DEPARTMENT OF MECHANICAL ENGINEERING

SIMULATION-DRIVEN CONCEPT LEARNING

Academic year	: 2023-2024
Degree	: B.E.
Year & Semester	: II/IV
Course Code & Title	: ME3492 / Hydraulics and Pneumatics
Name of the Faculty Member	: Mr. K. Saravanan
Date	: 12/02/2024
Innovative Practice	: Simulation-Driven Concept Learning
Topic	: Hydraulic Actuators: Cylinders – Types and construction, Application
Total Students Participated	: 16

Introduction

Simulation-Driven Concept Learning is an innovative pedagogical approach that integrates interactive simulations with core theoretical instruction to enhance conceptual understanding. This method enables students to visualize abstract principles, observe system behavior under varying conditions, and actively engage with learning concepts that are otherwise difficult to comprehend through traditional lecture-based teaching alone..

Methodology

1. Introduce the concept – Explain hydraulic power and how cylinders convert fluid pressure into linear motion using simple examples.
2. Use visual aids – Show diagrams, animations, or actual cylinder parts to help students understand structure and working.
3. Explain types and construction – Clearly describe different cylinder types and their components with comparisons.
4. Conduct practical demonstrations – Operate a hydraulic cylinder in the lab or show videos to illustrate real-world functioning.
5. Engage students with activities – Ask questions, give small numerical problems, and discuss applications to reinforce learning.

Outcomes

1. Students will be able to explain how hydraulic cylinders convert hydraulic energy into linear mechanical motion.
2. Students will differentiate between single-acting, double-acting, and telescopic cylinders and identify their major components (barrel, piston, rod, seals, end caps).
3. Students will calculate actuator force, stroke, and speed based on hydraulic pressure and cylinder dimensions.
4. Students will relate various cylinder types to appropriate industrial, mobile, or heavy-duty machine applications.
5. Students will diagnose common issues (leakage, seal wear, misalignment) and recommend maintenance procedures for reliable operation.

Student Participation

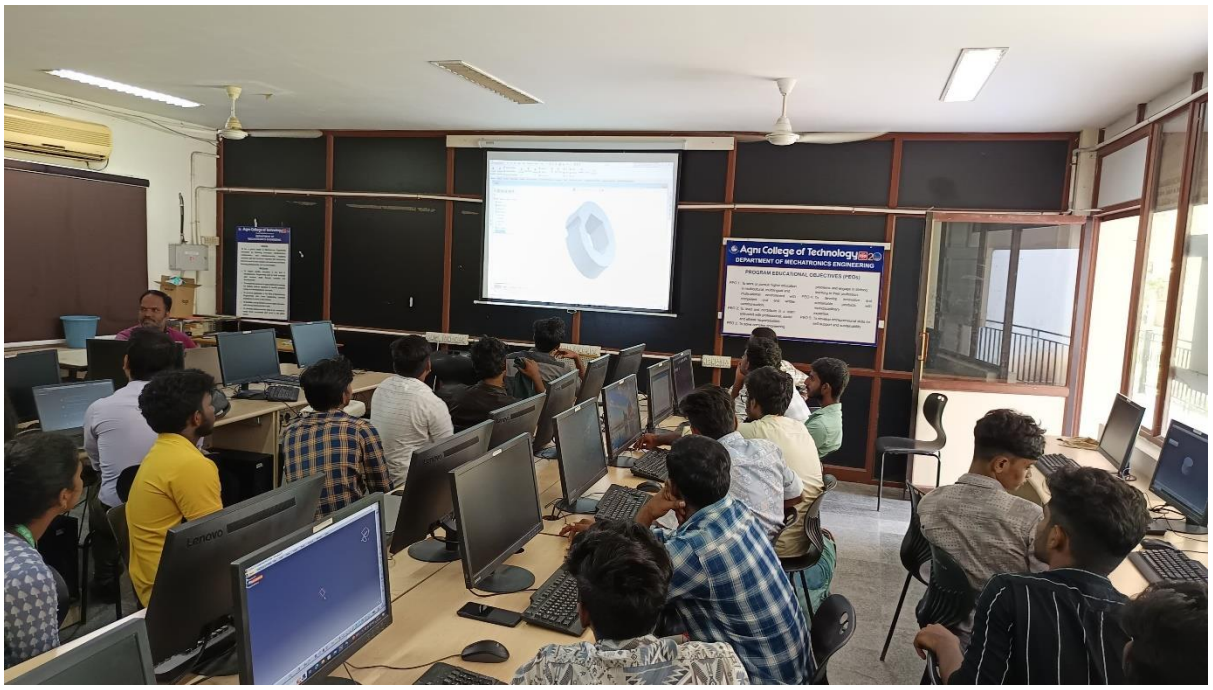
- Total Students: 16
- Participation Mode: Virtual Labs & You Tube Videos
- Engagement: Students actively discussed, clarified doubts, and provided feedback to their peers.

Relavant PO's :

PO1	PO 3	PO 4	PO 5	PO 7

Participant Name List

S. NO	REGISTER NO	STUDENTS NAME
1	312821114002	Divya N
2	312821114003	Gokul P
3	312821114004	Guna S
4	312821114005	HariRaghavan C
5	312821114006	Kalaiselvan R
6	312821114007	Kannan S
7	312821114008	Karthick K
8	312821114010	Reshav Raj
9	312821114011	Sibi Raynord U
10	312821114012	Sivasakthi J
11	312821114013	Yuvaraj A
12	312821114301	Gokul S
13	312821114302	Meera T M
14	312821114303	Mohammed Jameel S
15	312821114305	Umar Faruk N
16	312821114306	Yuvaraj M



Simulation-Driven Concept Learning Method conducted on 12.02.2024 by Mr. K.Saravanan for Hydraulics and Pneumatics Course

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The valuable feedbacks can be provided in the below link for the above innovative teaching method.

https://docs.google.com/forms/d/1djvl5lwzoGiz28TsnM1-GU07nVLVyzmS3MQp61o8ons

Faculty In charge

HoD/Mech