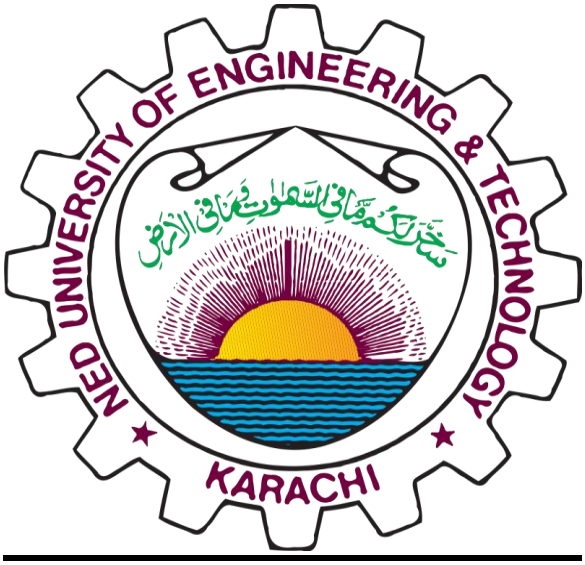

CCN(CS-327)

PROJECT PROPOSAL

SUMITTED BY:

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Project Proposal

Course Code and Title: CS-327 Computer Communication Networks
Project Title: Smart Secure Alert & Notification System for Environmental Events

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1. Project Idea

This project aims to design and implement a **real-time, secure alert broadcasting system** that simulates environmental warning notifications (e.g., temperature spikes, air quality issues, or flood alerts).

A **central server** will continuously monitor simulated sensor data and immediately broadcast **encrypted alerts** to all connected client systems through **TCP socket communication**.

The purpose of this project is to demonstrate **reliable and secure real-time communication** between multiple clients on a single device, similar to how early warning systems work in smart cities, campuses, and industrial environments.

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2. Objectives

- To design and implement a secure client-server network architecture using **TCP sockets**.
- To simulate environmental events and deliver **real-time encrypted alerts** to all connected clients.
- To ensure **efficient broadcasting and low latency** in message delivery.
- To integrate **basic security mechanisms** (e.g., encryption using SSL or symmetric key encryption).
- To evaluate **performance metrics** such as latency and packet flow using monitoring tools.

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3. Tools and Technologies

- **Programming Language:** Python (socket)
- **Packet Analysis:** Wireshark
- **Testing/Simulation:** Multiple terminal windows (all on a single device)
- **Operating System:** Windows

4. Expected Outcomes

- A **working real-time secure alert broadcasting system** over a network.
- Multiple clients receiving **encrypted alerts** simultaneously with minimal delay.
- Packet-level analysis of communication using Wireshark.
- Demonstration of **transport layer communication**, **basic security**, and **practical system design**.

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5. Relevance to Course Learning Outcomes (CLOs)

- **CLO-1:** Demonstrates basic network topology and TCP/IP socket communication.
- **CLO-2:** Explores operational and design issues of **real-time secure client-server communication**.
- **CLO-3:** Shows how communication networks can support **environmental protection and sustainability** by enabling early warnings and efficient response.

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6. Alignment with Complex Problem Attributes (CPA)

- **CPA-1 (Depth of Analysis):** Requires abstraction to model **secure, real-time broadcasting** with no predefined solution.
- **CPA-2 (Level of Interaction):** Involves managing **secure communication** between multiple nodes with timing and delivery challenges.
- **CPA-3 (Familiarity):** Extends basic socket programming concepts to build a **secure, practical, and sustainable** communication system.