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MAGNETIC LEVITATION TRAIN MODEL

A Magnetic Levitation (Maglev) Train Model uses magnetic forces for lift and propulsion, eliminating the need for wheels. It demonstrates how magnets with like poles repel to achieve levitation. The model reduces friction, allowing for smoother & faster movement. It's commonly used in STEM projects to illustrate advanced transportation technology.

Team Members First Year (2024-25)

Three groups worked on this concept

MUDASSAR Ali Khan | BHAVYA Panday | HEMANTH Maddu

IQRA Aaisha Shaikh | AARAV Pastay | BHARAT Kariyappanavar

AKSH Jain | RISHI Singh

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ELECTRIC MOTOR

An electric motor is a device that converts electrical energy into mechanical motion using the principles of electromagnetism. It operates by generating a magnetic field in the stator, which interacts with the rotor to produce rotational movement. Electric motors are widely used in industries, household appliances, electric vehicles, and robotics due to their efficiency and reliability.

Team Members First Year (2024-25)

Two groups worked on this concept

UNNATI Nighot

TAHREEM Khan

ADITYA Pathak

RAJGURU Chiwate

FULL WAVE RECTIFICATION

Full wave rectification – is the process of converting an alternating current (AC) into a direct current (DC) by allowing both halves of the AC waveform to pass through. This is achieved using a bridge rectifier or a center-tapped transformer with two diodes.

Team Members First Year (2024-25)

JEEL Nandha

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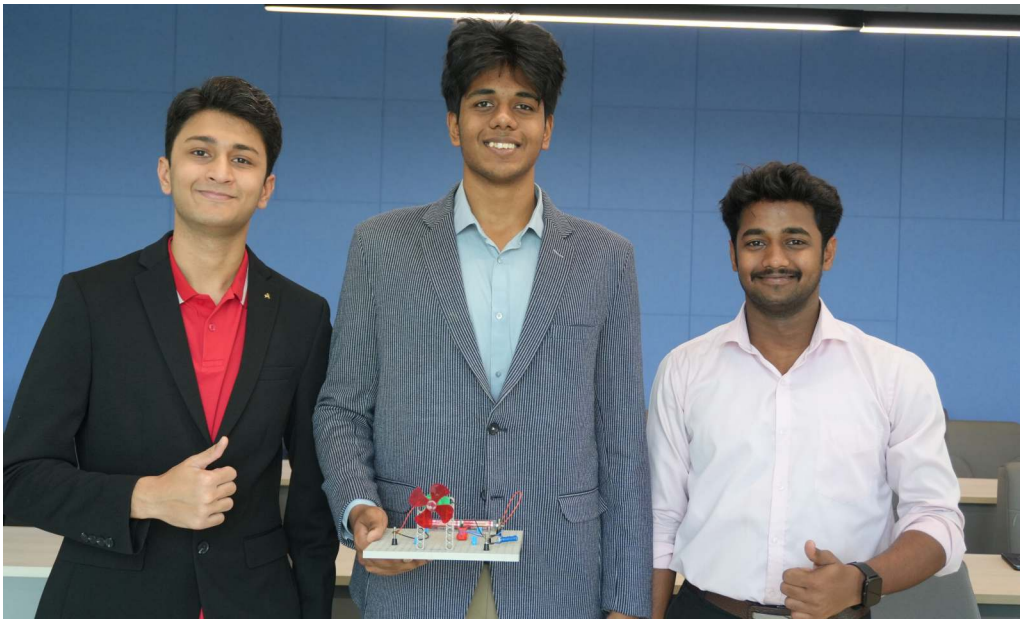
ELECTROMAGNETIC AQUATIC SCRAP RETRIEVAL SYSTEM

Electromagnetic Aquatic Scrap Retrieval System – is a device designed to remove metallic waste from water bodies using the principles of electromagnetism. It consists of a floating or submerged electromagnet that attracts ferrous materials like iron, steel, and other metallic debris from rivers, lakes, and oceans. This system helps in cleaning polluted water sources, preventing harm to aquatic life, and promoting environmental sustainability. It is particularly useful for low-cost, efficient waste management in rural and urban water bodies.

Team Members First Year (2024-25)



AADIDEV Raizada | AKHIL Barman | MANISH Saw | PROVISH Kashyap

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LI FI AUDIO DATA TRANSMISSION

Li Fi Audio Data transmission – is a wireless communication technology that uses visible light to transmit audio signals instead of radio waves. It operates by modulating LED light at high speeds, which is then received by a photodetector and converted back into an audio signal. Li-Fi offers advantages such as high-speed data transfer, security (as light does not penetrate walls), and minimal interference compared to traditional wireless technologies. It is particularly useful in environments where RF signals are restricted, such as hospitals, airplanes, and industrial settings.

Team Members First Year (2024-25)

KRISHNA Sevak

DAKSH Singh

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WIRELESS POWER TRANSFER

Wireless Power Transfer – is a method of transmitting electrical energy without physical wires, using electromagnetic fields. It works on principles such as inductive coupling, resonant inductive coupling, and electromagnetic radiation. Nikola Tesla pioneered this concept with his Tesla coil and Wardenclyffe Tower experiments. Today, WPT is used in wireless charging for smartphones, electric vehicles (Evs), and medical implants. Research continues to improve its efficiency and range for future applications like wireless grids and space-based solar power.

Team Members First Year (2024-25)

Four groups worked on this concept

YASH Mali | SIDDHAKESH Lanjewar | NEHA Sherkhanee | KRISHNA Dhiware

DAKSH Joshi | RAUNAK Kumar | HIMANSHU Pathak

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PAPER SPEAKER

A paper speaker is a simple, lightweight speaker made using a thin paper diaphragm, a coil, and a magnet. It works on the principle of electromagnetic induction, where an electric current passing through the coil creates a magnetic field that interacts with the magnet, causing vibrations in the paper diaphragm to produce sound. Paper speakers are often used in DIY projects, educational experiments, and low-cost audio devices. Despite their simplicity, they can effectively demonstrate the basics of sound reproduction.

Team Members First Year (2024-25)

Ali Asgar | Aryan Mishra | Nikhil Raj | Nikhil Shukla

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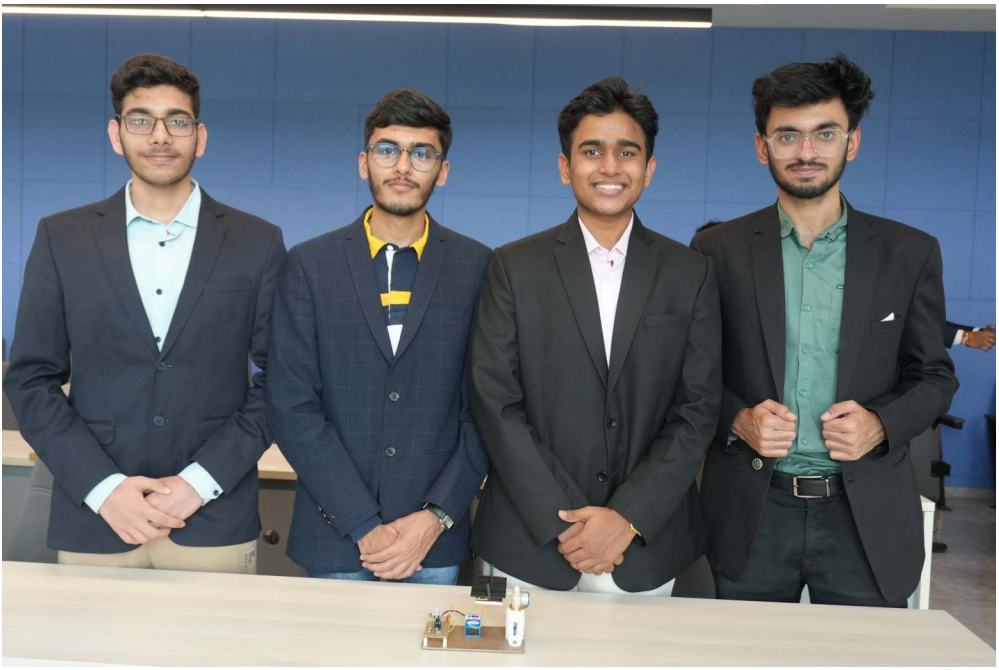
SOLAR TRACKING SYSTEM

Solar Tracking System – is a mechanism that automatically adjusts the position of solar panels or solar reflectors to follow the sun's movement across the sky. This increases energy absorption and improves the efficiency of solar power generation. Solar trackers can be single-axis (tracking the sun's movement from east to west) or dual-axis (tracking both altitude and azimuth). They are widely used in solar farms, concentrated solar power (CSP) plants, and advanced photovoltaic systems to maximize energy output.

Team Members First Year (2024-25)



VEDANSH Mehrotra | TEJAS Adhiya | SHARDUL Narvekar | SANJEEV Bellamkonda

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QUANTUM ENTANGLEMENT

A phenomenon where two or more particles become interconnected such that the state of one particle instantly influences the state of the other, no matter how far apart they are. This challenges classical physics and suggests that information can be transmitted faster than light, though not in a way that violates relativity. Albert Einstein famously called it "spooky action at a distance." Entanglement plays a key role in quantum computing, cryptography, and teleportation experiments.

Team Members First Year (2024-25)

SONIA Shelke

SURYAANSH Singh

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STRENGTH OF AN ELECTROMAGNET

The strength of an electromagnet depends on several factors, including: Number of Coil Turns – More loops of wire around the core increase the magnetic field. Electric Current – A higher current through the coil generates a stronger magnetic field. Core Material – A soft iron core enhances the magnetism due to its high permeability. Coil Length and Density – A tightly wound coil produces a more concentrated field. Electromagnets are widely used in electric motors, generators, magnetic locks, and industrial lifting equipment due to their controllable magnetic strength.

Team Members First Year (2024-25)

SHAUNAK Rane | SANKET Deka | YASH Pandit | RUDRA Pratap

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LIFI PROJECT

LIFI project - is a wireless communication technology that uses visible light instead of radio waves (Wi-Fi) to transmit data. It works by rapidly modulating LED light intensity, which is then detected by a photodetector and converted into data. Li-Fi offers higher speeds, greater security, and less interference compared to traditional Wi-Fi. However, it requires a direct line of sight and cannot pass through walls. Li-Fi is being researched for applications in smart homes, hospitals, aircraft, and underwater communication.

Team Members First Year (2024-25)

AWADHOOT Warge	ANIKET Limje	MUNSHI Rahim	HARSHWARDHAN Marepalli

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POWER TRANSMISSION BASED ON MUTUAL INDUCTION

Power Transmission based on Mutual Induction – is the principle where a changing current in one coil induces a voltage in a nearby coil without physical contact. This is the basis of wireless power transmission and is commonly used in transformers, inductive charging systems, and wireless energy transfer technologies. In power transmission, an alternating current (AC) in the primary coil creates a varying magnetic field, which induces a voltage in the secondary coil. This principle is applied in wireless phone chargers, electric vehicle (EV) charging stations, and medical implants, enabling efficient energy transfer without direct wiring.

Team Members First Year (2024-25)

RATNADEEP Patil | SHIVSHREE Patil | SIDDHI Shendge | SHRAVANI Karanjkar

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HYDRO ELECTRICITY

Hydro electricity – is a renewable energy source that generates electricity from flowing or falling water using hydropower plants. The energy of moving water spins turbines, which drive generators to produce electricity. It is one of the most reliable and widely used forms of renewable energy. Dams, tidal power, and run-of-river systems are common hydroelectric setups. Hydropower is eco-friendly, cost-effective, and provides grid stability, but it may impact aquatic ecosystems and require large infrastructure.

Team Members First Year (2024-25)

SOHAM Parab

SHIVAM Thakur

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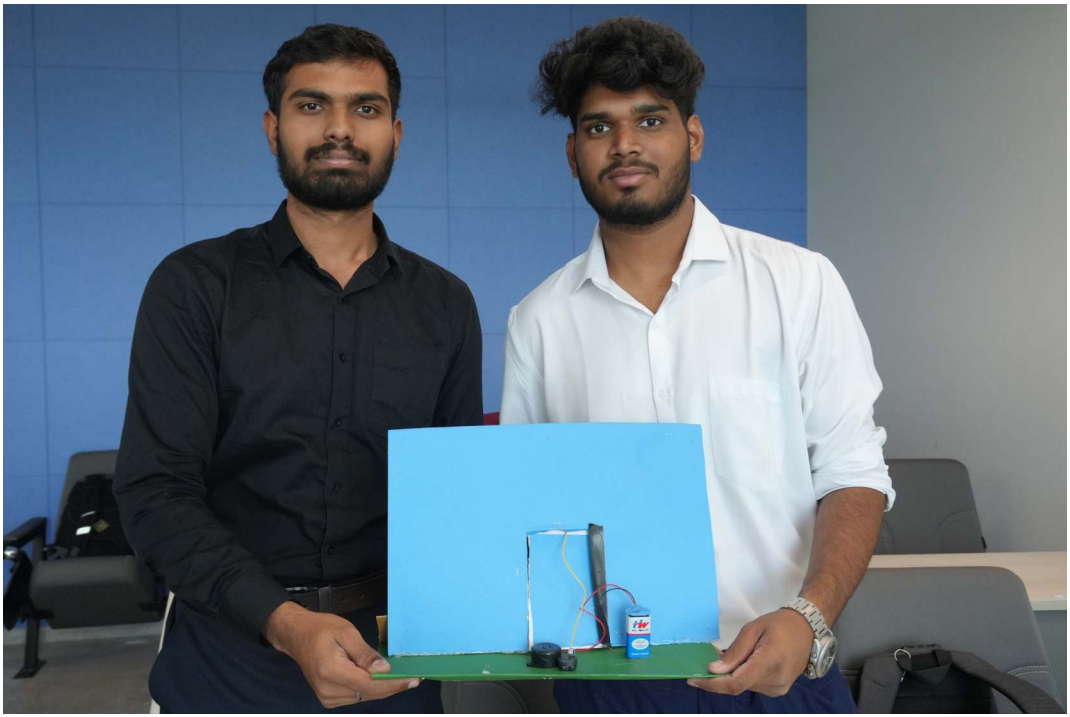
DOOR ALARM BY HALL EFFECT

Door alarm by hall effect – works by detecting changes in a magnetic field when a door opens or closes. It consists of a Hall effect sensor and a magnet placed on the door frame and the door, respectively. When the door moves, the magnetic field changes, triggering an alarm or notification. This system is commonly used in security systems, smart homes, and industrial safety applications for intrusion detection and access control.

Team Members First Year (2024-25)



HARSH Khamkar	MINIT Shetty	RAYAN Shaikh	VINIT Deogade

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BUZZER SYSTEM

Buzzer System – an electronic device that produces sound or alarm signals using electromechanical, piezoelectric, or magnetic mechanisms. It operates on electric current, converting it into audible alerts. Buzzers are used in alarms, timers, doorbells, warning systems, and electronic appliances. They can produce different tones, volumes, and frequencies depending on the application. Simple and reliable, buzzer systems are essential for notifications and safety alerts in various industries.

Team Members First Year (2024-25)

VEDANSHU Gatade

LOUKYA