

# VIVEK KUMAR

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## Education

Indian Institute of Technology Dharwad	B.Tech (Civil) — Minor in CSE — CPI: 7.97	2022–2026
Manas Bharti Educational Complex, CBSE	Class XII — 81%	2019–2021
Delhi Public School, CBSE	Class X — 95.6%	2013–2019

## Experience

**Research & Development Intern – Self-Healing Material Analysis**, IIT Dharwad, India | 2025

- Evaluated material performance using structured testing, data recording, and statistical comparison across sample variants.
- Designed test plan and executed controlled loading cycles for accurate strength measurement.
- Identified 37% improvement trend in post-recovery performance using formula-driven evaluation.
- Prepared research documentation summarizing methodology, observations, conclusions, and actionable insights.

## Projects

Five in a Row Game (Group Project)	Python, Pygame, NumPy, Minimax, Alpha Beta Pruning, MCTS	2024
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- Built a strategy game using Python and Pygame with customizable board sizes and difficulty levels.
- Implemented Minimax and Alpha-Beta Pruning algorithms to optimize AI decision-making up to depth 6.
- Integrated Monte Carlo Tree Search (MCTS) with UCT to simulate 200 scenarios per turn for adaptive gameplay.
- Engineered a NumPy-based evaluation logic to efficiently detect horizontal, vertical, and diagonal winning patterns.

Simon Memory Game	HTML, CSS, JS, jQuery, DOM	2024
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- Developed an interactive web game using HTML, CSS, JavaScript, and DOM manipulation.
- Architected core game logic in jQuery for sequence generation, input validation, and level progression.

ProTrack W	MongoDB, ExpressJS, ReactJS, Tailwind CSS, Shadcn, Cron	2025
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- Built a MERN-based student analytics platform with Codeforces API integration and dashboards for tracking student performance.
- Automated daily performance sync via cron scheduling for accurate, up-to-date tracking of submissions and ratings.
- Designed responsive visualizations using Tailwind and Shadcn for efficient analysis with filters and insights.
- Implemented an automated Nodemailer system to send performance reports and task alerts to students.

Peer-to-Peer VoIP	Python, Sockets, PyAudio, TCP, UDP, Multithreading	2025
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- Developed a decentralized P2P VoIP system for real-time voice calls using Python, eliminating dependency on a central server.
- Engineered low-latency audio streaming via UDP and PyAudio, leveraging multithreading for concurrent call handling.
- Implemented dynamic call management and peer-to-peer connection handling for robust, uninterrupted communication.
- Built a custom Tracker Server to manage peer registration and active user discovery with minimal latency.

## Skills & Interests

- Programming Languages:** C, C++, Python, JavaScript, HTML, CSS
- Frameworks & Libraries:** Node.js, Express.js, React, jQuery, EJS, Bootstrap
- Tools & Platforms:** LaTeX, BASH, Git, GitHub, Beamer, VS Code, npm
- Databases & Data Analytics:** SQL, Pandas, NumPy, Matplotlib, Tableau, Excel
- Professional & Interpersonal Skills:** Time Management, Teamwork, Communication, Leadership
- Areas of Interest / Specialization:** Full Stack Web Development, Software Development, Business Analytics

## Key Courses Taken

- Data Structures and Algorithms, Discrete Structures, Computer Networks, Artificial Intelligence, Design and Analysis of Algorithms, System Software Lab, DBIS, Web Development.

## Positions of Responsibility

**Class Representative**, IIT Dharwad | April 2024 – Present

- Acted as a liaison between faculty and students; coordinated academic and extracurricular matters.

**Joint Secretary**, Civil Engineering Association (CEA) | Nov 2024 – Present

- Helped organize intra-departmental tournaments, technical talks, and student engagement activities.

## Achievements

- Maths Olympiad:** Qualified PRMO, RMO (secured 7<sup>th</sup> rank in South Bihar), conducted by HBCSE, Govt. of India.
- Hyundai Hope Scholarship Winner (2025):** Awarded INR 62,000 for innovative engineering ideas.
- Awards and Recognitions:** Felicitated with INR 15,000 cheque, scholarships (worth lakhs), a golden plaque, medals, and certificates.