Project Presentation

Tech Fiesta: Project Presentation Guidelines

Welcome, Innovators!

Welcome to the flagship event of Tech Fiesta: the Project Presentation Competition! This is your platform to showcase your technical skills, creativity, and passion for solving real-world problems. Whether you choose to build on a pre-defined idea or pioneer a new one, we can't wait to see what you create.

Path A: Predefined Project Ideas

Choose **one** project from the categories below.

Computer Science & Engineering (CSE)

Cybersecurity & Networking

- Machine Learning-based Phishing Detection Tool

  (Difficulty: Intermediate)

  - **Objective:** Detect phishing URLs or emails using ML algorithms.
  - **Technology:** Python, Scikit-learn, pandas, Flask (for frontend), dataset (like PhishTank).
  - **Features:**
    - URL or email text input.
    - ML model classifies it as Phishing or Legitimate.
    - Dashboard to visualize prediction confidence.
  - **Skills Gained:** Supervised ML, data preprocessing, cybersecurity basics.

- Wi-Fi Honeypot Attack Simulation

  (Difficulty: Advanced)

- **Objective:** Create a fake Wi-Fi access point to simulate credential harvesting.
- **Technology:** Raspberry Pi + Alfa adapter / TP-Link v1, Aircrack-ng, DNS spoofing tools.
- **Features:**
  - Rogue AP with captive portal.
  - Collect user credentials entered.
  - Demonstrate man-in-the-middle vulnerability.
- **Skills Gained:** Ethical hacking, wireless security, Raspberry Pi usage.

- Firewall Rules Visualizer (Beginner Level)

  (Difficulty: Beginner)
  - **Objective:** Create a GUI tool to visualize and manage basic firewall rules.
  - **Technology:** Python (tkinter), iptables (Linux), JSON for rule storage.
  - **Features:**
    - Add/edit/delete rules via GUI.
    - Show incoming/outgoing port maps.
  - **Skills Gained:** Basic networking, GUI dev, Linux commands.

FinTech

- Student's Budget Tracking Application

  (Difficulty: Beginner)
  - **Objective:** Help students manage daily/monthly expenses and track budgets.
  - **Technology:** Android Studio (Java/Kotlin) or Flutter, Firebase or SQLite.
  - **Features:**
    - Add/edit/delete income and expenses.
    - Category-wise expense charts.
    - Daily, weekly, monthly insights.
  - **Skills Gained:** App development, databases, financial planning.

- Crypto Price Tracker with API

  (Difficulty: Beginner)

  - **Objective:** Display real-time cryptocurrency prices from a public API.
  - **Technology:** React.js / Flutter (frontend), REST API (CoinGecko).
  - **Features:**
    - List of top 10 crypto prices.
    - Currency converter.
    - Search functionality.
  - **Skills Gained:** API integration, UI development, JSON handling.
- Peer-to-Peer Payment Application Prototype

  (Difficulty: Intermediate)

  - **Objective:** Simulate a digital wallet system for P2P payments.
  - **Technology:** Android / Web app (Flutter/React), Firebase backend.
  - **Features:**
    - Login, balance, and transaction features.
    - Send/receive mock payments.
    - Transaction history.
  - **Skills Gained:** Authentication, database management, UI design.

AI/ML/Data Science

- Student Performance Prediction with ML

  (Difficulty: Intermediate)

  - **Objective:** Predict student academic performance using input parameters.
  - **Technology:** Python, pandas, scikit-learn, matplotlib.
  - **Features:**
    - Input fields (attendance, internals, etc).
    - ML model predicts pass/fail or grade.
    - Charts to compare prediction accuracy.

- **Skills Gained:** Regression, data visualization, model evaluation.

- Fake News Detection with NLP

  (Difficulty: Intermediate)

  - **Objective:** Identify fake news articles using Natural Language Processing.
  - **Technology:** Python, sklearn, NLTK or spaCy, TfidfVectorizer.
  - **Features:**
    - Text input or upload article.
    - Output: Real or Fake.
    - Uses a dataset like LIAR or from Kaggle.
  - **Skills Gained:** NLP, binary classification, vectorization techniques.

- Teachable Machine to Classify Images

  (Difficulty: Beginner)

  - **Objective:** Use Google Teachable Machine to train custom image models.
  - **Technology:** Teachable Machine, TensorFlow.js, basic HTML/CSS.
  - **Features:**
    - Collect image samples.
    - Train and export model.
    - Run in web browser.
  - **Skills Gained:** Image classification, no-code AI, browser-based ML.

Game Dev / 3D Design

- 2D Platformer Game using Unity

  (Difficulty: Beginner)

  - **Objective:** Build a simple 2D side-scrolling game.
  - **Technology:** Unity, C#.
  - **Features:**
    - Character movement, levels, obstacles.

        - Score system and restart option.
    - **Skills Gained:** Unity basics, game logic, physics engine.
- VR Tour of Your College (Mock-up in Unity)

  (Difficulty: Intermediate)
    - **Objective:** Create a basic VR experience showcasing your college.
    - **Technology:** Unity, C#.
    - **Features:**
        - Import 3D models or images.
        - Enable 360 viewing and walkthrough.
    - **Skills Gained:** VR basics, 3D navigation, Unity camera systems.
- Maze Solver Game with AI Bot

  (Difficulty: Intermediate)
    - **Objective:** Design a game where an AI bot solves a maze.
    - **Technology:** Python (Pygame) or Unity + C#.
    - **Features:**
        - Random maze generation.
        - AI pathfinding (DFS, BFS, A*).
    - **Skills Gained:** Algorithms, AI logic, game development.

Civil Engineering Mini Projects

- Rainwater Harvesting and Filtration Model

  (Difficulty: Beginner)
    - **Objective:** To build a physical model demonstrating a rainwater harvesting system that collects, filters, and stores water for non-potable use.
    - **Technology:** Physical modeling materials (pipes, containers), filtration layers (gravel, sand, charcoal), small water pump.
    - **Features:** A collection area (rooftop), a conveyance system (gutters/pipes), a multi-stage filtration unit, and a storage tank.

    - **Skills Gained:** Sustainable design, water resource management, physical modeling.

- Green Building Materials Analysis

  (Difficulty: Beginner)

    - **Objective:** To analyze and compare the environmental impact, cost, and basic properties of sustainable building materials versus traditional ones.
    - **Technology:** Research databases (e.g., Google Scholar), spreadsheet software (Excel/Google Sheets), presentation tools.
    - **Features:** Data comparison charts (e.g., carbon footprint, R-value), cost-benefit analysis, a final report recommending materials for different use cases.
    - **Skills Gained:** Research, data analysis, environmental engineering principles, technical writing.

- Bridge Load Simulation using Software Tools

  (Difficulty: Intermediate)

    - **Objective:** To use software to model various bridge designs and simulate how they respond to different types of structural loads.
    - **Technology:** CAD software (like AutoCAD), structural analysis software (like a student version of SAP2000 or ANSYS).
    - **Features:** 3D models of truss, arch, and beam bridges; application of static and dynamic loads; visualization of stress and strain points.
    - **Skills Gained:** Computer-Aided Design (CAD), Finite Element Analysis (FEA), structural engineering.

- Soil Stabilization Techniques using Waste Materials

  (Difficulty: Intermediate)

    - **Objective:** To conduct a comparative study on improving the engineering properties of local soil by mixing it with different waste materials (e.g., plastic fibers, fly ash).
    - **Technology:** Soil testing equipment (for Atterberg limits, compaction tests), waste materials, lab equipment.

- **Features:** Preparation of multiple soil samples with varying percentages of waste material, testing for properties like shear strength and compressibility, analysis of results.
- **Skills Gained:** Geotechnical engineering, laboratory testing, data analysis, sustainable construction practices.

Electronics & Communication Mini Projects

- Smart Blind Stick using Ultrasonic Sensors

  (Difficulty: Beginner)

  - **Objective:** To design a smart stick to help visually impaired individuals navigate by detecting obstacles.
  - **Technology:** Arduino/ESP32, Ultrasonic Sensors (HC-SR04), Buzzer, Vibrating Motor.
  - **Features:** Detects obstacles in front, provides auditory (beep) and haptic (vibration) feedback, feedback intensity increases as the obstacle gets closer.
  - **Skills Gained:** Embedded Systems, IoT Basics, Sensor Integration, Hardware Prototyping.
- RFID-based Attendance System

  (Difficulty: Beginner)

  - **Objective:** To create an automated attendance system that records attendance by scanning RFID tags.
  - **Technology:** Arduino or Raspberry Pi, RC522 RFID reader module, RFID tags/cards, LCD display, database (e.g., a spreadsheet or simple SQL database).
  - **Features:** Each user has a unique RFID tag, scans the tag to log attendance with a timestamp, displays a confirmation message on an LCD.
  - **Skills Gained:** RFID technology, embedded systems, serial communication, database management.
- Voice Controlled Home Automation

  (Difficulty: Intermediate)

- **Objective:** To build a system that allows controlling home appliances (like lights and fans) using voice commands.
- **Technology:** Raspberry Pi or ESP32, relay modules, microphone, a platform for voice recognition (e.g., Google Assistant API, or an offline module like Elechouse V3).
- **Features:** Control multiple appliances with commands like "turn on the light," provides feedback on command execution, can be controlled remotely.
- **Skills Gained:** Voice recognition, IoT, relay control, API integration.

- IoT-based Weather Monitoring System

  (Difficulty: Intermediate)

  - **Objective:** To build a device that measures environmental parameters and sends the data to the cloud for remote monitoring.
  - **Technology:** ESP8266/ESP32, DHT11/22 (Temp/Humidity), BMP180 (Pressure), a cloud platform (ThingSpeak/AWS IoT).
  - **Features:** Real-time data collection of temperature, humidity, and pressure; a cloud dashboard for visualization; potential for alerts.
  - **Skills Gained:** IoT, Sensor Interfacing, Cloud Computing, Data Visualization.

- Digital Notice Board using GSM and LED

  (Difficulty: Intermediate)

  - **Objective:** To design a digital notice board where messages can be updated remotely by sending an SMS.
  - **Technology:** Arduino, GSM module (like SIM900A), P10 LED display panel.
  - **Features:** Send a specific SMS to the GSM module to change the displayed text, scrolling text functionality, secure access (only accepts messages from an authorized number).
  - **Skills Gained:** GSM technology, microcontroller interfacing, LED matrix control.

Biomedical Engineering Mini Projects

- Heart Rate and SpO2 Monitor using Arduino

  (Difficulty: Intermediate)

  - **Objective:** To build a compact device to measure and display heart rate and blood oxygen saturation (SpO2).
  - **Technology:** Arduino/ESP32, MAX30100/MAX30102 sensor, OLED display.
  - **Features:** Real-time reading from a finger sensor, display of beats per minute (BPM) and SpO2 percentage, portable design.
  - **Skills Gained:** Biomedical sensor integration, I2C communication, embedded systems.
- Smart Wheelchair with Obstacle Avoidance

  (Difficulty: Intermediate)

  - **Objective:** To modify a model wheelchair to automatically detect and avoid obstacles.
  - **Technology:** Arduino, motor driver, ultrasonic sensors, joystick module (for manual override).
  - **Features:** Autonomous obstacle detection, manual control mode, alert system (buzzer).
  - **Skills Gained:** Robotics, motor control, basic sensor fusion.
- Brainwave Controlled Robot (BCI)

  (Difficulty: Advanced)

  - **Objective:** To create a robot that can be controlled by interpreting brainwave signals from an EEG headset.
  - **Technology:** MindWave Mobile or similar EEG headset, Python/MATLAB for signal processing, Arduino for robot control, Bluetooth communication.
  - **Features:** Forward/stop commands based on attention/meditation levels, wireless control.
  - **Skills Gained:** Brain-Computer Interface (BCI), signal processing, robotics.
- Patient Monitoring System using IoT

(Difficulty: Intermediate)

- **Objective:** An IoT system to remotely monitor a patient's vital signs.
- **Technology:** ESP32, temperature sensor (DS18B20), heart rate sensor (MAX30100), IoT cloud platform (ThingSpeak, Blynk).
- **Features:** Collects multiple vitals, sends data to a cloud dashboard, can set up alerts for caregivers.
- **Skills Gained:** IoT, cloud platforms, biomedical instrumentation.

- Portable ECG Signal Recorder and Analyzer

  (Difficulty: Advanced)

  - **Objective:** To build a portable device to capture ECG signals and perform basic analysis.
  - **Technology:** AD8232 ECG sensor module, Arduino/STM32, OLED display, SD card module for storage.
  - **Features:** Real-time ECG waveform plotting, calculation of BPM, storage of signal data to an SD card.
  - **Skills Gained:** Biomedical signal processing, analog electronics, data acquisition.

Mechanical Engineering Mini Projects

- Solar Powered Water Purifier

  (Difficulty: Intermediate)

  - **Objective:** To design and build a working prototype that uses solar energy for a multi-stage water purification process.
  - **Technology:** Solar panel, battery, small DC water pump, filtration materials (charcoal, sand), UV LED for disinfection, basic mechanical frame.
  - **Features:** Multi-stage filtration (sedimentation, activated carbon), UV sterilization powered by solar, demonstrates a complete off-grid system.
  - **Skills Gained:** Mechanical Design, Renewable Energy, Fluid Dynamics, Systems Integration.

- Automatic Pneumatic Bumper System for Vehicles

(Difficulty: Intermediate)

- **Objective:** To design a safety system model where a bumper automatically extends when an obstacle is detected at close range.
- **Technology:** Arduino, ultrasonic sensor, pneumatic solenoid valve, small air compressor or cylinder, mechanical bumper assembly.
- **Features:** Sensor detects an imminent collision, triggers the pneumatic system to extend the bumper, providing an extra cushion.
- **Skills Gained:** Pneumatics, automation, sensor integration, mechanical design.

- Regenerative Braking System Model

  (Difficulty: Intermediate)

  - **Objective:** To build a working model that demonstrates the concept of recovering kinetic energy during braking.
  - **Technology:** DC motor (acting as a generator), flywheel, wheels, a circuit to store energy (capacitor/battery), LEDs or a multimeter to show recovered power.
  - **Features:** System captures energy when braking is applied, stored energy is used to power an LED, comparison of braking with and without the system enabled.
  - **Skills Gained:** Energy Systems, Mechanical Design, Basic Electronics, Electromechanical systems.

- Fabrication of Hydraulic Jack

  (Difficulty: Beginner)

  - **Objective:** To fabricate a small-scale, working model of a hydraulic jack to demonstrate Pascal's principle.
  - **Technology:** Medical syringes of different diameters, flexible tubing, hydraulic fluid (water/oil), a simple frame to hold the assembly.
  - **Features:** A small input force on a small piston lifts a heavier load on a larger piston, visually demonstrating the principle of hydraulic multiplication of force.
  - **Skills Gained:** Fluid mechanics, mechanical fabrication, understanding of basic engineering principles.

- Design of Smart Helmet for Safety Monitoring

  (Difficulty: Advanced)

  - **Objective:** To design a smart helmet for industrial workers or miners that can detect accidents and monitor the environment.
  - **Technology:** Arduino/ESP32, accelerometer (for impact detection), gas sensor (e.g., MQ-2), GPS module, GSM module for sending alerts.
  - **Features:** Automatic fall/impact detection, air quality monitoring, sends an SMS alert with GPS coordinates to an emergency contact upon detecting an accident.
  - **Skills Gained:** Wearable technology, IoT, sensor fusion, emergency response systems.

General Interdisciplinary Mini Projects

- Online Voting System with Authentication

  (Difficulty: Intermediate)

  - **Objective:** To develop a secure web application for conducting online elections, focusing on user authentication and vote integrity.
  - **Technology:** Web framework (Flask/Django/React+Node.js), database (SQL/MongoDB), authentication mechanism (e.g., OTP).
  - **Features:** Secure user registration/login, one-vote-per-user logic, real-time results dashboard.
  - **Skills Gained:** Full-stack web development, database design, security principles.

- AI-based Career Guidance System

  (Difficulty: Intermediate)

  - **Objective:** To create an application that suggests career paths based on a user's skills, interests, and academic performance.
  - **Technology:** Python, Scikit-learn/TensorFlow, pandas, a web framework for UI (Flask/Streamlit).
  - **Features:** User input via a quiz or form, an ML model for prediction, detailed career suggestions with required skills.

    - **Skills Gained:** Machine learning (recommendation systems), data science, web development.
- Virtual Internship Experience Dashboard

  (Difficulty: Beginner)

    - **Objective:** To build a web dashboard that simulates the tasks and projects of a virtual internship to help students prepare for real-world work.
    - **Technology:** HTML, CSS, JavaScript (React/Vue.js would be a plus).
    - **Features:** Task list with deadlines, a mock project submission portal, progress tracking, a resource library.
    - **Skills Gained:** Frontend web development, UI/UX design, project management concepts.
- College Navigation App with AR

  (Difficulty: Advanced)

    - **Objective:** To develop a mobile app that uses Augmented Reality to overlay directions and information on a live camera view of the college campus.
    - **Technology:** Unity with AR Foundation (for ARCore/ARKit) or a dedicated AR SDK, 3D models of campus buildings.
    - **Features:** Point-of-interest markers, real-time pathfinding to classrooms or labs, search functionality for locations.
    - **Skills Gained:** Augmented Reality (AR) development, mobile app development, 3D asset integration.
- E-waste Collection and Management App

  (Difficulty: Beginner)

    - **Objective:** To design an app to schedule e-waste pickups and inform users about responsible recycling.
    - **Technology:** App development framework (Flutter/React Native), Firebase for backend, Google Maps API.
    - **Features:** User login, schedule pickup requests, map view of nearby recycling centers, educational content about e-waste.

- **Skills Gained:** Mobile app development, database management, API integration.

Path B: The Innovator's Hub (Bring Your Own Idea!)

Have a groundbreaking idea that isn't on our list? The Innovator's Hub is for you! We encourage out-of-the-box thinking and solutions to problems you are passionate about.

Proposal Requirements

If you choose this path, you must submit a one-page project proposal along with your registration. The proposal must include:

1. **Project Title:** A catchy and descriptive name for your project.
2. **Problem Statement (The "Why"):** Clearly describe the problem you are trying to solve and why it is important.
3. **Proposed Solution (The "How"):** Detail your proposed solution. What will you build? How will it work?
4. **Key Features:** List the top 3-5 features your project will have.
5. **Technology Stack:** List the primary technologies, hardware, and software you plan to use.

Judging Criteria

All projects will be evaluated based on the following criteria. Note that projects from the "Innovator's Hub" will be given higher weightage in the "Innovation & Originality" category.

Criteria	Description	Points
Innovation & Originality	How creative and unique is the project? Does it solve a problem in a novel way?	30
Technical Execution & Quality	Is the project well-built? Is the implementation robust? Does it function correctly during the demo?	40
Presentation & Communication	How clearly did the team explain their project's	20

	purpose, functionality, and challenges?	
Impact & Viability	Does the project have a practical application or solve a real-world problem?	10
Total		**100**

For any questions, please contact the organizing committee at **asymmetric@citchennai.net**

Good luck, and may the best ideas win!