Department of Electronics and Communication Engineering

Innovative Teaching Methods

Assessment & Engagement Tools

Sl.No	Subject code & Name	Topic	Technique
1.	19UMBOE701 - Stress Management	Survey on Stress Levels among Engineering Students	Quiz (Google forms)
2.	19UECPE803 - Wireless sensor networks	Network Architecture	Quiz
3.	23AM4404 - Computer Networks	Network Layer	Z-A approach
4.	23EC2301 - Circuit Analysis	Transistor model and parameters	Puzzle
5.	23EC2301 - Circuit Analysis	Network theorems	Quiz
6.	23EC1301 - Electronic Devices	PN Junction Diode	Quiz

Department of Electronics and Communication Engineering

Innovative Teaching Methods

Academic Year: 2024-25 (Even Semester)

Course Name : **Stress Management**

Subject Code : **19UMBOE701**

Topic of Innovative Teaching : **Survey on Stress Levels among Engineering Students**

Technique of Teaching : **Quiz**

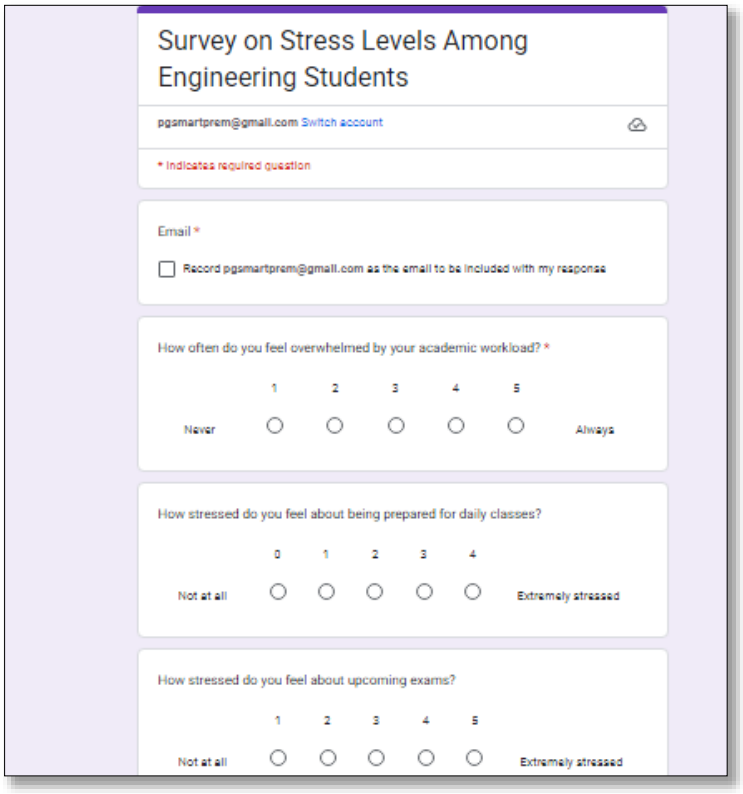
Faculty/Designation :**Dr.M.Margarat**

Goals/Objectives of the Method

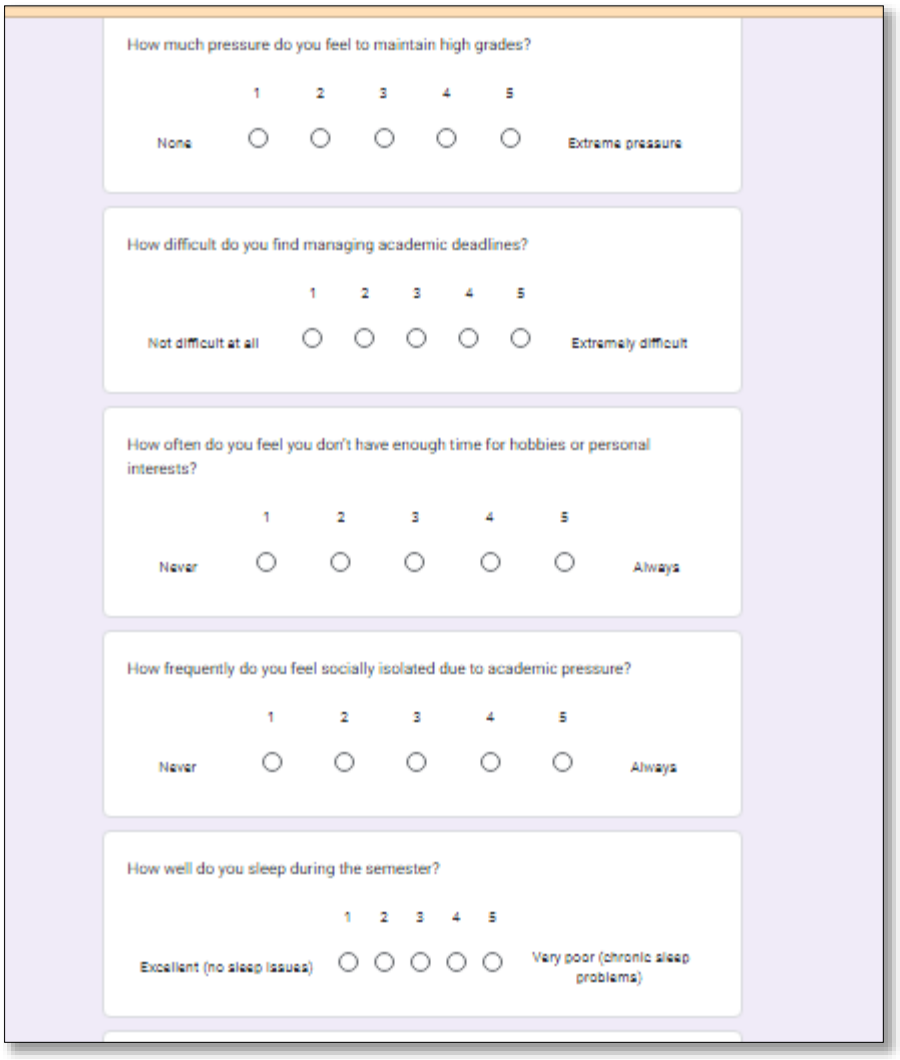
To help students identify their stress levels, understand contributing factors, and develop positive strategies for future stress management.

Description of the Method

A quiz-based approach is used to assess students' stress levels by presenting multiple-choice and situational questions related to academic workload, time management, personal challenges, and coping mechanisms. Based on their responses, students are categorized into different stress levels. The quiz is followed by an interactive session where students analyze their results, discuss contributing factors, and explore strategies for stress reduction and future well-being.



Note: The material is designed to be reproducible and adaptable, allowing other scholars to build upon it for further academic progress.



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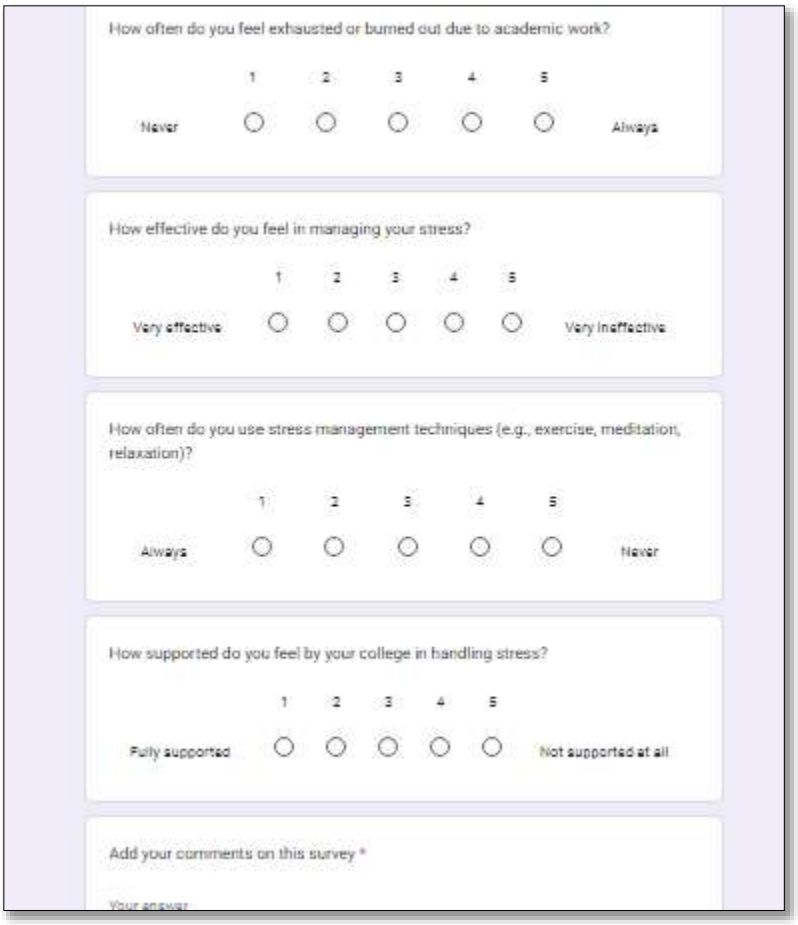
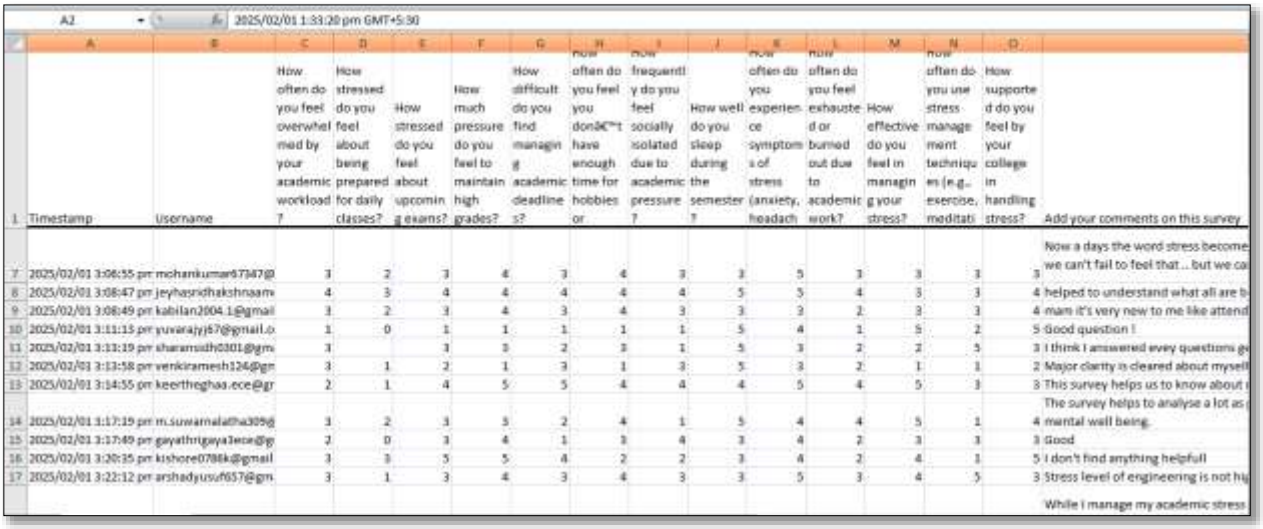




	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Timestamp	Username	How often do you feel overwhelmed by your academic workload?	How stressed do you feel about being prepared for daily classes?	How stressed do you feel about upcoming exams?	How much pressure do you feel to maintain high grades?	How difficult do you find managing academic deadlines?	How often do you feel you donâ€™t have enough time for hobbies or	How frequently do you feel socially isolated due to academic pressure?	How well do you sleep during the semester?	How often do you experience symptoms of stress (anxiety, headach	How often do you feel exhausted or burned out due to academic work?	How effective do you feel in managing your stress?	How often do you use stress management techniques (e.g., exercise, meditati	How supported do you feel by your college in handling stress?	Add your comments on this survey
7	2025/02/01 3:06:55 pm	mohankumar67347@	3	2	3	4	3	4	3	3	5	3	3	3	3	Now a days the word stress become we can't fail to feel that... but we ca
8	2025/02/01 3:08:47 pm	jeyhasridhakshnaam	4	3	4	4	4	4	4	5	5	4	3	3	4	helped to understand what all are b
9	2025/02/01 3:08:49 pm	kabilan2004.1@gmail	3	2	3	4	3	4	3	3	3	2	3	3	4	mam it's very new to me like attend
10	2025/02/01 3:11:15 pm	yuvarajyj67@gmail.c	1	0	1	1	1	1	1	5	4	1	5	2	5	Good question !
11	2025/02/01 3:11:19 pm	sharansidh0301@gm	3		3	3	2	3	1	5	3	2	2	5	3	I think I answered evey questions g
12	2025/02/01 3:13:58 pm	venkiramesh124@gm	3	1	2	1	3	1	3	5	3	2	1	1	2	Major clarity is cleared about myself
13	2025/02/01 3:14:55 pm	keertheghaa.ece@gr	2	1	4	5	5	4	4	4	5	4	5	3	3	This survey helps us to know about
14	2025/02/01 3:17:19 pm	m.suwamalatha309@	3	2	3	5	2	4	1	5	4	4	5	1	4	The survey helps to analyse a lot as mental well being.
15	2025/02/01 3:17:49 pm	gayathrigaya3ece@g	2	0	3	4	1	3	4	3	4	2	3	3	3	Good
16	2025/02/01 3:20:35 pm	kishore0788k@gmail	3	3	5	5	4	2	2	3	4	2	4	1	5	I don't find anything helpfull
17	2025/02/01 3:22:12 pm	arshadyusuf657@gm	3	1	3	4	3	4	3	3	5	3	4	5	3	Stress level of engineering is not hi
																While I manage my academic stress

For review and critique contact: ***margarat.rosy@gmail.com***

Significance of Results:

The method promotes self-awareness, helps students plan for stress management, and enables faculty to address common stress patterns for a healthier academic environment.

Note: The material is designed to be reproducible and adaptable, allowing other scholars to build upon it for further academic progress.

Department of Electronics and Communication Engineering

Innovative Teaching Methods

Academic Year: 2023-24 (Odd Semester)

Course Name : **WIRELESS SENSOR NETWORKS**

Subject Code : **19UECPE803**

Topic of Innovative Teaching : **Network Architecture**

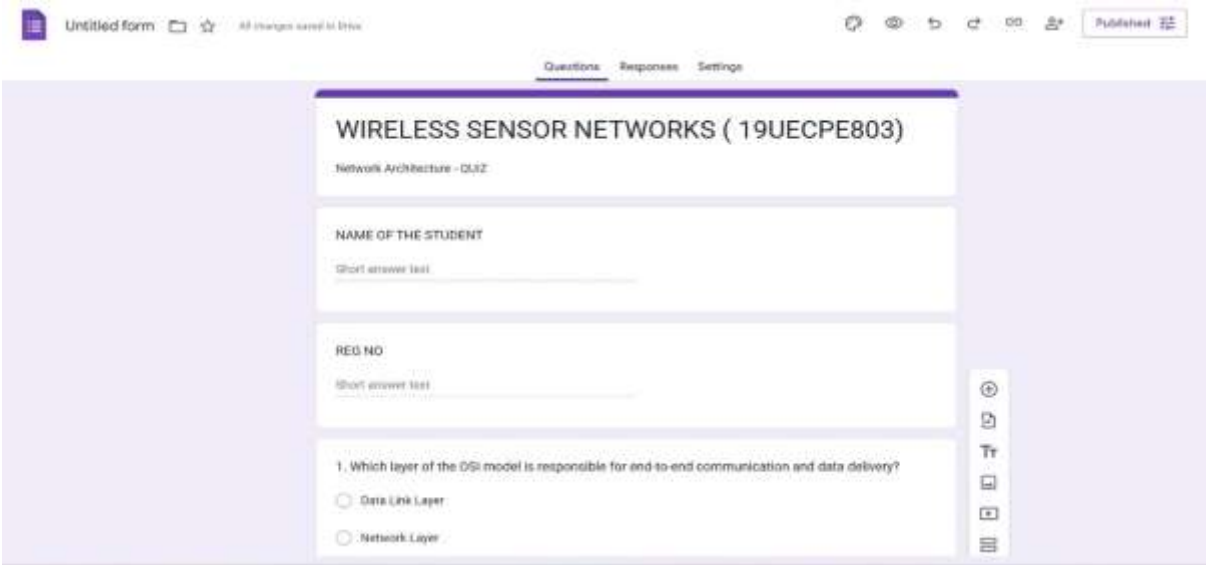
Technique of Teaching : **QUIZ**

Faculty/Designation : **Mrs. P. Ranjitha, Ap/ECE.**

Goals/ Objective of the method : The quiz aims to assess students' understanding of Network Architecture by focusing on key concepts, design principles, and functionalities. Students understand Network Architecture Fundamentals to assess knowledge of different types of network architectures (Client-Server, Peer-to-Peer, etc.) and to identify various network topologies and their applications.

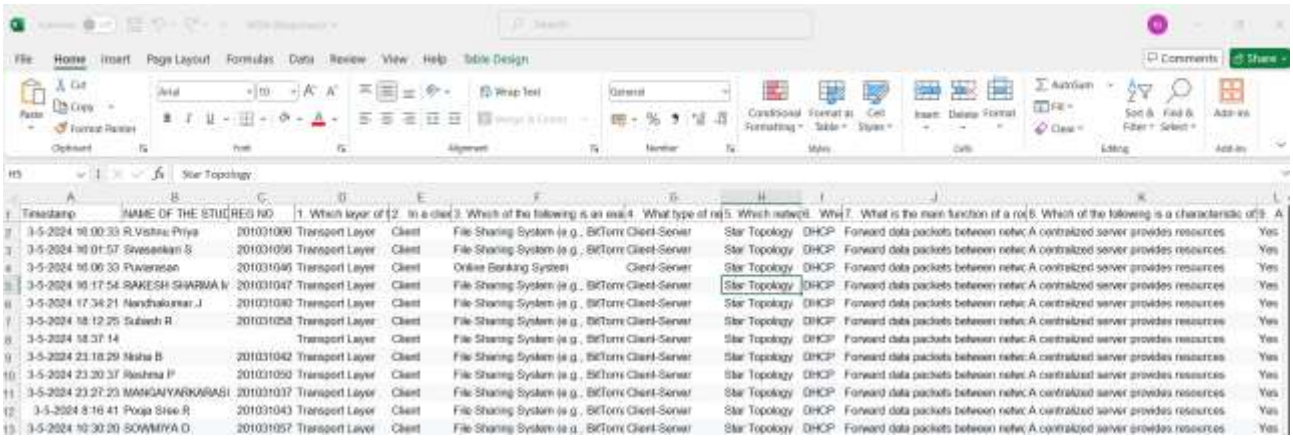
Description of method (8 – 10 lines): This method is designed to effectively assess students' knowledge and understanding of Network Architecture through a structured evaluation approach. The method includes a variety of question formats to test different cognitive levels, from recall to application and analysis. The quiz consists of a combination of the Multiple-Choice Questions (MCQs) is to assess fundamental concepts and technical knowledge and True/False Questions is to test students' understanding of key principles and terminologies. Application-Based Questions is to analyze real-world scenarios and justify networking decisions.

2. Assessment Approach:



Google Form for assessment and feedback:
https://docs.google.com/forms/d/e/1FAIpQLScW4cJkpZi9-2fwItGB-SMtOrzP9INPsh3_9VPDxGjKm0uAgA/viewform?usp=sharing

Responses:



Timestamp	NAME OF THE STU	REG NO	1. Which layer of	2. In a clie	3. Which of the following is an exa	4. What type of ne	5. Which netwo	6. Whi	7. What is the main function of a ro	8. Which of the following is a characteristic of	9. A
3-5-2024 16:00:33	R.Vishnu Priya	201031080	Transport Layer	Client	File Sharing System (e.g., BitTorre	Client-Server	Star Topology	DHCP	Forward data packets between netwo	A centralized server provides resources	Yes
3-5-2024 16:01:57	Sivasankari S	201031096	Transport Layer	Client	File Sharing System (e.g., BitTorre	Client-Server	Star Topology	DHCP	Forward data packets between netwo	A centralized server provides resources	Yes
3-5-2024 16:06:33	Puvaneesan	201031046	Transport Layer	Client	Online Banking System	Client-Server	Star Topology	DHCP	Forward data packets between netwo	A centralized server provides resources	Yes
3-5-2024 16:17:54	RAKESH SHARMA N	201031047	Transport Layer	Client	File Sharing System (e.g., BitTorre	Client-Server	Star Topology	DHCP	Forward data packets between netwo	A centralized server provides resources	Yes
3-5-2024 17:34:21	Nandhakumar J	201031040	Transport Layer	Client	File Sharing System (e.g., BitTorre	Client-Server	Star Topology	DHCP	Forward data packets between netwo	A centralized server provides resources	Yes
3-5-2024 18:12:25	Subash R	201031058	Transport Layer	Client	File Sharing System (e.g., BitTorre	Client-Server	Star Topology	DHCP	Forward data packets between netwo	A centralized server provides resources	Yes
3-5-2024 18:37:14			Transport Layer	Client	File Sharing System (e.g., BitTorre	Client-Server	Star Topology	DHCP	Forward data packets between netwo	A centralized server provides resources	Yes
3-5-2024 23:18:29	Nisha B	201031042	Transport Layer	Client	File Sharing System (e.g., BitTorre	Client-Server	Star Topology	DHCP	Forward data packets between netwo	A centralized server provides resources	Yes
3-5-2024 23:20:37	Reshma P	201031050	Transport Layer	Client	File Sharing System (e.g., BitTorre	Client-Server	Star Topology	DHCP	Forward data packets between netwo	A centralized server provides resources	Yes
3-5-2024 23:27:23	MANGAIYARKARASI	201031037	Transport Layer	Client	File Sharing System (e.g., BitTorre	Client-Server	Star Topology	DHCP	Forward data packets between netwo	A centralized server provides resources	Yes
3-5-2024 8:16:41	Pooja Sree R	201031043	Transport Layer	Client	File Sharing System (e.g., BitTorre	Client-Server	Star Topology	DHCP	Forward data packets between netwo	A centralized server provides resources	Yes
3-5-2024 10:30:20	SOWMIYA D	201031057	Transport Layer	Client	File Sharing System (e.g., BitTorre	Client-Server	Star Topology	DHCP	Forward data packets between netwo	A centralized server provides resources	Yes

Significance of Results

The results of this quiz method provide valuable insights into students' understanding of **Network Architecture** and help in identifying strengths and areas for improvement and indicate students' grasp of **network architecture fundamentals**, including sensor network topologies (star, mesh, tree, etc.).

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Department of Electronics and Communication Engineering

Innovative Teaching Methods

Academic Year: 2024-25 (ODD Semester)

Course Name : **Computer Networks**

Subject Code : **23AM4404**

Topic of Innovative Teaching : **Network Layer**

Technique of Teaching : **Z-A Approach**

Faculty/Designation : **Mrs.M.Jayasudha**

Goals/ Objective of the method : The objective is to build a comprehensive understanding by beginning with practical applications and real-world scenarios, allowing learners to relate abstract concepts to their actual usage. The Z-A approach aims to foster a deeper and more intuitive understanding of how the network layer supports end-to-end communication, by emphasizing its practical and functional aspects before diving into technical specifics. It promotes active learning and enables students to better retain knowledge by seeing the broader context before delving into the individual components.

Description of method (8 – 10 lines):

The Z-A approach for the network layer is a reverse learning technique that begins with the complex, high-level aspects of network communication before moving on to foundational details. It starts by exploring advanced concepts like routing protocols, end-to-end communication, and real-world applications of the network layer. From there, the method moves backward, breaking down the essential components such as IP addressing, subnetting, packet creation, and routing tables. This approach allows learners to first understand the practical, real-world applications of the network layer and then delve into the underlying technical principles. It utilizes visual aids, scenarios, and interactive elements to link the abstract concepts with their practical implementations, making the learning process more relatable.

For review and critique contact: ***jayas1128@gmail.com***

Note: The material is designed to be reproducible and adaptable, allowing other scholars to build upon it for further academic progress.

Reverse Engineering [Network Layer – Z-A Approach]

Z-A Journey – Storytelling Method

- Network Layer functions as **a journey of a courier package traveling from one city to another.**
- Start from **Z (Zero Congestion Control) → A (Addressing and Routing).**

Example Story – "The Great Delivery Race"

Imagine you are sending an important parcel from India to the USA. The journey involves multiple checkpoints, just like packets traveling through the network layer!

Reversing the Path: From Delivery to Dispatch

Stage	Network Layer Function	Real-Life Analogy
Z – Zero Congestion Control	Avoids data traffic jams	Traffic signals preventing road congestion
Y – Yielding Efficient Routing	Finds the best path	GPS selecting the shortest route
X – eXchange of Packets	Ensures smooth data transfer	Parcel handled at transit hubs
W – Wide Area Communication	Enables large-scale connectivity	International courier services
V – Virtual Circuit & Datagram Services	Connection types	Express vs. Standard shipping
U – Uniqueness in Addressing	Identifies devices uniquely	Correct postal addresses
T – Translating Logical to Physical Address	Converts IP to MAC	Converting country name to a ZIP code
S – Security & Packet Filtering	Protects data flow	Customs checks before international transit
R – Reliability through Error Handling	Detects errors	Checking package for damage
Q – Quality of Service (QoS)	Prioritizes traffic	VIP courier services for urgent deliveries

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Stage	Network Layer Function	Real-Life Analogy
P – Packet Forwarding & Switching	Transfers packets	Moving parcels via different routes
O – Optimal Path Selection	Finds the best route dynamically	Traffic-based rerouting
N – Network Fragmentation & Reassembly	Breaks data into small parts	Breaking a large order into smaller parcels
M – Multicasting & Broadcasting	Sends data to multiple recipients	Group package delivery
L – Layer 3 Addressing & Routing	Uses IPs for routing	Street addresses in a city
K – Keep Alive Mechanisms	Maintains connectivity	Periodic tracking updates
J – Junction Between Subnetworks	Bridges different networks	Inter-city package exchanges
I – Inter-networking Support	Connects networks	Collaboration between DHL & FedEx
H – Hop Count Limitation	Limits packet travel distance	Package return after multiple failed attempts
G – Gateway Interaction	Interfaces different networks	Changing from train to flight transport
F – Flow Control & Congestion Avoidance	Regulates data flow	Limiting the number of vehicles on a road
E – Error Detection & Handling	Identifies transmission errors	Package tracking & damage reporting
D – Datagram Encapsulation	Encapsulates data for transmission	Securing the parcel in a box
C – Connectionless vs. Connection-Oriented	Two types of communication	Sending via regular mail (no tracking) vs. courier (tracking)
B – Bandwidth Allocation	Allocates data capacity	Limited vs. express lanes on highways
A – Addressing & Routing	Core function of the network layer	Ensuring the package reaches the right address

Significance of Results

The Z-A approach helps learners grasp the big picture of how the network layer operates, starting from practical examples and gradually understanding the technical foundations. By beginning with complex concepts, students can better appreciate the real-world significance of the network layer before learning the finer details, promoting better retention and understanding. This method fosters an intuitive learning experience where students can relate theory to practice, making the material more accessible and engaging. The technique enhances problem-solving abilities as students can see how various network protocols interact and function in real scenarios. Ultimately, the Z-A approach leads to deeper comprehension and stronger practical application skills, which are essential for working with real-world networks.

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Department of Electronics and Communication Engineering

Innovative Teaching Methods

Academic Year: 2023-24 (Even Semester)

Course Name : **Circuit Analysis**

Subject Code : **23EC2301**

Topic of Innovative Teaching : **Network theorems**

Technique of Teaching : **Quiz**

Faculty/Designation : **Mrs.K.Keerthiga**

Goals/ Objective of the method : To evaluate problem-solving skills and conceptual clarity in applying network theorems like Thevenin's, Norton's, and Superposition in circuit analysis.

Description of method (8 – 10 lines):

Network theorems provide systematic methods to analyze electrical circuits efficiently. These theorems, such as **Thevenin's Theorem, Norton's Theorem, Superposition Theorem, and Maximum Power Transfer Theorem**, simplify complex circuits into more manageable forms. The process typically involves identifying circuit components, applying mathematical transformations, and solving for voltages and currents. In a quiz setting, students may be required to apply these theorems to determine equivalent circuits, solve for unknown values, or verify circuit behavior under different conditions. By using network theorems, students develop a structured approach to circuit analysis, improving accuracy and problem-solving skills.

Flowchart for reference and modifications:
https://docs.google.com/forms/d/1FL5JqxczlLhjCnWhX20JJgtcYK4W4msGLVuyynlQI1k/edit

Google Form for assessment and feedback:
https://docs.google.com/spreadsheets/d/11wVUy0o0tkf0FUQ_bIrB529I9RfHQRY7woPXZLNyTwg/edit?resourcekey=&gid=729964668#gid=729964668

For review and critique contact: *jayalakshmyece@ifet.ac.in*

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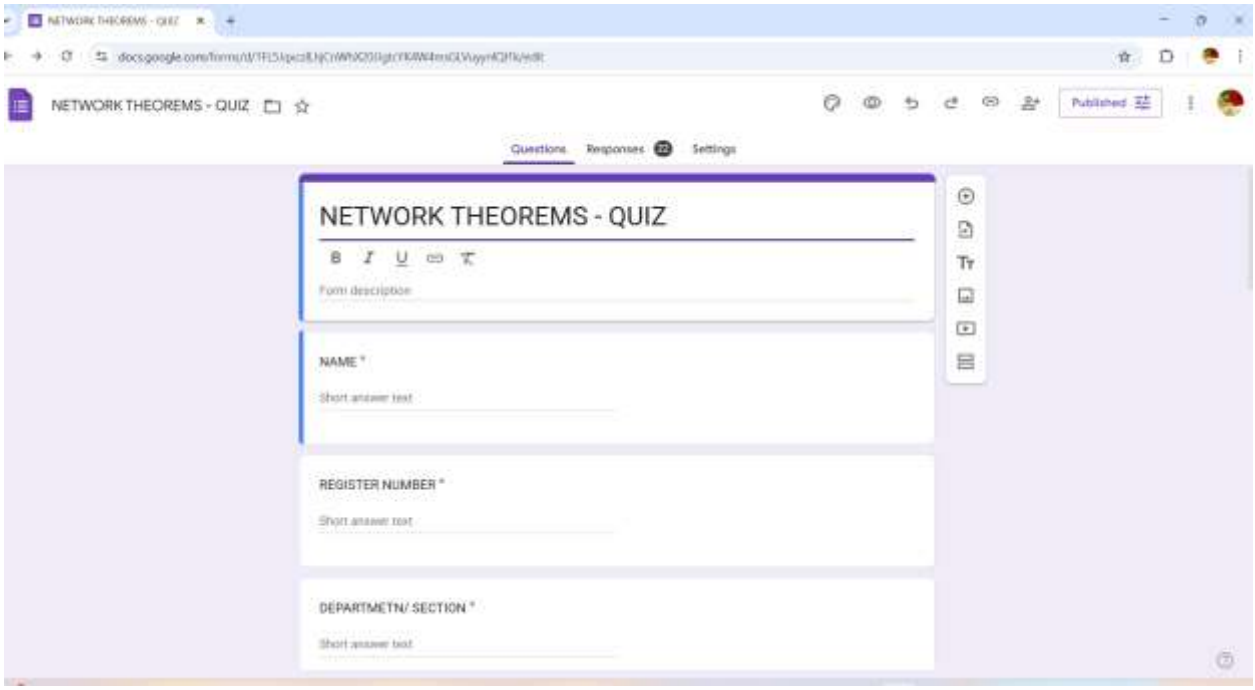
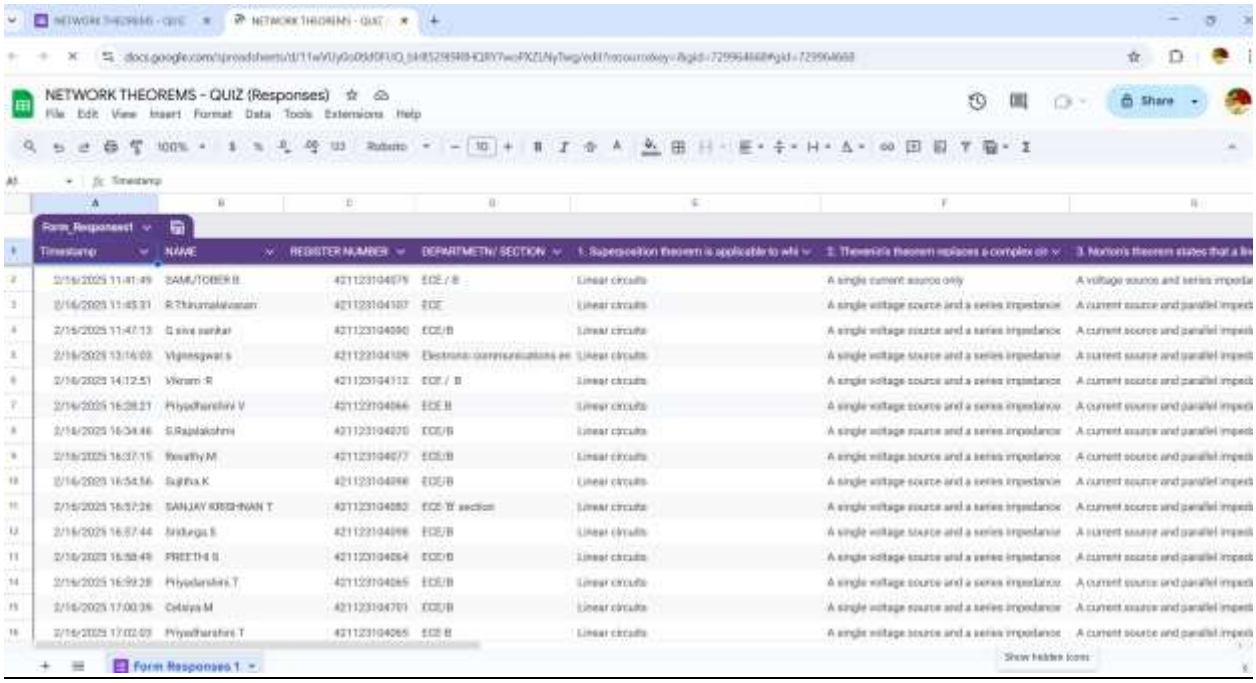


Responses:



Significance of Results

The results of the quiz on network theorems provide valuable insights into students' understanding of fundamental electrical circuit concepts. A high score indicates strong analytical skills and the ability to apply theorems like Thevenin's,

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Norton's, and Superposition effectively. Lower scores highlight areas requiring further clarification and practice. The results help educators identify common misconceptions and adjust teaching strategies accordingly. Additionally, the quiz enhances problem-solving abilities, preparing students for real-world circuit analysis. By evaluating performance, students can gauge their proficiency and improve their technical knowledge, ensuring a solid foundation for advanced electrical engineering topics.

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Department of Electronics and Communication Engineering

Innovative Teaching Methods

Academic Year: 2023-24 (Odd Semester)

Course Name : **Electronic Devices**

Subject Code : **23EC1301**

Topic of Innovative Teaching : **PN Junction Diode**

Technique of Teaching : **Quiz**

Faculty/Designation : **Mrs.K.Keerthiga**

Goals/ Objective of the method : The objective of the PN junction diode quiz is to assess students' understanding of the diode's behavior under different biasing conditions. It also aims to evaluate their ability to apply theoretical knowledge to real-world circuit analysis and design.

Description of method (8 – 10 lines):

The PN junction diode can be analyzed using its fundamental properties and behaviors to understand its operation in electrical circuits. This method typically involves studying the diode's response to forward and reverse biases. When forward bias is applied, the diode conducts current after overcoming the built-in potential barrier, which is modeled using the Shockley diode equation. In reverse bias, the diode ideally does not conduct, with a small reverse saturation current. The analysis may also involve the use of equivalent circuit models, such as the ideal diode model or the more complex model that includes series resistance and parallel capacitance. In a quiz setting, students may be asked to calculate the current through the diode, determine its behavior under different bias conditions, or use the diode's equation to solve for unknown parameters. By applying these principles, students can effectively model and analyze circuits with diodes.

Flowchart for reference and modifications:
https://docs.google.com/forms/d/1MD9OOuYOaJbnApeqh-INBJLFsYAwghj69BwrT-YScyU/edit#responses

Google Form for assessment and feedback:
https://docs.google.com/spreadsheets/d/1EMhmoQuASpt_FB8MVIWjJttT7Hcqw4cp5IITbh3FfBA/edit?resourcekey=&gid=966978644#gid=966978644

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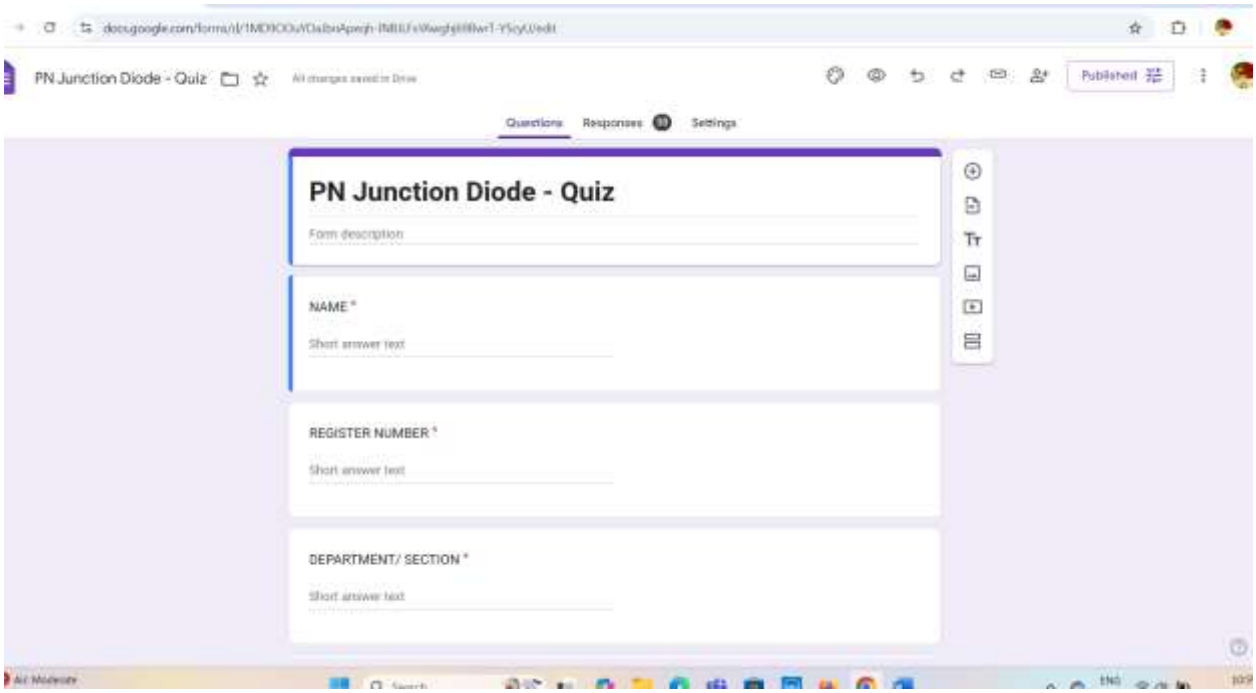

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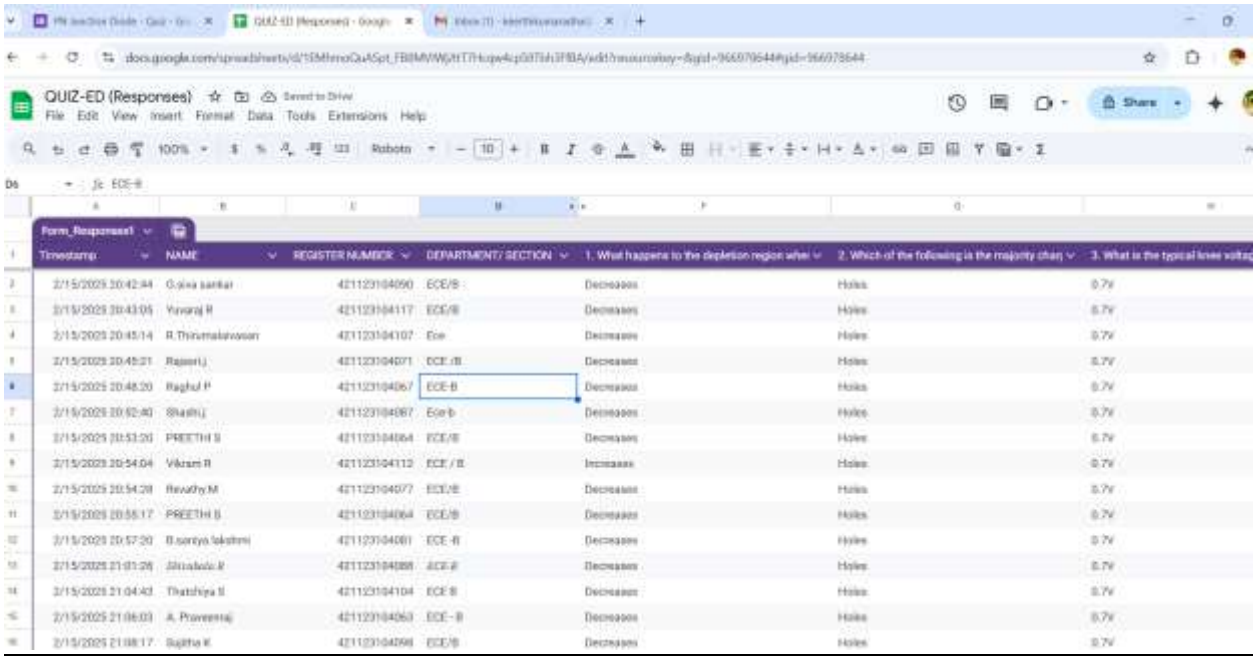

Significance of Results

The results of the quiz on PN junction diodes provide valuable insights into students' understanding of semiconductor behavior and diode characteristics. A

high score indicates a strong grasp of the principles behind the formation of the depletion region, forward and reverse bias behavior, and the application of diodes in circuits. It reflects the student's ability to analyze and predict current flow in various configurations. Lower scores highlight areas that need further exploration, such as the physics of semiconductor junctions or the impact of temperature on diode performance. The results help educators identify common gaps in understanding, enabling them to refine their teaching methods. Additionally, the quiz fosters problem-solving skills, preparing students for practical applications of diodes in electronics. By assessing performance, students can identify their strengths and areas for improvement, building a strong foundation for more advanced semiconductor theory and circuit design.

Comparitive and Analytical Thinking

Sl.No	Subject code & Name	Topic	Technique
1.	19UMBOE701 - Stress Management	Environmental, Organizational, and Individual Consequences of Stress	Comparison Chart
2.	19UECPC702 - Optical and Microwave	LASER Diodes	Mind Mapping
3.	19UECPEX02 - Advanced Communication Techniques	ISI, Nyquist criterion	Flowchart Activity
4.	23EC4403 - Microprocessor Architectures and Microcontrollers	8086 Instruction Set	Flow chart activity
5.	19UCEOE801 - Industrial Safety	Ionising and Non - ionising radiation	Comparison Chart
6.	23EC1301 - Electronic Devices	CE, CB, CC configurations and characteristics	Comparison Chart

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Department of Electronics and Communication Engineering

Innovative Teaching Methods

Academic Year: 2023-24 (Even Semester)

Course Name : **Stress Management**

Subject Code : **19UMBOE701**

Topic of Innovative Teaching : **Environmental, Organizational, and Individual Consequences of Stress**

Technique of Teaching : **Comparison chart**

Faculty/Designation : **Dr.M.Margarat**

Goals/Objectives of the Method

A structured approach to analyzing stress consequences, categorizing impacts at various levels, assessing causes and preventive measures

Description of the Method

This method systematically evaluates stress by categorizing its impact at environmental, organizational, and individual levels. It involves data collection, analysis of causes and effects, and recommendations for preventive measures to enhance well-being and efficiency.

Category	Environmental Consequences	Organizational Consequences	Individual Consequences
Definition	The impact of stress on ecosystems, natural resources, and social stability.	The effects of stress within workplaces, affecting operations and employee well-being.	The personal toll of stress on mental, emotional, and physical health.
Examples	- Increased pollution due to industrial overuse. - Climate changes influenced by unsustainable work habits. - Rise in societal unrest and environmental negligence.	- Decline in employee productivity and efficiency. - Higher rates of absenteeism and job turnover. - More workplace conflicts and disengagement.	- Emotional distress such as anxiety and depression. - Physical health concerns like high blood pressure and fatigue. - Reduced concentration and impaired decision-making.

Note: The material is designed to be reproducible and adaptable, allowing other scholars to build upon it for further academic progress.

Causes	- Overuse of resources and urban congestion. - Economic pressures and industrial demands. - Social instability due to environmental degradation.	- Heavy workload and unrealistic deadlines. - Poor leadership and lack of work-life balance. - Job insecurity and high-pressure environments.	- Personal pressures and perfectionist tendencies. - Lack of coping strategies and emotional support. - Lifestyle factors and traumatic experiences.
Long-term Effects	- Loss of biodiversity and ecosystem depletion. - Increased natural disasters due to climate stress. - Economic imbalances and global conflicts.	- Higher employee turnover and talent retention challenges. - Increased operational costs due to absenteeism and burnout. - Negative company reputation and low staff morale.	- Chronic diseases like heart conditions and weakened immunity. - Strained relationships and social withdrawal. - Reduced quality of life and emotional instability.
Preventive Measures	- Sustainable environmental policies and conservation efforts. - Government interventions and corporate responsibility initiatives. - Promotion of eco-friendly business practices.	- Workplace wellness programs and stress management initiatives. - Encouraging positive leadership and work-life balance. - Providing flexible work arrangements and employee support.	- Regular physical activity and healthy lifestyle choices. - Seeking professional counseling and emotional support. - Effective time management and relaxation techniques.

For review and critique contact: ***margarat.rosy@gmail.com***

Significance of Results:

This method structured stress analysis across environmental, organizational, and individual levels, helping identify key challenges and improvements. It enabled targeted stress management strategies, promoting well-being, efficiency, and proactive solutions.

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Department of Electronics and Communication Engineering

Innovative Teaching Methods

Academic Year: 2023-2024 (Odd Semester)

Course Name : **Optical & Microwave Engineering**

Subject Code : **19UECPC702**

Topic of Innovative Teaching : LASER Diodes

Technique of Teaching : Mind Mapping

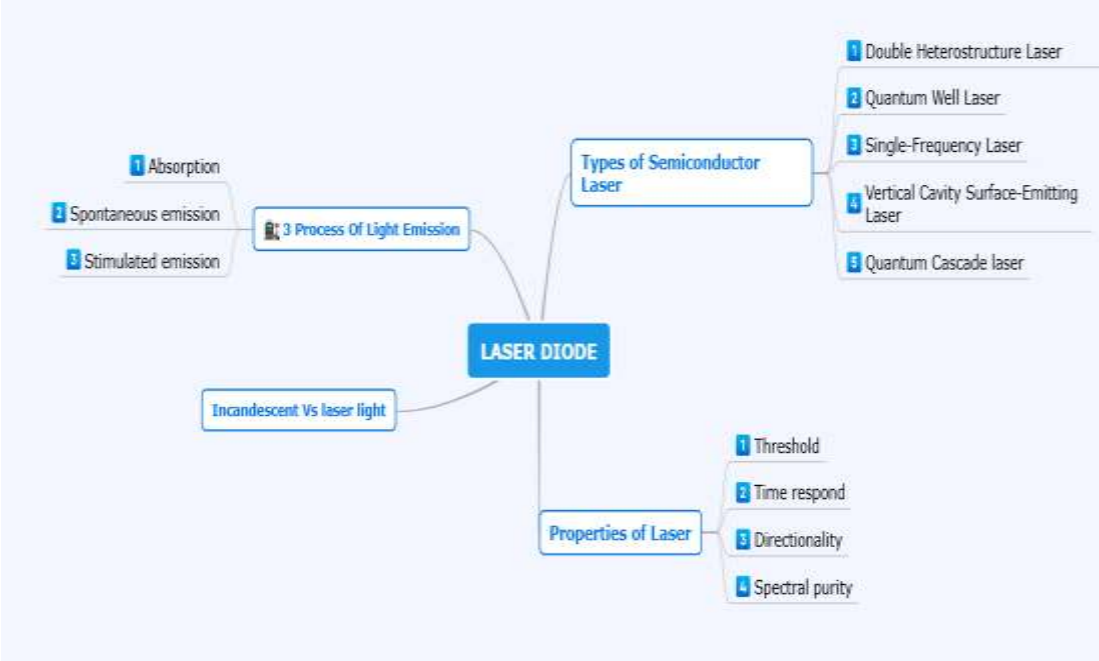
Faculty/Designation : **Mrs.S.Kalpana**

Goals/ Objective of the method : The Mind Mapping method aims to enhance understanding by visually organizing key concepts such as working principles, types, and characteristics. It helps in comparing LASER diodes with other light-emitting devices, analyzing efficiency factors like wavelength and power output, and exploring real-world applications in industries, medicine, and communications. Additionally, it facilitates troubleshooting common challenges and understanding recent advancements, making learning more structured and engaging**.**

Description of method (8 – 10 lines):

The LASER Diodes Mind Mapping method is a structured visual learning approach that organizes key concepts like working principles, types, characteristics, and applications in a hierarchical format. It enhances understanding by enabling comparisons with other light-emitting devices, analyzing efficiency factors such as wavelength and power output, and exploring real-world applications in telecommunications, medicine, and defense. This method also helps identify common challenges like thermal management while highlighting recent advancements. By simplifying complex topics and improving retention, it provides an engaging and effective way to grasp LASER diode concepts.

Note: The material is designed to be reproducible and adaptable, allowing other scholars to build upon it for further academic progress.



Significance of Results

The LASER Diodes Mind Mapping method lies in its ability to enhance comprehension, retention, and application of key concepts. By visually structuring information, it enables learners to quickly grasp the working principles, characteristics, and efficiency factors of LASER diodes. This method aids in better differentiation from other light-emitting devices, facilitates problem-solving by identifying challenges like thermal management, and highlights advancements in the field. Additionally, it improves the ability to apply knowledge in real-world applications such as telecommunications, medical devices, and defense, making learning more effective and practical.

Note: The material is designed to be reproducible and adaptable, allowing other scholars to build upon it for further academic progress.

IFET Autonomous College of Engineering
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Department of Electronics and Communication Engineering

Innovative Teaching Methods

Academic Year: 2023-24 (Odd Semester)

Course Name : **Advanced Communication Techniques**

Subject Code : **19UECPEX02**

Topic of Innovative Teaching : **ISI, Nyquist criterion**

Technique of Teaching : **Flowchart Activity**

Faculty/Designation : **Mrs. P. Ranjitha, Ap/ECE.**

Goals/ Objective of the method : The Flowchart Activity for Inter-Symbol Interference (ISI) and the Nyquist Criterion is designed to enhance students' understanding through a structured visual approach.

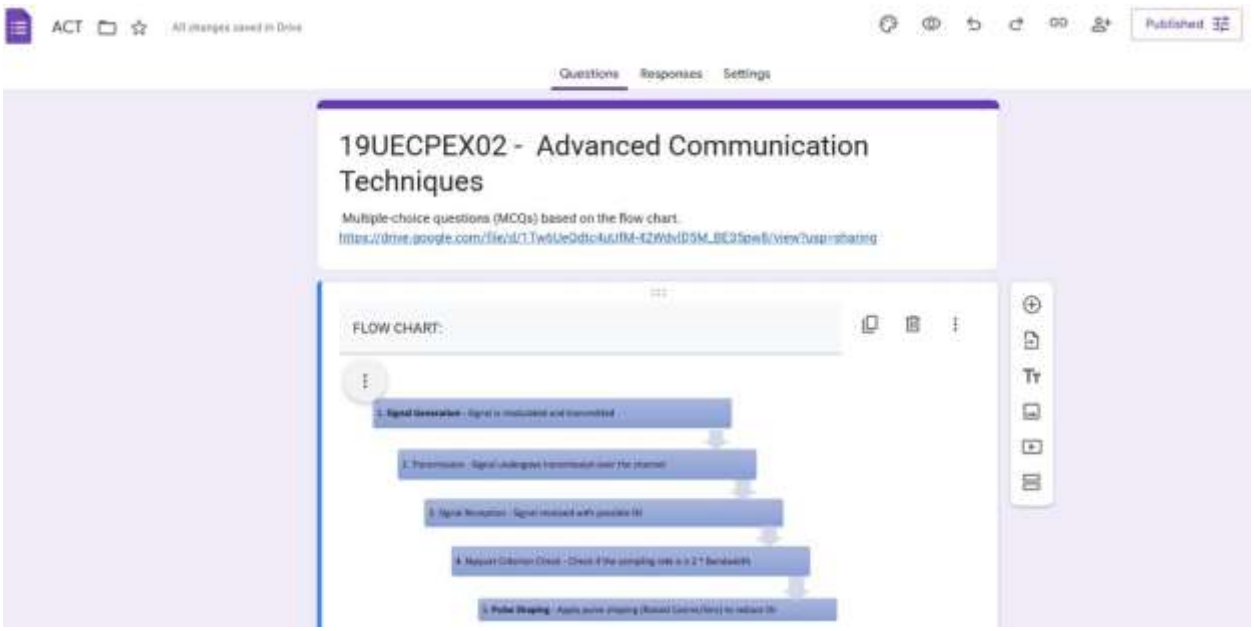
Description of method (8 – 10 lines):

The **Flowchart Activity** for ISI and the Nyquist Criterion is a structured visual learning method where students develop a step-by-step flowchart to understand signal distortion and ISI mitigation. It begins with defining ISI, identifying its causes, and illustrating Nyquist's first and second criteria for zero ISI. Students analyze pulse shaping techniques like Raised Cosine filtering and explore bandwidth limitations. The method promotes logical reasoning, active engagement, and collaborative learning. It enhances problem-solving by visually mapping signal transmission challenges and solutions. By constructing and refining flowcharts, students gain clarity on ISI reduction techniques. This activity strengthens critical thinking and application skills.

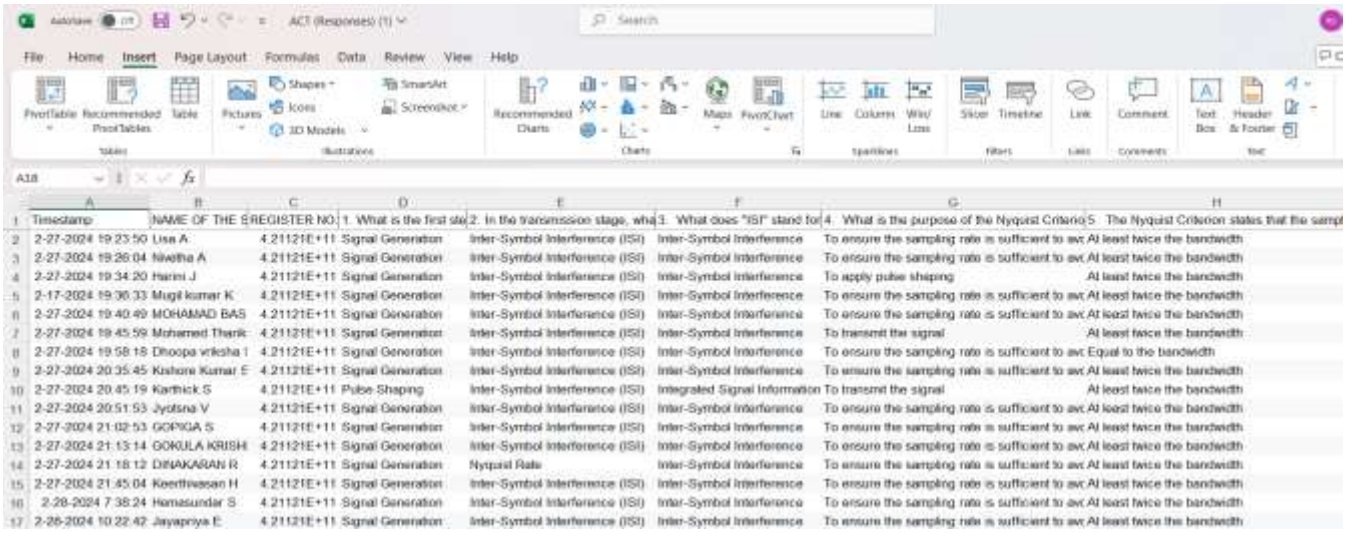
Flowchart for reference and modifications:
https://drive.google.com/file/d/1Tw6UeQdtc4uUfM-42WdvlD5M_BE35pw8/view?usp=sharing

Google Form for assessment and feedback:
https://docs.google.com/forms/d/e/1FAIpQLSc5FVnznJRhXhr09iPLUEL9oOaQKbhha1_twtIE5rNuoRRFYQ/viewform?usp=dialog

Note: The material is designed to be reproducible and adaptable, allowing other scholars to build upon it for further academic progress.



Responses:



Timestamp	NAME OF THE S	REGISTER NO.	1. What is the first ste	2. In the transmission stage, wha	3. What does "ISI" stand for	4. What is the purpose of the Nyquist Criterio	5. The Nyquist Criterion states that the sampl
2-27-2024 19:23:50	Lisa A	4.21121E+11	Signal Generation	Inter-Symbol Interference (ISI)	Inter-Symbol Interference	To ensure the sampling rate is sufficient to avc	At least twice the bandwidth
2-27-2024 19:26:04	Nivetha A	4.21121E+11	Signal Generation	Inter-Symbol Interference (ISI)	Inter-Symbol Interference	To ensure the sampling rate is sufficient to avc	At least twice the bandwidth
2-27-2024 19:34:20	Harini J	4.21121E+11	Signal Generation	Inter-Symbol Interference (ISI)	Inter-Symbol Interference	To apply pulse shaping	At least twice the bandwidth
2-17-2024 19:36:33	Mugil kumar K	4.21121E+11	Signal Generation	Inter-Symbol Interference (ISI)	Inter-Symbol Interference	To ensure the sampling rate is sufficient to avc	At least twice the bandwidth
2-27-2024 19:40:49	MOHAMAD BAS	4.21121E+11	Signal Generation	Inter-Symbol Interference (ISI)	Inter-Symbol Interference	To ensure the sampling rate is sufficient to avc	At least twice the bandwidth
2-27-2024 19:45:59	Mohamed Thank	4.21121E+11	Signal Generation	Inter-Symbol Interference (ISI)	Inter-Symbol Interference	To transmit the signal	At least twice the bandwidth
2-27-2024 19:58:18	Dhoopa vriksha T	4.21121E+11	Signal Generation	Inter-Symbol Interference (ISI)	Inter-Symbol Interference	To ensure the sampling rate is sufficient to avc	Equal to the bandwidth
2-27-2024 20:35:45	Kishore Kumar S	4.21121E+11	Signal Generation	Inter-Symbol Interference (ISI)	Inter-Symbol Interference	To ensure the sampling rate is sufficient to avc	At least twice the bandwidth
2-27-2024 20:45:19	Karthick S	4.21121E+11	Pulse Shaping	Inter-Symbol Interference (ISI)	Integrated Signal Information	To transmit the signal	At least twice the bandwidth
2-27-2024 20:51:53	Jyotsna V	4.21121E+11	Signal Generation	Inter-Symbol Interference (ISI)	Inter-Symbol Interference	To ensure the sampling rate is sufficient to avc	At least twice the bandwidth
2-27-2024 21:02:53	GOPIGA S	4.21121E+11	Signal Generation	Inter-Symbol Interference (ISI)	Inter-Symbol Interference	To ensure the sampling rate is sufficient to avc	At least twice the bandwidth
2-27-2024 21:13:14	GOKULA KRISH	4.21121E+11	Signal Generation	Inter-Symbol Interference (ISI)	Inter-Symbol Interference	To ensure the sampling rate is sufficient to avc	At least twice the bandwidth
2-27-2024 21:18:12	DINAKARAN R	4.21121E+11	Signal Generation	Nyquist Rate	Inter-Symbol Interference	To ensure the sampling rate is sufficient to avc	At least twice the bandwidth
2-27-2024 21:45:04	Keerthivasan H	4.21121E+11	Signal Generation	Inter-Symbol Interference (ISI)	Inter-Symbol Interference	To ensure the sampling rate is sufficient to avc	At least twice the bandwidth
2-28-2024 7:38:24	Hamasundar S	4.21121E+11	Signal Generation	Inter-Symbol Interference (ISI)	Inter-Symbol Interference	To ensure the sampling rate is sufficient to avc	At least twice the bandwidth
2-26-2024 10:22:42	Jayapriya E	4.21121E+11	Signal Generation	Inter-Symbol Interference (ISI)	Inter-Symbol Interference	To ensure the sampling rate is sufficient to avc	At least twice the bandwidth

Significance of Results

This method enhanced students' visual clarity and helps students systematically analyze ISI and Nyquist conditions, reinforcing logical thinking. The structured representation allows learners to apply theoretical knowledge in practical communication system scenarios effectively.

Note: The material is designed to be reproducible and adaptable, allowing other scholars to build upon it for further academic progress.

IFET Autonomous College of Engineering
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Department of Electronics and Communication Engineering

Innovative Teaching Methods

Academic Year: 2024-25 (Even Semester)

Course Name : **Microprocessor Architectures and Microcontrollers**

Subject Code : **23EC4403**

Topic of Innovative Teaching : **8086 Instruction Set**

Technique of Teaching : **Flowchart Activity**

Faculty/Designation : **Dr.S.Jayalakshmy**

Goals/ Objective of the method : To evaluate students' understanding of the 8086 instruction set, track their progress, and enhance learning through interactive flowchart-based assessment and peer review.

Description of method (8 – 10 lines):

We developed an interactive learning approach using a flowchart in draw.io to visually represent the 8086 instruction set. The flowchart categorized instructions and execution steps, enabling students to grasp concepts more effectively. A Google Form was used to collect student responses, where they answered conceptual questions and provided peer reviews on the flowchart's clarity and accuracy. Their feedback helped identify gaps, suggest improvements, and ensure reusability for future learning. The responses were analyzed to assess learning effectiveness and track student progress.

Flowchart for reference and modifications:
https://drive.google.com/file/d/13r6jExTewhHcHtbaCI00ZMvpabusXf_E/view?usp=drive_link

Google Form for assessment and feedback:
https://forms.gle/wUwJd3ZNJ64mNXDw6

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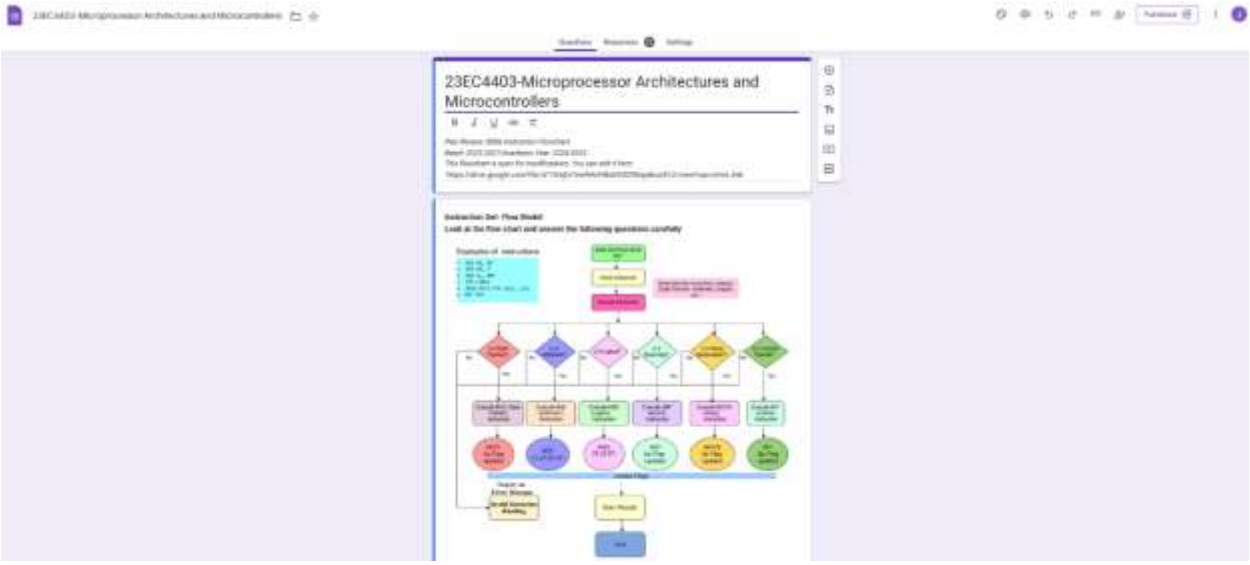
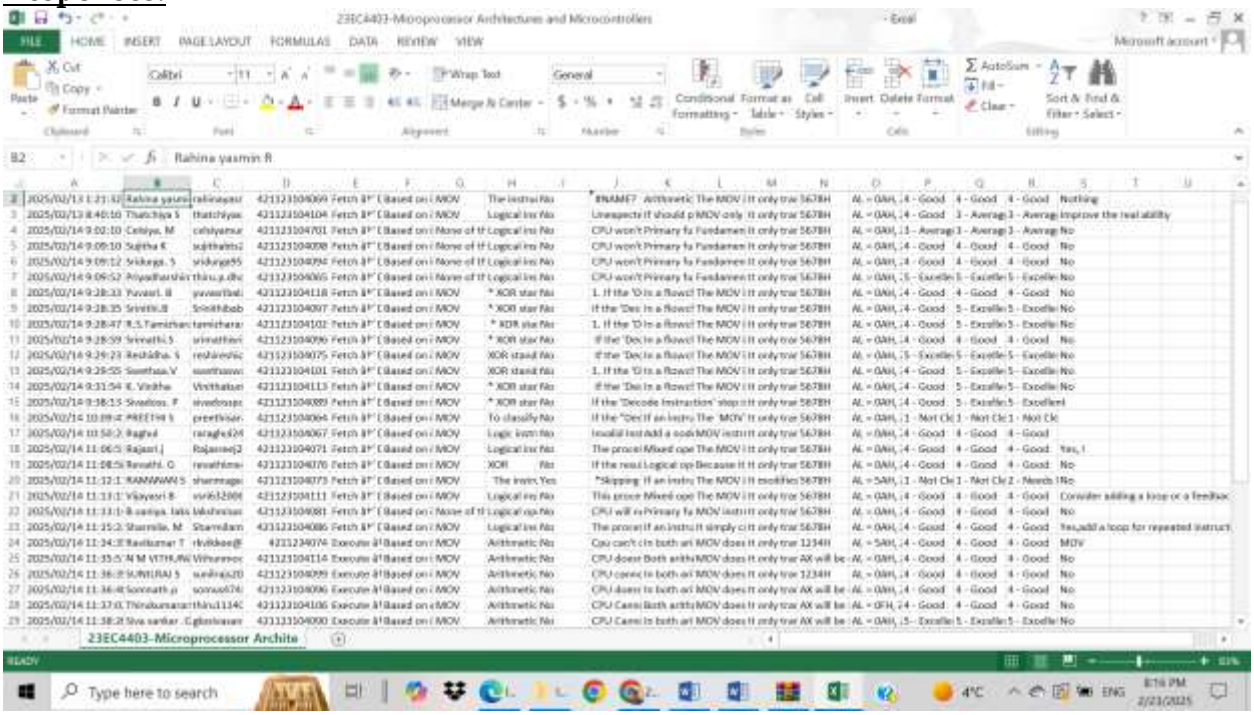


Responses:



Significance of Results

The method enhanced student engagement by providing a visual and interactive representation of the 8086 instruction set. Immediate feedback through conceptual questions helped students assess their understanding and identify areas for improvement. The above analysis indicates that the students have found the activity-based learning very interesting, educative, and helped them understand the subject better.

Note: The material is designed to be reproducible and adaptable, allowing other scholars to build upon it for further academic progress.

For review and critique contact: ***academics@ifet.ac.in***

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Department of Electronics and Communication Engineering

Innovative Teaching Methods

Academic Year: 2023-24 (Even Semester)

Course Name : **Industrial Safety**

Subject Code : **19UCEOE801**

Topic of Innovative Teaching : **Ionizing vs. Non-Ionizing Radiation**

Technique of Teaching : **Comparison Chart**

Faculty/Designation : **Mrs.G.Premalatha /Senior Assistant Professor**

Goals/ Objective of the method : To make the students clearly differentiate between Ionizing and Non-Ionizing Radiation in terms of energy, penetration, sources, and effects and enhances student learning by visual clarity through structured comparisons.

Description of method:

The comparison chart provides a visual representation of key differences in terms of energy levels, penetration power, sources, applications, and biological effects. By organizing information systematically, students can easily grasp complex concepts without confusion. By comparing the risks and benefits of ionizing and non-ionizing radiation, students develop critical thinking skills in assessing radiation-related technologies, such as medical imaging (X-rays, MRI), communication (Wi-Fi, 5G), and industrial applications. The chart also helps students evaluate radiation safety protocols and regulatory guidelines.

For review and critique contact : *pgsmartprem@gmail.com*

Significance of Results:

Using a comparison chart as an innovative teaching tool for ionizing and non-ionizing radiation enhances concept retention, critical thinking, and engagement among students. It transforms traditional learning into an interactive, real-world exploration of radiation technology, preparing students for practical applications in science, engineering, and healthcare.

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Feature	Ionizing Radiation	Non-Ionizing Radiation
Definition	Radiation with enough energy to remove tightly bound electrons from atoms, creating ions	Radiation that lacks the energy to ionize atoms but can excite electrons to higher energy states.
Energy Level	High energy (greater than 10 eV)	Low energy (less than 10 eV)
Wavelength	Short wavelength (high frequency)	Long wavelength (low frequency)
Biological Effects	Can damage DNA, leading to mutations, cancer, or cell death.	Can cause heating effects, such as tissue heating or burns.
Health Risks	Can cause radiation sickness, cancer, and genetic mutations with prolonged exposure.	Prolonged exposure can lead to burns, cataracts, and potential tissue damage.
Examples	X-rays, Gamma rays, Alpha particles, Beta particles	Radio waves, Microwaves, Infrared radiation, Visible light
Penetration Power	High penetration (X-rays, gamma rays) or limited (alpha and beta particles)	Lower penetration, mostly absorbed at the surface level.

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Department of Electronics and Communication Engineering

Innovative Teaching Methods

Academic Year: 2023-24 (Odd Semester)

Course Name : **Electronic Devices**

Subject Code : **23EC1301**

Topic of Innovative Teaching : **CE, CB, CC configurations and characteristics**

Technique of Teaching : **Comparison Chart**

Faculty/Designation : **Mrs.K.Keerthiga**

Goals/ Objective of the method : The objective of the method for analyzing CE, CB, and CC configurations is to evaluate students' understanding of transistor behavior in these configurations. It aims to assess their ability to identify key characteristics such as gain, impedance, phase shift, and their practical applications in real-world circuit design and analysis.

Description of method (8 – 10 lines):

The method for analyzing the Common-Emitter (CE), Common-Base (CB), and Common-Collector (CC) transistor configurations involves studying their respective amplifier behaviors, input and output impedances, voltage and current gains, and phase shifts. In a CE configuration, the transistor is biased with the emitter as the common terminal, offering high voltage gain and moderate current gain, making it suitable for general amplification purposes. The CB configuration, with the base as the common terminal, is used for high-frequency applications due to its low input impedance and high voltage gain, though it provides low current gain. The CC configuration, where the collector is the common terminal, acts as a buffer due to its high current gain and low voltage gain, often used for impedance matching. By comparing these configurations, we can evaluate their strengths and weaknesses for specific circuit applications, making informed decisions on design based on their distinct characteristics.

For review and critique contact: ***jayalakshmyece@ifet.ac.in***

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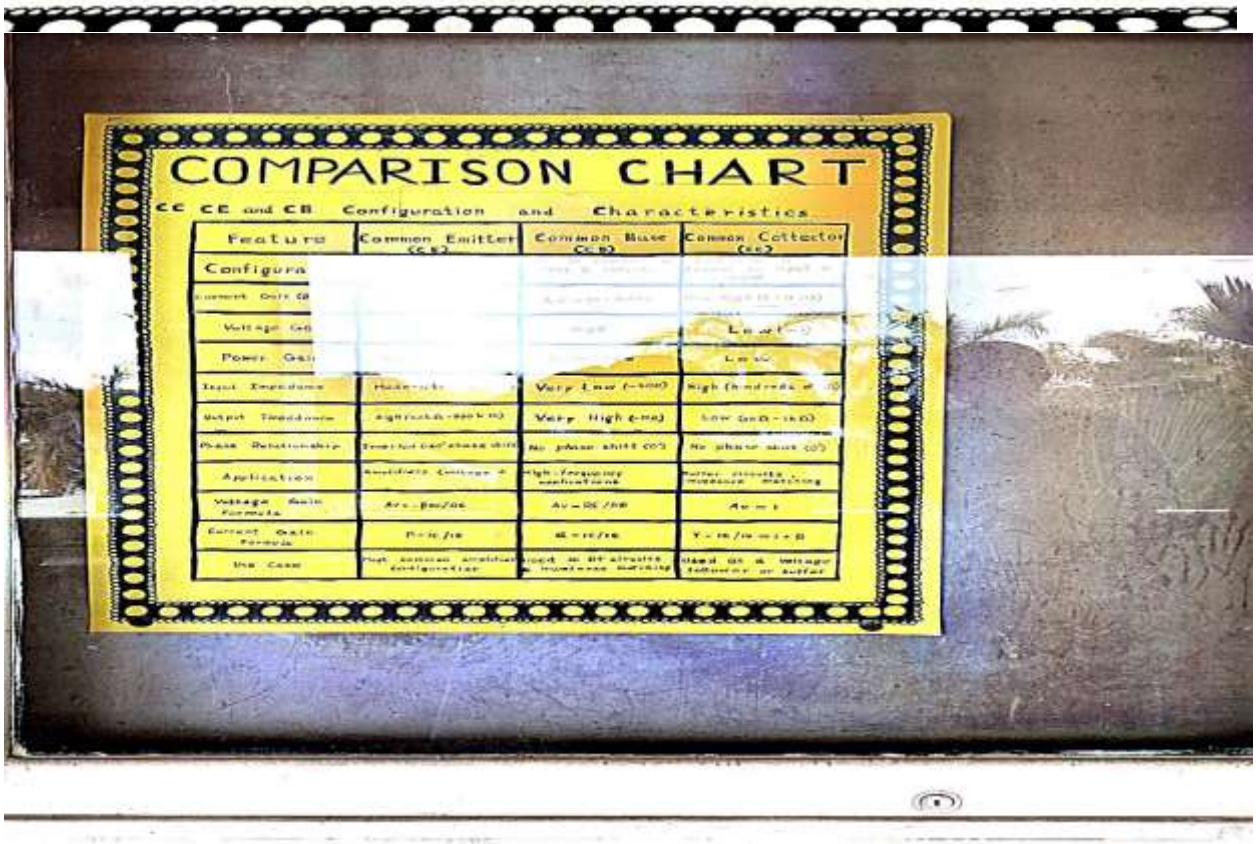
COMPARISON CHART

CC CE and CB Configuration and Characteristics

Feature	Common Emitter (CE)	Common Base (CB)	Common Collector (CC)
Configuration	Emitter is common to input & output	Base is common to input & output	Collector is common to input & output
Current Gain (β or α)	High (β = IC/IB)	Low (α = IC/IE)	Very high (γ = IE/IB)
Voltage Gain	High	High	Low (~1)
Power Gain	Very High	Moderate	Low
Input Impedance	Moderate (1kΩ - 5kΩ)	Very Low (~50Ω)	High (hundreds of kΩ)
Output Impedance	High (50kΩ - 500kΩ)	Very High (~MΩ)	Low (50Ω - 1kΩ)
Phase Relationship	Inverted (180° phase shift)	No phase shift (0°)	No phase shift (0°)
Application	Amplifiers (voltage &	High-frequency applications	Buffer circuits, impedance matching
Voltage Gain Formula	Av = -βRC/RE	Av = RC/RE	Av ≈ 1
Current Gain Formula	β = IC/IB	α = IC/IE	γ = IE/IB = 1 + β
Use Case	Most common amplifier configuration	Used in RF circuits & impedance matching	Used as a voltage follower or buffer



Note: The material is designed to be reproducible and adaptable, allowing other scholars to build upon it for further academic progress.

Significance of Results

The results from analyzing the CE, CB, and CC configurations highlight key differences in their performance, making each suitable for specific applications. The Common-Emitter (CE) configuration is highly significant for amplification due to its high voltage gain, though it comes with low input impedance. This makes it ideal for signal processing in audio and RF amplification. The Common-Base (CB) configuration, with its low input and voltage gain, is crucial in high-frequency applications like oscillators and radio-frequency (RF) amplifiers, where stability and minimal noise are essential. On the other hand, the Common-Collector (CC) configuration is valued for its high current gain and low output impedance, making it ideal for impedance matching and buffering, as it allows efficient transfer of current without significant loss. Each configuration serves a unique purpose based on the desired characteristics such as voltage, current gain, and impedance, thus guiding circuit designers to select the right configuration based on application needs. Understanding these characteristics is critical for effective circuit design and optimization.

Note: The material is designed to be reproducible and adaptable, allowing other scholars to build upon it for further academic progress.

Experiential Learning

Sl.No	Subject code & Name	Topic	Technique
1.	19UECES502 - Computer Networks	Data link layer	Role play
2.	19UECPE711 - ARM system architecture	Memory Management	Role play
3.	19UECPC404 - Control Systems	State Variables of Dynamic systems	Demonstration
4.	19UECPE711 - ARM system architecture	ARM Coprocessor interface	Hardware demonstration

IFET Autonomous College of Engineering
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Department of Electronics and Communication Engineering

Innovative Teaching Methods

Academic Year: 2024-25 (Odd Semester)

Course Name : **Computer Networks**

Subject Code : **19UECES502**

Topic of Innovative Teaching : **DLL**

Technique of Teaching : **Roleplay**

Faculty/Designation : **Dr.D.Prabakaran**

Goals/ Objective of the method : To visualize the structure of a neural network with 3 input neurons, 4 hidden neurons, and 3 output neurons, and enhance understanding through an animated GIF created using Matplotlib and FuncAnimation.

Description of method (8 – 10 lines):

An animated visualization was created using Matplotlib and FuncAnimation to illustrate the structure of a neural network with 3 input neurons, 4 hidden neurons, and 3 output neurons. The animation dynamically represents the connections and flow of information between layers, making the concept more engaging and intuitive. The generated GIF serves as a learning tool, helping students visualize neural network architectures effectively.

Note: The material is designed to be reproducible and adaptable, allowing other scholars to build upon it for further academic progress.

Significance of Results

The animated neural network visualization helps students grasp the structure and data flow in neural networks more intuitively. The shared GIF and source code allow students to explore, modify, and experiment with neural network architectures independently.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Innovative Teaching Methods

Academic Year: 2023-24 (ODD Semester)

Course Name : **ARM SYSTEM ARCHITECTURES**

Subject Code : **19UECPE711**

Topic of Innovative Teaching : **Memory Management**

Technique of Teaching : **Roleplay Activity**

Faculty/Designation : **Mrs.A.Devi**

Learning Objective of the method: To understand key concepts of memory management, including allocation, deallocation, paging, segmentation, and memory fragmentation.

Description of method

The roleplay activity is designed to provide students with a hands-on, interactive learning experience to understand the key concepts of memory management in ARM system architectures. By assigning specific roles to students and simulating real-world memory management scenarios, the activity helps students visualize and internalize abstract concepts like memory allocation, deallocation, paging, segmentation, and fragmentation.

ROLE-PLAY SCENE BREAKDOWN

Scene 1: Memory Allocation (Led by ABINASH)

- **Activity:**
  - ANBUSELVAN and DEVANATHAN (RAM) allocate blocks to ABINASH (P1) and KAVYA (P2).
  - ABINASH’s request fits perfectly, while KAVYA's request causes fragmentation.
- **Learning Outcome:** Highlights external memory fragmentation and its impact on memory allocation.

Note: The material is designed to be reproducible and adaptable, allowing other scholars to build upon it for further academic progress.

Scene 2: Paging and Segmentation (Led by BLESSED RAJ)

- **Activity:**
  - ANBUSELVAN (RAM) is full, and BLESSED RAJ (Virtual Memory Manager) swaps GAYATHRI's (P3) data to disk storage.
  - Physical memory constraints are handled using a paging mechanism.
- **Learning Outcome:** Demonstrates how paging and segmentation resolve memory constraints.

Scene 3: Memory Deallocation and Garbage Collection (Led by LAVANYA)

- **Activity:**
  - GAYATHRI (P3) completes the task and releases memory.
  - LAVANYA (Garbage Collector) reclaims fragmented blocks and optimizes memory usage.
- **Learning Outcome:** Understands the importance of deallocation and garbage collection in memory optimization.

Debriefing and Discussion:

After the roleplay activity, a debriefing session was conducted to reinforce key concepts and provide students with an opportunity to reflect on their learning. During this session, each group shared their experiences, challenges faced, and insights gained from their respective roles. The instructor facilitated a discussion on how these concepts apply to ARM system architectures, particularly the role of the Memory Management Unit (MMU) and virtual memory in real-world systems. Students were encouraged to suggest solutions to fragmentation and memory constraints, fostering critical thinking and collaborative problem-solving.

Significance of Results:

The method enhanced student engagement by providing a visual and interactive representation of memory management concepts, such as allocation, deallocation, paging, segmentation, and fragmentation. Immediate feedback through roleplay scenarios and debriefing sessions helped students assess their understanding and identify areas for improvement. The above analysis indicates that the students found the activity-based learning approach very interesting, educative, and effective in helping them grasp the subject better.

Note: The material is designed to be reproducible and adaptable, allowing other scholars to build upon it for further academic progress.

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Department of Electronics and Communication Engineering

Innovative Teaching Methods

Academic Year: 2022-23 (Odd Semester)

Course Name : **CONTROL SYSTEMS**

Subject Code : **19UECPC404**

Topic of Innovative Teaching : **State Variables of Dynamic systems**

Technique of Teaching : **Demonstration**

Faculty/Designation : **Mr. Jaya Kumar A/ASP**

Goals/ Objective of the method :

By the end of this session, students will be able to:

- Simulate **state-space equations** and visualize system response.

Description of method :

Students can enter initial conditions (x_0, v_0), mass (m), damping (b), and spring constant (k).

The GUI plots displacement over time.

Allows dynamic simulation by changing parameters and observing results.

Demonstration Link:

https://drive.google.com/file/d/11WtZrtJQym1sc_kwMOafEiqfBeGaw8KG/view?usp=drive_link

Text book: Dorf R. C and Bishop, R. H, "Modern control systems", Thirteenth Edition, Pearson2016

For review and critique contact: *jayangce@gmail.com*

Note: The material is designed to be reproducible and adaptable, allowing other scholars to build upon it for further academic progress.

Tasks:
Inputs:

Mass (m), damping (b), and spring constant (k).

- *Initial displacement (x0x_0x0) and velocity (v0v_0v0).*

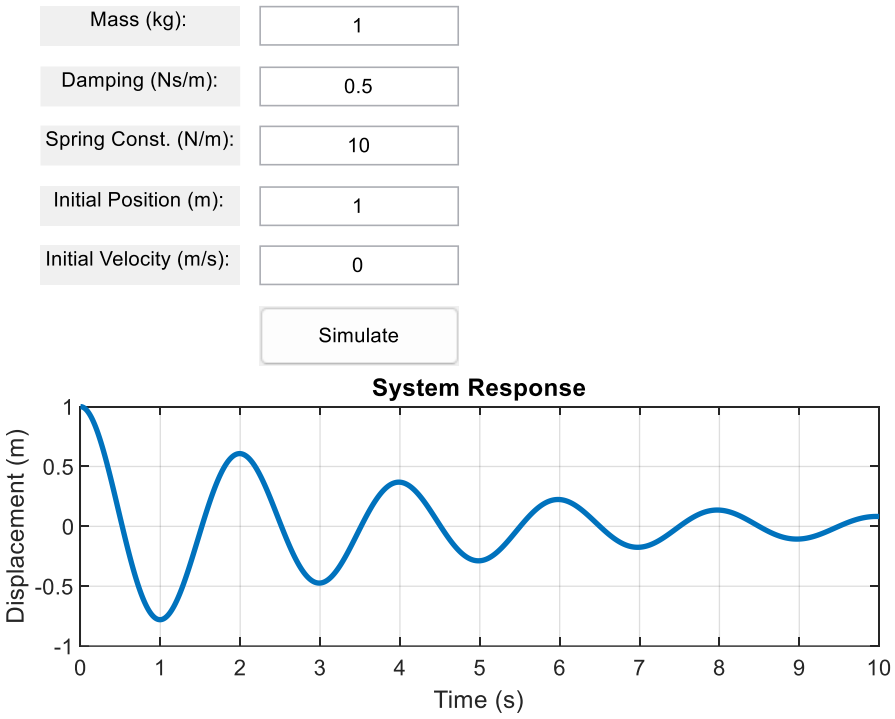
Press "Simulate" Button:

- *The system computes the state-space response using MATLAB's initial function.*
- *Plots displacement vs. time.*

Dynamic Interaction:

- *Students are asked to modify inputs and observe the outputs.*

Sample Output:



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Post Class homework:

IFET Autonomous College of Engineering

Department of Electronics and Communication Engineering
Academic Year: 2022-23 (Odd Semester)

Course Name	: SIGNALS AND SYSTEMS
Subject Code	: 19UECPC404
Topic of Innovative Teaching	: State variables of dynamic systems
Technique of Teaching	: Demonstration

Post class homework

1. What does the A matrix represent in this system?
2. How does the B matrix affect input forces?
3. What happens if b=0 (no damping)?
4. Compare state-space vs. transfer function models.
5. What happens if damping increases?
6. Make D=[1,0] and observe the results.

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Feedback Form:

Department of Electronics and Communication Engineering
Academic Year: 2022-23 (Odd Semester)

Course Name	: SIGNALS AND SYSTEMS
Subject Code	: 19UECPC303
Topic of Innovative Teaching	: State variables of dynamic systems
Technique of Teaching	: Demonstration
Name of the Faculty	: Mr.Jayakumar A

Feedback Form

1. *How well did you understand the topic after the demonstration?*
   - [x] Very Clear
   - [ ] Clear
   - [ ] Somewhat Clear
   - [ ] Not Clear
2. *Did the demonstration help clarify the concept of state variables?*
   - [x] Yes, completely
   - [ ] Somewhat
   - [ ] No, I still have doubts
3. *Was the demonstration engaging and interactive?*
   - [x] Very engaging
   - [ ] Somewhat engaging
   - [ ] Neutral
   - [ ] Not engaging
4. *Did the MATLAB or graphical representation aid in your understanding?*
   - [x] Very helpful
   - [ ] Somewhat helpful
   - [ ] Not helpful
5. **What did you like most about this session?**
   (Write your response here)
   Demonstration
6. **Suggestions for improvement:**
   (Write your response here)
   More demos can be given.

Significance of Results

State variables are fundamental to dynamic system analysis, but they can be difficult to grasp in purely mathematical form. A demonstration using MATLAB or graphical tools helps students visualize how state variables evolve over time. Instead of just learning equations, students see real-time system responses (e.g., step response, impulse response), reinforcing how theory translates into practical system behavior.

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Department of Electronics and Communication Engineering

Innovative Teaching Methods

Academic Year: 2022-23 (ODD Semester)

Course Name : **ARM SYSTEM ARCHITECTURES**

Subject Code : **19UECPE711**

Topic of Innovative Teaching : **ARM COPROCESSOR INTERFACE**

Technique of Teaching : **Hardware Demonstration Activity**

Faculty/Designation : **Mrs.A.Devi**

Learning Objectives:

- Understand the role of coprocessors in ARM architecture.
- Explore how ARM CPUs communicate with coprocessors via the coprocessor interface.
- Demonstrate real-world hardware examples using coprocessor instructions.

a. Introduction (15 minutes)

- Brief lecture with visuals explaining:
  - What a coprocessor is and its role in ARM architecture.
  - Common coprocessors (Floating Point Unit (FPU), DSP engines).

b. Interactive Visual Demonstration (20 minutes)

- **Hardware Simulation:**
  Used an ARM development board i.e **Raspberry Pi Pico**.
- **Demo Task:** Shown how floating-point operations are offloaded to an FPU coprocessor.
  - Write a simple program in ARM assembly that demonstrates floating-point arithmetic with the coprocessor (e.g., `VCVT`, `VMUL`).
  - Explain register access (`CP15`, `Coprocessor Load/Store instructions`).
  - Coprocessor interface components (signals, registers, and data pathways).

c. Experiment Hands-On (30 minutes)

Task:
Students created a simple coprocessor-based application:

- Used an ARM MCU and connect an **external cryptographic coprocessor i.e. ATECC608A**.

Note: The material is designed to be reproducible and adaptable, allowing other scholars to build upon it for further academic progress.

- Write code to offload a basic cryptographic operation, such as key generation or encryption.

d. Visual Debugging Tools (15 minutes)

- Used **Keil uVision** to visualize register operations during coprocessor transactions.
- Shown step-by-step debugging to trace data transfer between ARM and the coprocessor.

e. Group Discussion (10 minutes)

Discuss the impact of coprocessors in:

- Modern IoT devices
- AI/ML applications
- Multimedia processing (image and signal processing)

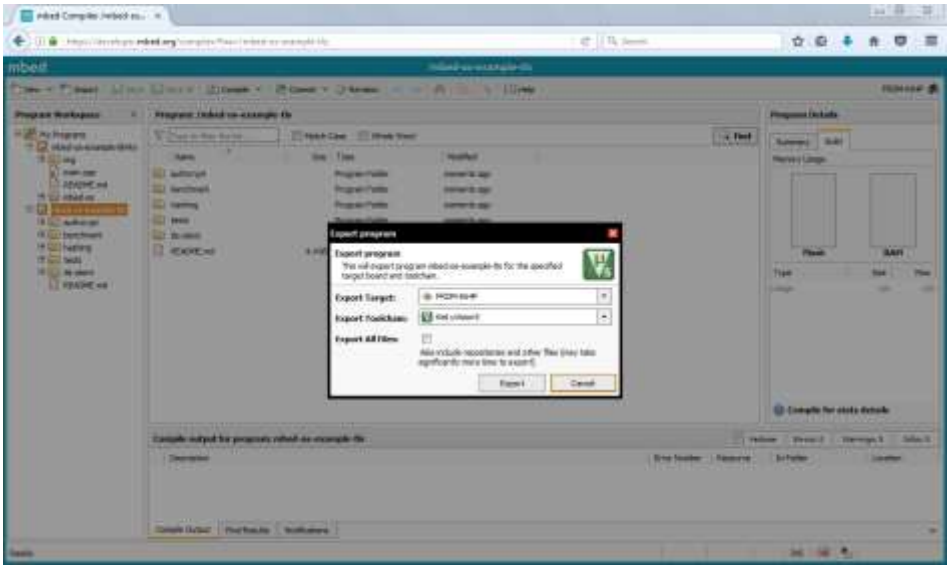
Key Takeaways:

- Coprocessors enhance ARM system performance by offloading specialized tasks.
- The coprocessor interface enables seamless communication between the CPU and coprocessors.
- Hands-on experimentation and debugging tools provide practical insights into coprocessor functionality.

Student Feedback and Surveys: Sample attached

Visual Evidence: Group Discussion

Note: The material is designed to be reproducible and adaptable, allowing other scholars to build upon it for further academic progress.



Keil uVision Usage

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Visual Aids & Conceptual Tools

Sl.No	Subject code & Name	Topic	Technique
1.	19UMBHS701 - Professional Ethics	Code of ethics	Concept Sketch
2.	19UMBHS701 - Professional Ethics	Honesty	Animation
3.	19UCEOE801 - Industrial Safety	FMEA	Concept Sketch
4.	23AM4404 - Computer Networks	Application Layer Protocols	Concept Sketch
5.	23AM4404 - Computer Networks	Network security	Infograph
6.	23AM4404 - Computer Networks	OSI LAYER	Concept Sketch

IFET Autonomous College of Engineering
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Department of Electronics and Communication Engineering

Innovative Teaching Methods

Academic Year: 2022-23 (Odd Semester)

Course Name : **Professional Ethics**

Subject Code : **19UMBHS701**

Topic of Innovative Teaching :**Code of Ethics**

Technique of Teaching : **Concept Map Activity**

Faculty/Designation :**Mrs.G.Premalatha**

Goals/ Objective of the method : To provide a **clear and structured understanding** of the **ethical principles, responsibilities, and decision-making processes** that engineering students must follow to uphold professional integrity and societal trust.

Description of method (8 – 10) lines:

The **concept mapping method** is a visual learning tool that helps engineering students understand the **Code of Ethics** by organizing key principles and relationships in a structured format. The central concept, **"Code of Ethics in Engineering,"** branches into core areas like **principles (honesty, integrity, responsibility), fundamental canons (public safety, competence, truthfulness), professional responsibilities (legal compliance, accountability), ethical decision-making, and key stakeholders.** Logical connections between concepts are illustrated using lines and keywords to show relationships. This method enhances **critical thinking, retention, and ethical awareness** by simplifying complex ideas into an easy-to-follow diagram. It encourages students to apply ethical principles to real-world engineering challenges, fostering responsible decision-making. Color coding, symbols, and clear labels improve clarity and engagement. Concept maps serve as an **effective tool** for ethical education, linking theory to practical application.

Concept map for reference and modifications: Scanned proof attached

For review and critique contact: **pgsmartprem@gmail.com**

Significance of Results

The **concept mapping method** is highly significant in engineering ethics education as it enhances **understanding, retention, and application** of the **Code of Ethics**. By visually organizing ethical principles, responsibilities, and decision-making

processes, it helps students grasp complex relationships **more effectively than traditional text-based learning**. It promotes **critical thinking** by encouraging students to analyze ethical dilemmas and make informed decisions. The method **bridges theory and practice**, preparing future engineers to uphold integrity and accountability in real-world situations. Additionally, concept maps serve as a **quick reference tool**, improving recall and reinforcing ethical awareness.

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Department of Electronics and Communication Engineering

Innovative Teaching Methods

Academic Year: 2022-23 (Odd Semester)

Course Name : **Professional Ethics**

Subject Code : **19UMBHS701**

Topic of Innovative Teaching : **Honesty**

Technique of Teaching : **Animation Activity**

Faculty/Designation :**Mrs.G.Premalatha**

Goals/ Objective of the method : To educate engineering students on the significance of **honesty in professional practice** and its impact on ethical decision-making, trust, and safety in engineering.

Description of method (8 – 10) lines:

This animation visually represents the concept of high honesty in professional ethics through a workplace scenario. It starts with an employee facing an ethical dilemma—choosing between reporting an accounting error or staying silent. The animation shows the employee contemplating their decision, followed by scenes of integrity, where they truthfully report the mistake despite possible consequences. As a result, their honesty earns respect and strengthens workplace trust. The animation contrasts this with a dishonest approach, showing the negative impact of deception. Using engaging visuals and smooth transitions, the animation emphasizes ethical values, transparency, and professional integrity.

Concept map for reference and modifications:
https://drive.google.com/file/d/1oQ8hrkdpNB4lLFqPlry9aDzzTmpbz0Q/view?usp=sharing

For review and critique contact: **pgsmartprem@gmail.com**

Significance of Results

The animation highlights the importance of honesty in professional ethics by demonstrating its positive impact on individuals and organizations. The results emphasize that truthfulness fosters trust, credibility, and long-term success in a professional setting. Employees who uphold honesty contribute to a culture of

transparency and accountability, reducing risks of fraud, legal issues, and reputational damage. The animation also shows how ethical behavior enhances teamwork, job satisfaction, and leadership credibility. Conversely, the negative consequences of dishonesty—such as loss of trust, conflicts, and organizational decline—reinforce the necessity of maintaining integrity in professional practices.

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Department of Electronics and Communication Engineering
Innovative Teaching Methods
Academic Year: 2023-24 (Even Semester)

Course Name : **Industrial Safety**
Subject Code : **19UCEOE801**
Topic of Innovative Teaching : **FMEA**
Technique of Teaching : **Concept sketch**
Faculty/Designation : **Mrs.G.Premalatha /Senior Assistant Professor**

Goals/ Objective of the method : A concept sketch is a visual representation of the FMEA process that simplifies complex ideas through diagrams, flowcharts, and tables. The objective of using a concept sketch includes:

- Helps students grasp FMEA concepts faster by seeing the relationships between failure modes, causes, and effects.
- A structured layout makes it easier to understand risk analysis.
- Students can collaborate on sketches to develop FMEA models for different systems.
- It fosters teamwork and discussion-based learning.
- It provides a simplified breakdown of key FMEA steps.

Description of method:

A concept sketch is a simplified visual diagram that:

- Represents key ideas, relationships, and processes using minimal text.
- Uses arrows, symbols, and labels to create a structured understanding.
- Encourages students to think critically and make connections between concepts. Can be hand-drawn or digitally created for better visualization.
- Simplifies complex topics by providing a structured representation. Helps students see relationships between different ideas more clearly.
- Aids in memory retention by engaging both verbal and visual processing.

For review and critique contact : pgsmartprem@gmail.com

Significance of Results:

- This approach enhances students' problem-solving skills, analytical thinking, and ability to apply FMEA to real-world engineering challenges.
- Students create their own concept sketches, leading to better engagement.
- A concept sketch acts as a ready reference for students during assignments, exams, and projects.
- Helps in developing analytical reasoning by breaking down information systematically.

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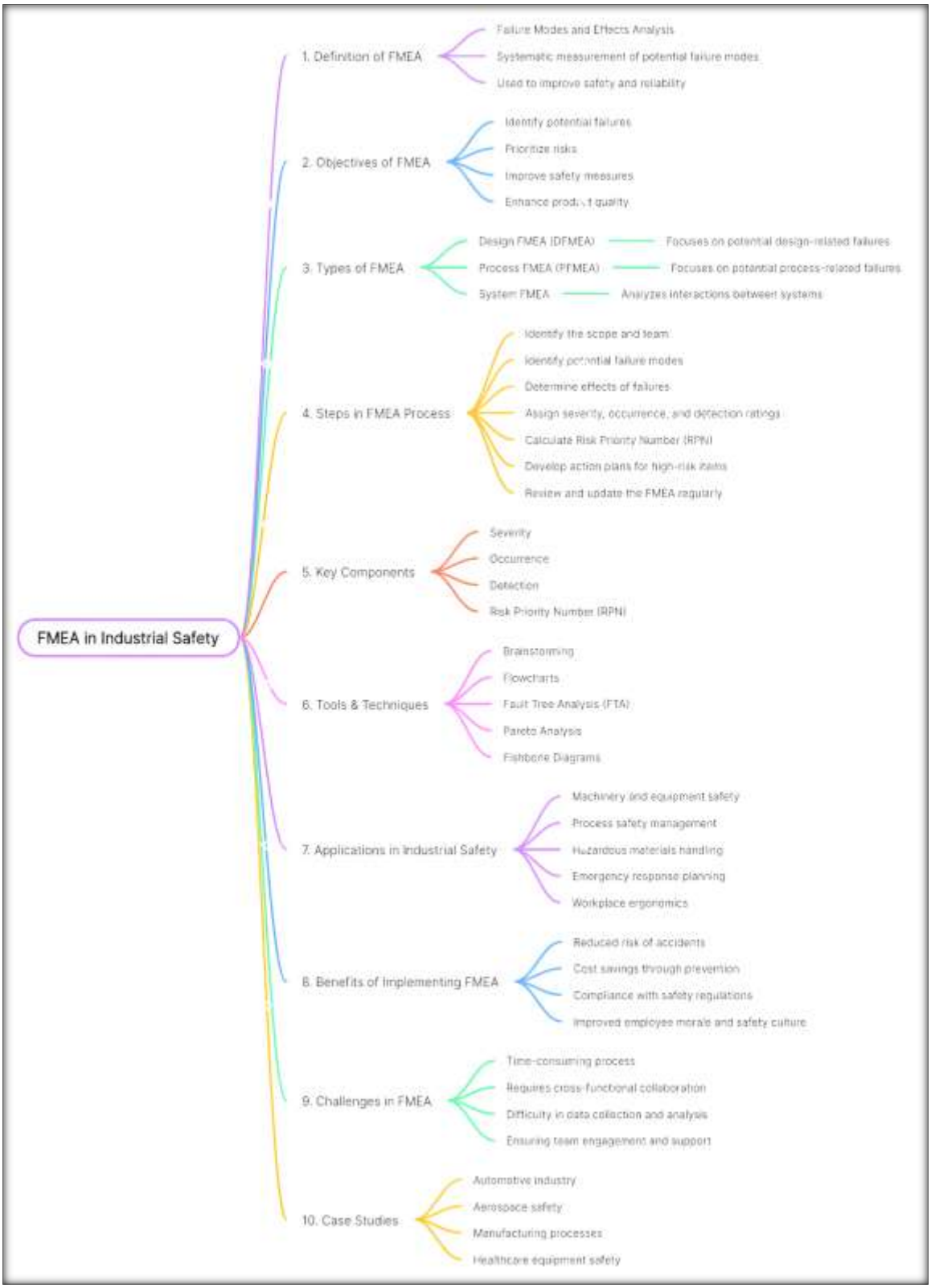
FMEA - CONCEPT SKETCH



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Department of Electronics and Communication Engineering

Innovative Teaching Methods

Academic Year: 2024-25 (ODD Semester)

Course Name : **Computer Networks**

Subject Code : **23AM4404**

Topic of Innovative Teaching : **Application Layer Protocols**

Technique of Teaching : **Concept Sketch**

Faculty/Designation : **Mrs.M.Jayasudha**

Goals/ Objective of the method : The goal of applying the **concept sketch method** to **Application Layer Protocols** is to enhance comprehension by visually organizing key concepts. This approach simplifies complex protocols like **HTTP, FTP, SMTP, DNS, and DHCP** using structured diagrams, flowcharts, and mind maps. By mapping protocol functions, message exchanges, and real-world applications, learners can better grasp their roles in communication networks.

Description of method (8 – 10 lines):

- **Concept Mapping Approach** – Uses visual diagrams to represent relationships between various application layer protocols.
- **Layered Structure** – Illustrates how protocols function within the application layer of the OSI and TCP/IP models.
- **Icon-Based Representation** – Utilizes symbols and icons for protocols like HTTP, FTP, SMTP, DNS, and DHCP.
- **Color Coding** – Differentiates protocols based on their functions, such as web communication, file transfer, and email services.
- **Flowchart Integration** – Depicts request-response mechanisms and data flow between client and server.
- **Comparison Tables** – Highlights differences and similarities between protocols for easy reference.
- **Real-World Examples** – Connects theoretical concepts with practical applications like web browsing and email exchange.
- **Step-by-Step Process** – Breaks down how protocols interact, ensuring a structured learning approach.

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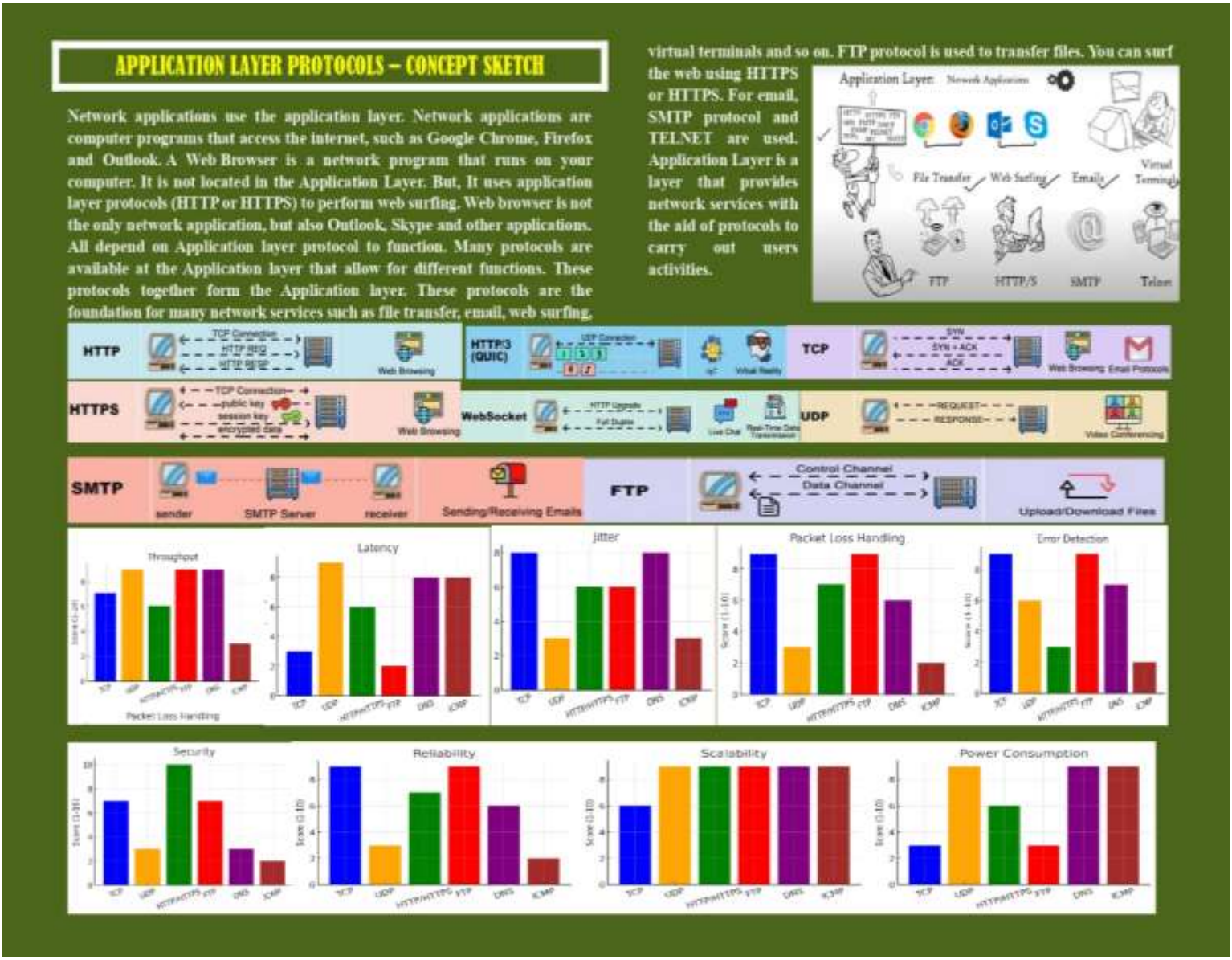
- **Interactive Elements** – Encourages active learning through quizzes and exercises based on concept maps.
- **Scenario-Based Learning** – Uses real-life situations to demonstrate protocol behavior and troubleshooting.
- **Simplified Terminology** – Presents information in an easy-to-understand format for learners of all levels.
- **Enhanced Engagement** – Makes complex networking concepts more accessible and visually appealing.

For review and critique contact: ***jayas1128@gmail.com***



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Metric	TCP (Transmission Control Protocol)	UDP (User Datagram Protocol)	HTTP/HTTPS (Hypertext Transfer Protocol)	FTP (File Transfer Protocol)	DNS (Domain Name System)	ICMP (Internet Control Message Protocol)
Throughput	Medium-High (depends on congestion control)	High (no congestion control)	Medium	High	High	Low
Latency (Delay)	Higher (due to acknowledgments & retransmissions)	Low	Medium	High	Low	Low
Jitter	Low (stable connection)	High (no retransmission or ordering)	Medium	Medium	Low	High
Packet Loss Handling	Retransmits lost packets	No retransmission	Uses TCP or UDP	Uses TCP	Uses UDP	No retransmission
Error Detection	Yes (Checksum, ACK/NACK)	Yes (Checksum only)	No direct mechanism	Yes (TCP-based)	Yes (UDP-based)	No
Security	Moderate (can use TLS over TCP)	Low (no security features)	High (HTTPS with TLS)	Moderate (can use SSL/TLS)	Low (vulnerable to attacks)	Low (prone to spoofing)
Reliability	High (guaranteed delivery)	Low (no guarantee of delivery)	Medium (depends on TCP/UDP)	High	Medium	Low
Scalability	Moderate (stateful, requires handshaking)	High (stateless)	High	High	High	High
Power Consumption	High (maintains state, retransmits)	Low (stateless, no retransmission)	Medium	High	Low	Low
Use Case	Web browsing, email, file transfer (reliable data transfer)	Streaming, VoIP, gaming (low-latency apps)	Web pages & secure transactions	Large file transfers	Domain name resolution	Network diagnostics (ping, traceroute)
Connection Type	Connection-oriented	Connectionless	Connectionless (stateless)	Connection-oriented	Connectionless	Connectionless

Significance of Results

The significance of the results for application layer protocols lies in the enhanced understanding of how different protocols operate and interact within the application layer of network communication. By visually representing protocols like HTTP, FTP, SMTP, DNS, and DHCP, learners can easily differentiate their functions and real-world applications. This method clarifies complex concepts by simplifying their roles in facilitating web browsing, email communication, file transfers, and domain name resolution. The use of color-coded diagrams, flowcharts, and interactive elements strengthens engagement and promotes active learning. As a result, students gain a deeper insight into the practical applications of these protocols, which are essential for troubleshooting and optimizing network services. The method not only aids in knowledge retention but also empowers learners to apply their understanding effectively in real-world scenarios.

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Department of Electronics and Communication Engineering

Innovative Teaching Methods

Academic Year: 2024-25 (ODD Semester)

Course Name : **Computer Networks**

Subject Code : **23AM4404**

Topic of Innovative Teaching : **Network Topologies**

Technique of Teaching : **Infographic**

Faculty/Designation : **Mrs.M.Jayasudha**

Goals/ Objective of the method : To Simplify complex network structures into visually appealing and easy-to-understand graphics and also it helps students grasp relationships between different network topologies quickly.

Description of method (8 – 10 lines):

The **infographic-based teaching method** for **network topology** utilizes visually structured diagrams, icons, and color-coded elements to simplify complex concepts. It presents different network topologies (such as bus, star, ring, mesh, and hybrid) using engaging graphics, real-world examples, and step-by-step explanations. Interactive elements like flowcharts, comparison tables, and mind maps help students analyze differences and applications effectively. The method promotes active learning by incorporating scenario-based problem-solving, quizzes, and animations to enhance engagement. Infographics provide a concise yet comprehensive way to explain network structures, improving knowledge retention and making learning more intuitive and accessible.

For review and critique contact: *jayas1128@gmail.com*

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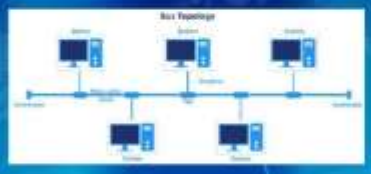
NETWORK TOPOLOGIES

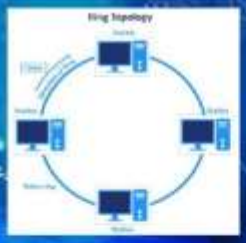
Network topology refers to the arrangement of various elements (nodes, links, etc.) in a computer network. It defines how devices are interconnected and communicate with each other. Different topologies offer varying advantages and are suited for specific applications. A network design that integrates multiple topologies is known as a 'hybrid topology,' a common practice in modern networking.

Consists of exactly two hosts (computers, switches, routers, or servers) connected directly using a single communication link. The receiving end of one host is connected to the sending end of the other, ensuring direct and efficient communication.

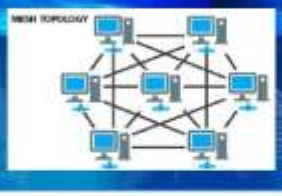


All hosts share a single communication line. This topology may have problems when multiple hosts send data at the same time. Therefore, Bus topology either uses CSMA/CD technology or recognizes one host as the Bus Master to solve the issue. A failure of a device does not affect the other devices, but failure of the shared communication line can make all other devices stop functioning.

A **Star Topology** is a network configuration where all devices are individually connected to a central hub, switch, or router, which acts as a communication point for data transfer. This setup ensures that each device has a dedicated connection, reducing the chances of network collisions and making troubleshooting easier. One of its key advantages is reliability—if one device fails, it does not affect the rest of the network. However, the central hub is a single point of failure; if it malfunctions, the entire network goes down. Star topology is widely used in office networks, home setups, and enterprise LANs due to its scalability and efficiency.

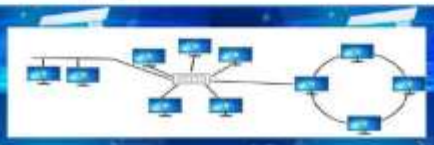


A **Ring Topology** is a network configuration where each device (node) is connected to exactly two other devices, forming a closed loop or ring. Data travels in one or both directions around the ring until it reaches its destination. Since there is no central hub, each node acts as a repeater, boosting and passing the data along the network. This topology ensures equal access to all devices, reducing data collisions. However, a major drawback is that if a single node or connection fails, the entire network can be disrupted unless a dual-ring setup is used for redundancy. Ring topology is commonly used in fiber-optic networks and older LAN technologies like Token Ring.



Each host is connected to one or multiple hosts. This topology has hosts in a point-to-point connection with every other host (Full Mesh) or may also have hosts that are in point-to-point connection with only a few hosts (Partially Mesh). Hosts in a Mesh topology also work as relays for other hosts that do not have direct point-to-point links.

Also known as Hierarchical Topology, this is the most common form of network topology in use presently. Tree topologies have a root node, and all other nodes are connected within a hierarchy. It is also known as a hierarchical topology. This topology integrates various Star topologies together in a single Bus, so it is known as a Star-Bus topology.



A combination of two or more different topologies. Commonly used in enterprise and data centre networks to optimize efficiency and flexibility. Example: A network may use a Star topology within departments and connect multiple departments using a Bus topology. Provides enhanced scalability, fault tolerance, and customization according to specific network requirements.

Note: The material is designed to be reproducible and adaptable, allowing other scholars to build upon it for further academic progress.

Significance of Results

The significance of the results lies in the improved understanding and retention of network topology concepts through visually structured infographics. By simplifying complex ideas with diagrams, icons, and color-coded elements, students grasp information more effectively. The use of real-world examples and interactive tools like flowcharts and comparison tables enhances analytical skills. Scenario-based problem-solving and quizzes promote active learning, keeping students engaged. Animations further clarify dynamic concepts, making learning more intuitive. This approach fosters better memory recall and long-term retention. Additionally, it provides an accessible and efficient way to compare and analyze different network topologies. Overall, infographic-based teaching makes technical education more engaging, effective, and learner-friendly.

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Department of Electronics and Communication Engineering

Innovative Teaching Methods

Academic Year: 2024-25 (ODD Semester)

Course Name : **Computer Networks**

Subject Code : **23AM4404**

Topic of Innovative Teaching : **OSI LAYER**

Technique of Teaching : **Concept Sketch**

Faculty/Designation : **Mrs.M.Jayasudha**

Goals/ Objective of the method : The goal of the OSI layer concept sketch method is to simplify the understanding of the seven layers of the OSI model by visually mapping their functions and interactions. It aims to provide a clear representation of how each layer operates and communicates with others in the network stack. By using color-coded diagrams, icons, and flowcharts, the method enables students to differentiate between each layer's role, such as physical, data link, network, transport, session, presentation, and application layers. The objective is to make complex networking concepts more intuitive, interactive, and engaging, enhancing students' ability to recall and apply them in real-world scenarios. Through this visual approach, learners can better grasp the hierarchical structure of the OSI model, improving both theoretical knowledge and practical skills in network communication.

Description of method (8 – 10 lines):

The OSI layer concept sketch method uses visual tools to represent and explain the seven layers of the OSI (Open Systems Interconnection) model. It employs diagrams, icons, and color-coded elements to clearly illustrate the functionality and interaction of each layer. The method breaks down each layer's specific roles, such as how the Physical Layer handles data transmission, the Network Layer manages routing, and the Application Layer facilitates user interaction. Flowcharts and comparison tables are integrated to show data flow and protocol interactions between layers. Interactive elements like quizzes and real-world examples allow for practical application, reinforcing understanding. This method also uses simplified terminology and step-by-step breakdowns to make the concept of network communication more accessible to learners of varying levels. By visualizing the OSI model in a structured way, students can more easily understand and retain the functions of each layer and how they collaborate to enable seamless network operations.

For review and critique contact: ***jayas1128@gmail.com***

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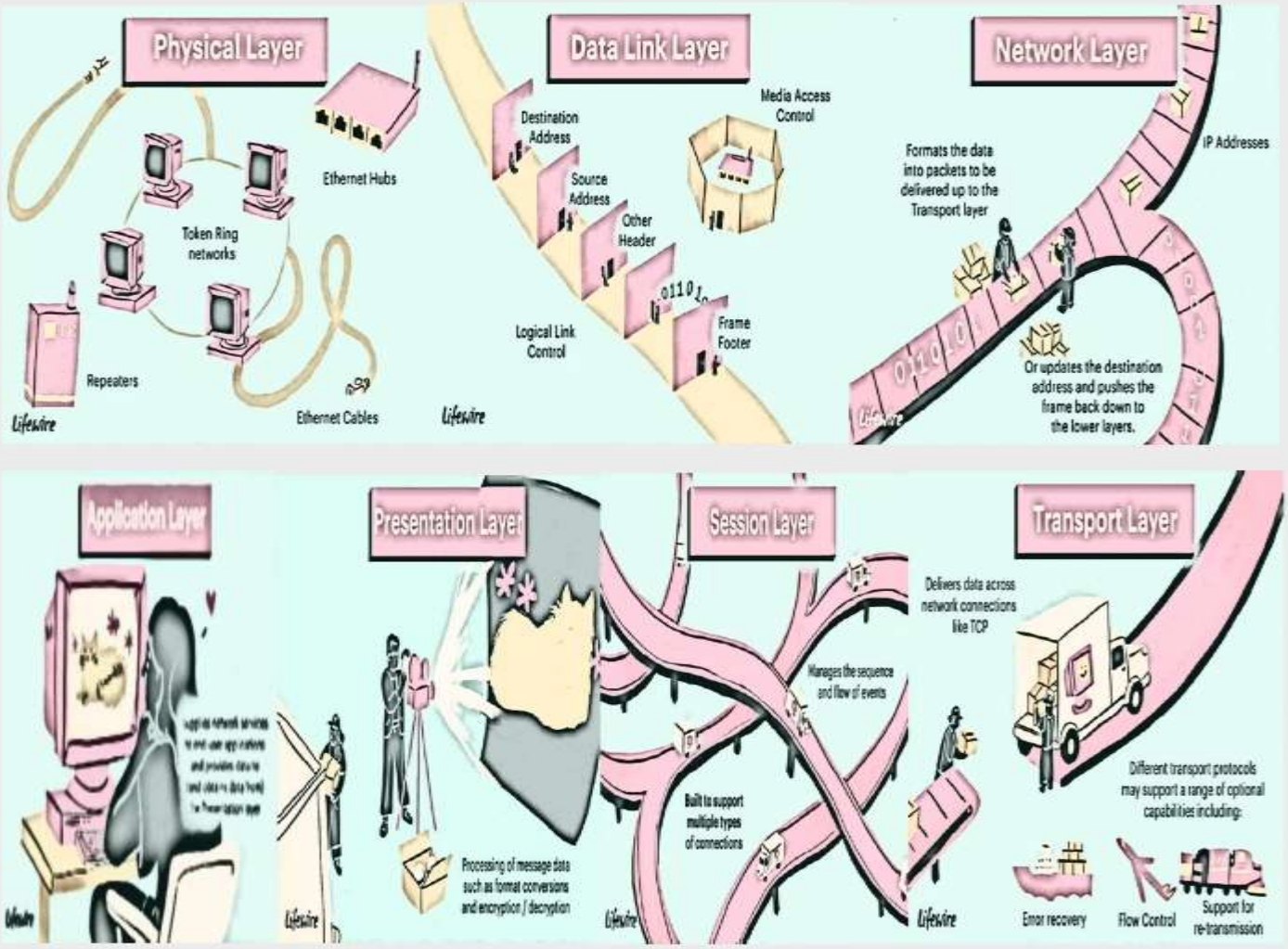
OSI LAYER CONCEPT SKETCH



Significance of Results

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