vehicle using demonstration of components in class as well as showing GIFs and YouTube videos in class delivery

Extent to which objective/goal achieved: Very effective

Explanation:

Automobile Engineering is an elective course for Final Year Mechanical Engineering students. It is a completely theoretical subject in which students tend to understand the concepts in weak manner in absence of an illustrative material or hands on delivery/ interaction. By elaboration of various topics in curriculum (Clutches/ Brakes/ Universal Joints) with real-time with demonstration, students can understand the construction and working of each of these components much easier. Aside this method, GIF and YouTube videos were included in the delivery content wherever necessary for better explanation and understanding of students.

Proof of implementation/supporting documents:

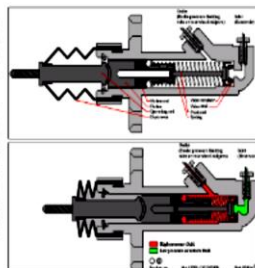


Use of actual components (Clutch, Universal Joint and brake lining) and YouTube video of suspension system to explain the sprung and unsprung weight of the car

Actuation System Components

Brake master cylinder

- The principle of working is that of Pascal's Law where a high pressure fluid is obtained at the outlet of smaller area, of a cylinder by application of force on the larger area inlet area.
- When the brake pedal pressed the push rod moves toward right by moving the piston against the spring force as it covers bypass port, a pressure built up in the compression chamber when sufficient pressure built up, the fluid check valve deflected & the fluid under pressure flows in the pipeline. When the brake pedal releases, the spring force in the master cylinder moves the piston towards left.



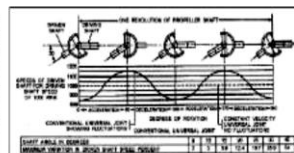
Run College Learning

Department of Mechanical Engineering

Prof. Anand Nandani

Universal Joint

- A peculiarity of the conventional universal joint is that it causes a driven shaft to rotate at a variable speed in respect to the driving shaft. There is a cyclic variation in the form of an acceleration and deceleration of speed (adjacent fig.).
- Two universal joints are placed in a drive shaft to eliminate the speed fluctuations of the shaft while the shaft is at an angle to the power source. The universal joints are placed at a 90-degree angle to each other and one counteracts the action of the other while in motion.



Speed fluctuations caused by conventional universal joints.



Department of Mechanical Engineering

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Inclusion of GIFs in the PPTs for better illustration of content and understanding of students