# Sreyas Institute of Engineering and Technology

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**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**


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## Metal Detector


## Abstract :

This project involves the design and implementation of a practical metal detector using electromagnetic induction principles. The detector features a copper coil that generates a magnetic field when powered by an oscillator circuit. When a metal object is brought near the coil, it disrupts the magnetic field, causing a change in the coil's resonance frequency. This frequency alteration is detected by transistors, which amplify the signal before directing it to a buzzer. The buzzer then emits an audible alert, indicating the presence of metal.

The detector can identify both ferrous metals like iron and steel, as well as non-ferrous metals such as aluminum, copper, and brass. A potentiometer allows for sensitivity adjustment, enabling precise tuning to detect metals of various sizes and distances. This feature makes the detector versatile for applications ranging from locating hidden metal objects to educational demonstrations of electromagnetic principles.

Constructed from basic electronic components, this project exemplifies fundamental concepts such as oscillation, signal amplification, and electromagnetic field interaction with conductive materials like metals. It serves as an invaluable educational tool, offering hands-on experience in electronics and enhancing understanding of real-world applications of electromagnetic theory. Overall, this metal detector project provides practical insights into electronics and showcases its potential in diverse educational and practical settings.



**Keywords:** Buzzer alert, Electromagnetic induction, Oscillator circuit, Potentiometer, Sensitivity adjustment, Signal amplification, Transistors



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