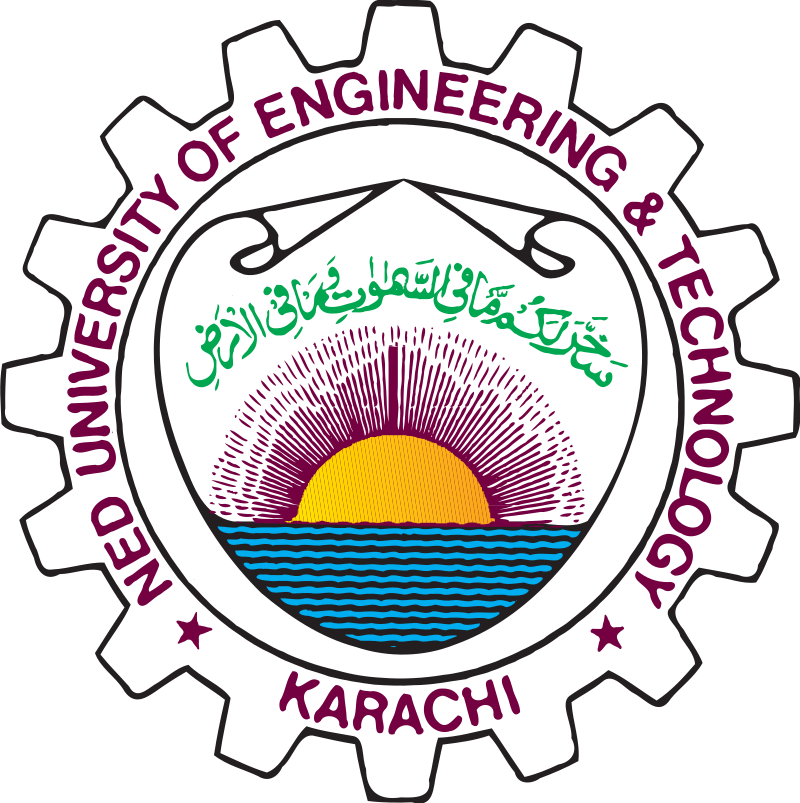
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**CCN(**CS-327)

**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

**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.

**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.

**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**.

**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.

**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.