BHARATI VIDYAPEETH'S

COLLEGE OF ENGINEERING FOR WOMEN, PUNE

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Department of Electronics and Telecommunication

Innovative Teaching Learning Practices

Goal:

To enhance students' learning experiences beyond traditional classroom methods, the department implements innovative teaching concepts. The core objectives of these initiatives are to:

1. Enhance the quality of student learning by implementing creative and modern teaching approaches.

2. Strengthen students' understanding and proficiency in using innovative techniques and learning strategies.

3. Expand students' awareness of cutting-edge technologies and current global and societal challenges.

4. Encourage creative thinking and problem-solving skills through active participation in different activities.

The following innovative teaching-learning approaches are being carried out in the department.

Title:-Think Pair Share

Think-Pair-Share (TPS) is an active learning strategy where students first think individually about a question or problem, then pair up to discuss their ideas, and finally share their thoughts with the larger group or class.

- **Goal: -** Encourage students to solve the problems with discussion.

- **The Practice:-**

1. **Think** – Students are given a problem, question, or scenario. They spend a few minutes thinking independently, organizing their thoughts.

   Purpose: Develops individual reasoning skills.

2. Pair – Students pair with a partner to discuss their ideas, compare perspectives, and refine understanding.
   Purpose: Encourages communication, collaboration, and peer learning.

3. **Share** – Pairs share insights with the whole class or a larger group. Teachers can summarize or highlight key points.

- **Outcome:-**
   1. A group of student discuss and find the solution for the given problem.
   2. Problem Solving Skills are enhanced
   3. Develops individual reasoning skills.
   4. Encourages communication, collaboration, and peer learning.
   5. Promotes confidence, public speaking, and collective learning.

   Think Pair Share Activity Document conducted for BE E&TC II class. In the lecture planning the innovative activities are planned.
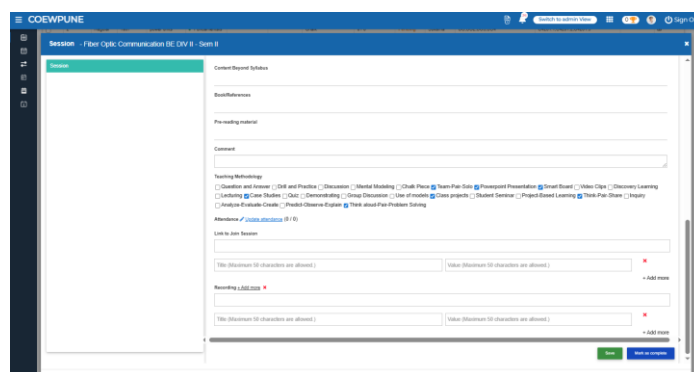

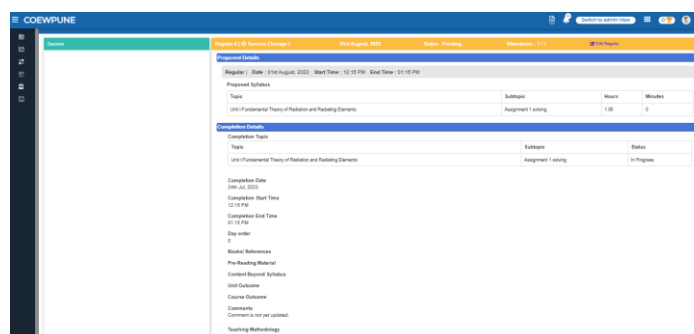Fig. 1 Screenshot from ERP with think pair share technique

Fig. 2 Topic covered under think pair share technique

Title:-Flipped Classroom

A flipped classroom is an instructional strategy where the traditional sequence of teaching is reversed. Instead of first learning content in class and then doing practice at home, students learn the basics at home (through videos, readings, or online modules) and use classroom time for practice, discussion, and problem-solving.

- **Goal: -** Encouraging students to engage with content before class, allowing more time for application-based learning during class.
- **The Practice:-**

Pre-Class Learning

1. Students are assigned video lectures, articles, recorded lessons, or e-learning modules. They go through these materials at their own pace, before coming to class.

In-Class Active Learning

Class time is used for interactive activities such as:

1. Group discussions
2. Problem-solving exercises

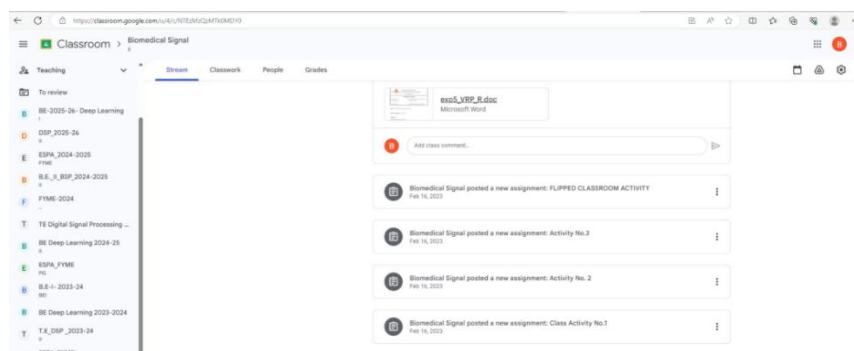- **Outcome:-** Participatory Learning Skills are enhanced

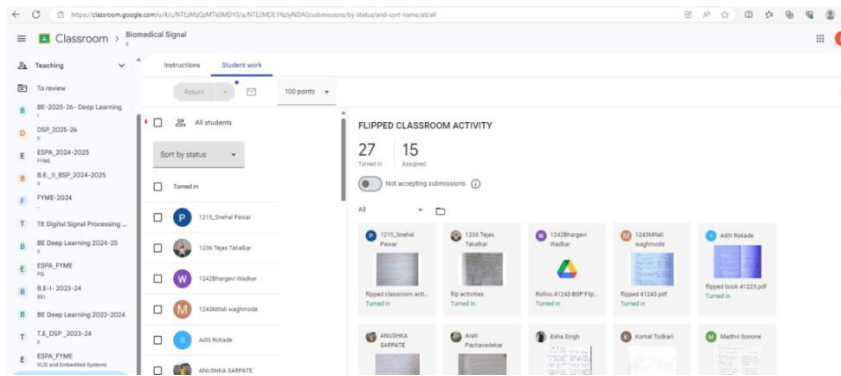Fig. 3 Flipped classroom technique used for BE students

Fig. 4 Flipped classroom technique used for BE students

Title:-Blended Learning

Blended learning is a formal educational approach that combines traditional classroom interaction with technology-based digital learning merging two modes of instruction online and face-to-face—offered either simultaneously or at different times.

- **Goal:-**

  1. Integrate Online and Offline Learning: Combine the strengths of traditional classroom teaching with e-learning tools for a holistic approach.

  2. A YouTube video explaining future need and existing scenario of the related topic is shared to the students. They find it satisfactory.

- **The Practice:-**

  1.The Teachers assign pre-class activities such as watching instructional videos on You Tube or technical websites.

  2. Assigned materials (papers, videos, topics) are discussed in detail during class for deeper understanding.

- **Outcome:-**

  1. Students show better understanding and retention of concepts due to repeated access to materials.

  2. Keep students interested and active in learning.

Following is the list of YouTube Links used by the faculties of the department.

Sr. No	Name Of The Staff	Subject And Topic	YouTube Channel Link
1	Prof. Dr. Chorage Suvarna Sandip	FOC Optical Sources	https://www.youtube.com/watch?v=xlPI9neZ7fo
		FOC Numerical Aperture Calculation	https://www.youtube.com/watch?v=pTwSFMbYaAE
		FOC Submarine Optical Networks	•https://www.youtube.com/watch?v=d0gs497KApU&t=277s
2	Dr. Pawar Vijaya Rahul	Embedded System Design- Design Challenges	https://www.youtube.com/watch?v=m7-rKy42Nck
		DFT - Fast Fourier Transform	https://www.youtube.com/watch?v=UrdtpEE4EXs
4	Dr. Itkarkar Savita Atul	Basic Electronics _ Diode As A Switch	https://youtu.be/kyP4O6l51q0?si=WFE5A6jg2sgNVeOD
		Basic Electronics _ BJT As A Switch	https://youtu.be/l4osxnfj3pc?si=0KY6X8z0utHOcJ03
		VLSI - CMOS As A Switch	https://youtu.be/8z091zvHpZk?si=8I8LC1G94yoWedsx
		Digital Electronics - Basic Logic Gates	https://youtu.be/v6n6Cx2Pug0?si=cL-POcvC0sJ46Rcn
		Digital Electronics - Derived Logic Gates	https://youtu.be/2mJD1oAqblE?si=IBzzsXnejHlSPTMq
		Applications Of CMOS In Digital Circuits	https://youtu.be/xyGpkK_IWi4?si=TvUCQtu7d3II0KPO
		Satellite Communication - Practical Set-Up	https://youtu.be/hMmXehdr4nI?si=CfDZQJ9WY5hXT-v5
		Satellite Communication - Active Link Set-Up And Link Fail Operation	https://youtu.be/U5Ylmy4i-kA?si=K1x1XhSTjhdVNgv4
		Satellite Communication - Voice Transmission Using	https://youtu.be/KGWyNwts3rA?si=cZ8JzmIc27RXVA1u

		Satellite Link	
		Satellite Communication - Direct Communication Between Tx & Rx	https://youtu.be/SHkQDsZEmJs?si=wpT7zDJPIUEOEyo8
		Satellite Communication - Audio Video Communication	https://youtu.be/C5WqmfoVGUg?si=7fA9cq1KpZshlk-2
		NSS Social Service - Community Connect	https://youtu.be/xLd5Ctr3TAs?si=ZiEr5h8wtvghe3_x
5	Dr. Jagdale Sumati Manoj	VLSI Design And Technology- IC Fabrication Process	VLSI - Lecture 2b: The Manufacturing Process - Detailed Process Flow
6	Mr. Kasar Mahavir Shantinath	Digital Communication Practical Experiment	https://youtube.com/@mahavirkasar3663?feature=shared
8	Mr. Mulik Vinod Prakash	Microcontroller- ADC Interfacing , PWM Generation, ,CCP Module Of PIC 18	http://www.youtube.com/@tejaswifoundation
9	Mrs. Jain Roma Rakesh	Microcontroller Practical's	https://youtube.com/@romajain30?si=g9Dhb9POouwnI_pJ
10	Mrs. Sapkal Roshnadevi Jaising	Mechatronics Practical Experiments	https://www.youtube.com/@RoshnaSapkal
11	S. M. Thorat	Digital Circuit Practical Experiment	https://www.youtube.com/watch?v=WxE7Vf7daB0
12	Mr.Yadav Amol Pandurang	Digital Communication	digital com - YouTube

Title:-Project Based Learning

It is a student-cantered teaching approach where learners gain knowledge and skills by working on real-world projects or problems over a period of time. Instead of passively receiving information, students actively explore, investigate, and create solutions.

- **Goal: -** Enhancing students' technical, analytical, and problem-solving abilities by engaging them in real-world, interdisciplinary projects that integrate theoretical

knowledge with practical application, thereby preparing them for industry, research, and innovation.

- **The Practice:-**

  1. Introduction of a Driving Question/Problem

  2. Teacher presents a real-life challenge or problem

  3. Students form teams

  4. They brainstorm ideas, plan tasks, and gather information from various sources (books, internet, experts, field visits).

  5. Improvements or extensions can be suggested.

- **Outcome:-**

  1.Students gain hands-on experience in applying theoretical engineering concepts.

Fig. 5 Projects displayed during project competition

Fig . 7 First prize for DIPEX State Level project competition

Title: - Experiential Learning

Experiential learning is a learner-centered approach where students gain knowledge, skills, and values through direct experiences, reflection, and active participation rather than passive listening.

- **Goal: -** Bridge the Gap between Theory and Practice: Provide real-world learning experiences to reinforce academic concepts.

- **The Practice:-**

  1. Students engage in real-life tasks, projects and simulations that make concepts practical through Industrial visits / internships

  2. Knowledge gained is applied in solving real-world problems, making learning meaningful by performing Laboratory experiments.

     a. Students take ownership of learning, increasing motivation and creativity.

        Outcome: - Students gain hands-on experience in applying theoretical knowledge.

Title: - Collaborative Learning

Collaborative learning is an instructional approach where students work together in groups to achieve shared learning goals. It emphasizes teamwork, knowledge sharing, and peer-to-peer learning.

- **Goal: -** To encourage students to work together on complex engineering problems, simulating real-world industry scenarios.

- **The Practice:-**

1. **Group Activities:** Students engage in discussions, problem-solving, or projects in small groups.

2. **Peer-to-Peer Interaction:** Encourages exchange of ideas, feedback, and mutual support.

3. **Shared Responsibility:** Each member contributes to achieving common objectives.

- **Outcome:-**

  Enhanced Teamwork and Leadership Skills: Students demonstrate ability to work effectively in teams, fulfilling NBA's graduate attributes.

Title:- Peer to Peer Learning

Peer-to-peer learning is a method where students teach and learn from each other. It enhances understanding as learners explain concepts in their own words, making learning interactive and relatable.

- **Goal: -** To allow students to reinforce and deepen their understanding by teaching their peers.

- **The Practice:-**

1. Peer learning is a collaborative and enjoyable approach where students interact with each other to achieve educational goals. Broadly, it represents "learning for everyone, by everyone".

2. In this process, one student with more experience or expertise—called a mentor—guides a small group of junior students, known as mentees. Peer learning fosters self-organization, which is often missing in traditional teaching methods. It involves exchanging subject knowledge, addressing academic challenges, guidance on university papers and projects, recommending books, preparing for placements, pursuing higher studies, and participating in co-curricular and extra-curricular activities.

Students often feel more comfortable discussing issues with their peers, which help build healthy relationships. Mentors also develop leadership, confidence, time management, communication, and teamwork skills through this practice.

1. A faculty member coordinates the peer learning program at both institute and department levels.
2. The department coordinator forms groups of students.
3. Each group is assigned a senior student as a mentor based on academic performance and skills.

- **Outcome: -**

    1. Improved Academic Performance: Both student-teachers and learners gain better understanding through teaching and discussion.

    2. Enhanced Confidence and Communication Skills: Students gain public speaking, articulation, and interpersonal communication skills.

Fig. 9 Peer to Peer learning

Title: - Enhancing Learning Through Online Quiz Practices

Participants were given individual access to the quiz with a set deadline using their mobile phones. The overall supervision was done with the help of smart boards in the classroom. Automatic grading features and feedback options were enabled to provide learners with immediate insights into their performance. Analytics from the quiz results were collected to evaluate overall trends and individual progress. The three toppers were announced to encourage the students.

- **Goal:**

The primary goal of implementing an online quiz was to reinforce learning, assess knowledge retention, and promote active engagement among participants. It aimed to provide immediate feedback, identify areas of improvement, and create a competitive yet supportive learning environment and entertaining as well**.**

- **The Practice:**

An interactive online quiz was developed and conducted using a digital platform Quizizz. The quiz consisted of multiple-choice questions, designed in alignment with the core learning objectives of the course/module. The quiz was conducted after completing the respective course content in the class.

- Target Audience: Students/participants of BE E&TC and TE E&TC
- Duration: 30 minutes]

- Question Count: [15 questions]

- Platform Used: [Quizizz, Wayground]

- Frequency: [End of Module]

- Content Scope: [For BE E&TC students the topic is Understanding Antennas and their Functions] [For TE E&TC students the topic is Exploring Random Processes and Statistics] [For TE E&TC students the topic is Understanding Random Processes]

- **Outcome:**

The online quiz practice yielded several positive outcomes:

1. Improved Engagement: Learners showed increased enthusiasm and involvement due to the interactive nature of the quizzes.

2. Knowledge Retention: Regular practice helped in reinforcing concepts, leading to better retention and recall during assessments.

3. Self-Assessment: Participants were able to evaluate their own understanding and track progress over time.

4. Performance Insights: The quiz analytics allowed educators to identify common areas of difficulty and adjust teaching strategies accordingly.

5. Immediate Feedback: The instant results and explanations contributed to faster correction of misconceptions.

Fig. 10 Students during Quiz competition

Fig. 11 Students solving the Quiz

Title:-Student Chapter in Engineering

A Student Chapter is an organized group of students under a professional body, association, or institution that promotes learning beyond the classroom. It provides a platform for students to engage in co-curricular and extracurricular activities, enhancing professional and personal skills.

- **Goal:-**

Professional Development

Help students understand real-world engineering practices and encourage interaction with industry professionals through seminars, webinars, and guest lectures.

- **The Practice:-**

  1.Skill Development: Organizing workshops, seminars, and technical talks.

  2.Industry Interaction: Connecting students with industry experts through guest lectures and conferences.

  Leadership & Teamwork: Students manage events, finances, and planning.

  Innovation & Creativity: Hackathons, project exhibitions, and idea competitions.

- **Outcome:-**

  1.Offer students opportunities to lead and manage events, becoming more confident and organized.

  2.Foster teamwork through committee roles, project groups, and cross-department initiatives.

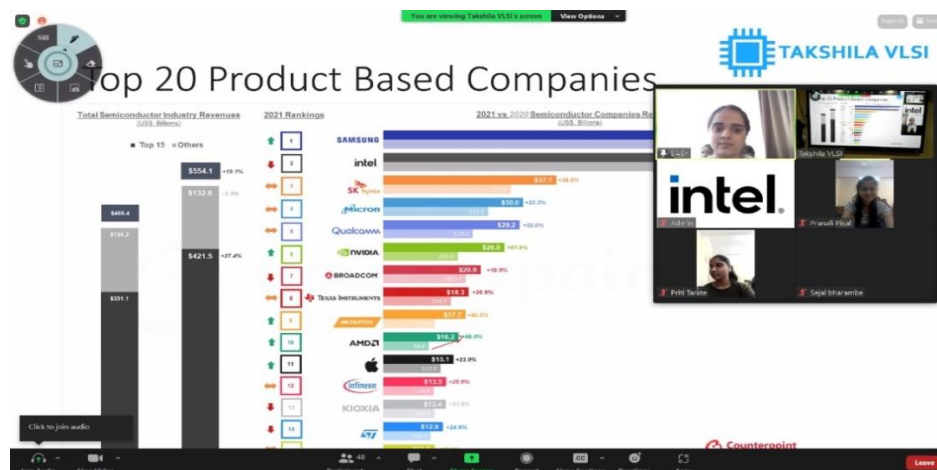Fig. 12 Seminar on Cyber Security for SE &TE E&TC Students under ETSA

Fig. 13 Online webinar on Job Opportunities in VLSI and Semiconductor Industries under ETSA

Fig. 14 National Level Project Competition under IETE inaugurated by Chairman, IETE Pune.
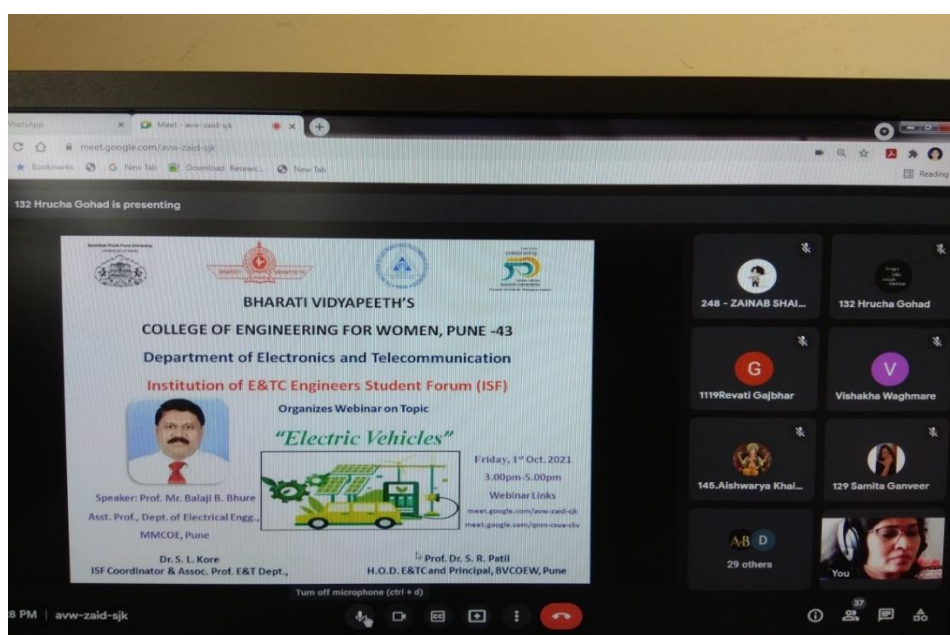

Fig. 15 Webinar on 'Electric Vehicle' under IETE.

Title: - Industrial Visit/ Internship

Industrial visits, training, and internships are learning approaches that connect classroom knowledge with real-world applications. They expose students to professional environments, industry practices, and practical problem-solving

- **Goal: -** To bridge a gap between academia and industry.
- **The Practice: -**

    1. Visits to manufacturing plants, IT companies, R&D labs, or startups.

    2. Certification courses and skill-based training (software tools, design, project management).

    3. In -semester-long internships in industries or research institutes.

    4. On-the-job training with mentors guiding students

- **Outcome:-**

1. To learn the working culture of corporate field.

2. To know how the problems are solved by using modern tools & techniques.

Fig. 16 T.E E&TC students Industrial visit to ERGEN Industries.

Title: - Role Play

Role play is an effective teaching strategy for demonstrating and illustrating concepts or ideas in a lively manner. By actively involving students, it enhances clarity and understanding of the topic under discussion. This approach also encourages learners to ask questions, participate in discussions, and develop a deeper comprehension of the subject matter.

- **Goal:-** Enhance Student Engagement, Promote Teamwork and Collaboration, Develop Communication Skills.

- **The Practice:-**

1. The teacher begins by explaining the concept that will be enacted through role play.

2. Students are selected or volunteer to take part in the activity.

3. A script related to the topic is provided by the teacher.

4. Students prepare their roles and present the concept in front of the class.

- **Outcome:-**

1. Active participation aids long-term retention of knowledge compared to passive learning.

2. Improved Conceptual Understanding.

3. Learners become more enthusiastic and interested due to the interactive nature of role play.

We would like to receive your feedback on Innovative Teaching Learning Practices carried out by the faculties in the department. Please enter the feedback using below Link

https://portal.vmedulife.com/institute/feedback/external/MzEyODU3/coew-pune