

## ABSTRAK

Penelitian ini bertujuan untuk merancang dan mengimplementasikan sistem monitoring dan kendali suhu ruangan berbasis Internet of Things (IoT) di Fakultas Teknik Universitas Malikussaleh guna meningkatkan efisiensi penggunaan AC. Sistem menggunakan mikrokontroler dan teknologi IoT untuk mengukur suhu, mendeteksi keberadaan pengguna, serta mengontrol AC dan ventilasi secara otomatis maupun manual melalui antarmuka web berbasis Firebase. Pengujian di ruang kelas Teknik Informatika menunjukkan bahwa sistem mampu menjaga suhu stabil pada 25–26°C dan menghemat energi dengan mematikan AC saat ruangan kosong atau suhu sudah rendah. Evaluasi terhadap lima responden menghasilkan tingkat kepuasan tinggi pada aspek efisiensi dan kenyamanan (skor 4,2), meskipun antarmuka web dan informasi sistem masih perlu ditingkatkan (skor 3,6 dan 2,6). Penelitian ini berkontribusi pada solusi praktis pengelolaan energi di lingkungan akademik, serta menawarkan potensi pengembangan sistem lebih lanjut dengan integrasi teknologi yang lebih canggih.

**Kata Kunci** : Efisiensi Energi, Internet of Things, Kendali AC, Monitoring Suhu, NodeMCU ESP8266

## **ABSTRACT**

*This study aims to design and implement a room temperature monitoring and control system based on the Internet of Things (IoT) at the Faculty of Engineering, Universitas Malikussaleh, to improve the efficiency of air conditioner (AC) usage. The system utilizes microcontrollers and IoT technology to measure temperature, detect human presence, and control AC and ventilation automatically or manually through a Firebase-based web interface. Testing conducted in an Informatics Engineering classroom showed that the system can maintain a stable temperature of 25–26°C and reduce energy consumption by turning off the AC when the room is unoccupied or sufficiently cool. Evaluation from five respondents indicated high satisfaction with energy efficiency and comfort (average score of 4.2), although improvements are needed in the web interface and system information display (scores of 3.6 and 2.6, respectively). This research contributes a practical solution for energy management in academic environments and offers potential for further development through the integration of more advanced technologies. Keyword: Temperature Monitoring, NodeMCU ESP8266, Internet of Things, AC Control, Energy Efficiency.*

**Keywords:** *Energy Efficiency, Internet of Things, Air Conditioning Control, Temperature Monitoring, NodeMCU ESP8266*