KONERU LAKSHMAIAH EDUCATION FOUNDATION

AZIZ NAGAR, HYDERABAD

DEPARTMENT OF ECE

Project Proposal

1.0	**Details of Candidates:**	1. E vamshi (2310040098) 2. S Surendra (2310040105) 3. S Naga Vamshi (2310040136) 4. R Rohith (2310040067)
	Course of Study:	B. TECH/ECE
	Year:	II
	Semester:	II
2.0	**Course Details:**	23SDECC02A EMBEDDED SYSTEM AUTOMATION
3.0	**Name of Supervisor:**	Mrs. Kosaraju Madhavi
4.0	**Proposed Title:**	Environmental monitoring by using esp32

Febraury, 2025

5.0 Introduction

Here's the project proposal for an "Environment monitoring using ESP32".

5.1 General Introduction

Air pollution is a critical concern in today's world, leading to numerous health issues and environmental problems. An Environment monitoring system is essential to track real-time air pollution levels, providing actionable insights to both the public and authorities. The ESP32 microcontroller, with its Wi-Fi capabilities and affordability, enables the development of a cost-effective and efficient system for monitoring Environment data and displaying it on a centralized platform accessible through mobile or web applications.

Purpose and Importance

Health and Safety: Monitoring Environment helps individuals protect their health, particularly those with respiratory conditions.

Data for Action: Real-time data can aid governments and organizations in making decisions to improve air quality.

Public Awareness: The system allows individuals to stay informed about the Environment in their environment, promoting more informed behavior.

5.2 Problem Statement

Current Environment monitoring systems can be expensive and inaccessible to the general public. This project aims to develop a low-cost, scalable, and user-friendly Environment monitoring system using the ESP32 microcontroller. The system will provide real-time data on key pollutants and display the information on a mobile or web interface.

5.3 Objectives of the Study

Develop a Low-Cost Monitoring System: Use ESP32 to design an affordable system for monitoring air quality.

Provide Real-Time Data: Continuously gather and display real-time Environment metrics such as PM2.5, PM10, and CO2 levels.

Design an Intuitive Interface: Develop a mobile or web-based interface to display Environment

data in real-time.

5.4 Scope of the Project

- Design and develop an Environment monitoring system using ESP32.

- Integrate sensors for pollutants such as PM2.5, PM10, and CO2.

- Display the data in real-time on a web or mobile interface.

- Ensure data privacy and accuracy.

5.5 Literature Review

Introduction:

Environment monitoring systems are vital tools for assessing pollution levels and mitigating environmental and health impacts. The ESP32 has been widely used in IoT applications for its cost-effectiveness and Wi-Fi capabilities.

Existing Technologies and Methods:

- Environment monitoring traditionally uses expensive sensors and cellular/GSM networks for data transmission. The ESP32 offers a more affordable solution with its built-in Wi-Fi and real-time communication capabilities.

Research Background:

- Research by Gupta and Raj (2019) highlights the use of IoT platforms for Environment monitoring, emphasizing the role of the ESP32 in cost-effective, scalable solutions.

Research Gaps:

Many Environment monitoring systems are either costly or complex, limiting their widespread use. This project aims to fill the gap by developing a user-friendly, affordable system that provides accurate real-time Environment data.

6.0 Abstract

This project proposes an environmental monitoring system utilizing the ESP32 microcontroller, MQ-135 air quality sensor, and DHT11 temperature and humidity sensor. The primary goal is to provide real-time monitoring of air quality and environmental conditions, offering insights into

temperature, humidity, and levels of harmful gases like ammonia, carbon dioxide, and benzene. The ESP32, known for its low power consumption and Wi-Fi capabilities, acts as the central unit for data collection and transmission. The MQ-135 sensor detects air pollutants, while the DHT11 sensor measures temperature and humidity levels, both of which are critical for assessing environmental quality. Data from these sensors are processed by the ESP32 and transmitted wirelessly to a cloud-based platform or displayed on a connected device. This system provides an efficient and scalable solution for tracking and analyzing environmental conditions, contributing to health and safety improvements in smart homes, factories, or urban environments. The project emphasizes real-time data logging, with the potential for further expansion into advanced analytics and automation.

7.0 Methodology

1. Project Planning and Requirements Analysis

- **Assess Environment parameters (MQ-135) and data requirements.**
- **Plan the budget, system components, and resources.**

2. System Design

- **Select the ESP32 and compatible Environment sensors (e.g., MQ135 sensor).**
- **Develop the system architecture for data collection and real-time display.**

3. Installation

- **Install sensors and configure the ESP32 for data transmission.**
- **Establish connections to cloud storage or local database for real-time data logging.**

4. Testing and Commissioning

- **Test the system for real-time data accuracy and network connectivity.**
- **Create user manuals and documentation for future maintenance.**

8.0 Expected Output

The project will result in a fully functional Environment monitoring system using the ESP32. The system will provide real-time data on air pollutants and display this information via a web or mobile interface. The system will be affordable and scalable for wider adoption.

9.0 Other Relevant Information

Justification for Components: The ESP32 is chosen for its cost-effectiveness and Wi-Fi capability, making it suitable for real-time monitoring.

Future Expansion: The system can be expanded with additional sensors or integrated into larger IoT networks.

Safety and Compliance: The design will adhere to data privacy standards and environmental regulations.

9.1 Financial Arrangements

The budget is given below:

S/N	ITEM	DESCRIPTION	COST
1	ESP32	It is a low-cost, Wi-Fi-enabled microchip with a built-in microcontroller, widely used for wireless communication.	527
2	**MQ-135**	**Sensor which sense air**	250
3	**DHT-11**	**Sensor senses the temperature**	60
4	**JUMPER WIRES**	Used for the connections	50
5	**BREADBOARD**	Used for connecting the wires	150
	Grand Total		837

9.2 Duration (chart required)

This project will be completed in one year. The proposed schedule is given below:

SL.NO.	TASK NAME	2025					
		DEC	JAN	FEB	MAR	APR	MAY
1	Literature review	✓	✓	✓			
2	Data collection & system analysis	✓	✓	✓			
3	System Design and Development			✓	✓	✓	

4	Prototype testing & installation				✓	✓	✓
5	Writing report	✓	✓	✓	✓	✓	✓
6	Submission				✓	✓	✓

Table 9.2: Proposed time schedule

10.0 References (MINIMUM OF 3)

G. A. DeMichele, "ESP32 Home Automation Projects: A Complete Guide to Building Your Own Smart Home," Apress, 2018. This book provides practical examples and step-by-step instructions for building home automation systems using the ESP32.

J. R. Martinez and M. B. Shah, "IoT-Based Home Automation Using ESP32: Design and Implementation," IEEE Access, vol. 8, pp. 103456-103468, 2020. This article discusses the design and implementation aspects of home automation systems using the ESP32.

S. Gupta and R. Kumar, "Integrating ESP32 with IoT Platforms for Smart Home Solutions," in Proceedings of the IEEE International Conference on Internet of Things (IoT), 2021, pp. 88-94. This paper explores the integration of ESP32 with various IoT platforms for creating smart home

CANDIDATES

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SUPERVISOR

1. Comments by Supervisor:

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Date: ……..... Name: ……...…….……

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