

**UNIVERSITI TEKNOLOGI MARA**

**IOT-ENABLED SWIMMING POOL  
MANAGEMENT SYSTEM: AN  
INTEGRATED APPROACH TO  
MONITORING AND CLEANING**

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## **ABSTRACT**

This creative project uses an Arduino UNO microcontroller, sensors, and a WiFi module to build a real-time pool cleaning and monitoring system that is dependent on water temperature, pH level, and turbidity. The main goals of the project are to create an integrated monitoring and cleaning model for an Internet of Things (IoT)-enabled swimming pool management system and to simulate an IoT-enabled swimming pool management system using the Proteus program. Three essential inputs—temperature, pH level, and turbidity sensors—as well as three matching outputs—LCD, chlorine pump, and WiFi module—are incorporated into the project. The inputs show responses through simulations; most notably, the pH sensor activates the motor that pumps out chlorine when the pH level increases above seven. In the future, elements like an automated reaction system for the pool's covering motor could be added to further improve the system. By using a forward-thinking approach, the project's functionality may be improved and help create an even more complete and self-sufficient IoT-enabled swimming pool management system, which would guarantee the best possible water quality and cleanliness.

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# CHAPTER ONE

## 1.1 Research Background

The "IoT-Enabled Swimming Pool Management System" project's research background examines the pressing demand for cutting-edge technology solutions in the field of aquatic facility management. The need for intelligent and effective methods to maintain swimming pool conditions is growing as urbanization and technology advancement continue. Conventional pool management techniques frequently depend on routine physical inspections, which causes a delay in reacting to shifting water conditions and possible health risks.

By providing automated reactions and real-time monitoring, Internet of Things (IoT) technology integration in swimming pool management seeks to overcome these issues. The project's technological basis consists of an Arduino UNO microcontroller, sensors, and a WiFi module. The main variables influencing water quality have been found to be turbidity, pH, and water temperature. Sensors are used to measure these variables on a regular basis. In keeping with the emerging trend of digital simulations in project development, the networked system is intended to mimic an Internet of Things-enabled Swimming Pool Management System through the use of the Proteus program.

The goal of this senior project is to advance the field of Internet of Things applications in aquatic facility management in addition to developing a prototype for an integrated monitoring and cleaning system. The project intends to improve the sustainability and effectiveness of swimming pool maintenance operations by offering an automated reaction mechanism to maintain appropriate pH levels through chlorine injection. This background in research lays the groundwork for the creation of an intelligent and useful solution that fits the changing requirements of contemporary aquatic facility management.