

# Tanvi Kshirsagar

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## EDUCATION

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COEP Technological University, Pune

Sept 2024 – May 2028

B. Tech in Electronics and Telecommunication Engineering

Relevant course work: Microcontrollers, Digital Electronics, Analog Circuits, Electronic Devices

Minor: Environmental Sustainability

**Class XII**

APJ College of Science and Commerce  
(MSBSHSE Board)

July 2022 – Aug 2024

**Class X**

Indira National School  
(CBSE Board)

Apr 2012 – Jun 2022

## EXPERIENCE

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**Intern**

Thalassemia Society Pune Chapter

June 2025 – July 2025

- Collected and organized patient data for community outreach initiatives.
- Assisted in documentation and awareness activities.
- Interacted with patients and developed communication skills through field work.

## PROJECTS

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Signal Encrypter using XOR gate (RTL Logic)

Apr 2026 - Present

- Designed and implemented a hardware-based signal encryption system using discrete transistor-level Resistor-Transistor Logic (RTL).
- Built a custom XOR gate from scratch using 2N2222 NPN transistors to perform bitwise encryption of a binary message signal against a shared secret key.

- Engineered the circuit to operate strictly in cutoff and saturation regions through precise Q-point analysis, ensuring reliable digital switching without the use of standard ICs like 7486.
- Validated the system via LTSpice simulations to verify switching characteristics and logic transitions before final hardware realization.
- Successfully transitioned from breadboard prototyping to a final, soldered Zero PCB implementation, demonstrating a deep understanding of transistor theory and hardware-level cryptography.

### Hand Gesture Recognition System Using ESP32 and Python

Apr 2026 - Present

- Developed a real-time, touchless human-computer interaction system that translates hand gestures into hardware control commands via computer vision.
- Engineered a software pipeline using OpenCV and MediaPipe to identify 21 hand landmarks, accurately detecting finger positions (up/down) with low-latency processing.
- Architected a client-server model where a Python-based client transmits gesture-mapped HTTP requests wirelessly to an ESP32 web server.
- Implemented a hardware interface using an ESP32 microcontroller to drive multiple LEDs, with each GPIO output dynamically responding to specific finger states.
- Optimized system efficiency by implementing state-change detection, ensuring wireless commands are only transmitted when a gesture transitions, minimizing network overhead.
- Tools Used: Python, MediaPipe, OpenCV, ESP32, Arduino IDE, IoT (HTTP/Wi-Fi).

### SKILLS

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**Programming languages:** C Language, Assembly Language (8051)

**Computer software/ frameworks:** MATLAB, LT Spice, MS Excel, Proteus, Arduino IDE

**Languages:** English (Fluent), Hindi (Fluent), Marathi (Native)

### EXTRACURRICULAR

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#### Writer

Abhijaat - COEP Newsletter

Feb 2025 – Aug 2025

- *Researched and wrote articles for institutional publications.*
- *Collaborated with editorial teams to create clear and engaging content.*

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**Media Coordinator**  
**COEP Quantitative Finance Club**  
**Dec 2025 – Apr 2026**

- *Managed communication and media initiatives for club events and outreach.*
- *Coordinated content planning and audience engagement.*

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**Scriptwriter**  
**COEP Drama and Films Club**  
**Sep 2024 – Apr 2026**

- *Wrote scripts and content for performances and productions.*
- *Worked collaboratively under deadlines.*

## **CERTIFICATIONS**

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- Certificate Course in Advance Excel
- Certificate Course in Programming (C)