MACET MYSTICA

MAULANA AZAD COLLEGE OF ENGINEERING & TECHNOLOGY

EDITORIAL

Science models in engineering education are essential tools for visualizing and understanding concepts. They bridge the gap between theory and practice, enabling students to explore and experiment with ideas in a controlled environment.

These models serve multiple purposes:

Conceptual Understanding: They help students grasp complex scientific and engineering concepts by translating them into physical forms.

Innovation: Students are encouraged to think creatively and develop innovative solutions to real-world problems through model building.

Collaboration: The process often involves teamwork, fostering collaboration skills crucial in the professional engineering world.

Communication: Presenting a science model requires clear and effective communication, as students must explain their design process, the science behind their model, and its potential applications.

The process of developing and presenting a science model has a profound impact on engineering students. It encourages them to apply theoretical knowledge in practical scenarios, fostering a deeper understanding of their field. Additionally, it enhances critical skills such as problem-solving, teamwork, and communication.

Moreover, these presentations often inspire students to think about the broader implications of their work, including how their models could be applied to solve real-world problems. This aspect of learning is vital in engineering, where innovation and practicality are most important.

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CONTENTS

Emerging Nanomanufacturing Techniques with 2D Materials

Mrs. Mamata Kumari (Asst,. Prof.), ME

Nanomanufacturing acquires solitary features and applications which can function at molecular and super molecular extent to engage the elemental structure of material and system with enhanced mechanical, physical, chemical and biological, optical properties at controlled nano range between 1 and 100 nm with one-atom-thick plane sheet of paper bonded carbon atoms firmly filled up into a honeycomb crystal lattice in plane σ c-c bonds and out -of -plane π bonds. Graphene, Transition Metal Dichalcogenides (TMDs) silicene, borophene, germanene, mono-chalcogenides, phosphene i.e., MXene, SnSe, GaSe, and where M is Ti, V, Nb, Ta, etc., Bucky Tape, Black Phosphorus or phosphene, hexagonal boron nitride (h-BN), etc. are some 2D materials with high grade of flexibility and versatility. Top-down and bottom-up approaches have recommended various major techniques to facilitate electronic instruments, energy storage devices, industrialization and applications to enhance the quality in global nano market along with improvement in deposition process. Lithography (photolithography, electron & ion beam lithography, different NPs photolithography, atom lasers, X-ray lithography, co-precipitation, etc.), liquid phase deposition and chemical vapour deposition techniques used in preparation of 2D materials. Automated assembly is more feasible and reliable process than nanomachining techniques in terms of quality and exploring some new properties of 2D material. So far, optical and electrical properties only got attention whereas development in nanomanufacturing mechanical and magnetic properties still have great opportunities to grow and develop along with their physical phenomenon. Van der Waals heterogeneous structure and encapsulating 2D materials with hBN with effective environmental stability, mass production methods in electronics devices are recent challenges in experimental approach towards integration of 2D materials. High-quality performance in photodetector device can be controlled and manipulated at nanoscale to convert raw material into finished nano structural devices.
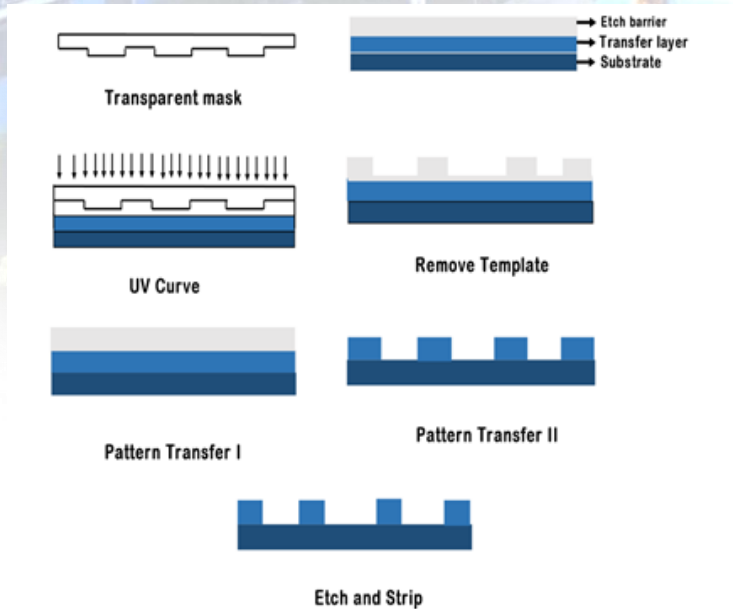
Step-and-flash imprint Lithography process (Step wise processes) are showing in the above diagram of making any imprint.

How to Secure Your Network: Best Practices and Tools

Mr. Zaffar Abbas, CSE

Securing your network is a crucial task for any organization to protect sensitive data and ensure operational integrity. Here are some best practices and tools to help you secure your network effectively:

Regularly Update Software and Firmware
Keep all systems, applications, and devices up-to-date with the latest patches and updates to prevent vulnerabilities.

Implement Strong Password Policies
Use strong passwords and do regular password changes.
Use password managers to store and manage passwords securely.

Use Multi-Factor Authentication (MFA)
Multiple forms of verification for access can be acquired by adding extra layer of security.

Network Segmentation
Divide your network into segments to limit access and reduce the impact of a potential breach.

Encrypt Data
Encryption can be done to protect data both at rest and in transit.
Implement SSL/TLS for secure communications.

Regularly Conduct Security Audits and Vulnerability Assessments
Identify and address security weaknesses through regular audits and assessments.

Implement a Robust Firewall and Intrusion Detection System (IDS)
Use firewalls to block unauthorized access and IDS to monitor and detect suspicious activities.

Use Secure VPNs for Remote Access
Ensure remote workers use VPNs to secure their connections to the corporate network.

Educate and Train Employees
Conduct regular security training sessions to raise awareness about cybersecurity threats and best practices.

Develop and Enforce a Security Policy
Create a comprehensive security policy that outlines the rules and procedures for maintaining network security.

Essential Tools for Network Security

Firewall
Examples: pfSense, Cisco ASA, Fortinet FortiGate
Function: Controls incoming and outgoing network traffic based on predetermined security rules.

Antivirus and Anti-Malware Software
Examples: Bitdefender, Malwarebytes, Norton
Function: Protects against malware, viruses, and other malicious software.

Intrusion Detection and Prevention Systems (IDPS)
Examples: Snort, Suricata, Palo Alto Networks
Function: Monitors network traffic for suspicious activity and takes action to prevent breaches.

Virtual Private Network (VPN)
Examples: OpenVPN, NordVPN, Cisco AnyConnect
Function: Encrypts internet connections and hides IP addresses to ensure secure remote access.

Security Information and Event Management (SIEM)
Examples: Splunk, IBM QRadar, LogRhythm
Function: Aggregates and analyzes activity from different resources across your IT infrastructure to identify potential security threats.

Encryption Tools
Examples: VeraCrypt, BitLocker, OpenSSL
Function: Encrypts data to protect it from unauthorized access.

Network Monitoring Tools
Examples: Nagios, SolarWinds, PRTG Network Monitor
Function: Continuously monitors network performance and alerts on potential issues.

Endpoint Security Solutions
Examples: Symantec Endpoint Protection, McAfee Endpoint Security
Function: Protects endpoints (desktops, laptops, mobile devices) from cybersecurity threats.

FDPs / Research Papers

Civil Engineering Department

Mr. ZEESHAN FAROOQUE

- Successfully Completed One Week Faculty Development Programme on "**Research Methodology for Engineering and Sciences**" organised by NITTTR Kolkata, conducted from 27th May to 31st May, 2024.

Computer Science & Engineering Department

Mazhar Eqbal

- Successfully completed 5 days National Level Online Teachers Training Program organized by Association of Muslim Professionals from 22nd July to 26th July 2024

Dr. Sana Firdos Khan

- Successfully completed one day Faculty Development Program held on 8th June, 2024 by UptoSkills "Leveraging AI for Effective Teaching Enhancing crotical Thinking and Fostering Personal Growth"
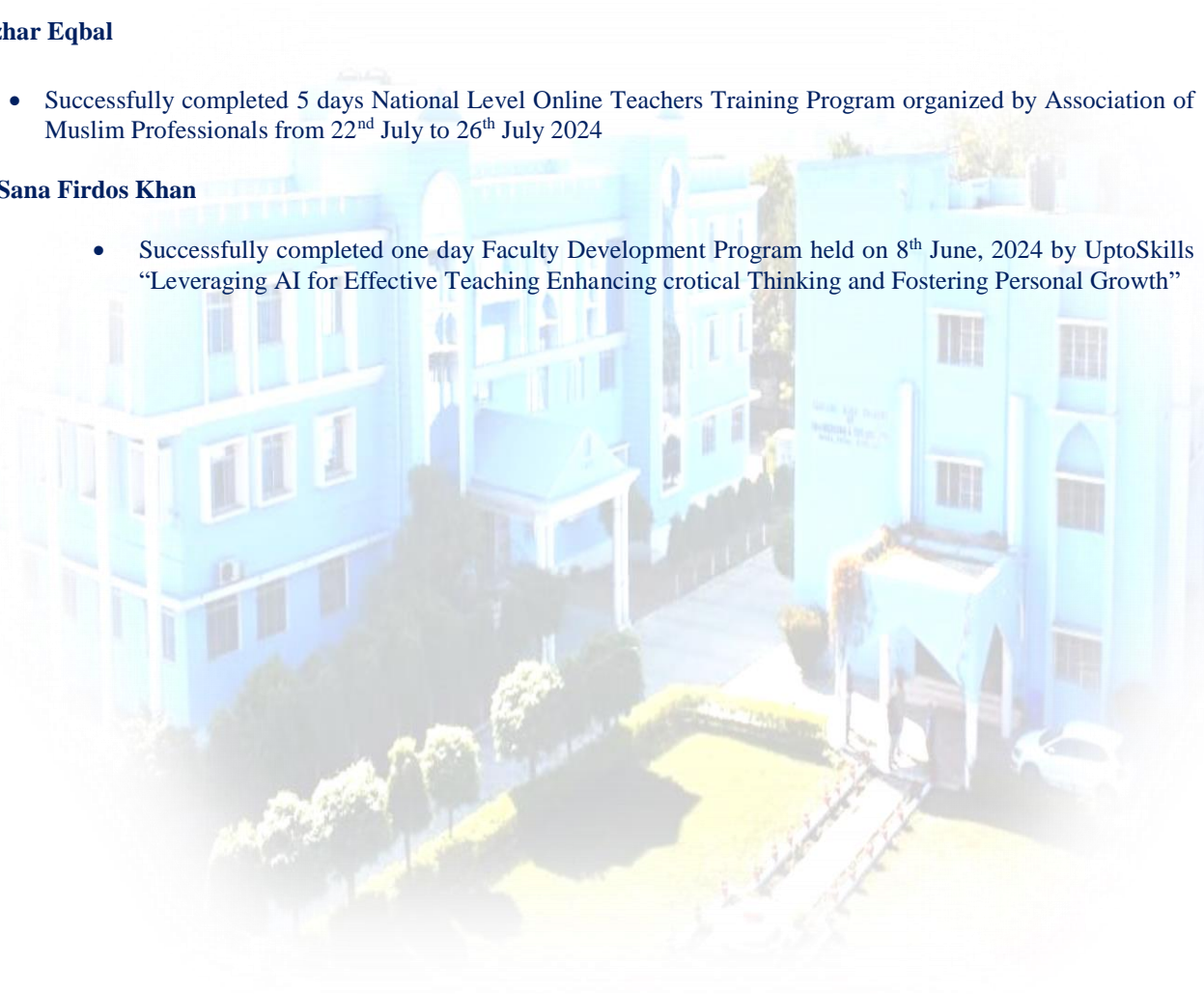
Event Attended on Topic GoLang at NIT Patna

Fauzia Nishat, CSE, 2023 Batch

I, **Fauzia Nishat**, attended the Google I/O Extended Event at **NIT Patna on July 27, 2024**, with batchmates (2023-2027) **Aiman Nishat, Arshia Kamal, and Gazala Parween**, along with Nameera Ahmed, a volunteer from my college (MACET).

Here are some key highlights from the event:

We were introduced to an in-depth talk on Flutter and Firebase, showing how to build robust mobile apps.Further the participants received valuable insights into **GoLang** and its use in creating powerful applications. A session was held to provide insights on using generative AI, with a full-stack developer's guide to Gemini. And some useful tips were given on how to prepare for jobs in product-based companies. Overall it was an immensely enriching experience for all the participants.

A memorable Experience at Indian Space Day Celebration at BIT Patna

Rishav Kumar, EEE, 2021 Batch

Attending the Indian Space Day celebration at BIT Patna was an incredibly enriching experience that broadened our understanding of space technology and show a deeper appreciation for the field. As a participant, I had the opportunity to work with my team Ayesha Naaz, Md Sohail Ansari and Md Murshid on a project that involved creating a model of a geostationary satellite. This experience not only enhanced our technical skills but also offered valuable insights into the collaborative and innovative spirit that drives space exploration.

Teamwork and Model creation

Our journey began with the idea hold by Ayesha to design and create a model of a geostationary satellite. This project required us to delve into the complexities of satellite technology, focusing on the components and mechanisms that enables a satellite to maintain a fixed position relative to the Earth. Each team member displayed unique skills and insights, allowing us to effectively divide tasks and bring our vision to life.

The model we developed aimed to faithfully represent the core aspects of a geostationary satellite, including its communication systems, weather monitoring, and orbital dynamics. We dedicated considerable time to ensuring that every detail was accurate and that our presentation effectively communicated the satellite's functionality. The collaborative effort and the shared goal of creating a successful model made the project both challenging and rewarding.

Event Highlights and Recognition

The BIT Patna campus provided an excellent setting for the Space Day celebrations. The event was well organized, with a range of activities that included ISRO Scientist interaction, painting competition, space related quizzes and interactive exhibits. These sessions offered valuable insights from top ISRO Scientists and fostered a stimulating environment for learning and understanding.

One of the most gratifying moments of the day was receiving a certificate for our geostationary satellite model. This recognition was a testament to the hard work and dedication of my team. The certificate not only acknowledged our technical achievement but also served as a meaningful reminder of the effort and creativity we invested in the project.

A Memorable Lunch

After a day of intense focus and activity, the lunch provided at the event was a welcome and enjoyable break. It was an opportunity to relax, reflect on our experiences, and socialize with fellow participants. The quality of the food and the chance to connect with others added to the overall positive experience of the day.

Conclusion

The Indian Space Day celebration at BIT Patna was a memorable and enriching experience. Working on the geostationary satellite model allowed us to apply and deepen our understanding of space technology, while the recognition and enjoyable lunch enhanced the overall satisfaction of the event. The day not only showcased the fruits of our hard work but also reinforced the importance of collaboration, innovation, and continuous learning in the field of space science. The event not only strengthened our technical skills but also reinforced our passion for space exploration. It was a reminder of the importance of collaboration, innovation, and perseverance in the pursuit of scientific advancement.

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