

Neel Upadhyay

647-224-2484 • neelmu12@gmail.com • [LinkedIn](#) • [GitHub](#) • Brampton, Ontario

SUMMARY

Final-year Software Engineering student (Cybersecurity Stream) at York University with hands-on experience in cryptographic protocol implementation, PKI fundamentals, and secure systems design. Built and validated key lifecycle mechanisms including DH key exchange, KDF chain derivation, per-message key rotation, and hardware-level AES-128 encryption. Familiar with X.509 certificate structure, CSR generation, trust chain validation, and OpenSSL certificate operations. Experienced with structured security workflows including log analysis, incident triage, and risk remediation documentation aligned with NIST CSF and MITRE ATT&CK. Available for full-time roles starting January 2027.

TECHNICAL SKILLS

Cryptography & PKI: PKI Fundamentals (X.509, CSR, trust chains, root/intermediate CAs), AES-128, Double Ratchet Protocol, KDF Chains, Key Rotation, Forward Secrecy, OpenSSL, GPG

Security Tools: Splunk, ELK Stack, Wireshark, Nmap, Metasploit, SQLMap, Hydra, Kali Linux, MITRE ATT&CK

Cloud & Dev: AWS EC2, Docker, REST APIs, Python, Java, C/C++, SQL, Bash, Verilog

Platforms: Jira, Confluence, Git, Linux/Unix, NIST CSF, Vulnerability Assessment

Certifications: Google Cybersecurity Certificate (2025), CompTIA Security+ (2026), AWS Cloud Practitioner (2026), Blue Team Level 1 (2026)

WORK EXPERIENCE

TJX Companies — Mississauga, ON

Sept 2024 – Dec 2024

Real Estate Market Analyst Co-op

- Automated data validation and reporting pipelines in Python, improving data accuracy by 15% across multi-source datasets used in compliance-sensitive reporting workflows.
- Produced risk-assessed trade area reports for senior stakeholders, distilling complex datasets into clear, decision-ready documentation under real business deadlines.

Manefa Contracting Inc. — Brampton, ON

June 2021 – Aug 2022

Software Developer Intern

- Built a Java/SQL application to automate cost-tracking workflows, eliminating manual entry errors by 60% and establishing consistent data integrity controls across project records.

PROJECTS

Double Ratchet Secure Messaging Protocol | Python, Diffie-Hellman, KDF Chains, AES

2025 – 2026

- Implemented Signal's Double Ratchet protocol from scratch, engineering a full key lifecycle: DH key exchange for session initiation, KDF chain-based symmetric key derivation, and per-message ephemeral key rotation with automatic renewal at each ratchet step — enforcing forward secrecy and break-in recovery.
- Stress-tested key lifecycle guarantees by simulating key compromise mid-session, confirming past session keys were irrecoverable and future keys regenerated cleanly — validating the same rotation and revocation logic used in enterprise certificate lifecycle management.

AES-128 Hardware Encryption — FPGA | Verilog, DE10-Lite FPGA, RTL Design, OpenSSL

2025 – 2026

- Implemented AES-128 encryption/decryption at the RTL level in Verilog, including a dedicated key-expansion module, FSM-controlled key generation, and RAM-backed key storage with isolated data boundaries between key material and plaintext I/O.
- Used OpenSSL to generate reference test vectors (aes-128-ecb) and validate RTL output against known ciphertext — verifying correctness of the hardware implementation against a trusted cryptographic baseline.

Cybersecurity Home Lab — SIEM & Threat Detection | Splunk, ELK Stack, Nmap, Hydra, MITRE ATT&CK

2025 – 2026

- Deployed Splunk and ELK Stack to ingest Windows/Linux event logs; simulated reconnaissance, brute-force, and lateral movement attacks, then triaged alerts using custom detection rules mapped to MITRE ATT&CK TTPs — replicating SOC incident response and escalation workflows.

Network Traffic Analysis | Wireshark, TCP/IP, DNS, HTTP, ARP

2025 – 2026

- Captured and dissected live traffic to identify unencrypted credentials, ARP spoofing indicators, and anomalous sessions — building network-level threat detection skills directly relevant to certificate trust chain issues and TLS misconfiguration triage.

EDUCATION

Lassonde School of Engineering — York University

Sept 2022 – Dec 2026

Honours Bachelor of Engineering, Software Engineering | Cybersecurity Stream