



**CHAITANYA BHARATHI
INSTITUTE OF TECHNOLOGY**

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Innovations by the Faculty in Teaching & Learning

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INNOVATIVE TEACHING METHODOLOGIES IDENTIFIED

S.no	Name of the Innovative teaching Methods
1	Socio constructivist perspective
2	Classroom Discussion
3	Short presentation
4	Group Projects
5	Mind map
6	Z to A approach
7	Role play
8	Brown bag approach
9	Think pair share
10	Mentimeter
11	Canvas
12	Never Miss a Class
13	Quiz by Google form and Google Spread Sheet
14	Project Based Learning
15	Kahoot
16	Demonstration Model
17	Virtual Black Board

1. Socio constructivist perspective

Social constructivist perspectives focus on the interdependence of students in the co-construction of knowledge.

IDEA: To play a video related to a topic and make students answer a few questions related to it.

IMPLEMENTATION: Playing a video on how a klystron works?

OUTCOME: Better understanding of a topic by students.

2. Classroom Discussion

IDEA: To make students discuss a given topic.

IMPLEMENTATION: Explained different configurations of transistor.

Students are divided into three groups. Each group is assigned a name based on configuration of transistor (i.e. CE, CB,CC).

Students are asked to give their views on the concept.

OUTCOME: Active participation of students. Remembering the topic for a longer time.

3. Short presentation

IDEA: To make students give a presentation on a given topic

IMPLEMENTATION: The following topics are given to some students.

1. Positive clipper circuit
2. Negative clamper circuit
3. Clamping with dc bias
4. Comparator circuit

They are asked to prepare and give seminars on the given topics.

OUTCOME: Improved presentation skills of student and better analysing of a topic.

4. Group Projects

IDEA: To make students understand IEEE papers and implement a part of it.

IMPLEMENTATION: Students have implemented a few IEEE projects.

OUTCOME: Bringing out the creative thoughts of students.

5. Mind map

IDEA: Mind Maps can be used in class to brainstorm and generate discussions. This involves use of notes with keywords and images in classroom teaching.

IMPLEMENTATION: Following image is shown to students and they are asked to discuss it among themselves.

OUTCOME: This will encourage students not only to participate but also to fully understand a topic and its nuances by creating connections between ideas. This makes students remember the topic for a longer time.

6. Z to A approach

IDEA: Attempt to explain the application for a particular concept first and then the concept

IMPLEMENTATION:

Listing different peripherals (like keyboard, mouse, LEDs and switches) used for better operation of 8086 microprocessor. Discussion of interfacing them with 8086. Drawing the need of using 8255 for interfacing 8086 with peripherals by increasing the number of I/O ports then discusses the 8255 architecture.

OUTCOME: Creating interest among the students in knowing the topic.

7. Role play

IDEA: Students are given a scenario and other options to solve a particular issue, then the students are exposed to decision making in a given environment.

IMPLEMENTATION: Some students are selected randomly. Each student is assigned a particular frequency. One student is selected to act as a low pass filter with particular cutoff frequency. He is made to stand at the door of classroom. Students come one by one. The student with frequency less than cutoff frequency is only allowed to enter the classroom. The other students are blocked at door.

OUTCOME: This helps in understanding of topic quickly.

8. Brown bag approach

IDEA: A bag is filled with papers having different topics of the subject written on them. Each student is asked to pick a paper of his/her choice. And they are given an opportunity to explain it.

IMPLEMENTATION: The following topics are written on paper, and kept in bag.

- Inverting amplifier
- Non inverting amplifier
- Integrator
- Differentiator
- Difference amplifier
- Instrumentation amplifier
- Students are asked to pick papers and explain them.

OUTCOME: This allows students to experience a real time exchange of knowledge.

9. Think pair share

IDEA: Think-pair-share (TPS) is a collaborative learning strategy where students work together to solve a problem or answer a question about an assigned reading.

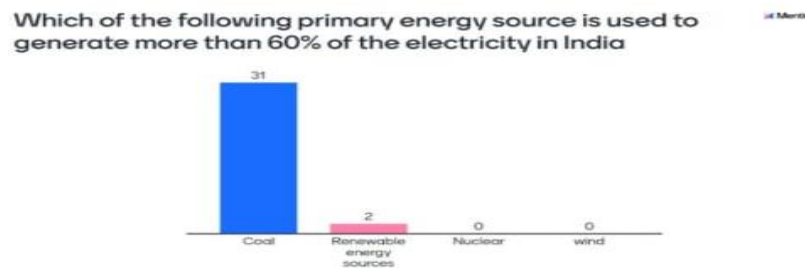
IMPLEMENTATION: In the classroom faculty has to give one question to the student and each student has to solve the question individually and after completion of solving the question student has to pair with one of his/her classmate and discuss each answer. Then one of the students in the class shares his/her thoughts with total class. This strategy requires students to think individually about a topic or answer to a question and share ideas with classmates.

Outcome: This strategy improves collaborative thinking enhances collective skills.

10. Mentimeter:

IDEA: Mentimeter is easy-to-use presentation software; we can create fun and interactive presentations by asking polling type questions.

IMPLEMENTATION: By using mentimeter, we can create no of questions in the form of polling type to easily answer and to enhance students interest so that teaching becomes more interactive by letting the students actively participate in lectures through using Mentimeter as a formative assessment tool. Students have to open the link and submit the answer.



OUTCOME: Active participation of students and can identify how many students answered correctly.

11. Canvas:

IDEA: With learning tools that support instructor innovation and student engagement, Canvas is more than higher education software. It's a platform for student success.

IMPLEMENTATION:we can give different permissions to different users so that you can have the teacher with the top-level permission and students can follow. Different roles can even assign projects, other roles, and assignments. All users can access our class virtually. Canvas sends alerts about upcoming projects, assignments, feedback, and questions. Canvas helps both teachers and students stay organized.

Key features and benefits:

- Content management (files, links, library integration)
- Interactive assessments
- Discussion forums
- Blogs
- Speed Grader
- Learning analytics

OUTCOME: Active participation of students and can identify how many students answered correctly.

12. Never Miss a Class:

IDEA: By this concept student will be able to learn the topics which he/she might have missed during the course.

IMPLEMENTATION: In order to implement the same faculty will be recording their class work regularly and update the same in social media like YouTube and provide the same link in their constrained class group.

OUTCOME: Students will never miss a topic in their course work.

13. Quiz by Google form and Google Spread Sheet:

IDEA: For continuous evaluation and student performance.

IMPLEMENTATION: After completion of each unit faculty will create a Google form which contains the questions and simple Problems related to topics from unit share the link in the student group.

OUTCOME: Student will be able to revise each particular unit.

14. Project Based Learning:

IDEA: To enhance collaborative, critical and creative skills.

IMPLEMENTATION: To involve students in mini projects and hobby projects and also through conduct a workshop.

OUTCOME: Students will be able to learn core subjects in an elaborative and practical way.

15.Virtual Black board:

IDEA: To recreate classroom environment in online teaching by using latest virtual aids.

IMPLEMENTATION: Virtual Blackboard is very easy-to-use. It has a very friendly User Interface. In a few applications, there is a need to learn how to operate those applications. Using this application, one can make quick notes for any lectures, Discussions or one can use this application for step by step drawing. While creating media (video) files, audio also gets Recorded. While playing the created media (audio) file, video as well as audio can be seen and heard.

OUTCOME: Students will be benefited through these aids to expose classroom teaching.

16. Kahoot:

IDEA: The idea is to transform the classroom, where the teacher acted as the game show host and the students were contenders using their own mobile devices.

Kahoot is a game-based learning platform that makes it easy to create, share and play learning games or trivia quizzes in minutes. Unleash the fun in classrooms.. Kahoot can be used to review students' knowledge, for formative assessment, or as a break from traditional classroom activities.

IMPLEMENTATION: We create multiple-choice quiz for the corresponding course,Input questions and answer choices are entered by students using their mobiles/laptops. Now students are awarded points based on the number of correct answers and time of submitting the answers. Finally, the rankings will be displayed.

OUTCOME:The main conclusion is that Kahoot! has a positive effect on learning performance, classroom dynamics, and anxiety in students.Studies Kahoot has statistical significant improvement in learning performance compared to traditional teaching and other tools, a statistically significant improvement on students' and teachers' perception of lectures, statistically significant improvement in classroom dynamics.

17. Demonstration Model:**IDEA:** EM Wave Representation on 3 – Dimensional coordinate systems**IMPLEMENTATION:**3 – Dimensional coordinate systems Model is prepared to explain Electromagnetic concepts**OUTCOME:** Demonstration method is very good approach for clear understanding of concepts The innovative teaching methodologies are introduced by senior faculty members (10 years experience) in front of Program Assessment committee (PAC) and Department Advisory Board (DAB). In turn the methodologies were amended based on their merits by the DAC member. Later the methodology is briefed to the faculty members to follow the same. The use of appropriate methods, significant results, effective presentation and reflective critique were periodically checked by DAB.**List of Faculty employing innovative teaching practices**

S.No.	Faculty	Topic	Subject	Approach used
1	Dr. K. Vasanth	Consolidated topics of DSP	Digital signal processing	Mind Map
2	Mr.P.Chandrasekar	Multivibrators and allied topics	Linear Digital IC Applications	Project Based Learning
3	Dr.S.Radha	State Machines and Allied topics	Digital system design using Verilog	Never Miss a Class
4	Dr.S.Radha	Theorems	Network Analysis	Never Miss a Class
5	Dr.J.Mounika	Concept of Semiconductors and Rectifiers	Dc Circuits, Sensors and Transducer	Short Presentation
6	Mr.Jagan Mohan Reddy	Designing of digital Circuits and develop HDL codes for designs.	VLSI Design	Think Pair Share
7	Smt.D.Sony	Concept of Embedded System Design, Design Metrics, Quality Attributes, Challenges.	Embedded Systems	Classroom Discussion
8	Mr.P.Ranjith	Elementary Signals and Classification	Systems for Signal Processing	Mentimeter
9	Dr. Sai Krishna	Fundamentals of signals and systems	Systems and Signal processing	Short Presentation
10	Mr.E.Chandrasekhar	Comparators	Data Converters	Brownbag Approach

1	Dr. K. Vasanth	Consolidated topics of DSP	Digital signal processing	Mind Map
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Name of The Subject: Digital signal processing

Name of the Innovative teaching methodology employed: Mind Map Activity

Name of the Topic: Consolidation of IIR filters, FIR filters, Sampling, Transform Techniques

Name of the Faculty: Dr.K.Vasanth

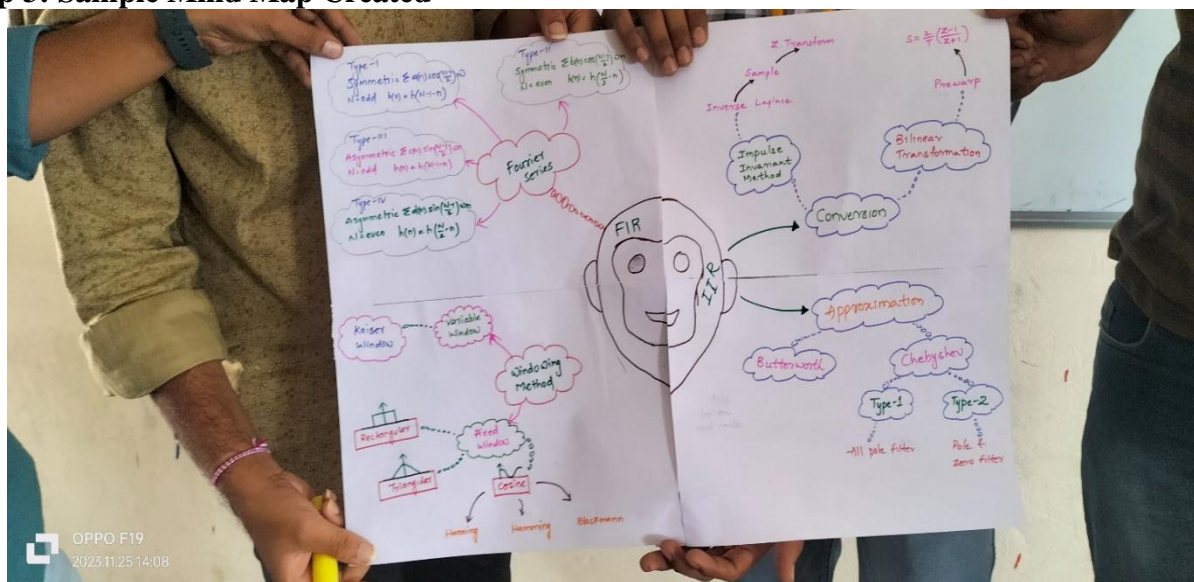
Step1: Students grouped and given a topic to perform Mindmap



Step 2: Students with Mind map Created on various topics of DSP



Step 3: Sample Mind Map Created



2	Mr.P.Chandrasekar	Multivibrators and allied topics	Linear Digital IC Applications	Project Based Learning
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Name of The Subject: Linear Digital IC Applications

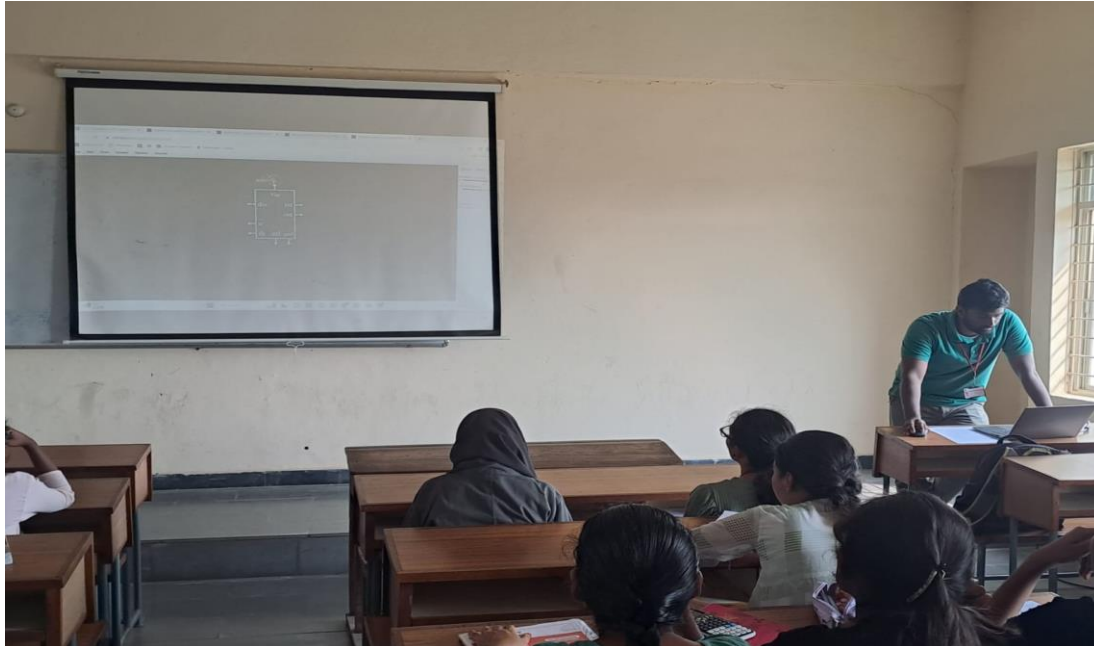
Name of the Innovative teaching methodology employed: Project Based Learning

Name of the Topic: Different IC based 555 Circuits on Cadence software

Name of the Faculty: Mr.P.Chandrasekhar



Demonstration of EDA Tool (Simulation of astable multivibrator using 555 timer)



Roll no 160120735055 is demonstrating “Astable Multivibrator” using 555 Timer in tool

3	Dr.S.Radha	State Machines and Allied topics	Digital system design using Verilog	Never Miss a Class
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Name of The Subject: Network Analysis

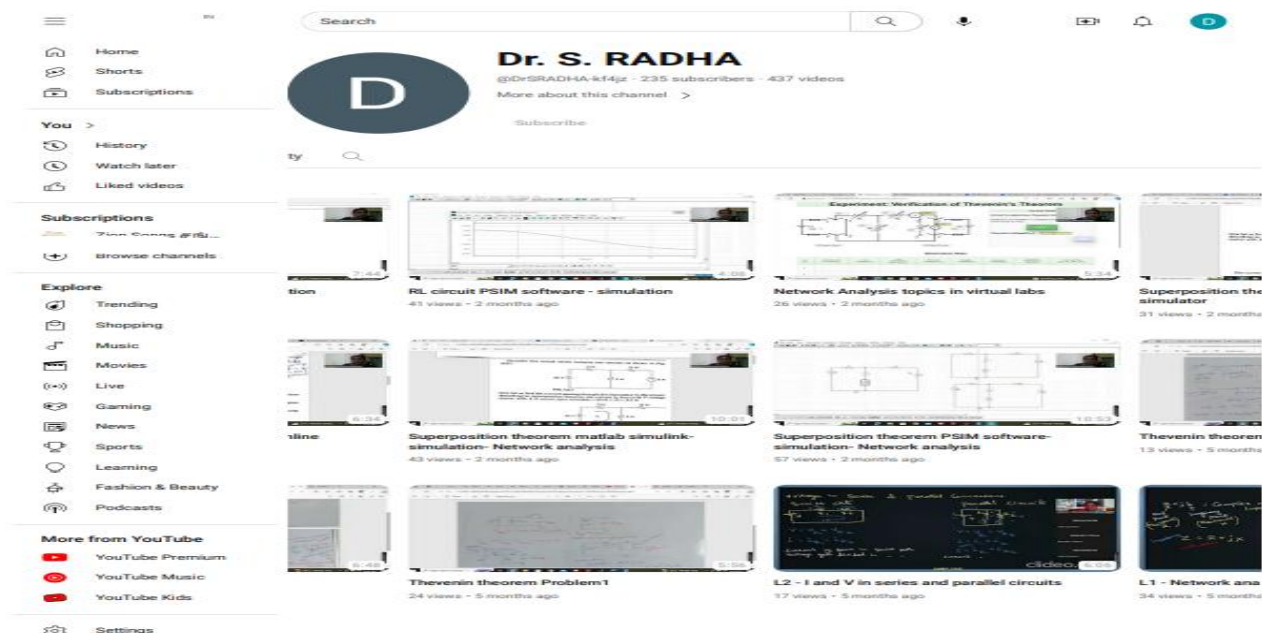
Name of the Innovative teaching methodology employed: Never Miss a Class

Name of the Topic: Theorems and Allied topics

Name of the Faculty: Dr.S.Radha

E-Content: Prepared 12 videos on NA & S subject (ECE) and hosted in Youtube

Sl. no.	Title of the E-Content module	Hosted on (web link)
1	Superposition theorem PSIM software- simulation- Networkanalysis	https://youtu.be/LLG8D5KTQwk
2	Superposition theorem Matlab Simulink- simulation- Networkanalysis	https://youtu.be/g01aVtLMaIg
3	Superposition theorem -Falstad online simulator	https://youtu.be/b79YRgNLyJg
4	Superposition theorem- Circuit Lab online simulator	https://youtu.be/fIMA_TE3gMo
5	Network Analysis topics in virtual labs	https://youtu.be/ppmDd9g14Zs
6	RL circuit PSIM software -simulation	https://youtu.be/FJtARYUCC2I
7	RL circuit Matlab Simulink -simulation	https://youtu.be/830mTQtzn0
8	Thevenin theorem problems	https://youtu.be/t_MWkhDw5xU https://youtu.be/dc7FCam1nnc https://youtu.be/r0oaK9JKDJk
9.	I and V in series and parallel circuits	https://youtu.be/w_0WH59ZC4A
10	Network analysis basics	https://youtu.be/eCvwpOqrJSs



Screenshot of Hosted Videos

4	Dr.S.Radha	Theorems	Network Analysis	Never Miss a Class
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Name of The Subject: Digital system design using Verilog

Name of the Innovative teaching methodology employed: Never Miss a Class

Name of the Topic: State Machines and Allied topics

Name of the Faculty: Dr.S.Radha

E-Content: Prepared 7 videos on NA & S subject (ECE) and uploaded in Youtube

Sl. no.	Title of the E-Content module	Hosted on (web link)
1	FSM (mealey/ moore state diagram) to ASM Charts conversion	https://youtu.be/T_t1tYM5YN4
2	Delays in xor gate operation- verilog coding	https://youtu.be/355sDNPMifA
3	cntrl signal(one) in buffer gate operation- verilog coding	https://youtu.be/ap-bK3X17Bw
4	cntrl signal(zero/one) in buffer gate operation- verilog coding	https://youtu.be/-mBInx3t8ao
5	cntrl signal(zero/one) in NOT gate operation- verilog coding	https://youtu.be/JnazeNAk4Xk
6	GSM in proteus using Arduino	https://youtu.be/Z4KOec1Tipg
7	GPS in proteus using Arduino	https://youtu.be/Ng7hnsTfgO0

The screenshot shows the YouTube channel page for Dr. S. RADHA. The channel has 235 subscribers and 437 videos. The 'For You' section displays four video thumbnails with their titles and view counts:

- counters theory and 3 bit asyn up counter in LT Spice L1**: 1K views • 2 years ago
- NAND Gate Dynamic CMOS LT Spice**: 1.1K views • 2 years ago
- Bode plot L4**: 22 views • 2 years ago
- 2x1 mux PSIM software**: 92 views • 1 year ago

5	Dr.J.Mounika	Concept of Semiconductors and Rectifiers	Dc Circuits, Sensors and Transducer	Short Presentation
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IDEA: To make students give a presentation on a given topic

IMPLEMENTATION: The following topics are given to some students.

1. PN Junction Diode
2. Half Wave Rectifier
3. Full Wave Rectifier

They are asked to prepare and give seminars on the given topics.

OUTCOME: Improved presentation skills of student and better analysing of a topic.

Name of The Subject: DC Circuits, Sensors and Transducers

Name of the Innovative teaching methodology employed: Short presentation

Name of the Topics: Concept of Semiconductors and Rectifiers

Name of the Faculty: Dr. J.Mounika

Step1: Students are asked to select their topic of interest from the subject



Step 2: They have given presentation on the topics they selected



Step 3: Students asked questions after the presentation



6	Mr.Jagan Mohan Reddy	Designing of digital Circuits and develop HDL codes for designs.	VLSI Design	Think Pair Share
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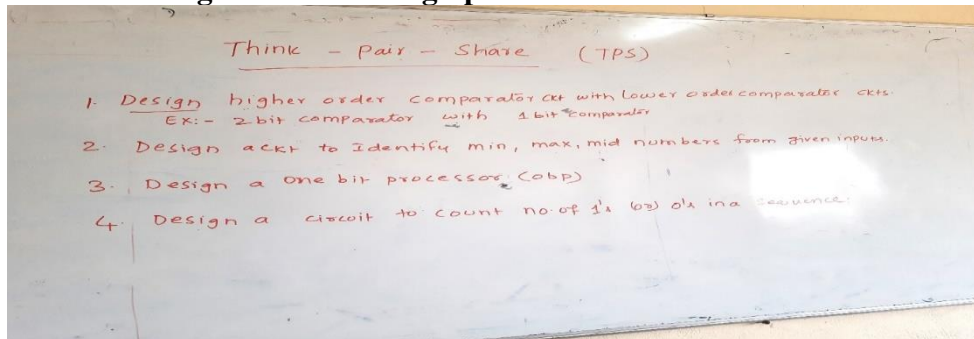
Name of The Subject: VLSI Design

Name of the Innovative teaching methodology employed: Think Pair Share.

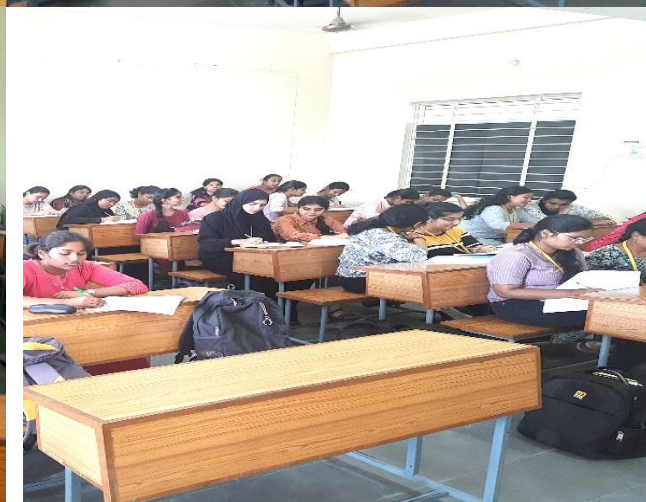
Name of the Topic: Designing of digital Circuits and develop HDL codes for designs.

Name of the Faculty: Sri N Jagan Mohan Reddy

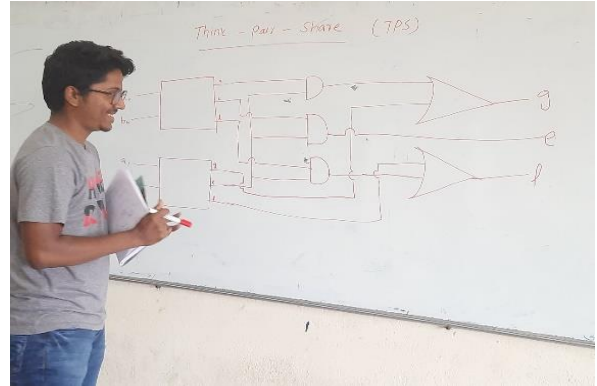
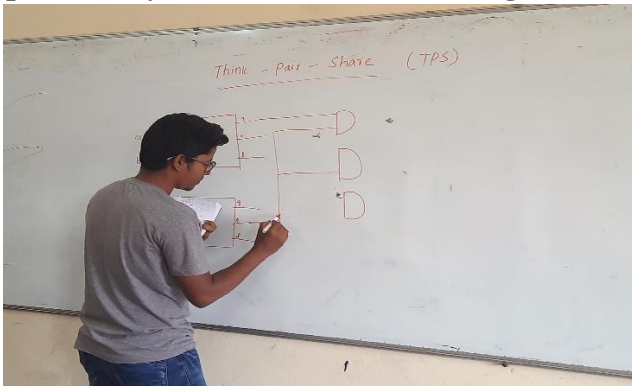
Step1: Students are assigned with a Design problem for Think Pair and Share activity.



Step 2: Students developed their independent solution to the problems and paired together to discuss the solution of the design problems.



Step 3: Finally, Student Shared the design solution to other fellow students.



Outcome: Think Pair Share (TPS) strategy focused on fostering independent thinking, peer sharing, and collaborative problem-solving skills among students. This approach is promoting deeper understanding and critical thinking of students. By combining these elements, the dynamic learning environment is created, that not only enhances students' independent thinking and problem-solving skills but also promotes peer learning and collaboration, ultimately preparing them for success in tackling real-world challenges.

Name of the Subject: Embedded Systems

Name of the Innovative teaching methodology employed: Class Room discussion

Name of the Topics: Concept of Embedded System Design, Design Metrics, Quality Attributes, Challenges.

Name of the Faculty: Smt.D.Sony

Step1: Students are asked to select their topic of interest from the subject



Step 2: Students are divided into groups



Step 3: Students have noted the key points from discussions held



8	Mr.P.Ranjith	Elementary Signals and Classification	Systems for Signal Processing	Mentimeter
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Name of the Faculty: Sri. P. Ranjith

Name of the course: Systems for Signal Processing

Name of the Method Used : Mentimeter

Topic Covered: Elementary Signals and Classification

IDEA: Created fun and interactive presentation on Elementary Signals and Signal classifications by asking polling type questions.

IMPLEMENTATION: Polling type Questions are presented and students are allowed to participate by clicking a link or by scanning QR code through mobile phones then students are asked to answer the question presented in the given time. Not only the right answer but also the fastest answer will be rewarded with higher score. After each Question Leader board is displayed to ignite enthusiasm in the students to compete with fellow students. To keep the session alive and interactive the response to the answer along with the explanation is done after each question.

OUTCOME:

1. Actively Engages students in Subject discussion.
2. Assess the performance of the students.
3. Helps to identify slow Learners and students apathetic towards Subject.



Fig 1.First slide with Link and QR code to join students

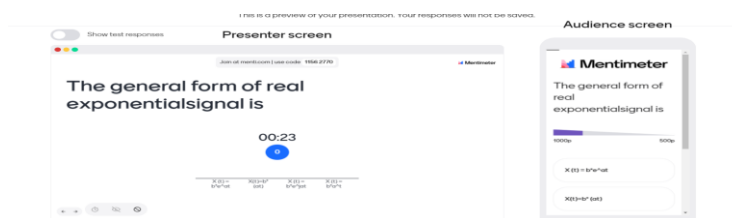


Fig2.Sample Question with countdown timer employed



9	Dr. Sai Krishna	Fundamentals of signals and systems	Systems and Signal processing	Short Presentation
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IDEA: To make students give a presentation on a given topics on Systems and Signal Processing

IMPLEMENTATION: The following topics are given to some students:

Classification of signals: Power vs Energy, Periodic vs non-periodic, even vs odd...

They are asked to prepare and give seminars on the given topics.

Fourier series representation of a periodic non-sinusoidal signal

OUTCOME: Improved presentation skills and analysis skills of the student.

Name of the Subject: Systems and Signal Processing

Name of the Innovative teaching methodology employed: Short presentation

Name of the Topics: Fundamentals of Signals & Systems

Name of the Faculty: Dr. Sai Krishna Kondoju

Step1: Topics are given to the students based on their interest



Step 2: Student has given presentation on the topics they selected (Sample)



Step 3: Student gave the answers to the quires raised from the other students from the class



10	Mr.E.Chandrasekhar	Comparators	Data Converters	Brownbag Approach
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Name of the Subject: CMOS Data Converters

Name of the Innovative teaching methodology employed: Brown bag approach

Name of the Topics: Comparators

Name of the Faculty: Sri E.Chandrasekhar

IDEA: A bag is filled with papers having different topics of the subject written on them. Each student is asked to pick a paper of his/her choice. And they are given an opportunity to explain it.

IMPLEMENTATION: The following topics are written on paper, and kept in bag.

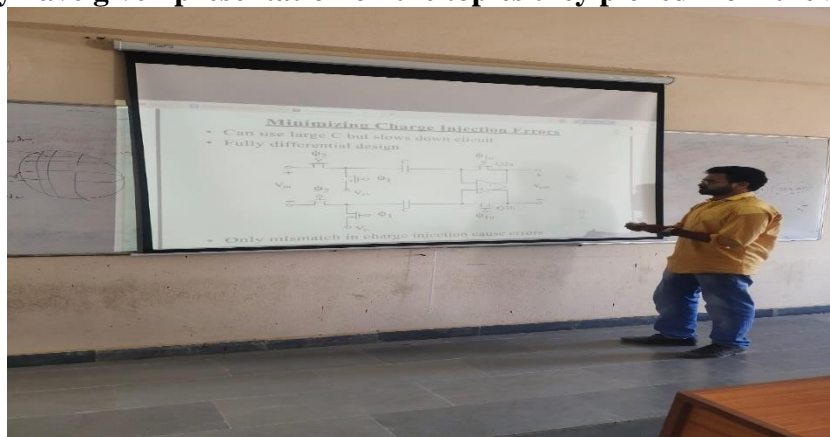
- Basic op-map comparator
- Input offset voltage errors
- Charge Injection errors
- Fully Differential Comparator
- Multistage comparator

OUTCOME: This allows students to experience a real time exchange of knowledge.

Step1: Students are asked to pick a paper of his/her choice from the bag.



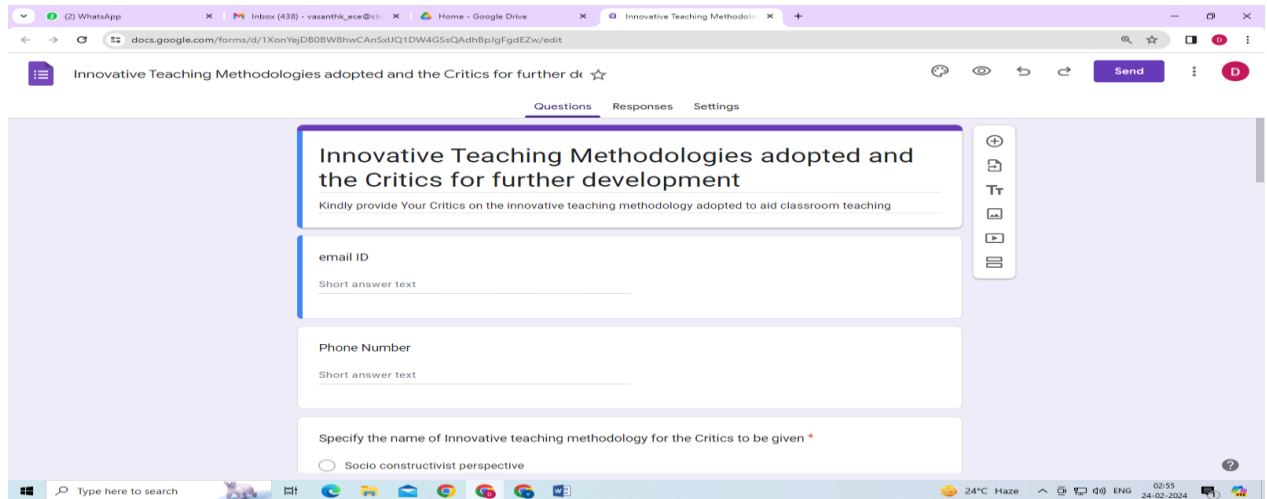
Step 2: They have given presentation on the topics they picked from the bag



Critics for peer review

A Google form is placed in the college website along with the List of innovative teaching practices aided along with Classroom teaching.

https://docs.google.com/forms/d/e/1FAIpQLSeXfdak5wggBs6FpZ8_6RiHq3fEDSn6NE2TftUnydQIZSxTWg/viewform?usp=sharing

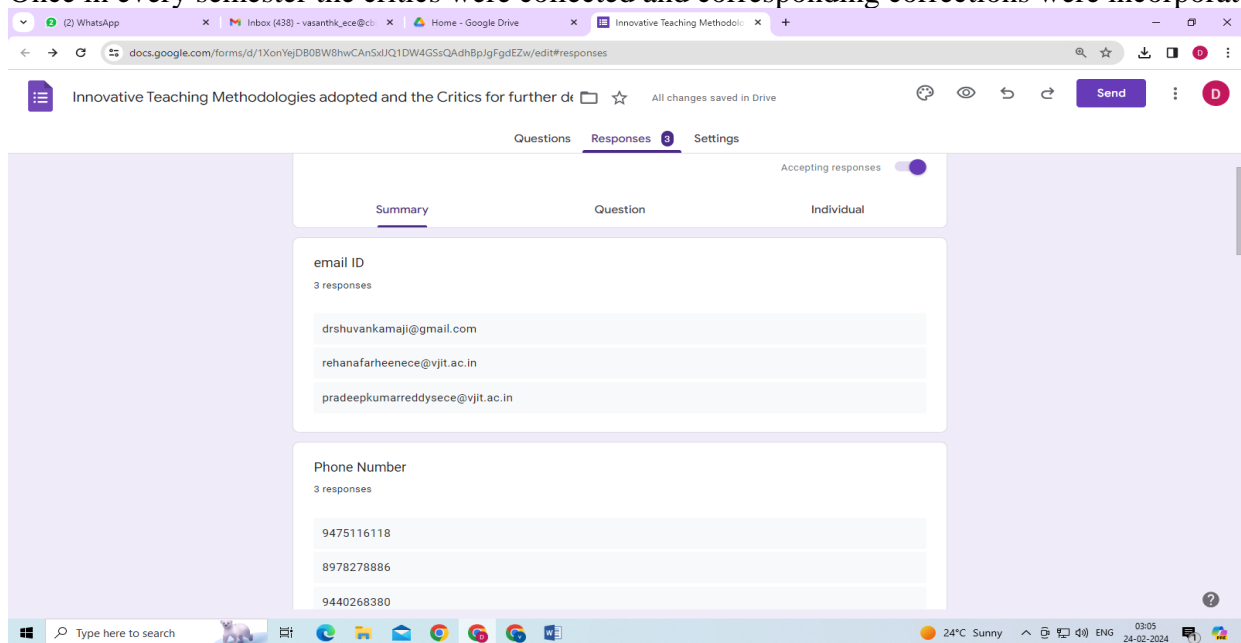


The screenshot shows a Google Form titled "Innovative Teaching Methodologies adopted and the Critics for further development". The form is designed for collecting feedback on teaching methods. It includes the following fields:

- Title:** Innovative Teaching Methodologies adopted and the Critics for further development
- Subtitle:** Kindly provide Your Critics on the innovative teaching methodology adopted to aid classroom teaching
- email ID:** Short answer text field
- Phone Number:** Short answer text field
- Specify the name of Innovative teaching methodology for the Critics to be given ***: Radio button selection with the option "Socio constructivist perspective".

Academic Peers around the world can click onto the link and give their critics on the technique used.

Once in every semester the critics were collected and corresponding corrections were incorporated.



The screenshot shows the "Responses" page of the Google Form. It displays the following information:

- Summary:** 3 responses for both the "email ID" and "Phone Number" questions.
- email ID responses:**
 - drshuvankamaji@gmail.com
 - rehanafarheenece@vjit.ac.in
 - pradeepkumarreddysece@vjit.ac.in
- Phone Number responses:**
 - 9475116118
 - 8978278886
 - 9440268380

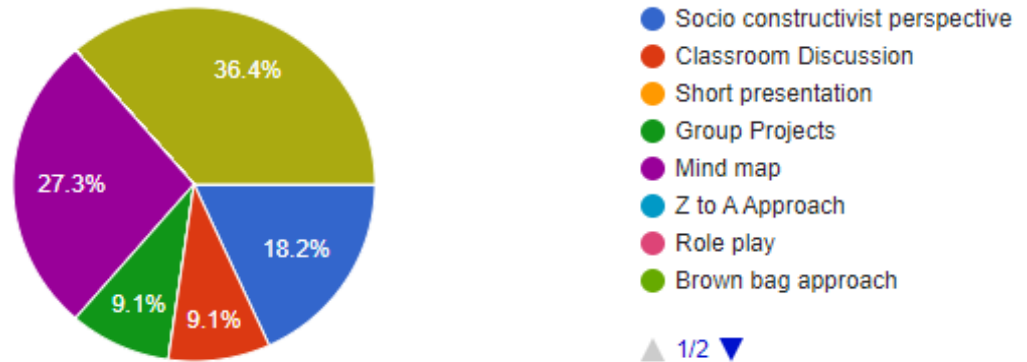
Responses from Academic Peers:

Timestamp	email ID	Phone Number	Specify the name of Innovative teaching methodology for the Critics to be given	Will the Innovation Teaching Methodology be useful during classwork?	Has the Innovative Teaching Methodology enhanced the students participation in class Room ?	Is there any Considerable improvement seen in class work because of the innovative teaching?	Has evaluating students before and after the activity shown some Improvement ?	Does activity contribute to students centric learning?	Any other suggestions to improve the teaching
2023/12/28 5:09:14 AM GMT	drshuvankamaji@gmail.com	9475116118	Mind map	Strongly agree	Strongly agree	Strongly agree	Agree	Yes	NA
2024/02/02 5:09:20 AM GMT	rehanafarheenece@vjit.ac.in	8978278886	Mind map	Strongly agree	Agree	Agree	Agree	Yes	
2024/02/28 5:10:15 AM GMT	pradeepkumarreddysece@vjit.ac.in	9440268380	Group Projects	Agree	Strongly agree	Strongly agree	Strongly Agree	Yes	
2024/02/29 5:18:41 AM GMT	bhavanidinesh149@gmail.com	9941439337	Project based Learning	Strongly agree	Strongly agree	Strongly agree	Strongly Agree	Yes	
2024/03/02 5:25:19 AM GMT	sridevji@vjit.ac.in	9603170489	Mind map	Strongly agree	Strongly agree	Strongly agree	Strongly Agree	Yes	No
2024/03/02 5:25:58 AM GMT	kalyaniwagh13@gmail.com	7276083456	Project based Learning	Agree	Agree	Neutral	Neutral	Yes	
2024/03/05 5:33:45 AM GMT	nagabushanam_p@vnrvjiet.in	9677528501	Classroom Discussion	Strongly agree	Strongly agree	Strongly agree	Strongly Agree	Yes	Nil
2024/03/07 5:41:47 AM GMT	Rallanaga@gmail.com	9949632049	Never Miss a Class	Strongly agree	Strongly agree	Agree	Agree	Yes	
2024/03/07 6:22:02 AM GMT	Rallanaga@gmail.com	9949632049	Mind Map	Strongly agree	Strongly agree	Agree	Agree	Yes	
2024/03/11 6:47:24 AM GMT	kthyagarajan22@gmail.com	9985187289	Project based Learning	Strongly agree	Strongly agree	Agree	Strongly Agree	Yes	
2024/03/11 6:48:33 AM GMT	rajeshce@mvit.edu.in	9894184602	Project based Learning	Strongly agree	Strongly agree	Strongly agree	Strongly Agree	Yes	Good

Analysis of the Critics Received from Academic Peers

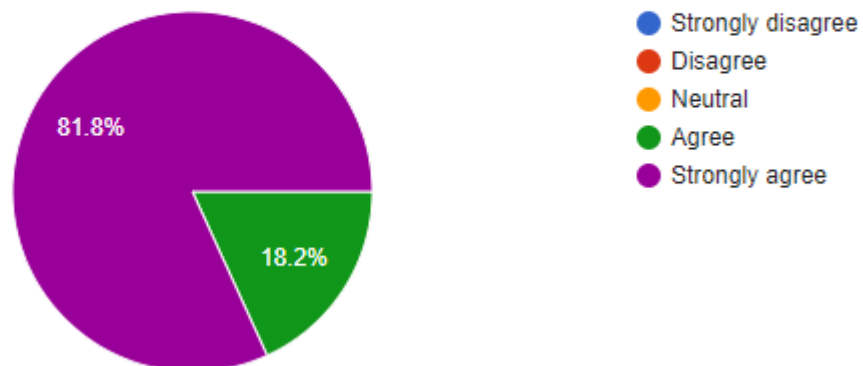
Specify the name of Innovative teaching methodology for the Critics to be given

11 responses



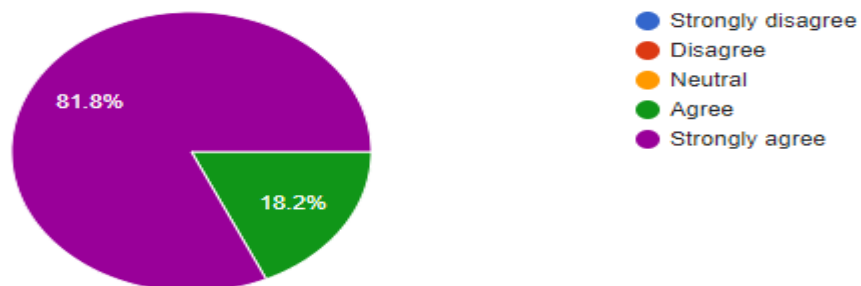
will the Innovation Teaching Methodology be useful during classwork?

11 responses



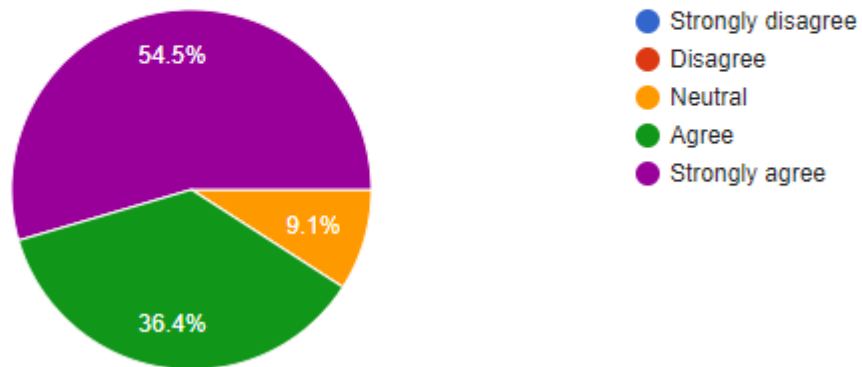
Has the Innovative Teaching Methodology enhanced the students participation in class room ?

11 responses



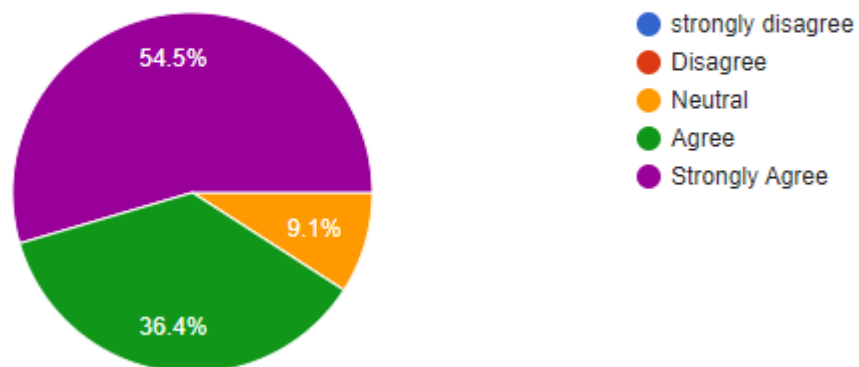
Is there any Considerable improvement seen in class work because of the innovative teaching?

11 responses



Has evaluating students before and after the activity shown some Improvement?

11 responses



Does activity contribute to students centric learning ?

11 responses

