



Innovations by the Faculty in Teaching and Learning

I. Models Used in Teaching Using Physical Models

What is Special about SREYAS Teaching Methods?

- At SREYAS , we prefer and motivate students only to build their teaching models with guidance of faculty and lab technicians
- We don't like to purchase teaching models, we want to involve students in building these models

Why Students has to involve in making teaching Models?

- Firstly, it is fun for students to involve in such activity
- During building models they will face manufacturing and fabrication challenges which will trigger their minds to solve those problems.
- During building, they will understand the concept their and then only. The students who involves in work never forget those concept in his or her life.
- Students will get hand on experience of workshop technologies, manufacturing technologies and other aspects also
- It helps and motivates them to enhance their skills towards good projects in future

Sreyas Faculty continuously engages with students in innovative teaching and learning process. Following are the some of the sample teaching models built by students.

- 1. Lame's Theorem Model:** This theorem is explained using the model by considering the three forces along different directions which are to be in equilibrium
- 2. Geometric Plane Model:** Representation Of Geometrical Planes for Showing Different Reference Plane From this model, the students can visualize the projection of objects in 2D and 3D
- 3. Friction Demo Model:** With this model, movement of bodies can be observed with respect to the different surfaces having different co-efficient of frictional values.

4. **Mechanism Models:** Working Models of Mechanisms to teach Kinematics of Machinery subject.

1. **Lame's Theorem Model:**

Course: Engineering Mechanics

Purpose of Model: To demonstrate parallelogram law of forces and Lame's Theorem

Materials: Wood, Pulleys, Strings and Weights

Method of teaching:

- Students are divide to a groups each consists of 2 to 3 members
- Each group conducts experiments to understand the working principle
- Faculty ask questions to judge their understanding of concept
- Faculty explains the concept again to students
- Faculty encourages students to ask any further question on concepts
- Students are asked to solve problems on their own
- Finally teaching faculties summarize and explain the application of the concept in real world.

Technical Concepts Covered:

- Parallelogram Law of Forces
- Lamis Theorem
- Types of forces
- Equilibrium of forces

Benefits to students:

- Students will gain interest in learning technical concepts
- Students will directly involve in conduction of experiments
- Students will come forward to give their suggestion or ask their questions.
- Mainly they understand concept or law clearly so that they can understand and apply in upcoming chapters/courses as well.

Sample Picture of Model:



2. Geometric Plane Model:

Course: Engineering Graphics

Purpose of Model: To explain basics of orthographic projections

Materials: Wooden cardboards, pipes, hinge and white sheets

Method of teaching:

- Faculty explains basic projection planes using teaching model
 - Vertical Plane (VP)
 - Horizontal Plane (HP)
 - Left Profile Plane(LPP)
 - Right Profile Plane(RPP)
- Faculty shows the rotation of horizontal planes (HP) to demonstrate top view of the object to students and LPP and RPP to demonstrate side view of object

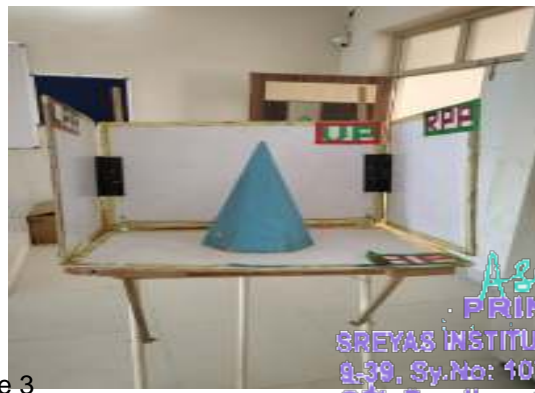
Technical Concepts Covered:

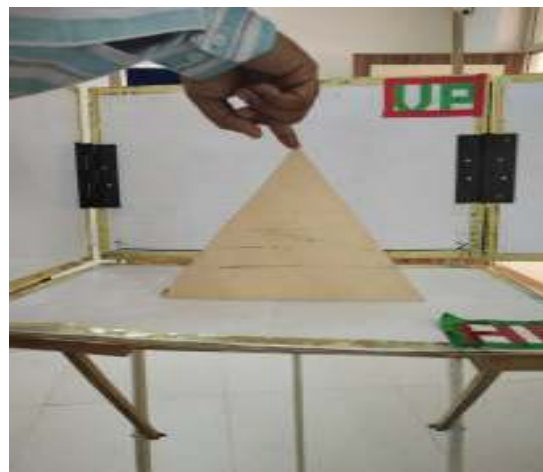
- Basics of projection planes
- Basics of Orthographic projection
- Projection of points and lines
- Projection of solids
- Projections of planes

Benefits to students:

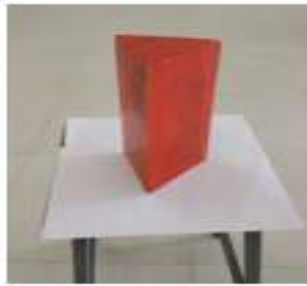
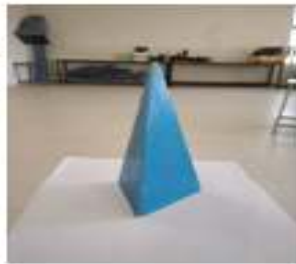
- Students will understand the concept of geometrical planes and orthographic projections clearly
- This builds strong foundation to understand engineering drawing of various components , which is the most fundamental skill for an engineer
- Ambiguities and confusion in understanding of projections will not occur.

Sample Picture of Model:





MODELS OF SOLIDS



MODELS OF PLANES



CONIC SECTIONS



3. Friction Demo Model

Course: Engineering Mechanics

Purpose of Model: To explain concept of friction

Materials: Wooden cardboards, hinges, protractors, blocks, pulley, weights, strings and different surfaces

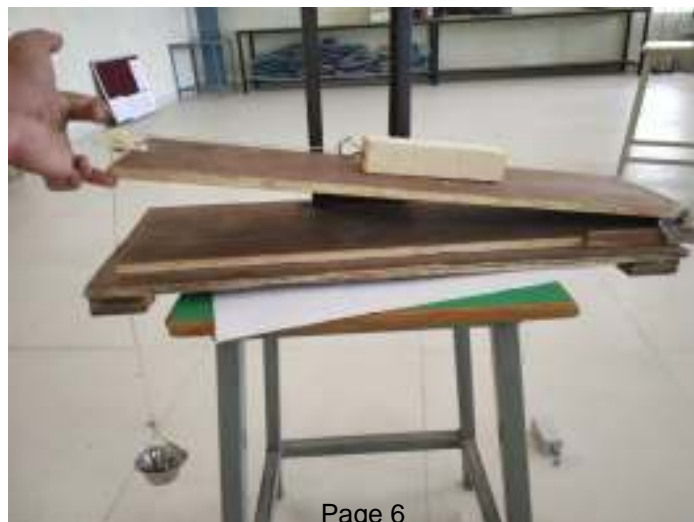
Method of teaching:

- Faculty explains parts of the model
- Faculty can call any students to come and perform some random experiments; other students will observe the demo with interest.
- Faculty gives chance to other students to come and perform
- After this exercise faculty explains concepts of friction such as angle of repose, coefficient of friction and laws of frictions with some simple demo examples
- Faculty encourages to students to try for new things on existing teaching models
- Students are divided into groups and asked to perform small experiment and to write note on what they learnt.
- Faculty the solves some problems on friction, which makes students comfortable and interesting
- Faculty now gives medium and application level problems to students to test their understanding and applying skills to solve real world problem
- Students are asked to solve previous year question papers.

Technical Concepts Covered:

- Basics of Friction
- Laws of friction
- Angle of repose
- Coefficient of friction
- Simple friction problems

Sample Picture of Model:



4. Mechanism Models

Course: Kinematics of Machinery

Purpose of Model: To demonstrate working of various mechanisms

Materials: Wooden cardboards, hinges, protractors, blocks, pulley etc

Method of teaching:

- Faculty explains the parts of model
- Then faculty explains application of mechanisms
- Faculty ask students to come operate the mechanism by themselves to have hands on experience in understanding working principle
- Students will solve problems by themselves , in case of any mistakes faculty will clarify his or her mistake

Technical Concepts Covered:

- Basics of kinematics
- Different types of links and joints
- Structure and mechanisms
- Applications of different mechanisms

Sample Pictures of Mechanisms Day Conducted at SREYAS:



Innovative methods in Teaching Learning:

BACKGROUND KNOWLEDGE PROBE (BKP)

Objective:

A *Background Knowledge Probe (BKP)* is a focused questionnaire that students fill out at the start of a unit (or course) to help teachers identify the best starting point for the class as a whole.

Execution Plan:

- Clarify your teaching purpose and learning goals for the *BKP*
- Prepare questions that will probe students' existing knowledge
- Set assignment parameters (how you'll present questions, time allowed, etc.)
- Develop a plan for learning assessment or grading
- Communicate assignment instructions to students
- Allow students time to complete the *Background Knowledge Probe*
- Reflect upon the activity and evaluate its effectiveness

Expected Outcomes:

- Present the *Background Knowledge Probe* to students.
- Provide students with time to respond to the questions.
- Review the answers so that you can determine the best point to start instruction.

CLARIFICATION PAUSES

Objective of the Activity:

- Student can getting cleared where is getting confused
- Improves the subject knowledge
- Improves communication skills

Execution Plan:

- Pause procedure is a technique in which the teacher makes use of strategic pauses to provide students with time during which they can review their notes, discuss among their pairs or undertake any similar activity that allows them to clarify, assimilate and retain the material.
- Pausing following presentation of key information is most appropriate. At least three two minute pauses in the lecture at 8-12 minute intervals to enhance learning.
- During the initial phase, to ensure adherence to the strategy use a minute timer set for every 10 minutes to force you to take a pause.
- This serves as a reminder for teachers as they may forget to use this strategy when caught up in their presentations.

- Sometimes students may request for more time to review and discuss the material. In such a situation the timer proves handy, as it signals the end of the pause period and the lecture is continued. Thus students are taught to work within the time period of the pause.

Expected Outcomes:

The pauses are effective only when the activity that follows stimulates and facilitates students to comprehend, reflect and learn the material. Here are some activities that you can follow with after you pause:

Note taking: Students can use this time to summarize the information presented in written format, listing down key points or main ideas, creating a graphical representation (mindscaping), filling an exit slip etc that allows them to reflect on the material head.

Pair review: A quick discussion among the pairs will help students in recalling facts, clarifying any misconceptions and filling in facts left out.

Framing questions: Students can be instructed to frame two questions based on the material that was presented. For example “how long was the first World war?”

Crossword: Students are presented with a quick crossword puzzle that they should solve. When called for, these puzzles can also be designed such as to connect previous learning with the present, in turn strengthening the learning.

JIGSAW

Objective of the Activity:

- To enhance problem solving, creativity and thinking skills in students.
- To understand team-based learning as an approach to collaborative learning
- To make students understand complex concepts.
- To develop oral communication skills, Fosters and develops interpersonal relationships.

Execution Plan:

- Divide students into 5- or 6-person jigsaw groups.
- Divide the day’s lesson into 5-6 segments.
- Assign each student to learn one segment.
- Give students time to read over their segment at least twice and become familiar with it.
- Form temporary “expert groups” by having one student from each jigsaw group join other students assigned to the same segment.
- Bring the students back into their jigsaw groups.

- Ask each student to present her or his segment to the group.
- Float from group to group, observing the process.
- At the end of the session, give a quiz on the material.

Expected Outcomes:

- Develops higher level thinking skills
- Promotes student-faculty interaction and familiarity
- Increases student retention
- Builds self esteem in students

ONE MINUTE PAPER

Objective of the Activity:

- To encourage synthesis and reflection; to help students formulate questions; to check student progress.

Execution Plan:

- The Minute Paper is a very commonly used classroom assessment technique.
- It is thus a very adaptable tool.
- It really does take about a minute and, while usually used at the end of class, it can be used at the end of any topic discussion.
- Its major advantage is that it provides rapid feedback on whether the professor's main idea and what the students perceived as the main idea are the same.
- Additionally, by asking students to add a question at the end, this assessment becomes an integrative task.
- Students must first organize their thinking to rank the major points and then decide upon a significant question.

Expected Outcomes:

1. Minute papers can provide a “conceptual bridge” between successive class periods.
2. Minute papers can improve the quality of class discussion by having students write briefly about a concept or issue before they begin discussing it..
3. Minute papers are an effective way of involving all students in class simultaneously.
4. Minute papers can be used to stimulate and facilitate discussion of diversity.
5. Minute papers can promote class attendance and attentiveness.

PLICKERS

Objective of the Activity:

- Plickers is an assessment tool made by a teacher who was looking for a quick and simple way to check student understanding.
- This assessment tool allows teachers to collect on-the-spot formative assessment data without the need to have students use devices or paper and pencil.
- Teachers can use this tool with previous planning or on the go as needed. This tool provides teachers with the data needed to inform their instruction.
- It provides students with the opportunity to participate and engage in learning without feeling self-conscious.

Execution Plan:

- Plickers allows you to check in on student understanding.
- With the data collected you can inform your instruction for a follow up class or in real time.
- Students stay engaged as they watch to see if their card was scanned, and their answer displayed.
- The cards can either be bought online or downloaded and printed.
- There are two views to see the data collected Students mode and graph mode.
- Student mode shows all the students cards and names, and whether they have answered or not. The graph view shows the way students answered.
- On both views you have the option to show the correct answer.
- One of my favourite features is that you can sign in to your account when planning your lesson or if at some point during instruction you need immediate feedback, opening the app and adding a question is hassle free.

Expected Outcomes:

- Tool helps students stay engaged during formative assessments.
- Worry-free way for all students to participate in answering questions with anonymity.
- Teachers can get immediate feedback to inform their instruction.

PROBLEM-BASED LEARNING

Objective of the Activity:

- Problem-based learning (PBL) is a student-centered approach in which students learn about a subject by working in groups to solve an open-ended problem.
- This problem is what drives the motivation and the learning.

Execution Plan:

PBL is often group-oriented, so it is beneficial to set aside classroom time to prepare students to work in group's and to allow them to engage in their PBL project.

- Create the problem. Ideally, this will be a real-world situation that resembles something students may encounter in their future careers or lives. Cases are often the basis of PBL.

activities. Previously developed PBL activities can be found online through the University of Delaware's PBL Clearinghouse of Activities.

- Establish ground rules at the beginning to prepare students to work effectively in groups.
- Introduce students to group processes and do some warm up exercises to allow them to practice assessing both their own work and that of their peers.
- Consider having students take on different roles or divide up the work up amongst themselves. Alternatively, the project might require students to assume various perspectives, such as those of government officials, local business owners, etc.
- Establish how you will evaluate and assess the assignment. Consider making the self and peer assessments a part of the assignment grade.

Expected Outcomes:

- Working in teams.
- Managing projects and holding leadership roles.
- Oral and written communication.
- Self-awareness and evaluation of group processes.
- Working independently.
- Critical thinking and analysis.
- Explaining concepts.
- Self-directed learning.
- Applying course content to real-world examples.
- Researching and information literacy.
- Problem solving across disciplines.

STUDENT SUMMARIES

Objective of the Activity:

- It helps students learn to determine essential ideas and consolidate important details that support them.
- It enables students to focus on key words and phrases of an assigned text that are worth noting and remembering.
- It teaches students how to take a large selection of text and reduce it to the main points for more concise understanding.

Execution Plan:

1. Begin by reading OR have students listen to the text selection.
2. Ask students the following framework questions:
 - a. What are the main ideas?

- b. What are the crucial details necessary for supporting the ideas?
 - c. What information is irrelevant or unnecessary?
3. Have them use key words or phrases to identify the main points from the text.

Expected Outcomes:

- Use writing activities to build on prior knowledge, help improve writing, and strengthen vocabulary skills.
- Guide students throughout the summary writing process. Encourage students to write successively shorter summaries, constantly refining their written piece until only the most essential and relevant information remains.
- Have students work together to answer summary questions and write responses.

THINK PAIR SHARE

Objective of the Activity:

- To enhance problem solving, creativity and thinking skills in students.
- To understand team-based learning as an approach to collaborative learning
- To make students understand complex concepts.
- To develop oral communication skills, Fosters and develops interpersonal relationships.

Execution Plan:

Think-pair-share (TPS) is a collaborative learning strategy in which students work together to solve a problem or answer a question about an assigned reading. This technique requires students to,


- **Think:** Teachers begin by asking a specific higher-level question about the topic to the students. Students "think" about what they know or have learned about the topic for a given amount of time (usually 1-3 minutes).
- **Pair:** Each student should be paired with another student. Teachers may choose whether to assign pairs or let students pick their own partner. Students share their thinking with their partner, discuss ideas, and ask questions of their partner about their thoughts on the topic (2-5 minutes).

Share: Once partners have had ample time to share their thoughts and have a discussion, teachers expand the "share" into a whole-class discussion. Allow each group to choose who will present their thoughts, ideas, and questions they had to the rest of the class.

Expected Outcomes:

- Develops higher level thinking skills
- Promotes student-faculty interaction and familiarity

- Increases student retention
- Builds self esteem in students

I.No	Innovation Method	Introduced on	Year	Description	Photo
1	Flipped Class Room	2016-17 IIsem	III	Student can learn new technology by giving seminars	
2	Background Knowledge Probe	2016-17 II sem	III	Before commencement of classwork, faculty has given some prerequisite knowledge to the students.	
3	Think Pair Share Activity	2017-18 IIsem	III	A group of student can make as group and think-pair-share the given problem in the classwork.	
4	Problem Based Learning	2016-17 II sem	II	Learning the new concept by derive/solve the given problem	
5	Clarification Pauses	2017-18 II sem	III	Students can clarify their doubts	
6	Jigsaw Group	2018-19 II sem	III	A jigsaw group of student can able to discuss and develop a project/product.	

Name of the faculty : Dr. Kantipudi MVV Prasad	Designation : Associate Professor	Subject : Internet of Things
Year / Semester : 2019-20/ IV-I	Section : A	Topic : Introduction to IOT
Name of the activity : Think Pair Share	Date : 17-07-2019	No. of Students attended : 15

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Question:

1. Visual to Explain What Is Internet of Things (10 Points)

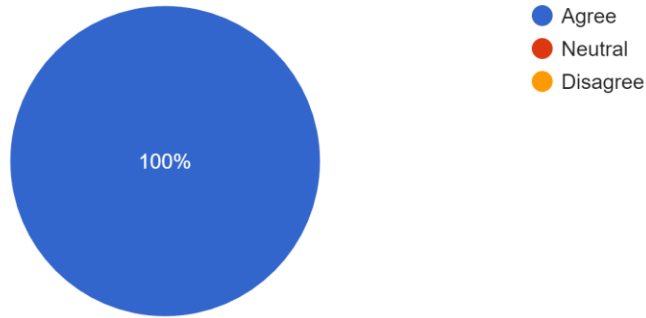
Perception of learning

Likert scale survey	Agree (%)	Neutral (%)	Disagree (%)
Thinking about the problem and writing the solution during the think phase helped me learn IOT concepts.	100	-	-
Discussing my solution with my partner during the pair phase helped me learn IOT concepts.	60	30	10
Listening to other students' solutions and discussion during the share phase helped me learn IOT concepts.	80	10	10
I would not have learned as much from the lecture if there had been no think-pair-share activities.	50	40	10

In-charge

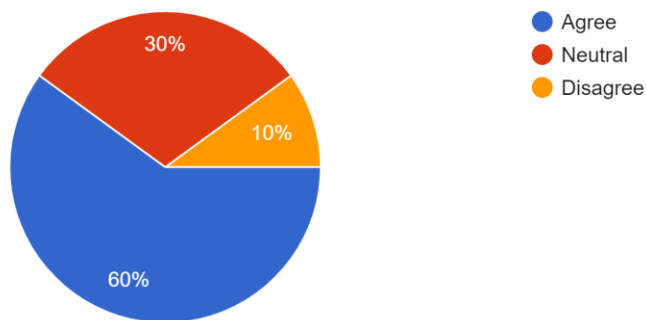
Thinking about the problem and writing the solution during the think phase helped me to learn IOT concepts.

10 responses



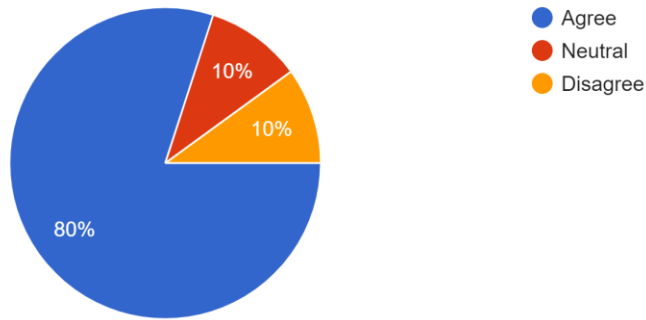
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10 responses



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10 responses



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10 responses

