Kamal Koushik Duppalapudi
B.Tech - Chemical Engineering
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EDUCATION

Degree/Certificate	Institute/Board	CGPA/Percentage	Year
B.Tech.	Indian Institute of Technology, Hyderabad	7.61 (Current)	2023-Present
Senior Secondary	Board of Intermediate Education, Andhra Pradesh	94.7%	2023
Secondary	State Board of Secondary Education, Andhra Pradesh	100%	2021

PROJECTS

- **Cryptographically-Enhanced Smart Access Control System** *April 2025*
  Club Project GitHub
  - Designed and implemented a **Time-based One-Time Password (TOTP)** authentication system on ESP32 hardware, utilizing **SHA-256** hashing for secure token generation with a 100-second rotation interval to enhance security.
  - Integrated a Real-Time Clock (RTC) module for continuous and accurate timekeeping, even during power interruptions, and enabled **Network Time Protocol (NTP)** synchronization. Facilitated seamless user interaction through **BLE** communication.
  - Deployed backend services on an **AWS EC2** instance with real-time monitoring, ensuring a scalable, cost-efficient solution.
  - Designed and implemented **FastAPI** endpoints for secure lock management with **PGP**-signed messages for integrity verification.
  - Designed an alternate self-sustained system using **Raspberry Pi** with **pyotp** library. (**ESP32**, **Flutter**, **FastAPI**, **PostgreSQL**)

- **Interactive Web App for Advanced Material Properties** *March 2025*
  Course Project GitHub
  - Engineered a **Django** application with **SQLite3** backend storing 118+ element properties using a fully normalized schema.
  - Simulated X-ray diffraction (XRD) patterns in the backend using **Python** and **pymatgen** for on-the-fly data generation.
  - Developed interactive **D3.js** visualizations to render dynamic diffraction peak charts with zoom and tooltip support.
  - Implemented in-browser 3D crystal lattice rendering via **Three.js**, leveraging **Blender**-modeled **glTF** assets for 5+ structures. (Django, Python, SQLite3, pymatgen, D3.js, Three.js, Blender, HTML/CSS, JavaScript, GSAP, GoogleOAuth)

- **Advanced Linux Integration on ARM32v7 (Surface 2)** *March 2025 – Present*
  Personal Project
  - Ongoing cross-compilation/development of **Linux 5.x** kernel for ARM32v7 (Tegra 4), adding support for USB, eMMC.
  - Enhanced **U-Boot** to support dynamic kernel/**initramfs** loading with **secure-boot** checks and rollback protection.
  - Ongoing development of drivers for the touchscreen (I2C-HID), and enabled GPU acceleration for stable 3D rendering.

TECHNICAL SKILLS

- **Programming Languages**: Python, C/C++, Go, TypeScript, Kotlin, R, C#, Java, JavaScript, SQL
- **Web Development**: HTML, CSS, Flask, FastAPI, Django, Tailwind-CSS, D3.js
- **Software Tools**: Git, GitHub, LaTeX, Blender, PlatformIO, Postman, SolidWorks, Avogadro, OpenBabel
- **Cybersecurity Tools**: Netcat, Nmap, Burp Suite, Hashcat, Aircrack-ng, Wireshark, Socat, Bettercap
- **Libraries & Frameworks**: NumPy, Pandas, Matplotlib, SciPy, seaborn, Pdfplumber, cupy (GPU NumPy)
- **DevOps & Cloud**: Nginx, AWS EC2, Oracle OCI, Azure, GitHub Pages, Cloudflare, Docker
- **Operating Systems**: Windows, Linux (Arch), macOS
- **Embedded Systems**: Arduino, ESP32, Raspberry Pi

POSITIONS OF RESPONSIBILITY

- **Overall Head**, Kludge, The InfoSec and Networking Club, IIT Hyderabad *May 2024 – Present*
  - Led an **18-member core** team during my tenure, overseeing **five** multi-phase cybersecurity projects focused on penetration testing and network assessments; handled network setup while mentoring core members through hands-on training sessions.
  - Conducted **MilanCTF24** and **EnigmaCTF25** end-to-end, managing challenge design, infrastructure deployment, and real-time event coordination across multiple domains including **web, crypto, pwn, and forensics** for **150+** participants.
  - Conducted **10+** community training sessions on threat modeling, **vulnerability analysis** and **secure coding practices**
  - Provided structured knowledge transfer and mentorship to core team members through workshops, documentation.
- **Executive**, CyberCon 2024 (Cybersecurity Event), IIT Hyderabad *January 2024 – April 2024*
  - Coordinated technical logistics for 3 keynote speakers and managed registration system handling **150+ attendees**
  - Assisted in organizing hands-on cybersecurity workshops, contributing to a significant increase in club membership, enhancing campus-wide security awareness, and fostering career opportunities in cybersecurity for participants.

SCHOLASTIC ACHIEVEMENTS & EXTRACURRICULAR ACTIVITIES

- JEE Advanced, AIR **6,843** out of 200,000 candidates in India's premier engineering entrance exam *2023*
- JEE Mains, AIR **2,922** among 1.6M+ candidates in national-level preliminary engineering exam *2023*
- MilanCTF 2023, **1st place** in IIT Hyderabad's Inter-Hostel Cybersecurity Championship *2023*
- PicoCTF 2024, Ranked **369 / 11,517** teams in global cybersecurity CTF by Carnegie Mellon University *2024*
- EnigmaCTF 2025, 1st place in CTF event at IIT Hyderabad's Annual Techno-Cultural Fest *2025*
- TheDeccanCTF 2025, **6th place** out of 110 teams in regional cybersecurity competition *2025*

KEY COURSES TAKEN

- **Computer Science**: Intro to Programming, Intro to Artificial Intelligence, Harvard's CS50X, CS50P, CS50T, Data Structures and Algorithms
- **Mathematics**: Probability, Statistics, Linear Algebra, Calculus, Differential Equations
- **Chemical Engineering**: Thermodynamics, Heat Transfer, Transport Phenomena, Fluid Mechanics, Numerical Methods, Chemical Reaction Engineering, Material Science