Guru Nanak Dev Engineering College, Ludhiana

(An Autonomous College under UGC Act)

Department of Computer Science and Engineering

Report of Value Added Course on "Cyber Security"

Title: Cyber Security
Instructor: Mr. Parminder Singh Sandhu (CSE Alumni, GNDEC)
Duration: 24th January 2025 – 28th March 2025
Mode: Online | Weekly on Fridays | 1 Hour per Session
Total Sessions: 8

Introduction:

The Department of Computer Science and Engineering, Guru Nanak Dev Engineering College, Ludhiana, organized an **Online Value-Added Course on Cyber Security** starting from **24th January 2025**. This course was aimed at exposing students to the foundational and advanced aspects of cybersecurity, addressing real-world challenges, tools, and opportunities in the domain.

About the Instructor :

Mr. Parminder Singh Sandhu

Cybersecurity Manager, Apple | Esteemed Alumnus, GNDEC | USA

Mr. Parminder Singh Sandhu, a distinguished alumnus of Guru Nanak Dev Engineering College (GNDEC), is currently leading advancements in digital defense as a **Cybersecurity Manager at Apple, USA**, based in the **San Francisco Bay Area**. With a strong academic background from **Concordia University** and a career rooted in elite tech environments, he brings global experience and deep technical expertise in the cybersecurity domain.

Course Objectives

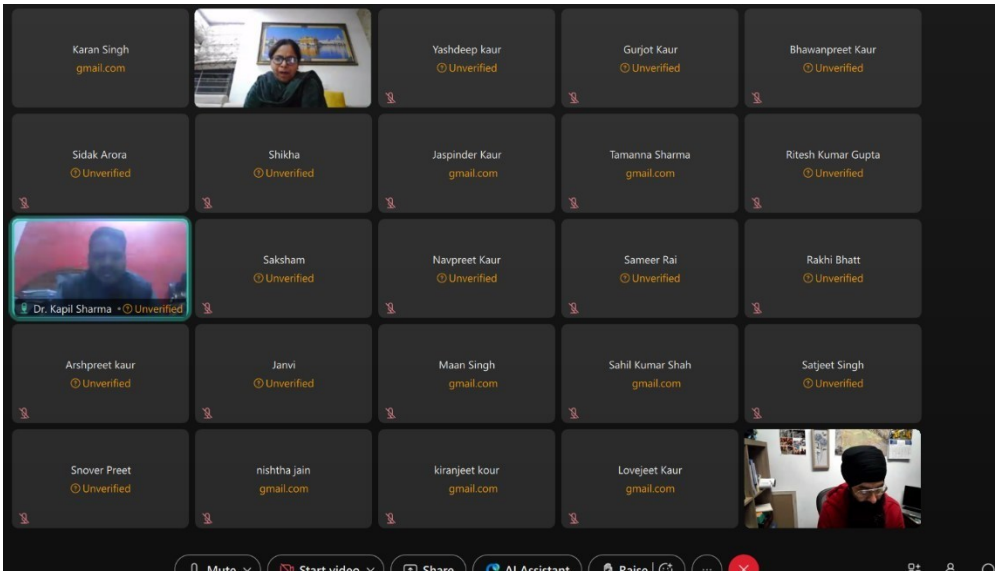
- To understand the fundamentals of cybersecurity.
- To explore cryptography, network, and cloud security protocols.
- To understand the tools and techniques of penetration testing.
- To get insights into industry opportunities in cybersecurity

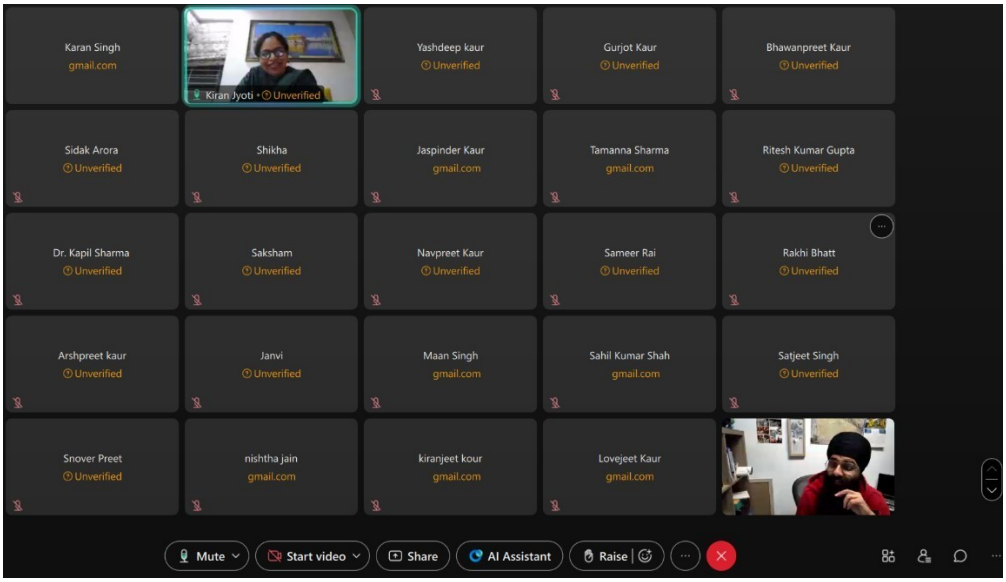
Inauguration Ceremony

The **Value-Added Course on Cyber Security** was inaugurated on **24th January 2025** by:

- **Dr. Kiran Jyoti**
  Head of Department, Computer Science and Engineering
- **Dr. Kapil Sharma**
  Assistant Professor, Department of CSE

They emphasized the importance of cybersecurity in today's digital landscape and encouraged students to participate actively and make the most of the expert-led sessions.





Session-wise Summary

Session 1: 24th January 2025

Summary:

The first session of the Value-Added Course introduced students to the **core principles of Cyber Security**. The instructor, **Mr. Parminder Singh Sandhu**, began by explaining what cybersecurity means in the context of modern digital infrastructures.

The session introduced the concept of **Cybersecurity**, highlighting its significance in the modern digital era. Key principles like the **CIA Triad (Confidentiality, Integrity, Availability)** were discussed, along with real-world threats such as **phishing, malware, and ransomware**. The session emphasized the growing need for security professionals and outlined foundational cybersecurity practices to protect digital infrastructure.

Session 2: 31st January 2025

Topics Covered:

- Cryptography
- Types of Cryptography
- Role of AI and LLMs in Security

Summary:

The session explained the basics of **cryptography**, including **symmetric**, **asymmetric encryption**, and **hashing**. It highlighted their importance in securing data. It also touched on how **AI and LLMs** are used in cybersecurity for threat detection, but also pose risks like advanced phishing and model manipulation.

Session 3: 14th February 2025

Topics Covered:

- Network Security
- Security Protocols
- Network Scanning

Summary:

This session covered the basics of **network security**, focusing on protecting data during transmission. It introduced key **security protocols** like HTTPS, SSL/TLS, and IPsec. The session also explained **network scanning techniques** used to identify vulnerabilities and open ports in a system, helping to detect threats early.

Session 4: 21st February 2025

Topics Covered:

- Business Continuity and Disaster Recovery
- Incident Response and Forensics
- Cyberattack Attribution

Summary:

This session emphasized the need for **business continuity plans** and **disaster recovery strategies** to ensure minimal disruption during cyber incidents. It also covered the **incident response process**, including detection, containment, and recovery. Finally, it introduced **cyberattack attribution**, the process of identifying the source of attacks, crucial for legal and strategic responses.

Session 5: 7th March 2025

Topics Covered:

- Access Control
- Authentication

Summary:
This session focused on **access control mechanisms** that restrict unauthorized access to systems and data. It covered **authentication methods** such as passwords, OTPs, biometrics, and multi-factor authentication (MFA). The importance of identity verification and ensuring users have appropriate access rights was also discussed.

Session 6: 14th March 2025

Topics Covered:

- Cloud Security
- Cloud Computing
- Security Risks in Cloud
- AWS EC2 (Amazon Elastic Compute Cloud)

Summary:
This session introduced **cloud computing** and its growing role in data storage and processing.

It highlighted **security risks** such as data breaches, misconfigurations, and insecure APIs. The session also covered **cloud security measures** and demonstrated basic usage of **AWS EC2**, a cloud service that allows users to run virtual servers securely.

Session 7: 21st March 2025

Topics Covered:

- Penetration Testing
- Reconnaissance
- Scanning
- Vulnerability Scanning
- Rules of Engagement (RoE)

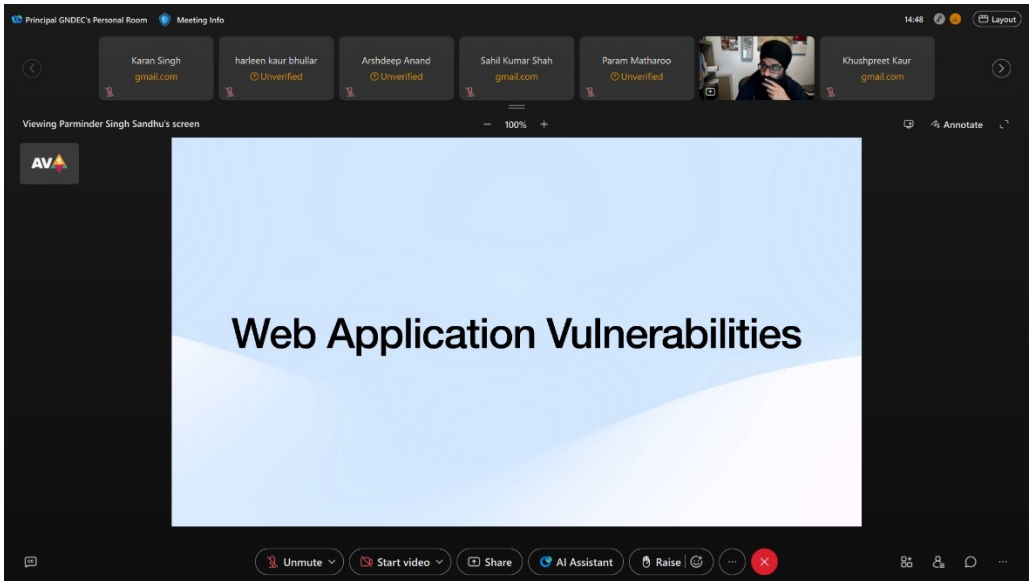
Summary:
This session introduced **penetration testing (pen testing)** as a method to evaluate system security by simulating attacks. It explained **reconnaissance** (gathering information), **scanning** (identifying open ports and services), and **vulnerability scanning** (finding system weaknesses). The concept of **Rules of Engagement (RoE)** was stressed to ensure ethical and controlled testing.

Session 8: 28th March 2025

Topics Covered:

- Web Application Vulnerabilities
- XSS (Cross-Site Scripting)
- SQL Injection
- Tools for Pentesting
- Career Opportunities in Cybersecurity

Summary:
This session covered key **web application vulnerabilities**, focusing on **XSS** and **SQL Injection** attacks, which exploit user inputs and databases. It demonstrated basic **pentesting tools** like Burp Suite and OWASP ZAP. The session concluded with insights into **career paths in cybersecurity**, including roles like ethical hacker, SOC analyst, and security engineer.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Web Application Vulnerabilities
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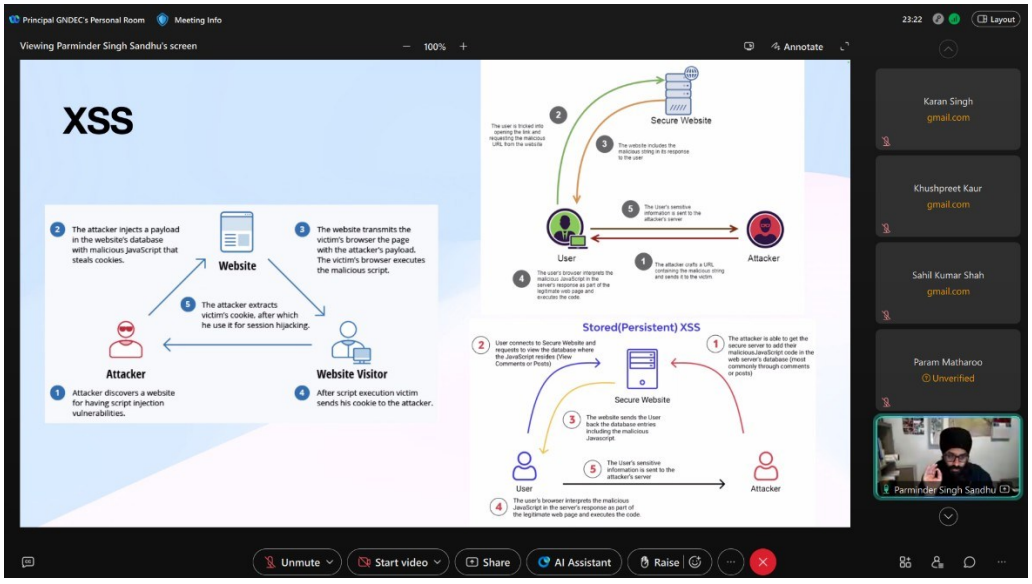
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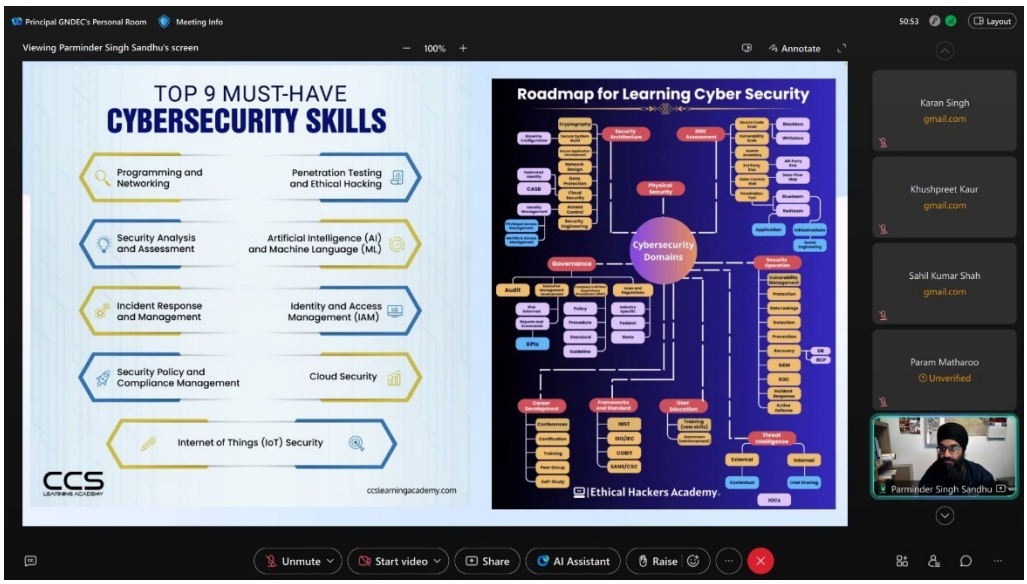
Principal GNDEC's Personal Room
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Annotate
TOP 9 MUST-HAVE
CYBERSECURITY SKILLS
Programming and Networking
Penetration Testing and Ethical Hacking
Security Analysis and Assessment
Artificial Intelligence (AI) and Machine Language (ML)
Incident Response and Management
Identity and Access Management (IAM)
Security Policy and Compliance Management
Cloud Security
Internet of Things (IoT) Security
CCS
ccslearningacademy.com
Roadmap for Learning Cyber Security
Cybersecurity Domains
Ethical Hackers Academy
Karan Singh
gmail.com
Khushpreet Kaur
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Sahil Kumar Shah
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Param Matharoo
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Conclusion

The 8-week online value-added course on **Cyber Security**, conducted by GNDEC CSE alumni *Mr. Parminder Singh Sandhu*, provided valuable insights into foundational and advanced concepts in the field of cybersecurity.

From cryptography and network security to penetration testing and cloud security, each session was thoughtfully designed to equip students with both theoretical understanding and practical knowledge. The integration of current technologies like **AI, LLMs, and AWS**, along with career guidance, made the course highly relevant in today's cyber threat landscape.

This course has significantly enhanced the participants' awareness and preparedness for a future in cybersecurity and served as a stepping stone for those pursuing careers in this dynamic field.

Acknowledgments

We extend our sincere thanks to:

- **Mr. Parminder Singh Sandhu** – Course Instructor and CSE Alumni, GNDEC
- **Dr. Kiran Jyoti** – Head of the CSE Department
- **Dr. Kapil Sharma** – Assistant Professor, CSE Department for their efforts in organizing and delivering this enriching course.