MALINENI LAKSHMAIAH WOMEN'S ENGINEERING COLLEGE

(AUTONOMOUS)

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Pulladigunta (Vil), Vatticherukuru (Md), Prathipadu Road, Guntur – 522 017 A.P.

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

PEDAGOGICAL METHODS-ACADEMIC YEAR: 2024-25

S.No	Subject Name	Faculty Name	Topics	Pedagogical Initiative	Dates of Plan	Venue of Implementation	No. of students involved
1	Radar Engineering	Ms. N. Lakshmi Tirupathamma	Comparison of Pulse Doppler and FM-CM Radar	Blended Learning Method	03-08-2024	ARC lab Room No-102	45
2	Optical Communication	Mrs. Ch. Pushpa	Total Internal Reflection	Fish Bowl Method	05-08-2024	Electronics lab Room No-329	13
3	DC	Mrs. P. Santhi	Source Coding Techniques	Experiential Learning Through Real-World Experiments	06-08-2024	III-B.Tech ECE Class Room No-327	65
4	CYBER SECURITY	Mrs. M. Chandana	DOS & DDOS Attacks	Experiential Learning	12-09-2024	IV B.Tech ECE Class Room No-318	70
5	PTSP	Dr.Ch. Ramesh	Random Variables, Random Processes Problems and Concept	Seminar & Problem Solving	24-09-2024	II B.Tech ECE Class Room No-321	60
6	STLD	Mr. T. Venkata Rao	Concept of Master –Slave Flip-flop (Sequential Logic Circuits)	Blended Learning	26-09-2024	Processors & Controller Lab Room No-333	65
7	EDC	Mrs. K. Sarada	Implementation of Amplifier circuits	Experiential Learning	27-09-2024	Hardware Lab (Electronics Lab) Room No-329	35
8	Analog IC Applications	Mrs P. Rajani	555Timer	PPT	25-10-2024	III-B.Tech ECE Class Room No-326	60
9	LCS	Mrs. N.N. Rajakumari	Translational Mechanical Systems	Brainstorming Method	10-12-2024	Communications Lab Room No-330	60
10	AC	Mrs. P. Santhi	Types of Pulse Modulations and its Responses	Blended Learning Method	06-02-2025	Centre of Excellences Lab (NB 102)	64
11	VLSI	Mr. T. Venkata Rao	Implementation of Pseudo NMOS circuits	Experiential Learning	19-02-2025	ECAD Lab Room No-315	60

Coordinator

Head of the Department

Department of Electronics and Communication Engineering

INNOVATIVE TEACHING LEARNING METHOD

Academic Year	:	2024-25
Name of the Course	:	Radar Engineering
Year & Semester	:	IV B.Tech. I Semester
Name of the Topic	:	Comparison of Pulse Doppler and FM-CW Radar
Course Faculty	:	Ms. N. Lakshmi Tirupathamma
Pedagogical Initiative	:	Blended learning Method
Date	:	03-08-2024
Venue	:	**Room No-315**
No. of students involved	:	45

Objectives:

1. To understand the working principles, features, and differences between Pulse Doppler and FM-CW radar systems.
2. To analyze the advantages and limitations of each radar type in different applications such as aviation, automotive, and weather monitoring.
3. To develop analytical thinking by comparing system parameters like range, velocity detection, and signal processing techniques.

Method (Blended Learning):

1. Online learning materials were shared through the Google Class Room for self-paced study.
2. In-class sessions were conducted for interactive discussions, problem-solving, and real-time Q&A based on the online content.
3. A comparative case study assignment was given, where students analyzed real-world applications using both radar types.

Impact:

1. Enabled students to grasp complex radar concepts with the help of multimedia and visual simulations.
2. Promoted independent learning as well as collaborative discussion through a mix of online and offline activities.
3. Improved critical thinking and application skills by evaluating real-world use cases of Pulse Doppler and FM-CW systems.


Figure 1 & 2: Interactive In-class Session on Pulse Doppler and FM-CW Radar

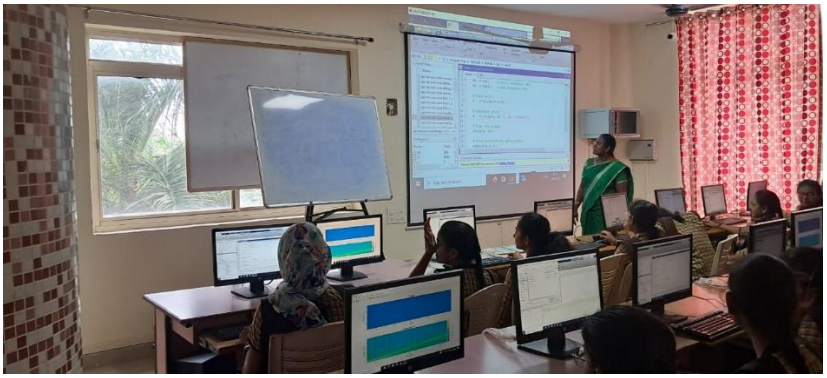

Figure 2: Generation of a continuous chirp signal using MATLAB

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INNOVATIVE TEACHING LEARNING METHOD

Academic Year	**:**	2024-25
Name of the Course	**:**	Optical Communication
Year & Semester	**:**	IV B.Tech. I Semester
Name of the Topic	**:**	Total Internal Reflection
Course Faculty	**:**	Mrs. Ch. Pushpa
Pedagogical Initiative	**:**	Fish Bowl method
Date	**:**	05-08-2024
Venue	**:**	**Room No-329**
No. of students involved	**:**	13

Objectives:

1. To understand the concept and conditions required for Total Internal Reflection (TIR) in optics.
2. To explore real-life applications of TIR such as fibre optics, diamonds, and endoscopes.
3. To clarify misconceptions and improve conceptual clarity through peer-led discussions.

Method (Fish Bowl):

1. A small group (Inner Circle) of students discussed real-life scenarios and solved problems related to TIR while others observed.
2. The other group (Outer Circle) noted important points and later joined the discussion, rotating roles to ensure full participation.

Impact:

1. Encouraged active learning and improved communication among students.
2. Helped students understand the topic deeply by listening to and building on each other's ideas.
3. Increased confidence in applying TIR concepts to practical situations like medical instruments and optical fibres.

Figure 1 & 2: Fish Bowl Circle Discussion for Active Learning on Total Internal Reflection

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INNOVATIVE TEACHING LEARNING METHOD

Academic Year	:	2024-25
Name of the Course	:	Digital Communication
Year & Semester	:	III B.Tech. I Semester
Name of the Topic	:	Source Coding Techniques
Course Faculty	:	Mrs. P. Santhi
Pedagogical Initiative	:	Experiential Learning Through Real-World Experiments
Date	:	06-08-2024
Venue	:	**Room No-327**
No. of students involved	:	65

Objectives:

1. To explore how source coding reduces data size while preserving information integrity.
2. To familiarize students with practical coding algorithms like Huffman and Shannon-Fano used in real-world systems.
3. To develop problem-solving skills by applying compression techniques to multimedia and communication systems.

Method (Experiential Learning):

1. Students worked on compressing real files (text, image, audio) using coding techniques to observe space-saving benefits.
2. Case studies of applications like ZIP files, MP3, and JPEG compression were analyzed and discussed.
3. Simulated scenarios were given where students had to choose and implement the best source coding method for a given use-case.

Impact:

1. Students gained hands-on experience in applying theory to real-life data compression challenges.
2. Improved ability to link theoretical concepts with practical systems like mobile communication and multimedia storage.

3. Fostered critical thinking and innovation in designing efficient encoding systems for modern applications.

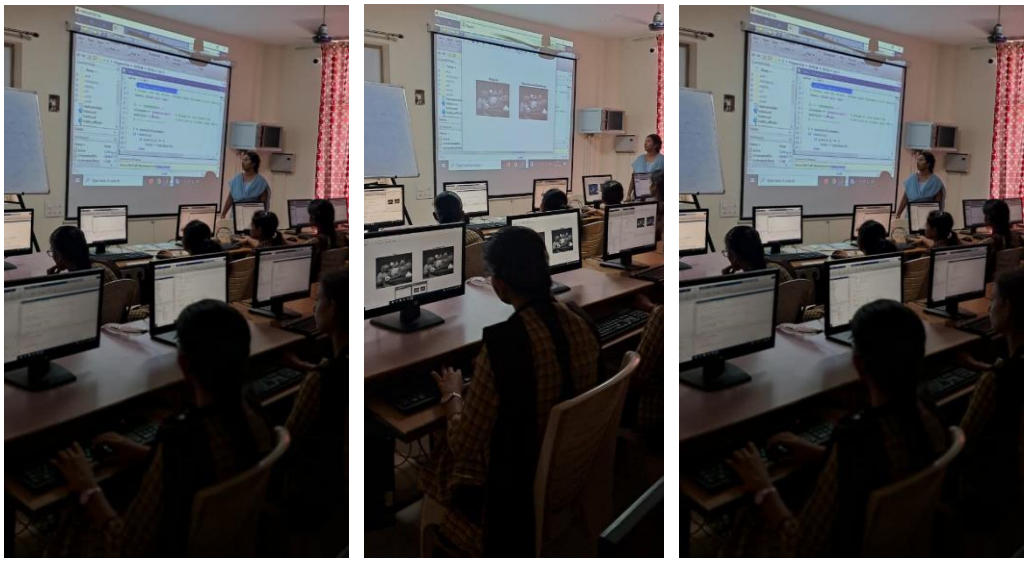

Figure 1, 2 & 3: Hands-on session on JPEG File Compression

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INNOVATIVE TEACHING LEARNING METHOD

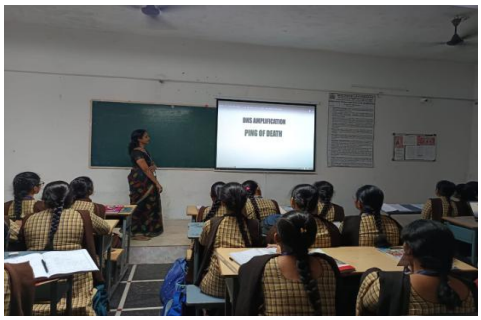
Academic Year	:	2024-25
Name of the Course	:	Cyber Security
Year & Semester	:	IV B.Tech. I Semester
Name of the Topic	:	DOS & DDOS Attacks
Course Faculty	:	Mrs. M. Chandana
Pedagogical Initiative	:	Experiential Learning
Date	:	12-09-2024
Venue	:	**Room No-322**
No. of students involved	:	70

Objectives:

1. To introduce the concept and types of Denial of Service (DoS) and Distributed Denial of Service (DDoS) attacks in cybersecurity.
2. To understand how DoS/DDoS attacks affect network resources and services.
3. To explore mitigation techniques and preventive measures used to secure networks from such attacks.

Method:

1. Delivered a detailed lecture using real-world case studies and attack simulations.
2. Demonstrated tools like LOIC/HOIC in a controlled lab environment to show how DDoS attacks are initiated and mitigated.
3. Encouraged group discussions and Q&A sessions to enhance understanding and clarify misconceptions.



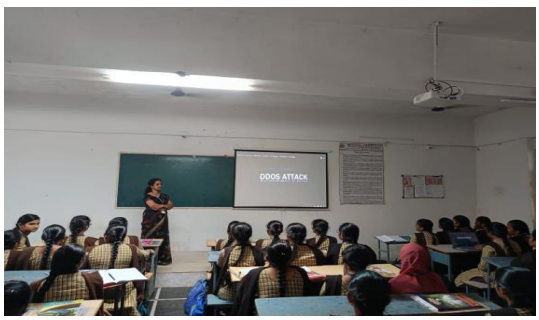


Figure 1 & 2: SMS Application and Ping of Death Demonstration

Impact:

1. Students gained practical awareness of how cyberattacks are launched and their potential damage to online systems.
2. Improved understanding of network vulnerabilities and the importance of firewall, IDS, and rate-limiting techniques.
3. Developed critical thinking and preparedness in identifying and responding to cyber threats in real-time scenarios.

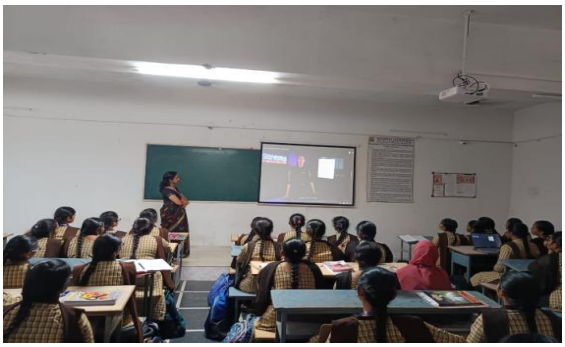



Figure 3 & 4: Analyzing Student's Perspectives in Cyber Security

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INNOVATIVE TEACHING LEARNING METHOD

Academic Year	:	2024-2025
Name of the Course	:	Probability Theory & Stochastic Processes
Year & Semester	:	II B.Tech. I Semester
Name of the Topic	:	Random Variables, Random Processes Problems and Concept
Course Faculty	:	Dr. Ch. Ramesh
Pedagogical Initiative	:	Seminar & Problem Solving
Date	:	24-09-2024
Venue	:	Room No-321
No. of students involved	:	60

Objective

- To enhance understanding of random variables and processes through interactive seminars and collaborative problem solving.
- To improve analytical, presentation, and teamwork skills.

Method of Implementation

- Students divided into 6 groups for seminar presentations on subtopics.
- Each group delivers a 10-minute seminar with Q&A.
- A set of problems is solved in peer groups, followed by board discussion.
- Faculty facilitates and evaluates participation and clarity.

Impact

- Improved student confidence in explaining core concepts.
- Enhanced teamwork, communication, and critical thinking.
- Stronger grasp of problem-solving techniques and real-time application.
- Increased classroom participation and enthusiasm for learning.

Figure 1: Student Seminar on Random Variables

Figure 2: Student Seminar on Random Process

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INNOVATIVE TEACHING LEARNING METHOD

Academic Year	**:**	2024-25
Name of the Course	**:**	Switching Theory & Logic Design
Year & Semester	**:**	II B.Tech. I Semester
Name of the Topic	**:**	Concept of Master –Slave Flip-flop (Sequential Logic Circuits)
Course Faculty	**:**	Mr. T. Venkat Rao
Pedagogical Initiative	**:**	Blended learning
Date	**:**	26-09-2024
Venue	**:**	**Room No-333**
No. of students involved	**:**	65

Objectives:

1. To understand the working principle of Master–Slave Flip-Flops and their role in sequential circuits.
2. To differentiate between simple flip-flops and edge-triggered Master–Slave configurations.
3. To develop circuit analysis and timing diagram interpretation skills.

Method (Blended Learning):

1. Online resources including tutorial videos, interactive simulations, and animations of flip-flop operation were provided for pre-class learning.
2. Classroom sessions were used to discuss timing diagrams, practical applications, and real-time implementation using digital kits or simulators.
3. Collaborative problem-solving and quizzes were conducted both online and in-class to reinforce concepts and check understanding.

Impact:

1. Helped students visualize the timing behavior and internal switching mechanism of Master–Slave Flip-Flops.
2. Improved conceptual clarity and retention through a mix of self-paced and instructor-led learning.
3. Enabled students to confidently design and troubleshoot sequential logic circuits in labs and projects.

Figure 1: Interactive In-class Session on Master Slave JK Flip Flop

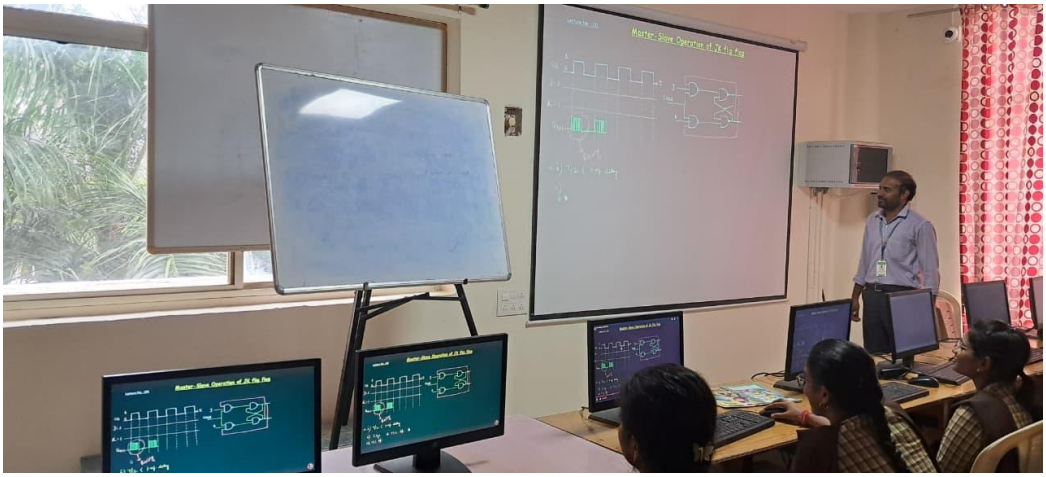

Figure 2: Online Learning of Master Slave JK Flip Flop

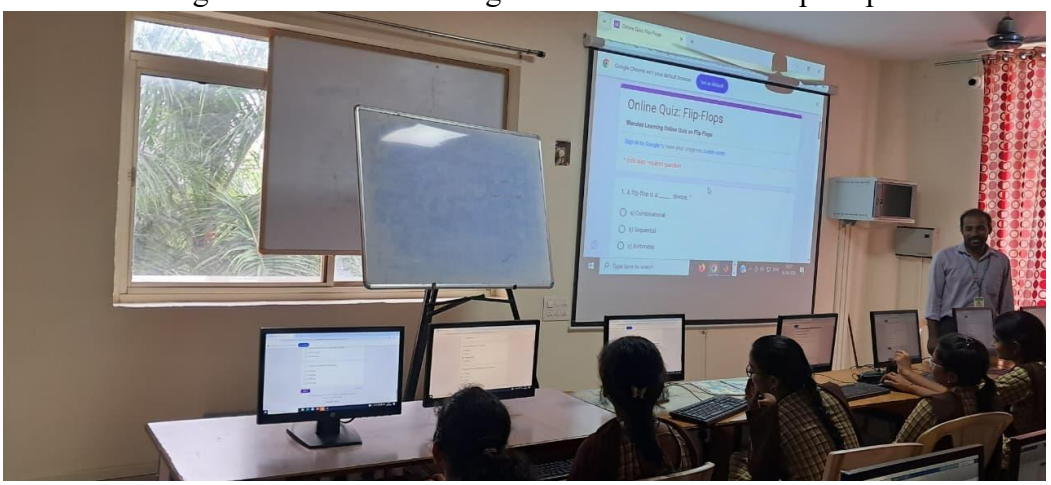

Figure 3: Online Quiz Session on Flip Flops

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INNOVATIVE TEACHING LEARNING METHOD

Academic Year	**:**	2024-2025
Name of the Course	**:**	EDC
Year & Semester	**:**	II B.Tech. I Semester
Name of the Topic	**:**	Implementation of Amplifier circuits
Course Faculty	**:**	Mrs. K. Sarada
Pedagogical Initiative	**:**	Experiential Learning
Date	**:**	27-09-2024
Venue	**:**	Room No - 329
No. of students involved	**:**	35

Objectives:

1. To understand the working principles of various amplifier circuits such as CE, CB, and multistage amplifiers.
2. To bridge the gap between theoretical knowledge and practical circuit behavior.
3. To develop skills in designing, constructing, and troubleshooting amplifier circuits.

Method (Experiential Learning):

1. Students physically built amplifier circuits on breadboards.
2. Real-time measurements of gain, input/output waveforms, and frequency response were performed using CRO, Function Generator, and DMM.
3. Circuit behavior was observed under different conditions (e.g., varying load, supply voltage), encouraging exploration and discussion.

Impact:

1. Improved hands-on proficiency in electronic circuit design, soldering, and testing.
2. Enhanced conceptual clarity through visualization of signal amplification and phase shift.
3. Boosted confidence and readiness for real-world applications like audio amplifiers and sensor signal conditioning.

Figure 1: Working Principle of CE Amplifier

Figure 2: Practical Realization of CE Amplifier Using Breadboard Trainer

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INNOVATIVE TEACHING LEARNING METHOD

Academic Year	**:**	2024-25
Name of the Course	**:**	Analog IC applications
Year & Semester	**:**	III B.Tech. I Semester
Name of the Topic	**:**	555Timer
Course Faculty	**:**	Mrs. P. Rajani
Pedagogical Initiative	**:**	PPT
Date	**:**	25-10-2024
Venue	**:**	**Room No-326**
No. of students involved	**:**	60

Objective:

- To familiarize students with the internal architecture and functional blocks of the 555 timer IC.
- To explain the working modes of the 555 timer: Astable, Monostable, and Bistable.
- To demonstrate the use of the 555 timer in timing, pulse generation, and oscillator circuits.

Method:

- PowerPoint Presentation: A visually engaging PPT was used to present the pin configuration, block diagram, working principles, and formulas.
- Circuit Diagrams & Waveforms: Detailed circuit schematics and timing diagrams were shown for each mode of operation.
- Real-world Applications: Practical examples such as LED blinkers, tone generators, and delay timers were discussed.

Impact:

- Conceptual Clarity: Students gained a clear understanding of the internal operation and timing behavior of the 555 timer.
- Practical Relevance: Real-life use cases helped students appreciate the versatility of the IC in both academic and industry projects.

- Foundation for Mini-Projects: The session inspired students to consider 555-based circuits for mini-projects and lab experiments.

Figure 1 & 2: Working principle of the 555 IC Timer demonstrated through PPT

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INNOVATIVE TEACHING LEARNING METHOD

Academic Year	**:**	2024-25
Name of the Course	**:**	Linear Control System
Year & Semester	**:**	II B.Tech. II Semester
Name of the Topic	**:**	Translational mechanical systems
Course Faculty	**:**	Mrs. N.N. Rajakumari
Pedagogical Initiative	**:**	Brainstorming method
Date	**:**	10-12-2024
Venue	**:**	**Room No-330**
No. of students involved	**:**	60

Objectives:

1. To understand the basic elements of translational mechanical systems such as mass, spring, and damper.
2. To learn how to derive mathematical models (differential equations) for translational systems.
3. To visualize real-world systems like vehicle suspension and door-closing mechanisms in terms of mechanical models.

Method (Brainstorming):

1. Students were encouraged to identify and discuss everyday systems involving translational motion (e.g., elevator, shock absorber).
2. Open discussion was conducted to connect mechanical elements with electrical analogies (force-voltage, force-current).
3. Teams proposed and solved system models collaboratively, stimulating critical and creative thinking.

Impact:

1. Strengthened the ability to correlate theoretical concepts with real-life mechanical systems.
2. Improved engagement and participation through peer discussion and collective problem-solving.

Figure 1: Open discussion on Force-Voltage Analogy

Figure 2: Open discussion on Force-Current Analogy

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INNOVATIVE TEACHING LEARNING METHOD

Academic Year	**:**	2024-25
Name of the Course	**:**	Analog Communication
Year & Semester	**:**	II B.Tech. II Semester
Name of the Topic	**:**	Types of pulse modulations and its responses
Course Faculty	**:**	Mrs. P. Santhi
Pedagogical Initiative	**:**	Blended Learning Method
Date	**:**	06-02-2025
Venue	**:**	Centre of Excellence Lab (NB 102)
No. of students involved	**:**	64

Objective:

- To introduce students to the various types of pulse modulation techniques such as PAM, PWM, PPM, and PCM.
- To explain the time and frequency responses of each modulation technique.
- To help students understand the practical significance and application areas of pulse modulation in communication systems.

Method:

- Classroom Teaching: The session began with traditional board explanations and lectures to introduce the basic concepts of pulse modulation.
- Multimedia Presentations: PowerPoint slides and video demonstrations were used to visually represent different modulation waveforms and their system responses.
- Hands-on Simulations: Simulation software MATLAB was used to show real-time pulse modulation signals.

Impact:

- Improved Conceptual Understanding: Students developed a solid grasp of the types and characteristics of pulse modulation techniques.
- Practical Exposure: Simulation exercises provided students with hands-on experience in generating and analyzing pulse-modulated signals.
- Better Preparation for Labs and Projects: The session served as a useful foundation for upcoming practical labs and communication system design tasks.

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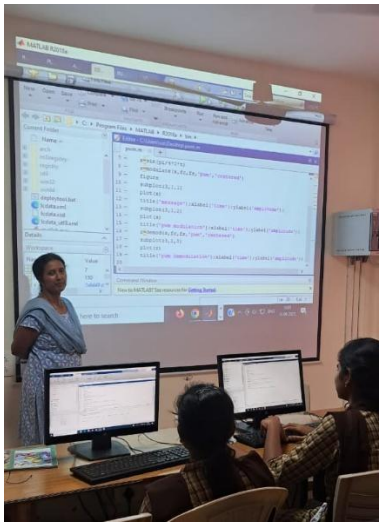
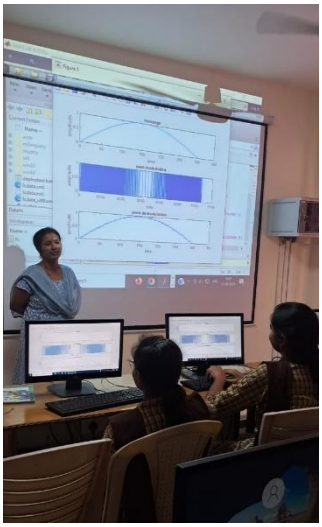

Figure 1 & 2: Hands-on Session on Generating PWM Using MATLAB

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INNOVATIVE TEACHING LEARNING METHOD

Academic Year	**:**	2024-25
Name of the Course	**:**	VLSI Design
Year & Semester	**:**	III B.Tech. II Semester
Name of the Topic	**:**	Implementation of Pseudo NMOS circuits
Course Faculty	**:**	Mr. T. Venkata Rao
Pedagogical Initiative	**:**	Experiential Learning
Date	**:**	19-02-2025
Venue	**:**	**Room No-315**
No. of students involved	**:**	60

Objectives:

1. To understand the structure, operation, and characteristics of Pseudo NMOS logic circuits.
2. To explore design trade-offs such as power consumption, speed, and area compared to CMOS logic.
3. To develop skills in simulating and implementing pseudo NMOS circuits in VLSI design tools.

Method (Experiential Learning):

1. Students designed and simulated Pseudo NMOS logic gates (e.g., inverter, NAND) using tools like Cadence.
2. Waveform analysis was conducted to compare power, delay, and switching characteristics with CMOS equivalents.
3. Real-world applications such as low-power digital circuits were discussed, and students applied design concepts to mini-projects.

Impact:

1. Enhanced practical understanding of non-standard logic styles used in low-power or high-speed digital design.
2. Developed hands-on experience in VLSI design flow, from schematic to simulation.

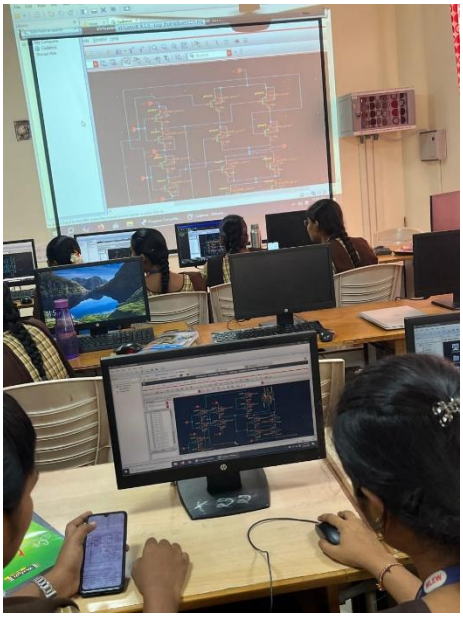

Figure 1: Hands-on Session on Generating NMOS Logic Gates Using Cadence Tool

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