



NEHRU INSTITUTE OF TECHNOLOGY

(Autonomous)

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Accredited by NAAC with A+, Recognized by UGC with Section



DEPARTMENT OF AERONAUTICAL ENGINEERING

INNOVATIONS BY THE FACULTY IN TEACHING & LEARNING PROCESS

The following innovative tools are used by the Faculty in Teaching and Learning Process:

1. Multimedia Learning Process:

Faculties are using multimedia elements such as LCD projectors with computers, Smartboards, and audio systems in the classroom. It will help the faculties to represent the content with more efficacy. The following pictures represent the well-equipped classrooms in our department.



Figure 1.1 Smart TV Enabled Classroom



Figure 1.2 Projector-enabled Classroom

❖ **Benefits to the students using Multimedia:**

- Multimedia learning captures learners' attention through a combination of visual, auditory, and interactive elements, leading to increased interest and participation.
- The use of various media types aids in better information retention. Multimedia content is often more memorable than text alone, as it caters to different learning styles and reinforces key concepts through visuals, audio, and interactive elements.
- Multimedia Learning often includes interactive elements like simulations, quizzes, and branching scenarios.
- This interactivity encourages active participation, critical thinking, and problem-solving, which are essential skills for real-world applications of knowledge.

2. ICT (Information and Communication Technologies)

Our faculties are using ICT tools to build students' self-confidence, connect to reality, and offer variation in teaching. Faculties are handling classes with the help of ICT tools like PowerPoint presentations and video Lectures recorded and stored for their subjects concerned, and it is stored on our college website as study material for students' reference whenever they wish to study. Faculties are also arranging classes for students with the help of NPTEL videos handled by experts from IITs, NITs, and DELNET resources in the classroom methodology. The following summarizes the various innovative practices followed in the teaching and learning process by the faculty of the department.

- The institution has been encouraging students and faculty to introduce innovations for the enhancement of the quality of teaching and Learning.
- The department has a well-equipped Classroom with multimedia accessories and high bandwidth internet connections with 80 Mbps to enable ICT-based learning Practices and know the recent trends in the technology through webinars.
- The faculty members are using LCD projectors with smart whiteboards, BENQ-smart boards, Marker Boards, and Audio Visual Presentation.

2.1 Google Classroom:

Google Classroom is your all-in-one place for teaching and Learning. Our easy-to-use and secure tool helps educators manage, measure, and enrich learning experiences.

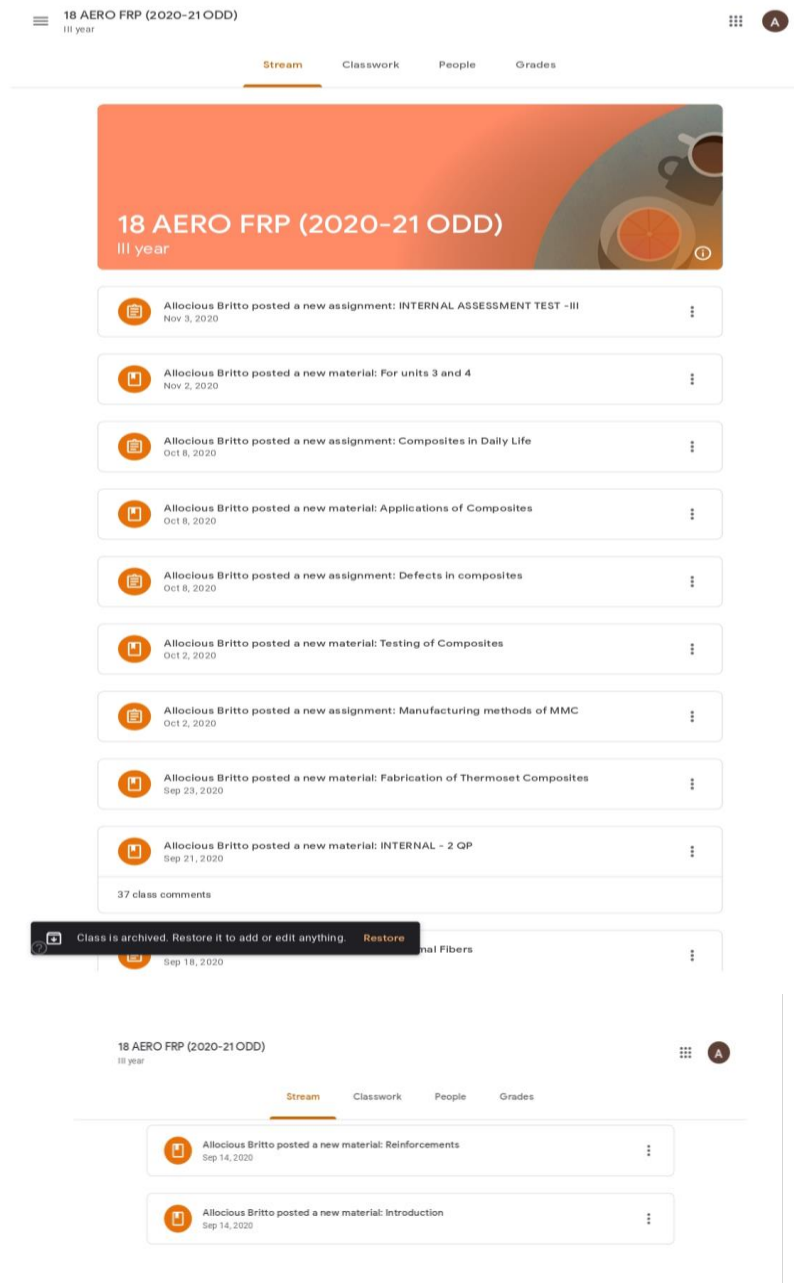


Figure 2.1 Google Classroom

2.2 Edpuzzle:

It is a free assessment-centered tool that allows teachers and students to create interactive online videos by embedding either open-ended or multiple-choice questions, audio notes, audio tracks, or comments on a video. Edpuzzle is an easy-to-use platform that allows you to engage every student, one video at a time.

The screenshot shows the Edpuzzle interface for a course titled "Industrial Aerodynamics". At the top, there is a navigation bar with the Edpuzzle logo, a search icon, and a "+ Add Content" button. Below the course title, there are tabs for "Assignments", "Class members", and "Gradebook". The main content area displays a list of assignments under the "In progress" status. Each assignment entry includes a video thumbnail, the assignment title, the start date (all are "April 12th"), the due date (all are "No due date"), and a progress indicator (all are "0 of 0").

Assignment	Start date	Due date	Completed
Understanding Aerodynamic...	April 12th	No due date	0 of 0
The Aerodynamics o...	April 12th	No due date	0 of 0
Aerodynamics - Beginning Level...	April 12th	No due date	0 of 0
MAN - Aerodynamics...	April 12th	No due date	0 of 0
Wings and Spoilers; Lift an...	April 12th	No due date	0 of 0

On the right side, a user profile menu is open for "Allocious Britto (/profile)". The menu includes options for "Log out (/logout)", "Invite students", "7 of 20 storage used", "Get more space (/pricing)", "Invite teachers", "Resources (/resources)", "Courses" (with a link to https://learn.edpuzzle.com/Online), "Help Center" (with a link to https://support.edpuzzle.com/hc/), and "0 of 0".

At the bottom left, the URL is https://edpuzzle.com/classes/636e9f9fae6fd40f9b8af7d. At the bottom right, there is a page indicator "1/1".

Figure 2.2 Edpuzzle

2.3 Kahoot:

Kahoot is a Norwegian game-based learning platform used as educational technology. It has learning games, also known as "Kahoots", which are user-generated multiple-choice quizzes that can be accessed via a web browser or the Kahoot app. Kahoot also includes trivia quizzes.

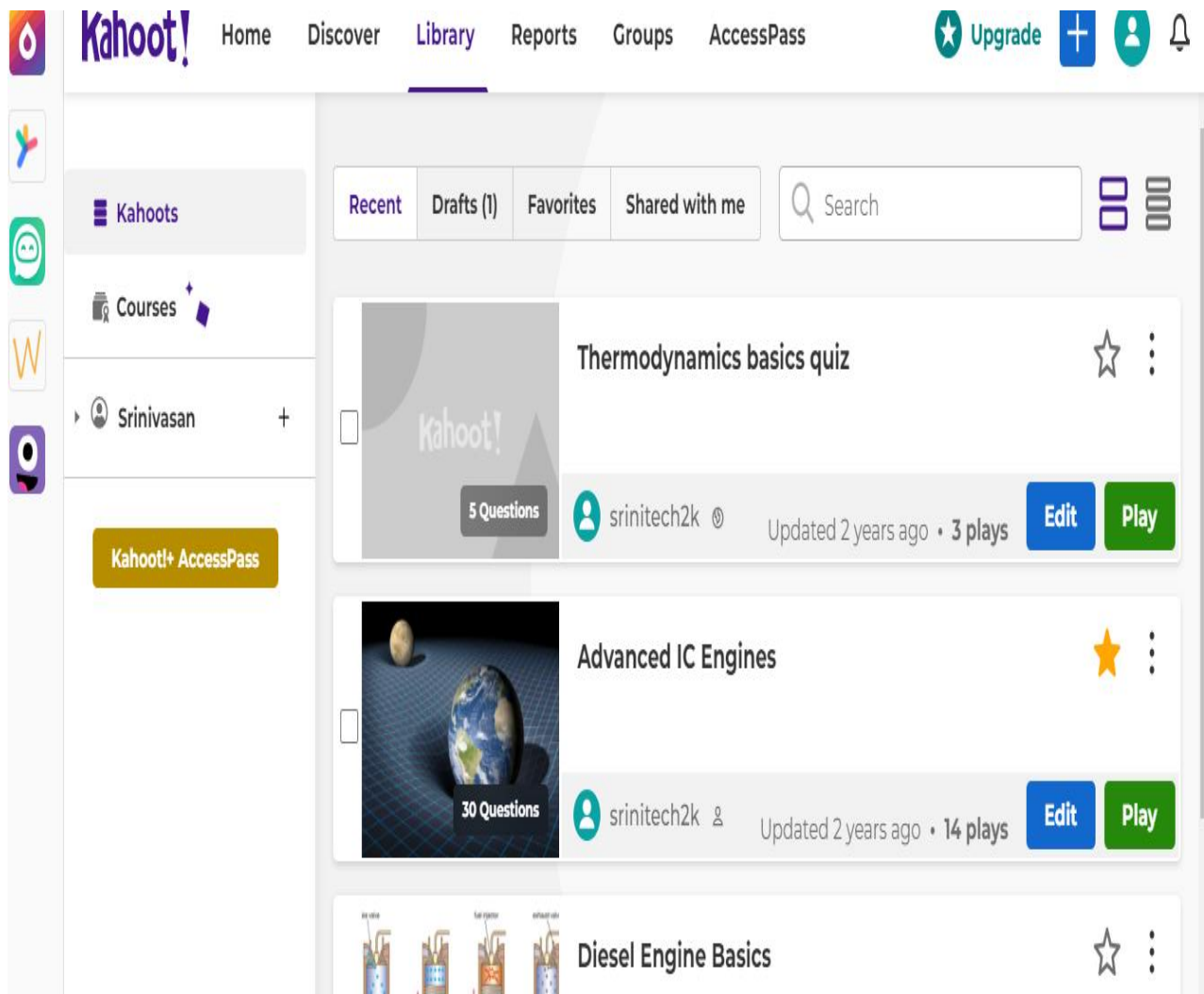


Figure 2.3 Kahoot

2.4 E-Learning Resources

E-learning is an educational approach that relies on the use of videos as a primary medium for delivering instruction and content. Videos can cover a wide range of educational topics and subjects, making them a versatile tool for both formal and informal Learning.

The image displays two side-by-side screenshots of a YouTube video player interface. Both screenshots show a man in a white shirt speaking, likely a lecturer or instructor. The left screenshot includes social media handles for Instagram and Facebook (@nammasoorulocalguide) and a 'LOCAL GUIDE' logo. Below the video, there are two 'Comments' sections. The first section has a 'Top' button selected and a reminder to follow community guidelines. It contains three comments: one from @dillipartha asking for M.E. CAD/CAM notes, one from @bharathkumar6671 asking how to get a gold medal in 2021 regulation, and one from @vox0906 asking how to download 1st year mechatronics books. The second 'Comments' section contains two comments: one from @rajeshr3769 asking for an RTI letter, and one from @vignesh2377 asking for help with a water supply connection RTI letter. A '1 reply' link is visible below the second comment in the second section. The right screenshot shows a similar video player and comment section, but with only two comments visible.

Figure 2.4 E-Learning Resources

Our faculty members develop the following Videos; links are provided along with this table.

S. No	Faculty Name	Genre	Content description	Link
1	Dr. T. Manikandan	Composites	Polymer Nano Composites	https://youtu.be/phxMvnLP1Eo?list=PL-I2jXxvGuYMO3rdG3-cJizEQHJlyNXse
2	Dr. V. Saravanan	Engineering Mechanics	Introduction to Engineering Mechanics	https://youtu.be/oydcy8Pz7wM?list=PL-I2jXxvGuYMO3rdG3-cJizEQHJlyNXse
3	Mrs. T. Banu	Flight Dynamics	Forces and Moments Acting on Aircraft	https://youtu.be/6T9sGIeNiOk?list=PL-I2jXxvGuYMO3rdG3-cJizEQHJlyNXse
4	Mr. Allocious Britto Rajkumar	Airframe Maintenance and Repair	Safety Practices	https://youtu.be/A42hLRyecOc?list=PL-I2jXxvGuYMO3rdG3-cJizEQHJlyNXse
5	Mrs. T. Muthumari	Elements of Aeronautical Engineering	Aerofoil	https://youtu.be/No9rydeHv38?list=PL-I2jXxvGuYMO3rdG3-cJizEQHJlyNXse
6	Mr. S. Satheesh Kumar	Renewable Energy	Importance of Renewable Energy Sources	https://youtu.be/YQzyhSy5O9A?list=PL-I2jXxvGuYMO3rdG3-cJizEQHJlyNXse
7	Mr. T. Anand	Testing of Materials	Non-Destructive Testing	https://youtu.be/BFgUhdSAyI?list=PL-I2jXxvGuYMO3rdG3-cJizEQHJlyNXse
8	Mr. A. C. Ramkumar	Strength of Materials	Mechanical Properties	https://youtu.be/7DJovz30TL8?list=PL-I2jXxvGuYMO3rdG3-cJizEQHJlyNXse

9	Mr. A. C. Ramkumar	Strength of Materials	Trusses	https://youtu.be/P-rrL2d4Xq8
10	Mr. A. C. Ramkumar	Mechanics of Materials	Types of Supports and their Reactions & DOF - 2D	https://youtu.be/CK-W-4RdIY4
11	Mr. A. C. Ramkumar	Engineering Mechanics	State of Equilibrium	https://youtu.be/mkZygfUqg-c
12	Mr. A. C. Ramkumar	Engineering Mechanics	Free Body Diagram	https://youtu.be/XRxb0QoADVg
13	Mr. A. C. Ramkumar	Thermodynamics	Refrigeration and Air-conditioning	https://youtu.be/G6dOLKi47gE
14	Mr. A. C. Ramkumar	Industrial Engineering	Forecasting Concept	https://youtu.be/EdL8ags85co?list=PLoD6SGPnhN3FvWu--sUhl7S9H0cAysplb
15	Mr. S. Satheesh Kumar	Content beyond the syllabus	How to drive an Automatic Transmission vehicle	https://youtu.be/489tNT5HP6E?si=RQBbRfAcm_GLWdMO
16	Mr. S. Satheesh Kumar	Content beyond the syllabus	How to replace the wiper blades easily?	https://youtu.be/6-BVE-a8-VY?list=PLD6-IYx58gCGEFDfqap8Aa0hHKuN6xNw
17	Mr. S. Satheesh Kumar	Content beyond the syllabus	Know all about Tyres	https://youtu.be/yDHVjATbIc4?list=PLD6-IYx58gCGEFDfqap8Aa0hHKuN6xNw
18	Mr. S. Satheesh Kumar	Content beyond the syllabus	How to make Google Forms easily?	https://youtu.be/naR6eEfwyIY?list=PLD6-IYx58gCGEFDfqap8Aa0hHKuN6xNw
19	Mr. S. Satheesh Kumar	Content beyond the syllabus	Patent filing procedures and charges	https://youtu.be/Yb5rEqnDG38?list=PLD6-IYx58gCGEFDfqap8Aa0hHKuN6xNw

20	Mr. S. Satheesh Kumar	e-learning development	Psychometric chart	https://youtu.be/jdqZY22Ca1Q?list=PLD6-IYx58gBwLrtnje9p9n-CJeZq2liI
21	Mr. S. Satheesh Kumar	e-learning development	Problem solved using Psychometric chart	https://youtu.be/miRbm9BERCw?list=PLD6-IYx58gBwLrtnje9p9n-CJeZq2liI
22	Mr. S. Satheesh Kumar	e-learning development	How to use Steam Tables?	https://youtu.be/0f0cPcg-JEA?list=PLD6-IYx58gBwLrtnje9p9n-CJeZq2liI
23	Mr. S. Satheesh Kumar	Content beyond the syllabus	How to Choose inverter for your home	https://youtu.be/55GChaCHfWw?list=PLpZIQIzXV6j5A4WK9Y2DtIIDdqIkB3P4g
24	Mr. S. Satheesh Kumar	Content w.r.t. societal needs.	Engineering Syllabus for First Year in Anna University Affiliated Colleges Regulations 2021	https://youtu.be/ZVvxxBEgt58?list=PLpZIQIzXV6j5A4WK9Y2DtIIDdqIkB3P4g
25	Mr. S. Satheesh Kumar	Content w.r.t. societal issues.	How to file RTI?	https://youtu.be/hYwZIXyn3U?list=PLpZIQIzXV6j5A4WK9Y2DtIIDdqIkB3P4g
26	Mr. S. Satheesh Kumar	Content w.r.t. societal issues.	Omicron - Variant of Concern mutant corona	https://youtu.be/dhLvErCxdfg?list=PLpZIQIzXV6j5A4WK9Y2DtIIDdqIkB3P4g
27	Mr. S. Satheesh Kumar	Content w.r.t. societal issues.	How to complain about sexual harassment online?	https://youtu.be/_p1Wr5Jjgn8?list=PLpZIQIzXV6j5A4WK9Y2DtIIDdqIkB3P4g
28	Mr. S. Satheesh Kumar	Awareness w.r.t. societal needs.	Innuyir Kappom Thittam. Nammai Kakkum 48	https://youtu.be/Gxv8zbqyLeA?list=PLpZIQIzXV6j5A4WK9Y2DtIIDdqIkB3P4g

29	Mr. S. Satheesh Kumar	Awareness w.r.t. societal needs.	Get Rs.15,00,000 worth of funds for your idea	https://youtu.be/dxiLah4LK G4?list=PLpZIQIzXV6j5A4WK9Y2DtIIDdqIkB3P4g
30	Mr. S. Satheesh Kumar	Career Guidance	TNEA Counselling 2022	https://youtu.be/Htpvdw1Z HoU?list=PLpZIQIzXV6j4wC-NpP_hcal01wZDDaPl
31	Mr. S. Satheesh Kumar	Career Guidance	Enna Padikkalam after +2	https://youtu.be/HOm-PZNIJlg?list=PLpZIQIzXV6j4wC-NpP_hcal01wZDDaPl
32	Mr. S. Satheesh Kumar	Outreach activity	Water Rocketry event at Nehru Institute of Technology	https://youtu.be/BXBBepp0p GWE
33	Mr. S. Satheesh Kumar	E-content development	Klien's and Ritterhaus's construction	https://youtu.be/PL-uuBBym80
34	Mr. S. Satheesh Kumar	Content beyond the syllabus	India's first Commuter bike with a TFT console	https://youtu.be/tB-mDj-ZgS8

Table.1. E-Learning Sources by Various Faculty

❖ Benefits to the students using ICT Tools:

- Provide individual Guidance with prompts, encouragement, and automated hints.
- Enable students to show work so teachers better understand their thinking.
- Access a built-in resource section with skill cards and video tutorials.
- Empower the students to check their answers to know if they are on the right track.
- Ensure support for multiple input devices that allow for handwriting, drawing, and symbolic expressions.

3. Cooperative learning tools

- In our college, we practice special cooperative tool, which includes Quiz, Role Play, Team Based Learning, Panel Discussion, Peer to Peer Learning, Concept Mapping, Think Pair Share, Seminar, Mind Map, and Case Study, which helps the students to understand the fundamentals, concepts, problems easy way and also which improve the communication skills for the students.
- This platform acts as a knowledge-sharing place among the students in the classroom.
- Everyone has a chance to present their knowledge by using any of the tools listed below.

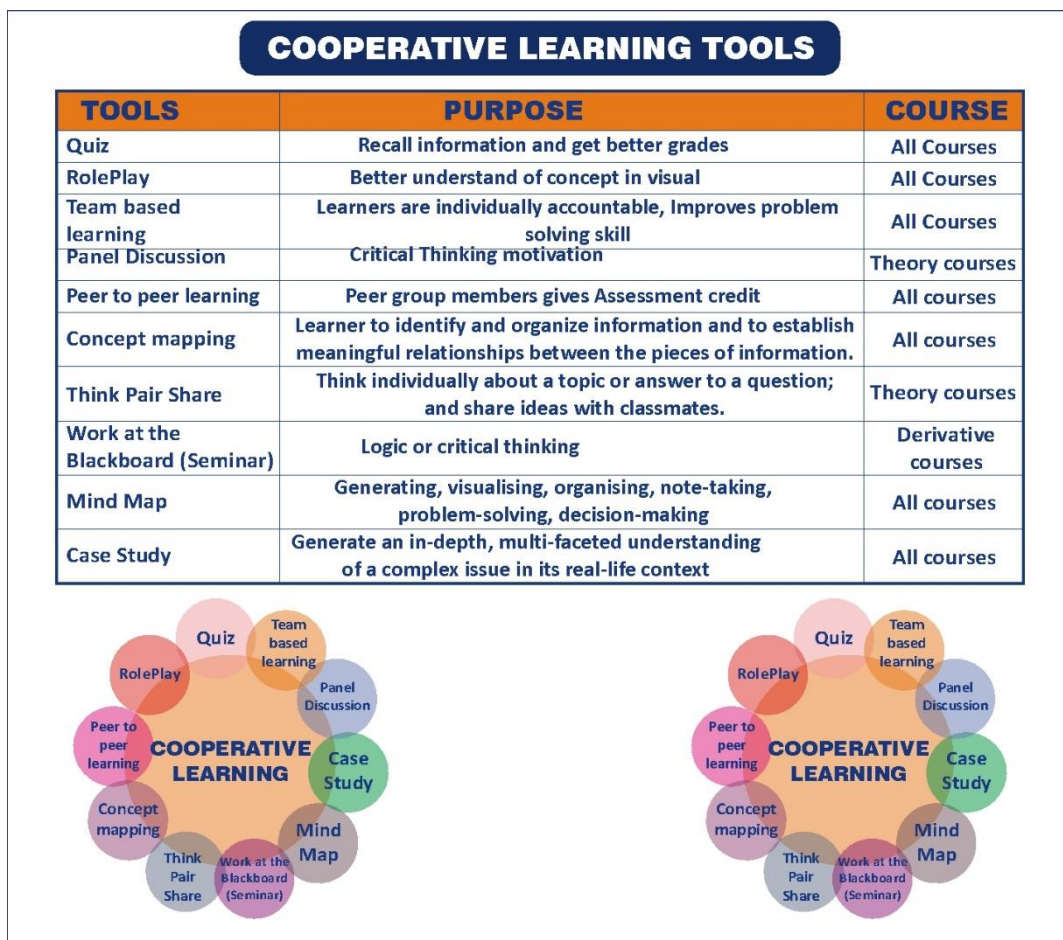


Figure 3 Cooperative Learning Tools

3.1 Technical Quiz:

A quiz is a form of assessment or knowledge evaluation in which individuals are presented with a series of questions or problems to answer or solve. The primary purpose of a quiz is to test or gauge a person's understanding, knowledge, or expertise on a particular subject or topic. Quizzes can vary in format, including multiple-choice questions, true or false statements, fill-in-the-blank questions, short answer questions, and more.

Figure 3.1 Technical Quiz

3.2 Role-play:

Role-play is a simulation or activity in which individuals take on specific roles, often different from their own, and act out scenarios or situations. It's used for various purposes, such as skill development, training, education, or entertainment. Role-play is a versatile and effective method for learning and skill development because it allows individuals to apply their knowledge and abilities practically and interactively.

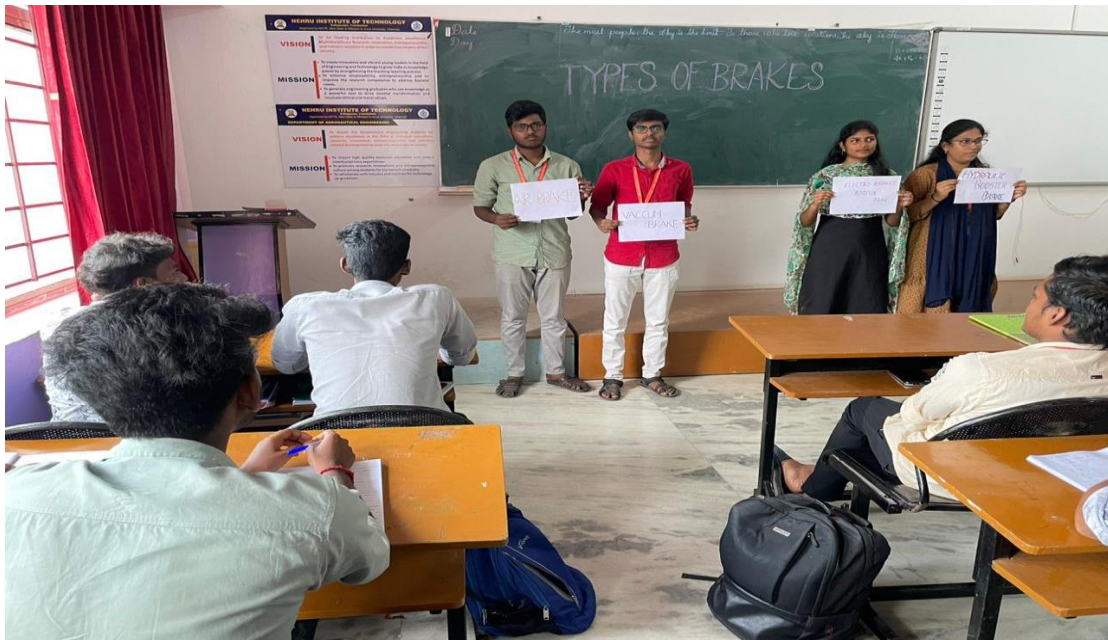


Figure 3.2 Role-play

3.3 Team-Based Learning:

Team-Based Learning (TBL) is a teaching and learning strategy designed to promote active engagement, collaboration, and critical thinking among students. It is often used in higher education, particularly in courses that require problem-solving, complex discussions, and the application of knowledge.



Figure 3.3 Photographs of Team-Based Learning

3.4 Panel Discussion:

Panel discussion is a formal, structured conversation involving a group of experts or individuals with knowledge and experience in a particular field or on a specific topic. These discussions are often held in educational, professional, or public settings and provide a platform for in-depth exploration and debate on important issues.



Figure 3.4 Photographs of Panel Discussion

3.5 Activity Based Learning:

Activity-Based Learning, also known as experiential Learning or hands-on Learning, is an educational approach that emphasizes active student engagement in the learning process. This approach shifts the focus from passive listening and memorization to active participation, problem-solving, and real-world application.



Figure 3.5 Photographs of Activity-Based Learning

3.6 Project Based Learning:

Project-Based Learning (PBL) is an instructional approach that centres on student-driven, hands-on projects and tasks to facilitate deep Learning and the acquisition of knowledge and

skills. Instead of traditional lecture-style Learning, PBL emphasizes real-world problems and challenges, encouraging students to explore, investigate, and create solutions.



Figure 3.6 Photograph of Project-Based Learning

3.7 Experiential Learning:

Experiential Learning is an educational approach that emphasizes learning through direct, hands-on experiences. This learning methodology encourages students to engage with the material actively, apply what they've learned in practical situations, and reflect on their experiences. Experiential Learning goes beyond traditional classroom instruction and aims to deepen understanding, develop skills, and foster personal growth.



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Figure 3.7 Photographs of Experiential Learning

3.8 Peer-to-Peer Learning:

Peer-to-peer Learning, also known as peer learning or collaborative Learning, is an educational approach where individuals learn from and with their peers. It's a student-centred approach that recognizes the value of interactions among students as a means of acquiring knowledge and skills. Peer-to-peer Learning is not confined to traditional classroom settings and can occur in various contexts, both formal and informal.

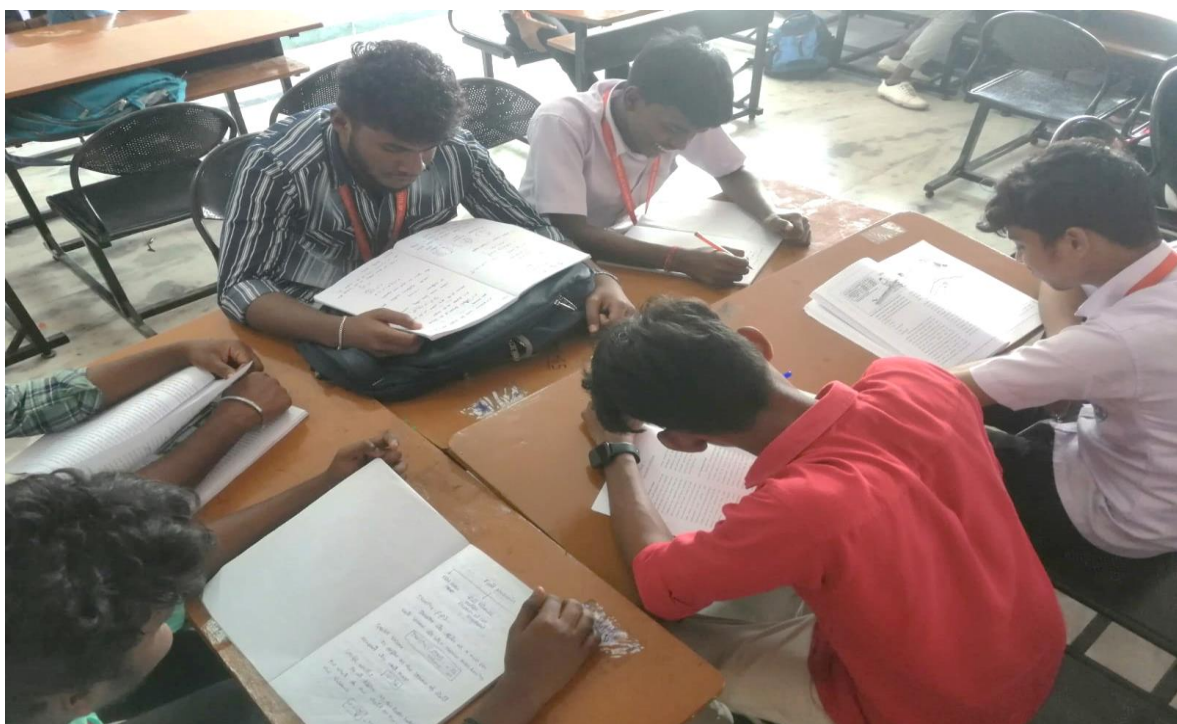


Figure 3.8 Photograph of Peer-to-Peer Learning

3.9 Work at the Blackboard & PPT Presentation (Seminar):

"Working at the blackboard" and "PPT presentation" are two different methods of teaching or delivering a presentation in an educational or professional setting. "Working at the blackboard" typically refers to a teaching method where an instructor or educator writes or draws on a chalkboard or whiteboard during a live classroom or lecture session. A "PPT presentation" refers to a presentation created using Microsoft PowerPoint or similar software. It's a multimedia approach to delivering content in a structured and visually appealing manner.



Figure 3.9 Photograph of Seminar Presentation

3.10 Concept Map:

- Concept mapping is a visual representation and organizational technique used to represent knowledge or ideas in a structured and hierarchical manner.
- It helps individuals or groups to visually organize, understand, and communicate complex information or concepts.
- Concept maps consist of nodes, which represent concepts or ideas, and links or lines that connect these nodes to illustrate the relationships between concepts.
- Concept mapping is not limited to any specific field or discipline. It can be applied in various contexts, such as education, business, science, and research, to help individuals or teams better understand and communicate complex ideas and relationships.

AE8401 AERODYNAMICS – I

UNIT I INTRODUCTION TO LOW SPEED FLOW

CONCEPT MAP



OPT551 – FIBER REINFORCED PLASTICS

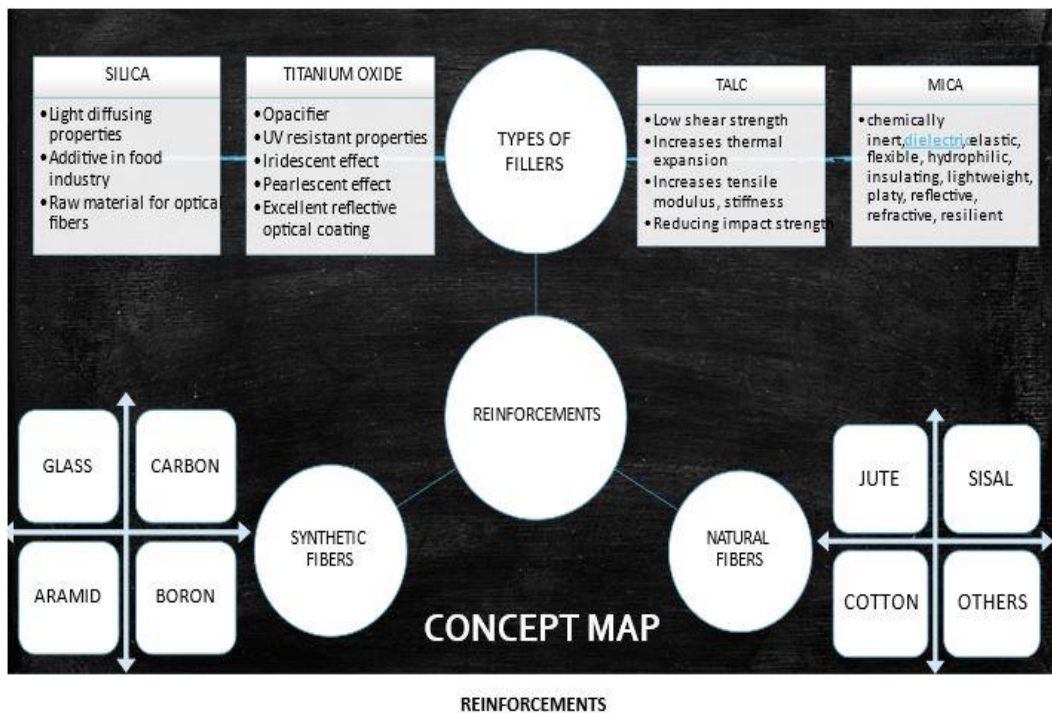


Figure 3.10 Concept map

3.11 Mind Map:

- A mind map is a graphical representation of ideas, concepts, or information that is structured around a central theme or topic.
- It is a visual thinking tool that allows you to organize and explore your thoughts, ideas, and knowledge in a non-linear and creative way.
- Mind maps are often used for brainstorming, problem-solving, note-taking, planning, and visualizing complex information.
- Mind maps make information more visual and accessible, making it easier to understand complex ideas and relationships.
- Mind maps are excellent tools for generating and organizing ideas during brainstorming sessions.

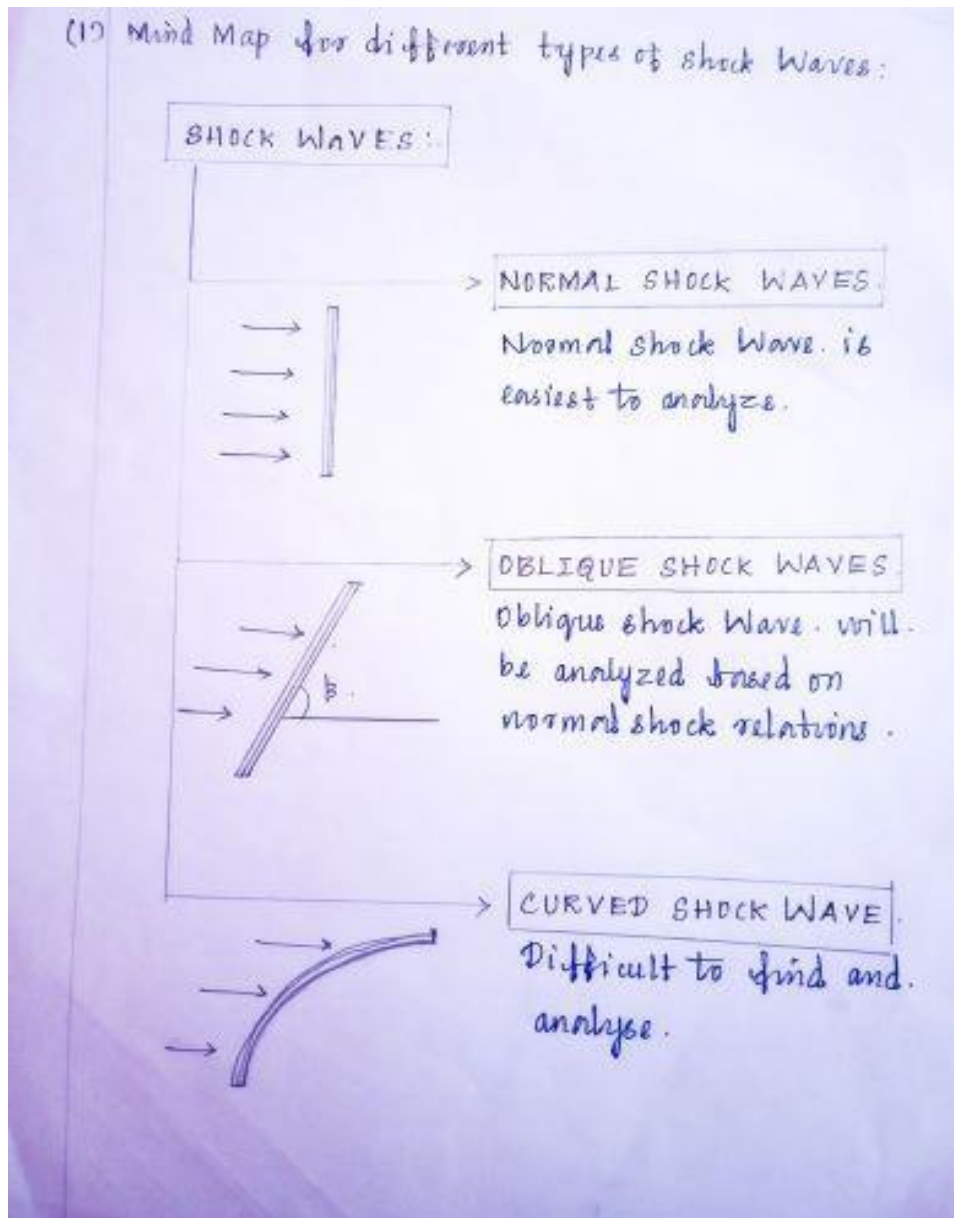


Figure 3.11 Mind map

❖ Benefits of Collaborative Learning Tools

- Collaborative learning tools make learning more interactive and engaging.
- Allowing them to share ideas, discuss topics, and provide feedback to one another.
- Collaborative learning tools enable students from various backgrounds to share their perspectives and experiences.
- Students using collaborative tools develop a range of skills, including communication, teamwork, and problem-solving.
- Students can work on group projects, engage in discussions, and access resources in ways that suit their individual needs and schedules.
- Students can learn from one another by providing peer support and tutoring.

4. Learning through Problem-solving methods and proposal submission (Smart India Hackathon, TNSCST)

Our faculty members give great motivation and Guidance to students for participation in various competitions like hackathons, NewGen IEDC TNSCST brings out their design and creative thinking. NewGen IEDC in our college is funded by DST, which initiates and encourages our students to prepare and submit their startup proposals for converting their innovative ideas into startups with faculty support. Our final-year and pre-final-year students are guided and motivated to convert their projects into funded proposals to TNSCST and other funding agencies.



Figure 4.1 Photograph of Smart India Hackathon Participation



Figure 4.2 Photograph of NewGen IEDC Participation

❖ **Benefits of Learning through Problem-solving methods and proposal submission**

- Participating in events like the Smart India Hackathon, organized by government like TNSCST, offers a rich learning experience that goes beyond theoretical knowledge and classroom learning.
- It equips participants with practical skills and prepares them for the challenges of the real world while contributing to innovation and problem-solving in society.
- Innovative solutions developed during problem-solving events can serve as the foundation for startup ideas and entrepreneurial ventures.
- Participants often face unexpected challenges during the competition. Overcoming these challenges fosters adaptability and resilience.
- Winning or being recognized in competitions like the Smart India Hackathon can be a valuable addition to one's resume or academic achievements.