

## **ABSTRACT**

*Patients in medical environments often require accurate and non-contact body temperature measurements to ensure proper condition monitoring without contamination risk. For this purpose, we designed a digital thermometer based on Arduino using the MLX90614 sensor, which measures temperature based on infrared radiation. This study aims to compare the calibration accuracy between the Arduino-based digital thermometer and commercial digital thermometers under different temperature measurement conditions. We conducted a series of tests covering various temperature ranges and factors such as initial calibration, operating environment, and calibration methods. The results of this study provide a comparison between the Arduino-based digital thermometer and commercial digital thermometers in the context of calibration. The study found that the Arduino-based digital thermometer with the MLX90614 sensor demonstrated better calibration accuracy compared to commercial digital thermometers. The average error produced by the Arduino-based thermometer was 0.1338%, while the commercial digital thermometer had an average error of 0.3731%. These results indicate that the Arduino-based thermometer has smaller and more consistent errors, making it more reliable for medical applications, especially in clinical environments where accuracy is crucial. In conclusion, the Arduino-based digital thermometer with the MLX90614 temperature sensor is reliable for accurately and non-contactly measuring body temperature.*

**Keywords:** *Thermometer calibration, digital thermometer, commercial thermometer, Arduino, microcontroller, accuracy comparison.*