RAMCO INSTITUTE OF TECHNOLOGY

Approved by AICTE, New Delhi & Affiliated to Anna University
NAAC Accredited with 'A+' Grade & An ISO 9001: 2015 Certified Institution
NBA Accredited UG Programs: CSE, EEE, ECE and MECH

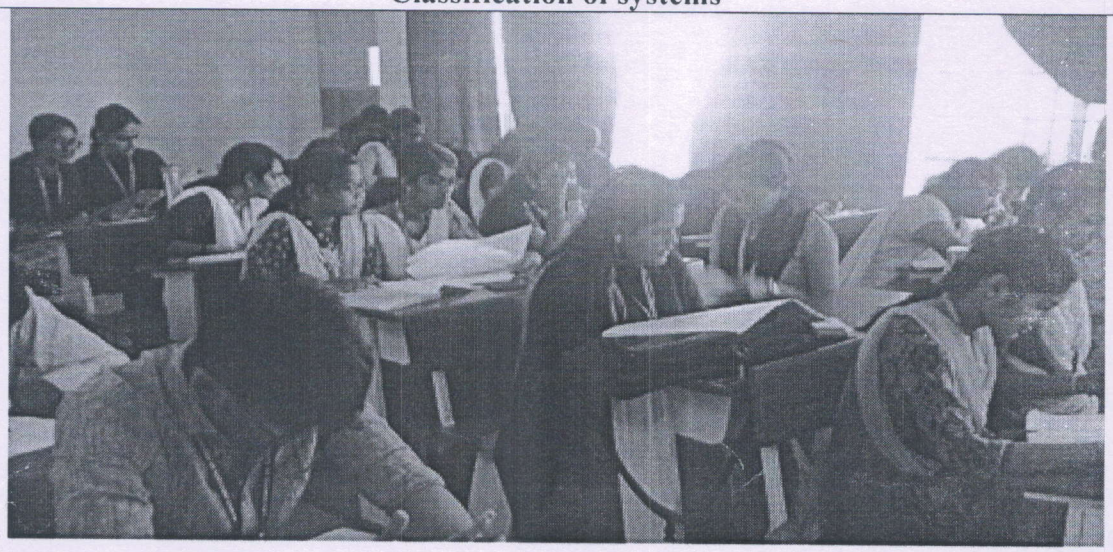
Department of Electronics and Communication Engineering
Academic Year: 2024- 2025 (Odd Semester)

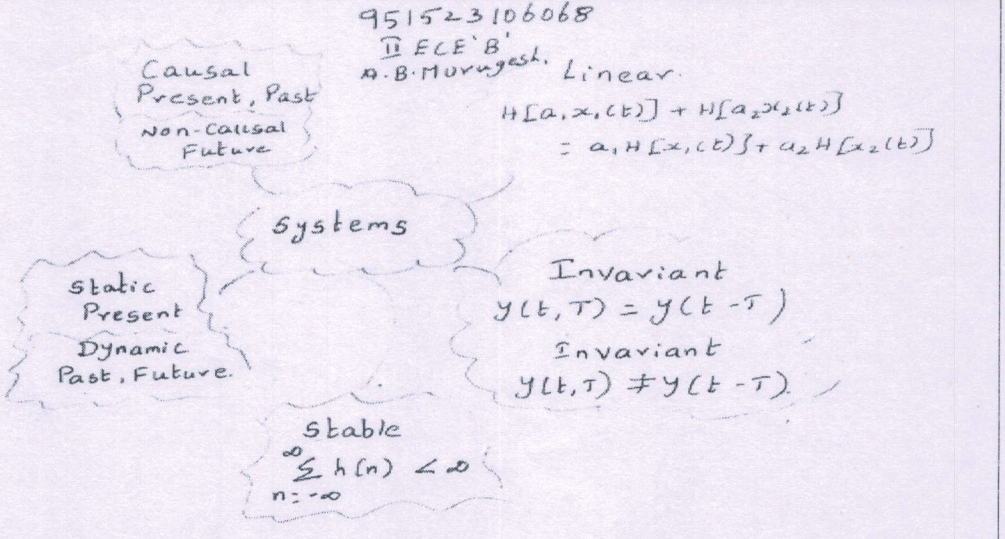
Active Learning Method

UNIT I – CLASSIFICATION OF SYSTEMS

Degree, Semester & Branch: B.E., III Semester & ECE 'A'
Course Code & Title: EC3354 & Signals and Systems
Name of the Faculty member: Dr.S. Vairaprakash
Name of the Topic: Classification of systems
Name of the Innovative Practice: Mind map
Date & Duration: 14.08.2024 & 10 minutes

Active Learning Method Execution
Classification of systems





Signature of the Faculty 15/8/24

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Department of Electronics and Communication Engineering

Academic Year: 2024- 2025 (Odd Semester)

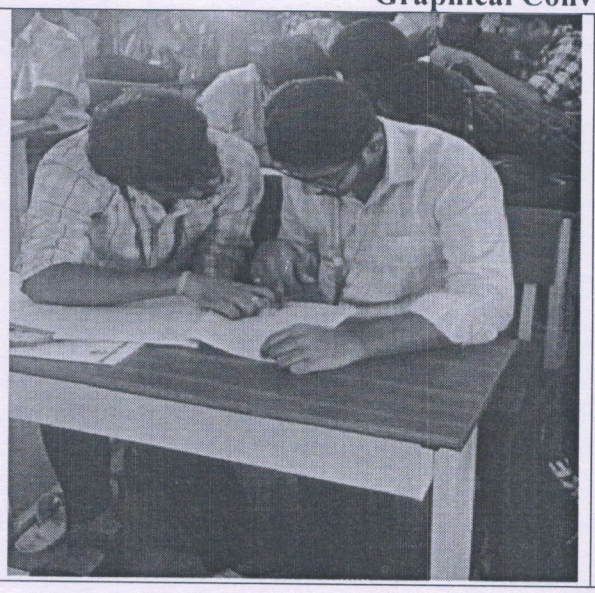
Innovative Teaching Method

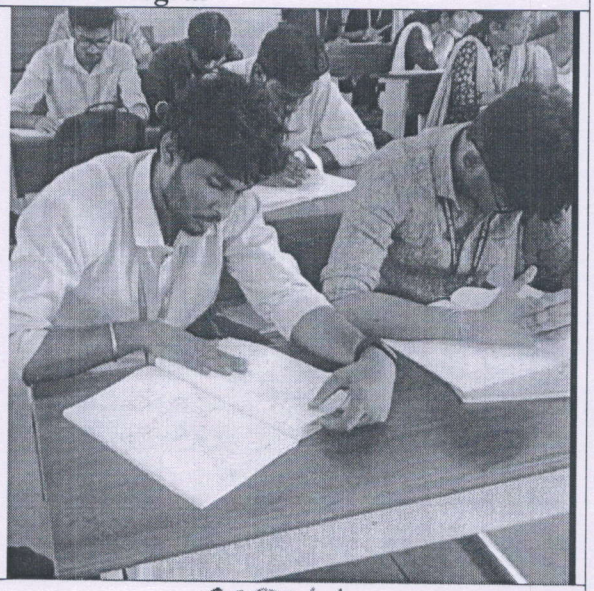
UNIT III –LTI-Continuous Time system

Degree, Semester & Branch: B.E., III Semester & ECE 'B'
Course Code & Title: EC3354 & Signals and systems
Name of the Faculty member: Dr.S.Vairaprakash
Name of the Topic: Graphical Convolution
Name of the Innovative Practice: One-minute Paper
Date & Duration: 20.09.2024 & 10 minutes

Active Learning Method Execution

Graphical Convolution Integral





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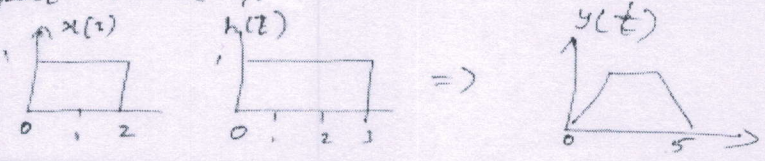
ECE 'B'

1. Rewrite given signals $x(t)$ and $h(t)$ as $x(\tau)$ and $h(\tau)$
2. flip $h(\tau)$ about $\tau=0$ and shift by $h(t-\tau)$
3. Plot $x(\tau)$, $h(t-\tau)$
4. For each overlap region, Multiply $x(\tau)$ and $h(t-\tau)$
5. Shift $h(t-\tau)$ to right side and find new interval
6. Repeat 5 and 4.



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Department of Electronics and Communication Engineering

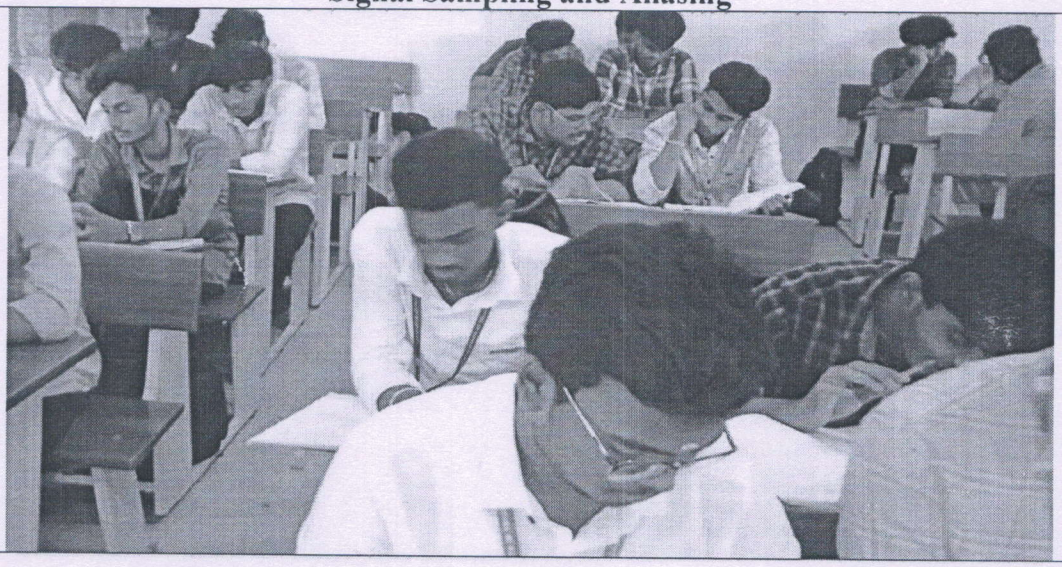
Academic Year: 2024- 2025 (Odd Semester)

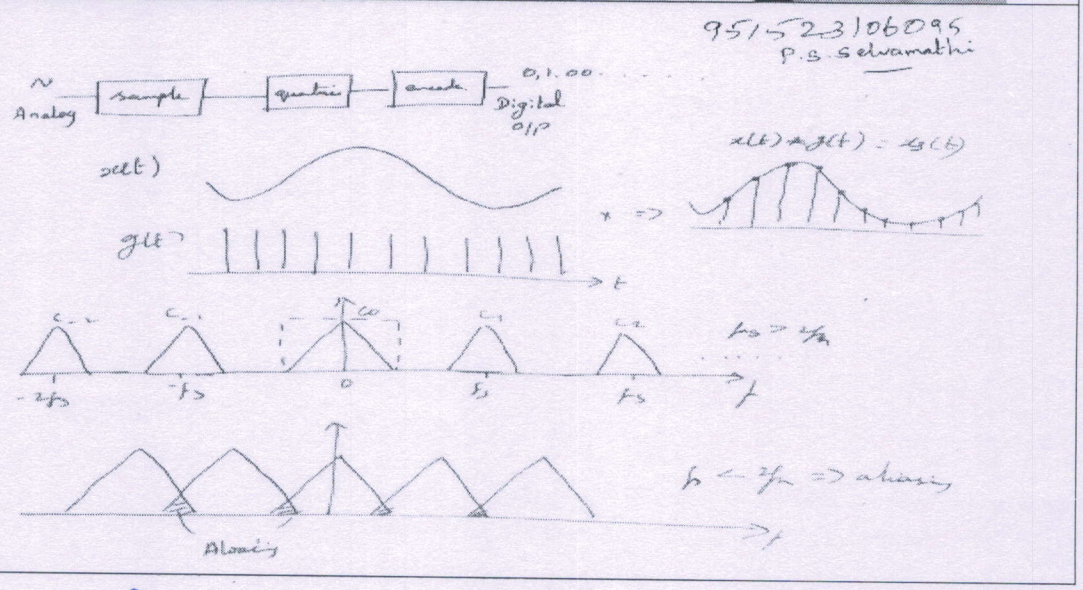
Active Learning Method

UNIT IV – Analysis of Discrete Time signals

Degree, Semester & Branch: B.E., III Semester & ECE 'B'
Course Code & Title: EC3354 & Signals and systems
Name of the Faculty member: Dr.S. Vairaprakash
Name of the Topic: Signal Sampling and Aliasing
Name of the Innovative Practice: Sketch Noting
Date & Duration: 09.10.2024 & 10 minutes

Active Learning Method Execution
Signal Sampling and Aliasing





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Department of Electronics and Communication Engineering
Academic Year 2024 – 2025 (Odd Semester)

Degree, Semester & Branch: B.E., III Semester & ECE B
Course Code & Title: EC3354 &Signals and Systems
Name of the Faculty member (s): Dr.S.Vairaprakash

Innovative Practice Description

- **Unit / Topic: III**/Differential equations
- **Course Outcome:** CO3
- **Topic Learning Outcome:** TLO11, TLO12
- **Activity Chosen:** Round Table Activity
- **Justification:**

  The Round Table activity allows the students to actively engage with the material. Instead of passively listening, they will be working on different types of problems and exploring how they are solved. Active learning helps them to retain information better and improves your understanding of the subject. They also get to practice solving differential equations in a hands-on way, making the concepts more concrete.

  Through the Round Table activity, they will have the opportunity to collaborate with their peers. Working in small groups lets them share ideas, learn from one another, and discuss different ways to approach problems. If they are struggling with a specific concept, someone in their group may offer a fresh perspective or a new method of solving the problem.
- **Time Allotted for the Activity:** 45 minutes
- **Details of the Implementation:**

Before beginning the Round Table activity, ensure that students have a foundational understanding of the First- and second-order linear differential equations, Laplace transforms and inverse Laplace transforms, Stability analysis related to continuous-time systems and differential equations

Divide the class into small groups of 5-6 students. This will allow for efficient collaboration and ensure that each student actively participates.

Within each group, assign roles to students to ensure that each person has a specific responsibility. Assigned roles are:

- **Problem Solver:** Works on solving the differential equation or system model.
- **Recorder:** Writes down the steps, key points, and the final solution.

- **Timekeeper:** Keeps track of time to ensure that groups rotate within the given time frame.
- **Presenter:** Prepares to share the group's findings with the class after the rotation.

The Round Table activity involved the students rotating through different problems or stations in a predetermined order. Each station should focus on a specific aspect of continuous-time systems, and each group will work on a station for a fixed amount of time (e.g., 10–15 minutes)

After the designated time at a station, the groups rotate to the next station. They will now work on the new problem at that station, applying their previous experience to the new topic. After completing the final rotation, each group will present their findings to the class.

Each group's presenter summarized their solution process, highlight key concepts, and explained the implications of their results

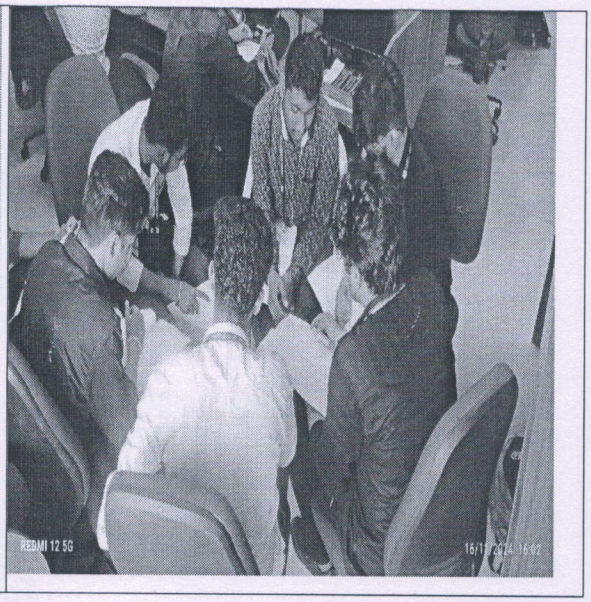
- **CO – PO / PSO mapping:**

CO	PO1	PO2	PO4	PO8	PO9	PO10	PSO1	PSO3
CO3	3	2	2	1	3	2	3	2

- **PO / PSO mapped:**

Innovative practice	PO9	PO10	PSO1
	3	2	3
Justification for correlation	The course outcome is highly correlated since the students work well as individuals and as a team while doing the round table activity.	The students' listen to; comprehend information, instructions and viewpoints of others through round table (collaborative) activity.	The students come up with new ways to solve existing/new problems while determining the response to an LTI CT system.

- **Images / Screenshot of the practice:**



- **Reflective Critique:**
  - ***Feedback of practice from students and other stakeholders:***

    Before the round table, they had a hard time understanding some of the more abstract concepts like Laplace transforms. But during the discussions, they were able to understand the process more clearly because each group explained it in simpler terms

    The collaboration was great, but sometimes there wasn't enough time for everyone to contribute equally.

  - ***Benefit of the practice:***

    Round table activities promote active participation from all students. Since the format usually involves smaller groups or discussions with the entire class, each student is encouraged to engage more deeply with the material.

    Students are often challenged to think in different ways when exposed to various methods of problem-solving.

  - ***Challenges faced in implementation:***

    Some students may not feel comfortable sharing their ideas, while others may dominate the discussion, preventing an equal exchange of ideas. Some students may dominate the conversation while others may remain passive.

References:

Textbooks:

1.AllanV.Oppenheim, S. Wilsky and S.H.Nawab,"Signals and Systems", Pearson Education, 2007.

Other References:

1. B. P. Lathi, "Principles of Linear Systems and Signals", Second Edition, Oxford, 2009.
2. R.E.Zeimer, W.H.Tranter and R.D.Fannin, "Signals & Systems - Continuous and Discrete", Pearson, 2007.
3. John Alan Stuller, "An Introduction to Signals and Systems", Thomson, 2007
4. P.Ramesh Babu and R.Anandanatarajan, "Signals and Systems", SciTech publications, Fourth Edition.
5. A.Nagoor Kani, "Signals and Systems", Tata McGraw Hill Education Private Limited, Second Edition, 2010.

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Department of Electronics and Communication Engineering
Academic Year 2024 – 2025 (Odd Semester)
Degree, Semester & Branch: B.E., III Semester & ECE B
Course Code & Title: EC3354 &Signals and Systems
Name of the Faculty member (s): Dr.S.Vairaprakash

Innovative Practice Description

- **Unit / Topic: II**/Laplace Transform Properties
- **Course Outcome:** CO2
- **Topic Learning Outcome:** TLO7
- **Activity Chosen:** Flipped Class room
- **Justification:**

  The topic of the properties of Laplace Transforms can be quite abstract and challenging for students, particularly because it involves both mathematical theory and its application to solve differential equations and systems. A flipped classroom approach for teaching this topic can offer several benefits that enhance learning and improve student outcomes. Unit 2 deals Fourier Transform and Laplace Transform applications to signals in Frequency domain using various properties. Since the students are exposed to the Laplace transform in mathematics and circuit analysis, the topic of properties in Laplace transform for flipped class activity was given. The flipped classroom model ensures that students are not just memorizing formulas but are actively engaging with the **concepts behind the properties** of the Laplace Transform.
- **Time Allotted for the Activity:** 45 minutes
- **Details of the Implementation:**

Implementing a flipped classroom activity for teaching the properties of Laplace Transforms involves a structured approach that blends independent learning outside the classroom with active, problem-solving sessions during class time.

1. **Pre-Class Preparation**

The goal of the pre-class phase is to introduce students to the theoretical concepts of Laplace Transforms and their properties. This phase should provide foundational knowledge that students can explore at their own pace. The content delivery can be done through videos, readings, or interactive tutorials.

2. **In-Class Activity**

The focus of in-class time is on active learning and problem-solving, allowing students to apply the properties of Laplace Transforms in more complex scenarios. The instructor's role during this time is to facilitate learning through group work, problem-solving, and

providing immediate feedback.

3. **Problem-Solving Sessions:**
    - Group Work: The faculty divide the students into small groups (5-6 students per group). Assign problems where they need to apply multiple properties of Laplace Transforms to solve more complex differential equations or analyze signals.
4. **Interactive Demonstrations:**

The students used classroom technology (like a whiteboard, smartboard, or projector) to solve a problem interactively with the class. They are encouraged to contribute their ideas and solutions.

a. For example, present a problem like solving a system of differential equations using the initial-value theorem and invite students to solve it in real-time.

5. **Peer Teaching:**
    - After working on problems in groups, each group is asked to present their solutions to the class. They are encouraged and explained how they used specific properties of Laplace Transforms and to walk through their reasoning.
    - By this way peer teaching helps reinforce the concepts and allows students to learn from each other.
6. **Instructor Guidance and Feedback:**
    - While students are working in groups, faculty is circulated the classroom and observed the students preparation. He provided the feedback as needed. Correct misconceptions, offer hints, and help clarify any confusion about how to apply a property.
    - If a group is struggling with a particular property, he briefly discussed it with them by providing examples and guiding them back to the correct application.

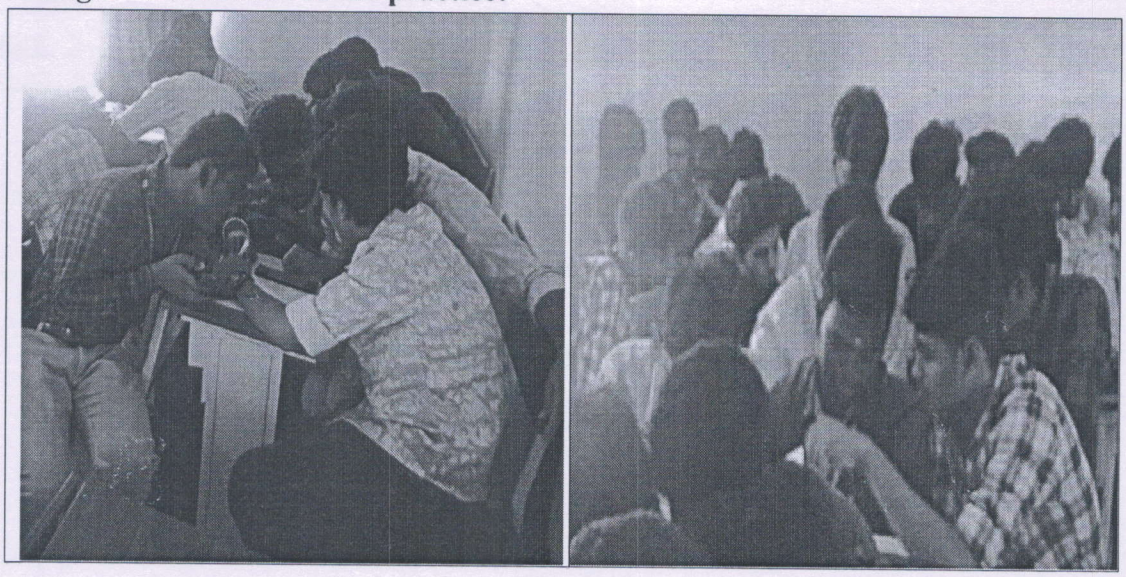
- **CO – PO / PSO mapping:**

CO	PO1	PO2	PO4	PO8	PO9	PO10	PSO1
CO2	3	2	2	1	3	2	3

- **PO / PSO mapped:**

Innovative practice	PO8	PO9	PO10
	1	3	2
Justification for correlation	The course outcome is correlated as low because the Flipped Classroom activity involves presentation which applies moral & ethical principles while collecting the materials related to the topic.	A collaborative activity (flipped classroom) is planned where the students work as a member of a team to achieve the goal. So, the course outcome is highly correlated	Through flipped classroom activity the students' listen to, comprehend information, instructions and viewpoints of others. So, the course outcome is moderately correlated.

- **Images / Screenshot of the practice:**



- **Reflective Critique:**
  - ***Feedback of practice from students and other stakeholders:***

    Many students appreciated the ability to learn at their own pace through the pre-class videos and readings. This flexibility helped them to engage with the topic in less pressured environment. They liked this practice of teaching that can be done through this type of activity. They could get idea from learning sources whichwould help them to prepare the presentation.

  - ***Benefit of the practice:***

    Students completed this task successfully. They conceptually prepared the presentation and organized the exercise for the topic they had selected. Every member of the group had a good understanding of the subjects. Students were able to understand concepts by discussing thoughts within the group they formed. Every

group member has the ability to explain and convey the idea of properties.

- ***Challenges faced in implementation:***

Some students struggled with the pre-class preparation, especially when they encountered difficulties understanding certain properties from the video lectures..

A few students mentioned that while the in-class problem-solving was engaging, some problems were too complex, making it difficult to fully apply the properties within the time frame.

References:

Textbooks:
1.AllanV.Oppenheim, S. Wilsky and S.H.Nawab,"Signals and Systems", Pearson Education, 2007.

Other References:
1. B. P. Lathi, "Principles of Linear Systems and Signals", Second Edition, Oxford, 2009.
2. R.E.Zeimer, W.H.Tranter and R.D.Fannin, "Signals & Systems - Continuous and Discrete", Pearson, 2007.
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5. A.Nagoor Kani, "Signals and Systems", Tata McGraw Hill Education Private Limited, Second Edition, 2010.
6. https://ctl.utexas.edu/instructional-strategies/flipped-classroom

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