

**BATCH NO:** 16

**PROJECT TITLE:** ADVANCEMENT IN SOIL SENSING TECHNOLOGIES:  
INTEGRATING WIRELESS SENSORS, MICROBIAL MONITORING AND AI FOR  
PRECISION AGRICULTURE RESEARCH

**ABSTRACT:**

This study delves into the advancements in soil sensing technology, particularly focusing on the integration of wireless sensors, microbial monitoring, and artificial intelligence (AI) for precision agricultural research. The research encompasses an extensive evaluation of wireless soil sensing technologies, with a specific emphasis on temperature monitoring and soil moisture levels. The project also explores the incorporation of water tank level monitoring into the system, enabling effective water management and irrigation methods through remote access and control facilitated by Internet of Things (IoT) characteristics. Utilizing hardware components such as ATMEGA 328P microcontroller, temperature and moisture sensors, ultrasonic sensor, water motor, servo motor, power supply, buzzer, and Node MCU, the project aims to develop a wireless soil sensing system capable of providing real-time data updates for visualization on an LCD screen. This integrated system holds promise in enhancing agricultural operations by facilitating informed decision-making and promoting sustainable water management practices.

**Keywords:** Soil sensing, wireless sensors, IoT, precision agriculture, water management, real-time monitoring.