RAMCO INSTITUTE OF TECHNOLOGY

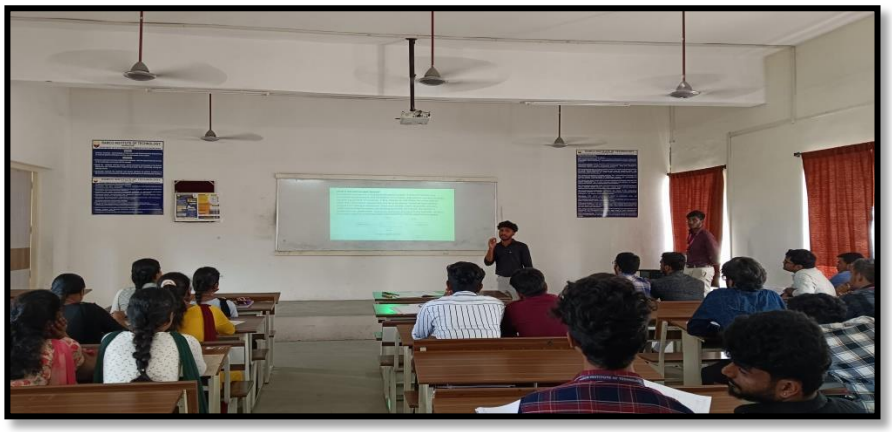
Approved by AICTE, New Delhi & Affiliated to Anna University
Accredited by NAAC & An ISO 9001:2015 Certified Institution
NBA Accredited UG Programs: CSE, EEE, ECE and MECH

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

INNOVATIVE TEACHING METHOD

Degree, Semester& Branch: V Semester B.E. ECE A
Course Code & Title: EC3501 Wireless Communication
Name of the Faculty member: Mrs.G.Gnana Priya

Sl.No.	Topic(s)	Activity	Reference(s)
UNIT I - THE CELLULAR CONCEPT-SYSTEM DESIGN FUNDAMENTALS			
1.	Prioritizing Handoffs, Practical Handoff Considerations	Think Pair Share	Rappaport.T.S, "Wireless communications", Pearson Education, Second Edition, 2010.



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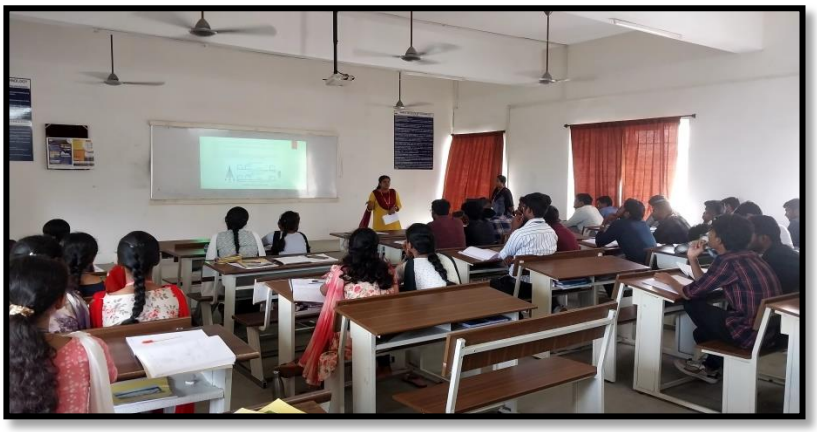
UNIT II MOBILE RADIO PROPAGATION			
1.	Fading Effects due to Doppler Spread, Revision	Brain Storming	Rappaport.T.S, "Wireless communications", Pearson Education, Second Edition, 2010.



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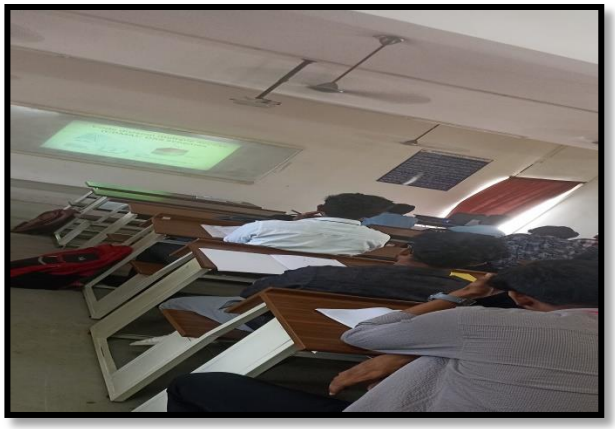
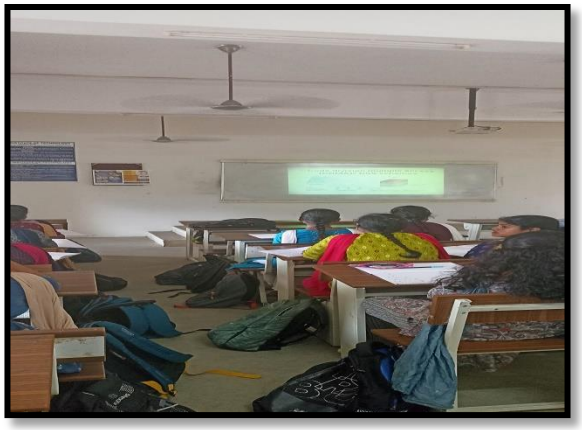
UNIT V WIRELESS NETWORKING			
1.	Development of Wireless Networks- First Generation Wireless Networks, Second Generation Wireless Networks, Third Generation Wireless Networks	Reciprocal Peer Questioning	Rappaport.T.S, "Wireless communications", Pearson Education, Second Edition, 2010.





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Innovative Practice Description

- **Unit / Topic:** Unit IV / Time Division Multiple Access (TDMA)
- **Course Outcome:** CO4
- **Activity Chosen:** Flipped Classroom
- **Justification:**

  The students are first introduced to the content TDMA through pre-recorded videos and reading materials before the class. This allows them to learn at their own pace and engage with the material actively by understanding the concepts. The students may need to understand concepts like time slots, frame structures and channel allocation, where active engagement can help them grasp these more easily than through passive lecture-based learning. TDMA involves complex concepts related to signal processing and communication systems. By flipping the classroom, the students are allowed to first encounter the material on their own, and then focus on higher-order thinking in class such as applying concepts, analyzing scenarios, or solving real-world problems.
- **Time Allotted for the Activity:** 50 minutes
- **Details of the Implementation:**

  Before the in-class session, students were provided with resources to learn the basic concepts of TDMA. This preparation allowed them to familiarize themselves with the content at their own pace. The goal is to ensure that they come to class with a foundational understanding of the topic.

  The material covers the following:
  - Definition of TDMA
  - Basic working principle of TDMA
  - Time slot allocation, synchronization, and frame structure
  - Comparison of TDMA with FDMA and CDMA
  - Real-world applications of TDMA in mobile communication systems, like GSM.

The main goal of in-class time is to actively engage students, clarify doubts, and help them apply the knowledge they gained during the pre-class preparation. The flipped classroom approach allows for more hands-on, interactive activities that strengthen their understanding.

CO – PO / PSO mapping:

CO	PO1	PO2	PO3	PO5	PO9	PO10	PO12	PSO1	PSO3
CO4	3	2	2	3	2	2	2	2	2

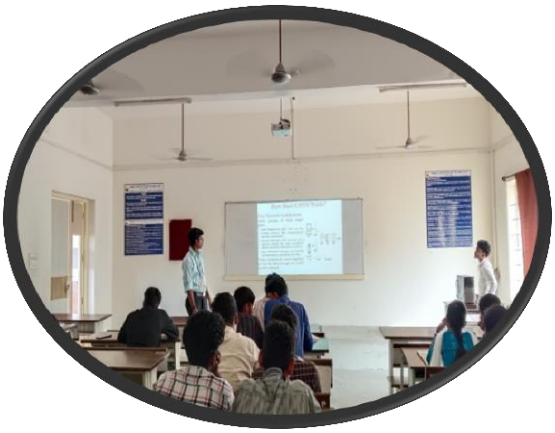
(1 – Low 2 – Moderate 3 – High)

- **PO / PSO mapped:**

Innovative practice	PO1	PO2	PO3	PO5	PO9
	3	2	2	3	2
Justification for correlation	The course outcome is mapped at level 3 since the knowledge on various multiple access techniques, its efficiency, capacity calculations are required to design wireless communication system.	Spread spectrum and CDMA concepts are required to identify the engineering and other relevant knowledge that applies to a given problem. Hence it is mapped at level 2.	Analysis of capacity of cellular CDMA is required to solve the problems related to wireless communication. Hence the course outcome is mapped at level 2.	This course outcome is correlated at level 3 since the concept of various multiple access schemes are validated using MATLAB simulation tool.	Flipped class room activity helps the students to improve the effective communication, conflict resolution and listen to other members. The course outcome is moderately correlated.

Innovative practice	PO10	PO12	PSO1	PSO3
	2	2	2	2
Justification for correlation	The topic deals with solving the problems of multiple access schemes and spread spectrum concepts. This task is accomplished through assignment therefore course outcome is correlated at level 2.	The course outcome is mapped at level 2 as the students learn the advanced concept of various multiple access techniques.	The concept of CDMA technique is used in mobile communication which overcomes the noise effect and the course outcome is mapped at level 2.	Thus course outcome is mapped at level 2 as the students design a wireless communication system by understanding the concepts of various multiple access schemes.

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



Reflective Critique:

❖ ***Feedback of practice from students and other stakeholders:***

The following points were observed based on the feedback got from the students.

- ✓ The students felt that the self-learning capability improved because of this activity.
- ✓ The presentation skills also increased while learning the concept by themselves and explaining to the class.
- ✓ The communication skills of the students improved while discussing with their team members and then presenting to the class.

❖ ***Benefit of the practice:***

- ✓ Instead of passively receiving information, students apply what they've learned through problem-solving and group discussions during class.

- ✓ By giving students control over when and how they interact with the material, the flipped classroom model promotes self-directed learning.
- ✓ Students often learn more effectively when they can discuss concepts with their classmates, explain ideas to others, and share their understanding of TDMA.
- ✓ The students feel more motivated to take ownership of their learning process.

❖ ***Challenges faced in implementation:***

- The biggest challenge was making the students to learn the materials.
- Few students struggled with the self-directed nature of flipped classrooms, where they are responsible for consuming content before class.
- Very few students were not actively participated in the activity. Making all the students to participate was also challenging.

References:

- ❖ Rappaport.T.S., " Wireless communications", Pearson Education, Second Edition, 2010.
- ❖ Andrea Goldsmith, "Wireless Communication", Cambridge University Press, 2011.