MALINENI LAKSHMAIAH WOMEN'S ENGINEERING COLLEGE
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MALINENI LAKSHMAIAH
WOMEN'S ENGINEERING COLLEGE
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NBA NATIONAL BOARD OF ACCREDITATION CSE & ECE - 2022-2025
ACCREDITED WITH GRADE A+ NAAC

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

PEDAGOGICAL METHODS-ACADEMIC YEAR: 2023-24

S.NO	Subject Name	Faculty Name	Topics	Pedagogical Initiative	Dates of Plan	Venue of Implementation	No. of students involved
1	DC	Mrs. P. SANTHI	BINARY PHASE SHIFT KEYING	PPT	10-07-2023	III B.Tech ECE Class Room No-326	66
2	PTSP	Dr. CH. RAMESH	RANDOM VARIABLE & RANDOM PROCESSES	EXPERIENTIAL LEARNING THROUGH REAL-WORLD EXPERIMENTS	11-09-2023	II B.Tech ECE Class Room No-321	67
3	STLD	Mr. T. VENKATA RAO	IMPLEMENTATION OF HIGHER ORDER CIRCUITS USING LOWER ORDER CIRCUITS (COMBINATIONAL LOGIC CIRCUITS)	BLENDED LEARNING	13-09-2023	Simulation Lab Room No-333	70
4	CYBER SECURITY	Mrs. M. CHANDANA	CYBER SECURITY FRAUDS & ITS EFFECTS	COLLABORATIVE LEARNING (GROUP DISCUSSION)	13-09-2023	IV B.Tech ECE Class Room No-319	62
5	RE	Ms. N. LAKSHMI TIRUPATHAMMA	RADAR APPLICATIONS	SEMINAR	30-09-2023	IV B.Tech ECE Class Room No-318	60
6	OC	Ms. N. LAKSHMI TIRUPATHAMMA	WAVELENGTH DIVISION MULTIPLEXING (WDM)	ROLE PLAY	06-10-2023	IV B.Tech ECE Class Room No-318	60x`
7	AICA	Mrs. P. RAJANI	741 IC APPLICATIONS	CONSTRUCTIVIST APPROACH	10-11-2023	II B.Tech ECE Class Room No-322	60
8	MPMC	Mr. Y. BHASKARA RAO	ADDRESSING MODES	SEMINAR	13-12-2024	III B.Tech ECE Class Room No-326	60

S.NO	Subject Name	Faculty Name	Topics	Pedagogical Initiative	Dates of Plan	Venue of Implementation	No. of students involved
9	AC	Mrs. P. SANTHI	NOISE CALCULATIONS IN DIFFERENT MODULATION TECHNIQUES	SEMINAR	10-01-2024	II B.Tech ECE Class Room No-322	63
10	LCS	Mrs. N.N. RAJAKUMARI	BLOCK DIAGRAM REDUCTION RULES	JIGSAW METHOD	22-01-2024	II B.Tech ECE Class Room No -321	60
11	VLSI	Mr. T. VENKATARAO	ALTERNATIVE FORMS OF PULL-UP	SEMINAR	20-02-2024	III B.Tech ECE Class Room No-327	60
12	CMC	Mrs. CH. PUSHPA	COMPONENTS OF CELLULAR SYSTEM	FISH BOWL METHOD	22-02-2024	III B.Tech ECE Class Room-327	60
13	DSP	Mrs. CH. PUSHPA	DFT AND PROPERTIES OF DFT	BLENDED LEARNING	15-03-2024	ARC lab Room No-102	60
14	DICD	Mrs. O. ADI LAKSHMI	UNIVERSAL SHIFT REGISTER IN DIGITAL LOGIC	COLLABORATIVE LEARNING	01-04-2024	III B.Tech ECE Class Room No-326	60

Coordinator

Head of the Department

Department of Electronics and Communication Engineering

INNOVATIVE TEACHING LEARNING METHOD

Academic Year	:	2023-24
Name of the Course	:	DIGITAL COMMUNICATION
Year & Semester	:	III B.Tech. I Semester
Name of the Topic	:	Binary Phase Shift Keying
Course Faculty	:	Mrs. P. SANTHI
Pedagogical Initiative	:	PPT
Date	:	10-07-2023
Venue	:	**Room No-326**
No. of students involved	:	66

Objective:

1. To understand the working principle of Binary Phase Shift Keying (BPSK), a digital modulation technique.
2. To learn how binary data is transmitted by changing the phase of a carrier signal.
3. To analyze BPSK signal representation, bandwidth requirements, and bit error performance in noisy channels.

Method: PPT Presentation

- A detailed PowerPoint presentation was prepared covering the theory, waveforms, mathematical model, and real-world applications of BPSK.
- Visual aids such as phase diagrams, constellation plots, and signal waveforms were used to enhance clarity.
- The presentation included short simulation clips and step-by-step modulation examples to support learning.

Impact:

1. Helped students visualize and clearly understand the phase modulation process.
2. Improved conceptual clarity through step-by-step explanation and visual representation.
3. Encouraged active learning and engagement through interactive discussions during the presentation.


Figure 1 & 2: Faculty Power Point Presentation on Binary Phase Shift Keying

Faculty Incharge

Department of Electronics and Communication Engineering

INNOVATIVE TEACHING LEARNING METHOD

Academic Year	**:** 2023-2024
Name of the Course	**:** Probability Theory & Stochastic Processes
Year & Semester	**:** II B.Tech. I Semester
Name of the Topic	**:** Random Variables & Random Processes
Course Faculty	**:** Dr. Ch. Ramesh
Pedagogical Initiative	**:** Experiential Learning Through Real-World Experiments
Date	**:** 11-09-2023
Venue	**: Room No-321**
No. of students involved	**:** 67

Implementation: Experiential Learning Through Real-World Experiments

Objective: Use physical or simulated experiments to illustrate random variables and random processes, making abstract concepts tangible.

Method:

- **Random Variables**:
  - Conduct simple experiments like rolling dice, flipping coins, or drawing cards.
  - Record the outcomes, categorize them as random variables (discrete or continuous), and calculate probabilities, expected values, and variances.
- **Random Processes**:
  - Use real-world phenomena, such as:
    - Monitoring temperature changes (continuous process).
    - Modelling arrival times of buses (Poisson process).
  - Let students collect data and observe how random processes evolve over time.
  - Supplement with software tool MATLAB for larger-scale simulations.

Impact:

- Hands-on experiments bridge the gap between theory and practical understanding.
- Promotes active participation and curiosity-driven learning.

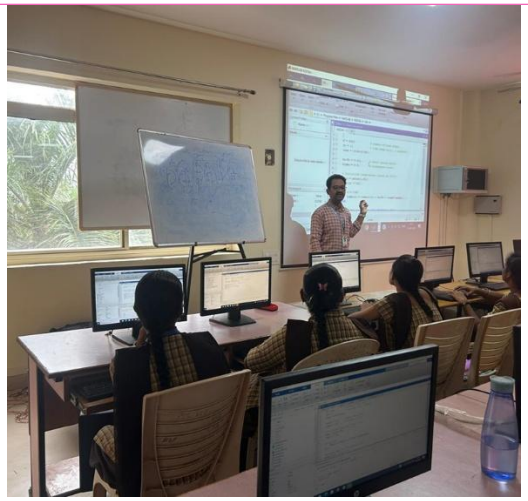
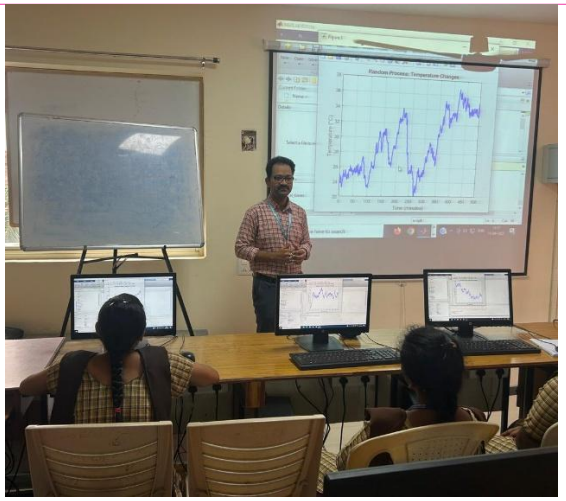

Figure 1 & 2: MATLAB Simulation of Random Process

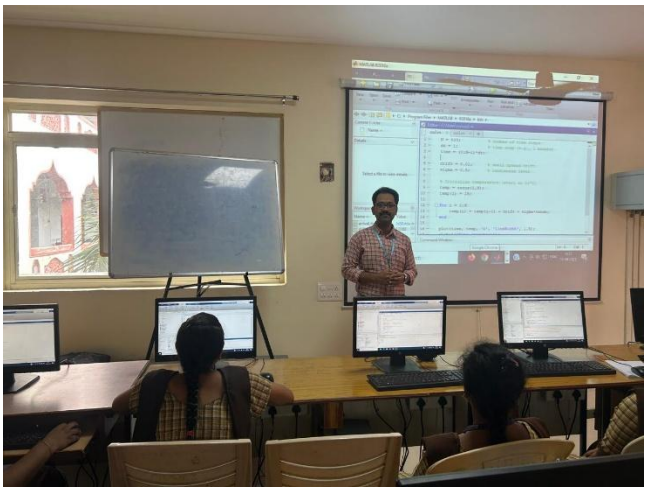
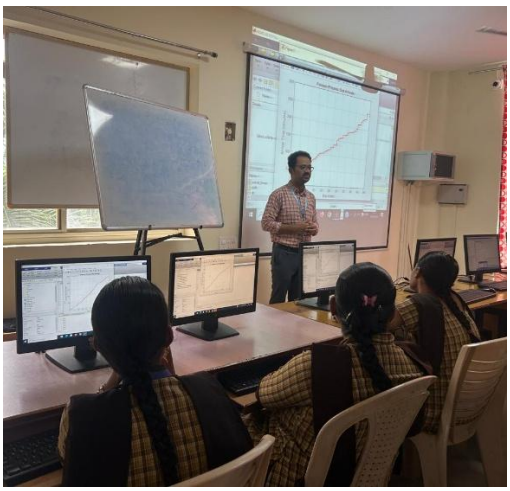

Figure 3 & 4: MATLAB Simulation of Poisson Random Process

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INNOVATIVE TEACHING LEARNING METHOD

Academic Year	**:**	2023-2024
Name of the Course	**:**	Switching Theory & Logic Design
Year & Semester	**:**	II B.Tech. I Semester
Name of the Topic	**:**	Implementation of higher order circuits using Lower order circuits (Combinational Logic Circuits)
Course Faculty	**:**	Mr. T. Venkata Rao
Pedagogical Initiative	**:**	Blended learning
Date	**:**	13-09-2023
Venue	**:**	**Room No - 333**
No. of students involved	**:**	70

Objective:

1. To understand how complex combinational logic circuits (e.g., 4-bit adders, multiplexers, decoders) can be implemented using simpler, lower-order components.
2. To develop skills in designing, analyzing, and constructing modular digital systems.
3. To apply theoretical concepts in practical design scenarios using simulation tools and hands-on lab work.

Method: Blended Learning

- **Online Learning:**

  Pre-recorded video lectures and tutorials on basic building blocks (e.g., half adder, full adder, 4:1 MUX) were shared for self-paced learning. Students explored circuit simulation tutorials using tools like Multisim.

- **In-Class Learning:**

  Classroom sessions were conducted to:

  - Solve design problems collectively.
  - Explain how to cascade or combine lower-order circuits to implement higher-order systems.
  - Address doubts and analyze different design approaches.

Impact:

1. Strengthened understanding of modularity and scalability in digital circuit design.
2. Promoted active learning through hands-on practice and collaboration.
3. Improved problem-solving skills by applying foundational concepts to more complex logic system implementations.

Figure 2: Student's Engaged in Active Learning on a 4×1 MUX

Figure 2: Online Learning Activity by Students on Combinational Logic Circuits

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Department of Electronics and Communication Engineering

INNOVATIVE TEACHING LEARNING METHOD

Academic Year	:	2023-24
Name of the Course	:	CYBER SECURITY
Year & Semester	:	IV B.Tech. I Semester
Name of the Topic	:	Cyber Security frauds & its effects
Course Faculty	:	Mrs. M. CHANDANA
Pedagogical Initiative	:	Collaborative Learning **(**Group Discussion)
Date	:	13-09-2023
Venue	:	**Room No-327**
No. of students involved	:	62

Objective:

1. To identify various types of cyber security frauds such as phishing, identity theft, ransomware, and financial scams.
2. To understand the psychological, financial, and social effects of these frauds on individuals and organizations.
3. To promote awareness and encourage the adoption of safe online practices through peer learning

Method: Collaborative Learning (Group Discussion)

1. Students were divided into small groups and each group was assigned a specific type of cyber fraud to research and discuss.
2. Within the groups, students collaborated to explore real-life cases, causes, impacts, and preventive measures.
3. Each group then presented their findings to the class, followed by a cross-group Q&A session to deepen understanding.

Implementation:

1. Pre-reading materials and news case studies were provided to students to initiate informed discussion.
2. During class, 4–5 groups were formed, each focusing on a topic (e.g., phishing, online scams, ransomware attacks, social media frauds).

3. Group leaders presented their discussion outcomes using visuals and real examples.

Figure 1 & 2: Group Discussion on Cyber Security frauds

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Department of Electronics and Communication Engineering

INNOVATIVE TEACHING LEARNING METHOD

Academic Year	:	2023-2024
Name of the Course	:	Radar Engineering
Year & Semester	:	IV B.Tech. I Semester
Name of the Topic	:	Radar Applications
Course Faculty	:	Ms. N. Lakshmi Tirupathamma
Pedagogical Initiative	:	Seminar
Date	:	03-08-2023
Venue	:	**Room No-327**
No. of students involved	:	60

Objective:

1. To understand the various types of radar systems and their working principles.
2. To explore the wide range of radar applications in fields such as defence, aviation, weather monitoring, automotive, and space.
3. To analyze how radar technology enhances surveillance, navigation, and object detection capabilities.

Method: Seminar

- A student-led seminar was conducted to present the fundamentals and real-time applications of radar technology.
- The presentation included:
    - Classification of radar types (e.g., pulse radar, Doppler radar, phased array radar).
    - Case studies and real-world use cases (e.g., air traffic control, missile tracking, weather forecasting).
    - Diagrams, animations, and short videos to explain radar operation and application scenarios.
- An interactive session followed the presentation, encouraging peer questions and technical discussion.

Impact:

1. Enhanced student understanding of radar principles and their significance in modern technology.
2. Improved presentation and public speaking skills through student-led learning.
3. Encouraged critical thinking about technological advancements and real-world problem-solving using radar systems.

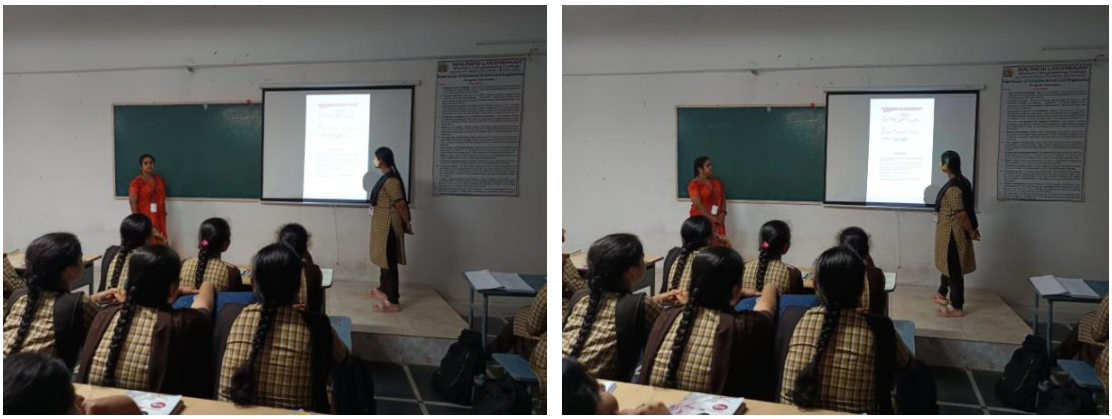

Figure 1 & 2: Student Seminar on Various Types of Radar

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Department of Electronics and Communication Engineering

INNOVATIVE TEACHING LEARNING METHOD

Academic Year	:	2023-2024
Name of the Course	:	Optical Communication
Year & Semester	:	IV B.Tech. I Semester
Name of the Topic	:	Wavelength Division Multiplexing
Course Faculty	:	Ms. N. Lakshmi Tirupathamma
Pedagogical Initiative	:	Role Play
Date	:	24-10-2023
Venue	:	**Room No-327**
No. of students involved	:	60

Objective:

1. To understand the concept and working principle of Wavelength Division Multiplexing in optical communication.
2. To identify the key components involved in WDM systems such as optical transmitters, multiplexers, demultiplexers, and receivers.
3. To visualize data transmission using multiple wavelengths over a single optical fiber through interactive participation.

Method: Role Play

- Students were assigned roles representing different components of a WDM system:
    - Light sources (lasers/LEDs) at different wavelengths
    - Multiplexer
    - Optical fiber
    - Demultiplexer
    - Receivers
- Each student enacted their component's function by passing colored light signals (or symbolic objects) to represent different wavelengths.
- The group demonstrated how multiple signals are combined, transmitted, and separated using WDM.

Implementation:

1. The instructor explained the WDM concept briefly and then assigned roles to students.
2. Props such as colored ribbons, LED cards, or colored markers were used to simulate different wavelengths.
3. Students enacted the flow of optical signals — combining them at the multiplexer, passing through the fiber, and separating them at the demultiplexer.
4. A discussion followed to reinforce learning, supported by actual WDM diagrams and use cases like internet backbone and fiber-optic TV systems.

Impact:

1. Simplified complex optical concepts through physical interaction and visualization.
2. Improved student engagement, creativity, and understanding of how WDM functions in real-world applications.
3. Encouraged collaborative learning and effective communication through teamwork and role-based learning.

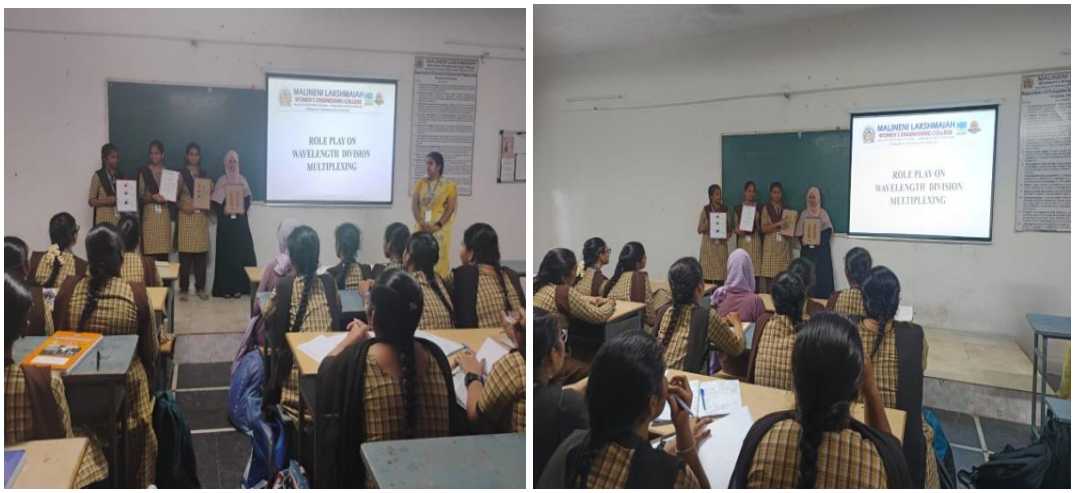

Figure 1 & 2: Student's Role-Play Model on Wavelength Division Multiplexing

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Department of Electronics and Communication Engineering

INNOVATIVE TEACHING LEARNING METHOD

Academic Year	:	2023-24
Name of the Course	:	Analog IC applications
Year & Semester	:	III B.Tech. I Semester
Name of the Topic	:	IC 741 Applications
Course Faculty	:	Mrs. P. Rajani
Pedagogical Initiative	:	Constructivist Approach
Date	:	10-11-2023
Venue	:	**Room No-322**
No. of students involved	:	60

Objective:

1. To understand the internal structure and working principle of IC 741 (Operational Amplifier).
2. To explore practical applications of IC 741 such as amplifiers, filters, comparators, and oscillators.
3. To develop circuit design and problem-solving skills by applying concepts in real-life electronic scenarios.

Method: Constructivist Approach

1. Students were encouraged to build their own understanding by designing and testing various circuits using IC 741.
2. Instead of direct instruction, guided exploration, peer collaboration, and problem-based learning were promoted.
3. Learners constructed knowledge by analyzing, assembling, and troubleshooting circuits, developer insights through hands-on experience.

Implementation:

1. Students were given design problems (e.g., build an inverting amplifier, a voltage follower, or a comparator) to solve using IC 741.
2. Each group presented their circuit functionality and learning outcomes, followed by reflective discussion and peer feedback.

3. The approach encouraged active participation, teamwork, and critical thinking, helping students connect theory to practical application.

Figure 1 & 2: Student's Constructive Approach towards Exploring IC741 Applications

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Department of Electronics and Communication Engineering

INNOVATIVE TEACHING LEARNING METHOD

1. Academic Year	**:**	2023-24
2. Name of the Course	**:**	Microprocessors and Microcontrollers
3. Year & Sem	**:**	III B.Tech & II Semester
4. Name of the Topic	**:**	Addressing Modes of 8086 Microprocessors
5. Course Faculty	**:**	Mr. Y. Bhaskara Rao
6. Pedagogical Initiative	**:**	SEMINAR
7. Date	**:**	13-12-2023
8. Venue	**:**	**Room No-326**
9. No. of Students Involved	**:**	60

Objective:

1. To explain the various addressing modes supported by the 8086 Microprocessor.
2. To understand how each addressing mode determines the location of the operand in memory or registers.
3. To demonstrate the application of addressing modes in real-time assembly programming.

Method: Seminar

- A student-led seminar was organized to present the concepts, classifications, and examples of addressing modes such as:
    - Immediate Addressing
    - Register Addressing
    - Direct Addressing
    - Register Indirect Addressing
    - Based and Indexed Addressing
    - Relative and Based-Indexed with Displacement
- The presenter used PowerPoint slides, memory diagrams, and sample assembly code snippets to explain each mode.
- An interactive Q&A session followed the presentation, allowing peers to clarify doubts and discuss application scenarios.

Impact:

1. Enhanced students' understanding of operand addressing in 8086 through visual and verbal explanation.
2. Improved presentation, technical communication, and peer interaction skills.
3. Fostered a deeper grasp of how assembly instructions function in hardware-level programming.

Figure 1 & 2: Student's Seminar on Addressing Modes of 8086 Microprocessor

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Department of Electronics and Communication Engineering

INNOVATIVE TEACHING LEARNING METHOD

Academic Year	**:**	2023-24
Name of the Course	**:**	Analog Communication
Year & Semester	**:**	II B.Tech. II Semester
Name of the Topic	**:**	Noise Calculations in Different Modulation Techniques
Course Faculty	**:**	Mrs. P. Santhi
Pedagogical Initiative	**:**	Seminar
Date	**:**	10-01-2024
Venue	**:**	**Room No-322**
No. of students involved	**:**	63

Objective:

1. To understand the impact of noise on different modulation schemes such as AM, FM, and PM.
2. To compare signal-to-noise ratios (SNR) and noise figure across modulation techniques.
3. To analyze how modulation choices influence system performance in noisy environments.

Method: Seminar

1. A seminar was conducted where key concepts of noise theory, SNR derivations, and graphical comparisons were presented.
2. Students were encouraged to participate by presenting case studies or examples showing noise behavior in different modulation formats.
3. Visual aids such as simulation results, mathematical graphs, and spectrum plots were used to enhance conceptual understanding.

Implementation:

1. Students were divided into small groups, and each group discussed a modulation technique and its noise profile.
2. Real-world scenarios like radio broadcasting, mobile communication, and telemetry were used to contextualize the topic.

Figure 1 & 2: Student's Seminar on Noise Calulations in AM, FM & PM

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Department of Electronics and Communication Engineering

INNOVATIVE TEACHING LEARNING METHOD

Academic Year	:	2023-2024
Name of the Course	:	Linear Control System
Year & Semester	:	II B.Tech. II Semester
Name of the Topic	:	Block Diagram Reduction Rules
Course Faculty	:	Mrs. N.N. RAJAKUMARI
Pedagogical Initiative	:	JIGSAW METHOD
Date	:	22-01-2024
Venue	:	**Room No-321**
No. of students involved	:	60

Objective:

1. To understand the fundamental rules for simplifying block diagrams in control systems.
2. To apply these rules to reduce complex block diagrams into simpler equivalent systems.
3. To enhance collaborative problem-solving and peer-teaching skills among students.

Method: Jigsaw Method

- The class was divided into "11 home groups", and each student was assigned one specific block diagram reduction rule (e.g., series, parallel, feedback, moving blocks).
- Students then moved into "expert groups" where all members studied and discussed their assigned rule in detail.
- After mastering the rule, students returned to their home group and taught their peers about their specific rule, enabling the entire group to learn all rules collaboratively.

Impact:

1. Improved understanding and retention of block diagram reduction rules through active participation and peer teaching.
2. Fostered leadership, accountability, and communication skills in a team setting.
3. Enabled students to solve control system problems with greater confidence and collaboration.


Figure 1 & 2: Student's displaying 11 Rules for Block Diagram Reduction

Faculty Incharge

Department of Electronics and Communication Engineering

INNOVATIVE TEACHING LEARNING METHOD

Academic Year	:	2023-2024
Name of the Course	:	VLSI Design
Year & Semester	:	III B.Tech. II Semester
Name of the Topic	:	Alternative forms of pull-up
Course Faculty	:	Mr. T. Venkata Rao
Pedagogical Initiative	:	Seminar
Date	:	20-02-2024
Venue	:	**Room No-318**
No. of students involved	:	60

Objective:

1. To understand the concept and necessity of pull-up mechanisms in digital logic circuits.
2. To explore and compare various types of pull-up configurations, such as resistive, active, and pseudo NMOS pull-ups.
3. To analyze the impact of different pull-up methods on circuit performance in terms of speed, power, and area.

Method: Seminar

1. A seminar session was organized where a student (or group) presented the different pull-up circuit techniques, including:
    a. Resistive pull-up
    b. PMOS (active) pull-up
    c. Pseudo NMOS logic
    d. Dynamic pull-up techniques
2. The presentation included theoretical explanations, circuit diagrams, and timing comparisons.
3. Practical implications in CMOS logic design and trade-offs were discussed.

Impact:

1. Improved understanding of how pull-up choices influence logic level stability and circuit functionality.
2. Developed student presentation and analytical skills through peer-teaching format.
3. Enabled students to link theoretical circuit design principles with practical VLSI applications.

Figure 1 & 2: Student's Seminar on Alternative forms of Pull Up

Faculty Incharge

Department of Electronics and Communication Engineering

INNOVATIVE TEACHING LEARNING METHOD

Academic Year	**:**	2023-24
Name of the Course	**:**	Cellular &Mobile communications
Year & Semester	**:**	III B.Tech. II Semester
Name of the Topic	**:**	Components of cellular system
Course Faculty	**:**	Mrs. Ch. Pushpa
Pedagogical Initiative	**:**	Fish bowl method
Date	**:**	22-02-2024
Venue	**:**	**Room No-327**
No. of students involved	**:**	60

Objective:

1. To identify and understand the key components of a cellular communication system such as Mobile Station (MS), Base Station (BS), MSC, and BTS.
2. To analyze the roles and interactions of these components in enabling seamless wireless communication.
3. To promote collaborative learning and clarify doubts through peer-led discussion and observation.

Method: Fish Bowl Method

1. A small group of students (inner circle) participated in an active discussion explaining each component and its functionality.
2. The rest of the class (outer circle) observed, took notes, and later rotated into the inner circle to continue or challenge the discussion.
3. The instructor facilitated the process by posing questions, ensuring participation, and summarizing key points.

Implementation:

1. Students were first provided with pre-reading material and visual aids (block diagrams of cellular systems).
2. During the classroom session, students in the inner circle began discussing each component's function, using examples like mobile calls, SMS, and handoffs.

3. The outer group then joined in with questions or additional points, allowing for role rotation, enhancing understanding from multiple perspectives.


Figure 1 & 2: Student's Fish Bowl Activity on Components of a Cellular System

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Department of Electronics and Communication Engineering

INNOVATIVE TEACHING LEARNING METHOD

Academic Year	**:**	2023-2024
Name of the Course	**:**	Digital signal processing
Year & Semester	**:**	III B.Tech. II Semester
Name of the Topic	**:**	DFT and properties of DFT
Course Faculty	**:**	Mrs.CH. Pushpa
Pedagogical Initiative	**:**	Blended learning
Date	**:**	15-03-2024
Venue	**:**	**Room No-102**
No. of students involved	**:**	60

Objective:

1. To understand the fundamental concepts of digital signal processing including DFT and its properties.
2. To explore the implementation of DSP algorithms for real-time applications in audio, image, and communication systems using sampling & quantization.
3. To bridge the gap between theoretical knowledge and practical application using simulations and hands-on exercises.

Method: Blended Learning

- Online Learning: Students were provided with pre-recorded video lectures, animations, and tutorials on DSP basics and algorithm design.
- In-Class Learning: Classroom sessions were used for problem-solving, discussions on practical use cases, and clarification of complex topics.
- Lab Component: MATLAB were used to implement and test DSP concepts like FIR/IIR filters and FFT.

Impact:

1. Enabled students to learn complex DSP concepts at their own pace while reinforcing learning through guided classroom support.
2. Improved hands-on skills in applying DSP techniques using software tools for real-world signal processing tasks.
3. Fostered analytical thinking and confidence in designing and testing DSP systems across various domains


Figure 1 & 2: Student's actively learning DFT, Properties of DFT & Various DSP algorithms

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Department of Electronics and Communication Engineering

INNOVATIVE TEACHING LEARNING METHOD

Academic Year	:	2023-24
Name of the Course	:	Digital IC Design
Year & Semester	:	II B.Tech. II Semester
Name of the Topic	:	Universal Shift Register in Digital Logic
Course Faculty	:	Mrs. O. Adi Lakshmi
Pedagogical Initiative	:	Collaborative Learning
Date	:	01-01-2024
Venue	:	**Room No-326**
No. of students involved	:	60

Objective:

1. To understand the functionality and block diagram of a Universal Shift Register (USR), capable of performing serial-in/serial-out, parallel-in/parallel-out, shift left, and shift right operations.
2. To explore the internal logic design and practical use cases of shift registers in digital systems.
3. To develop teamwork and communication skills through collaborative problem-solving and discussion.

Method: Collaborative Learning

- Students were divided into small groups, each assigned a different operation mode of the universal shift register.
- Groups worked together to analyze truth tables, logic diagrams, and timing sequences for their assigned mode.
- Each group created and presented a simple example circuit or simulation demonstrating their assigned function.

Impact:

1. Improved understanding of USR operations through active group participation and peer explanation.
2. Enhanced logical reasoning and design skills through collaborative circuit analysis and simulation.

3. Encouraged communication and leadership among students, fostering teamwork in digital circuit design.

Figure 1 & 2: Student's Collaborative Learning Activity on Universal Shift Register

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