Academic Year	Batch No: 4EIE09
2025-2026	

Main Project

Project title: Smart ESD and Environment Risk Monitor

Abstract

In high-precision industrial environments such as semiconductor manufacturing units, pharmaceutical cleanrooms, and PCB assembly lines, maintaining strict control over microclimatic conditions is essential. Electrostatic discharge (ESD), particulate contamination, and even minor fluctuations in temperature, humidity, or air pressure can lead to product defects, equipment malfunctions, or compliance failures. Despite their importance, these parameters are often monitored manually or using expensive, centralized systems, which can result in delayed responses to hazardous changes. This project addresses the need for a cost-effective, real-time monitoring solution that can detect and alert operators about environmental and ESD-related risks before they escalate.

The proposed system is a compact, edge-based device that continuously monitors key environmental parameters including electrostatic charge, particulate levels (PM2.5), temperature, humidity, and ambient pressure. A microcontroller processes sensor data to compute a real-time hazard score, displayed on an OLED screen with visual and audio alerts for critical conditions. The system also supports data logging and optional MQTT-based communication for centralized dashboards. Designed to be portable and energy-efficient, this solution can be deployed across multiple industrial zones, providing real-time insights to quality assurance and maintenance teams. The project offers a practical approach to enhancing industrial safety and process reliability, while aligning with Industry 4.0 standards.

Remarks from the Supervisor:

NAME AND SIGNATURE OF STUDENT TEAM LEADER	NAME AND SIGNATURE OF PROJECT GUIDE

Academic Year	Department	Batch No: 4EIE09
2025-2026		

Review 1

Date:

Title of the project : Smart ESD and Environment Risk Monitor

(Kindly ensure that the students have filled the project review approval form and approved by their supervisor before evaluation)

S.No	Name	Reg No.	Mark Allocation				
			Literature survey and Identification of Problem Statements	Framing of Project Objectives and deliverables & Confidence level	Conceptual understanding of Engg Fundamentals	Total	Guide Marks – Based on discussion and Participation of Students
			5	5	5	15	5
1	Dharani G R	2206008					
2	Nikhil C	2206034					
3	Pranav Krishna S	2206036					

Approved / Re-appear :

Remarks of the evaluators:

1.

2.

Signature of the Evaluators **Panel Coordinator** **Supervisor** **Project Coordinator**