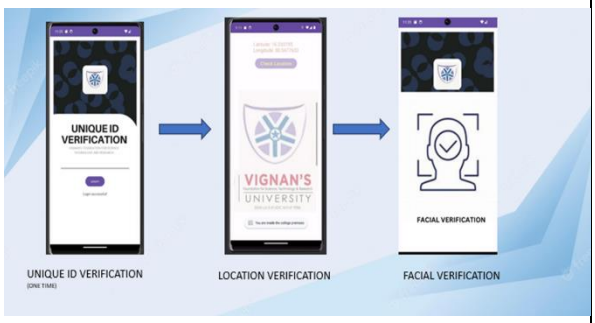
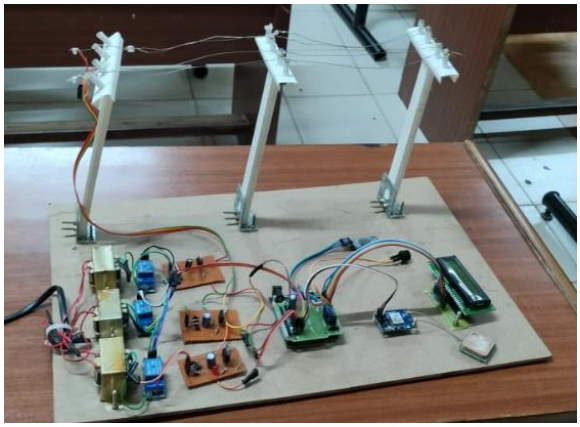
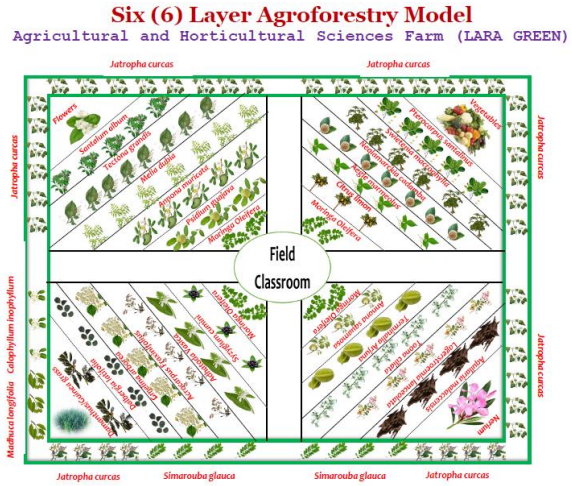
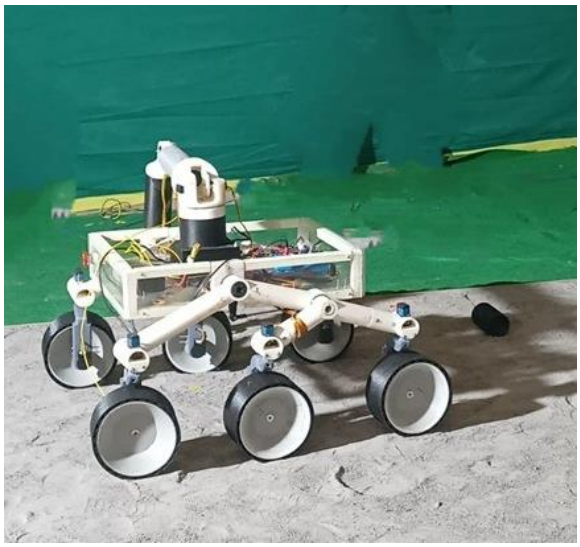
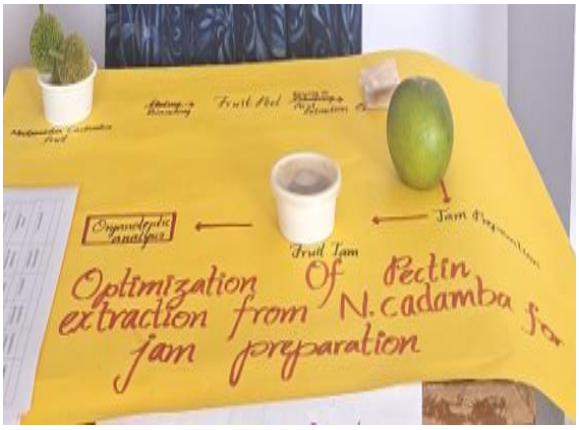
PHOTOGRAPH OF ONE-PROTOTYPE/DISPLAY MODEL & WRITE UP IN 100 WORDS

Smart Shopping Cart Using Radio Frequency Identification	
	The Smart Shopping Cart Using RFID project aims to improve shopping by incorporating RFID technology into traditional carts. Traditional carts are often inefficient, lacking real-time cost tracking and relying on manual checkout processes. This project creates a smart cart that provides instant cost feedback, minimizing checkout time and reducing pricing errors. At its core is the Arduino UNO, which processes data from RFID tags attached to products. An RFID reader scans items, and an I2C LCD display shows the total cost in real-time. The project includes integrating hardware and software for a functional prototype, ensuring portability and addressing security concerns. Initial tests show promising results, enhancing customer experience and offering benefits to retailers.
Enhancing Attendance Management GPS-Based Automated Attendance System	
	The project develops a mobile attendance system for faculty members using geofencing, facial recognition, GPS, and Firebase. This system automatically records attendance as faculty enter or exit campus, improving accuracy and minimizing manual errors. Geofencing establishes virtual boundaries, triggering attendance when a device enters or leaves. Facial recognition, powered by Google's FaceNet model and TensorFlow Lite, authenticates identities quickly without constant internet access. Firebase securely stores and syncs attendance records in real-time, enhancing data accessibility and security. Overall, the system modernizes attendance tracking, reduces administrative burdens, and fosters a tech-driven environment in educational institutions.

Transmission Line Fault Detection using Microcontroller and Bluetooth	
	This setup detects line-to-line (LL) and line-to-ground (LG) faults in transmission lines using an Arduino Mega 2560. Current Transformers (CTs) and Potential Transformers (PTs) measure line currents and voltages, providing signals to the Arduino. It calculates impedance (Z) and compares it with predefined thresholds to identify faults. Upon detection, a buzzer alerts the user, and an SMS is sent via Bluetooth, detailing the fault type, location (GPS coordinates), and line ID. The system includes Arduino, CTs, PTs, a buzzer, Bluetooth module (HC-05), and GPS module. Advantages include real-time detection, quick alerts, reduced downtime, and improved reliability of transmission lines.
Design and Development of X8 Copter	
	An Unmanned Aerial Vehicle (UAV) has various applications, such as pesticide spraying, photography, surveillance, search and rescue, and food delivery. The coaxial drone, a specific type of UAV, features two counter-rotating propellers on the same axis, offering enhanced stability and high payload capacity. While delivering heavy loads typically requires larger drones, this can be impractical in confined or hazardous spaces. The coaxial design overcomes this limitation by ensuring a high payload capacity while maintaining a more compact size, making it suitable for challenging environments. This combination of efficiency and versatility makes coaxial drones valuable in various operational contexts.

Rotary Tablet Press	
	Rotary tablet press is used for automatic compression of powders or granules in the manufacturing of tablets. Three stages are there in this operation viz. filling of powders in die cavity, compression of the powders into tablet, and ejection of the tablet form the die cavity. Different parts of the machine viz. hopper, punches, dies, turrets, die table, cam tracks, and feed frame involve in producing the tablets. Turrets hold the punches and die table holds the dies. The cam tracks guide moment of the punches during the three stages of the process.
Six-Layer Agroforestry Model	
	The 6-layer agroforestry model at AHS Farm (LARA GREEN) enhances biodiversity and soil health while promoting sustainable agriculture. By integrating diverse species like Jatropha curcas and Pongamia pinnata in a stratified layout, it optimizes light and resource efficiency. This model fosters symbiotic interactions, improving ecosystem services such as carbon sequestration. The Food Forest, covering 11,968 square meters, features diverse fruit species arranged for optimal productivity and employs a drip irrigation system for efficient water management. Floral Oasis is a circular garden showcasing plants like marigolds and jasmine, enhancing beauty and promoting ecological sustainability. Together, these projects serve as educational tools for students and local farmers.

6-Wheeled Rover with Rocker-Bogie Mechanism	
	This document describes a 6-wheeled rover designed with a rocker-bogie mechanism, fabricated using lightweight and cost-effective PLA material through 3D printing. This configuration is ideal for uneven terrains, maintaining balance and stability while navigating obstacles. The use of PLA allows for rapid prototyping and easy modifications. Advantages include the rover's ability to overcome obstacles, lightweight components, and cost-effective fabrication. However, limitations exist, such as PLA's temperature sensitivity and reduced mechanical strength compared to traditional materials. Additionally, factors like durability in various conditions, scalability of design, and an electronic control system for remote operation are crucial for the rover's performance.
3D-Printed Prosthetic Arm Using EMG Signals and Servo Motors	
	This report describes a 3D-printed prosthetic arm that utilizes five servo motors, controlled by muscle signals from EMG sensors. The arm enables intuitive movement by detecting electrical activity from residual limb muscles, with a microcontroller converting these signals into motor commands for actions like wrist rotation and hand gripping. Key advantages include customization, affordability, and improved user experience. However, challenges such as signal noise, user adaptation, and battery life persist. Future developments may involve advanced signal processing and AI integration to enhance functionality and control, ultimately improving the quality of life for users with limb loss.

Microbial Fuel Cells: Harnessing Microbial Energy for Sustainable Electricity	
	The project aims to explore the potential of microbial fuel cells (MFCs) as a sustainable technology for generating electricity from organic materials using microorganisms. The project focuses on microbial fuel cells (MFCs), innovative systems that generate electricity by harnessing the metabolic processes of microorganisms. By using organic materials, such as wastewater or biomass, MFCs convert chemical energy into electrical energy through the oxidation of substrates by bacteria. The setup consists of an anode and a cathode separated by a proton exchange membrane, allowing for the flow of electrons and protons, ultimately producing a sustainable source of power. The benefits of MFC technology are significant, as it not only provides a renewable energy source but also aids in waste management and reduces environmental impact. The project aims to optimize MFC designs, enhance power output through the selection of effective microorganisms, and assess the economic viability for real-world applications. This research contributes to the advancement of sustainable energy solutions, paving the way for greener alternatives in energy generation.
Pectin extraction from N. cadamba for jam preparation.	
	Neolamarckia cadamba, or Kadamba, is a tropical tree native to South and Southeast Asia, known for its fragrant, spherical flowers and fast growth. It has cultural, medicinal, and ecological importance. Pectin, used in jams, can be extracted from its fruit through a simple acidic method: • Preparation: Collect, wash, slice, and dry mature fruits, then grind into powder. • Acid Extraction: Mix powder with an acidic solution (pH 2–3) and heat at 80–90°C for 60–90 minutes. • Filtration & Precipitation: Filter the mixture, then add ethanol or isopropanol to precipitate pectin. • Recovery & Drying: Wash and dry the pectin for storage. Use 10–20 g of pectin per kg of fruit for jam.