

# Nguyen Hoang Minh Quoc

## Embedded Firmware Intern

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### CAREER OBJECTIVE

As a third-year Electronics and Telecommunications student at HCMUS, I am seeking an Embedded Automotive Firmware Internship to strengthen my skills in firmware design, peripheral drivers (UART, SPI, I<sup>2</sup>C, GPIO), and real-time ECU development, while gaining hands-on experience with CAN, UDS, and ISO 26262 standards.

### EXPERIENCE

#### Robotics & IoT Lab ( VNU-University of Sience (HCMUS))

04/2024 - 08/2025

##### STEM Tutor (Contract)

- Instructed STEM courses for high school and middle school students, covering Arduino/ESP32 programming, peripheral communication, and hardware integration on the weekends. Inspire young people to explore science, technology, and the field of embedded programming.

### EDUCATION

#### University of Science - VNUHCM (HCMUS)

2023 - 2027

#### Bachelor of Science - BS: Electronics and Telecommunications

• GPA: 3.73

- **Co-author and presenter of the paper:** VQASEP: Applying AI Technologies to develop a Vietnamese Q&A System on an Embedded Platform, successfully accepted and presented at the prestigious 14th Scientific Conference (VNUHCM-US Conf 2024). The project involved building a standalone voice assistant using a Raspberry Pi and Google Gemini API to deliver an intuitive, hands-free Q&A experience in Vietnamese. (**Git:** [https://github.com/MinhQuocNguyenHoang/PeeDee\\_assistant](https://github.com/MinhQuocNguyenHoang/PeeDee_assistant)).

### SKILLS

English VSTEP B2 (Overall: 6.5/10)

Embedded Programming C/C++, Embedded C

RTOS FreeRTOS

Microcontrollers, Mini pc & Architecture ARM Cortex-M, STM32, ESP32, ESP8266, Raspberry Pi, Arduino

Interfaces & Peripherals SPI, I<sup>2</sup>C, UART, ADC, Timers, GPIO, Interrupts

Hardware & PCB Design PCB Design: Altium, Proteus  
Prototyping: Proficient in soldering SMD (QFN, 0805, 1206) and through-hole components

Tools & Environments Git, Github, STM32CubeIDE, Keil C, VS Code, ESP-IDF, STM32CubeMX

### MY PROJECTS

#### IoT Attendance System (RFID & Google Sheets)

08/2025 - Present

##### Role: Firmware Developer

##### Responsibilities & Achievements:

- Designed and assembled a custom PCB (ESP32 + RC522 RFID + LCD 16x2 + power supply) using Altium.
- Integrated RC522 RFID reader via SPI protocol to read card data, and displayed attendance status on a 16x2 LCD through I<sup>2</sup>C interface.
- Implemented FreeRTOS tasks and inter-task queues for RFID scanning, Wi-Fi communication, and HTTPS data transmission to Google Sheets.
- Developed a Wi-Fi provisioning feature (BLE) allowing users to configure network credentials via mobile app.

Technologies & Skills: ESP32, ESP-IDF, FreeRTOS, SPI, I<sup>2</sup>C, BLE, HTTPS (Google Sheets API), UART, Altium Designer, Embedded C.

Git: [https://github.com/MinhQuocNguyenHoang/attendance\\_SYS](https://github.com/MinhQuocNguyenHoang/attendance_SYS)

#### Calculator with Keypad and LCD

06/2025 - 08/2025

##### Role: Firmware Developer

##### Responsibilities & Achievements:

- Designed and assembled a custom PCB (STM32 + Keypad(created from buttons) + LCD) using Altium.
- Implemented keypad (created from buttons) input handling with debouncing to ensure reliable multi-step operations.
- Developed a custom driver for 16x2 character LCD using direct GPIO control (4-bit parallel interface), without relying on external I<sup>2</sup>C modules, to display real-time results.
- Applied FreeRTOS tasks to process (input polling, calculation, display update).
- Extended functionality to support first- and second-degree equations in addition to basic arithmetic.

Technologies & Skills: STM32, HAL Drivers, FreeRTOS, GPIO, Altium Designer, Embedded C.

Git: <https://github.com/MinhQuocNguyenHoang/Calculator>

#### LiteHouse - Smart Home System ( 1 hardware + 1 firmware + 1 APP (MIT APP))

03/2025 - 05/2025

## Role: Firmware Developer

### Responsibilities & Achievements:

- Developed firmware drivers on STM32, including **GPIO driver for LED control** and **ADC interrupt-based driver** for gas detection.
- Implemented **UART communication between STM32 and HC-06 Bluetooth module** for mobile app connectivity.
- Integrated automated door-opening feature triggered by MQ2 sensor via ADC interrupt handling.
- Debugged and tested firmware using **SWD interface and STM32CubeIDE**.

**Technologies & Skills:** STM32, HAL/LL Drivers, UART, ADC, Interrupts, Bluetooth HC-06, Sensor Integration, SWD Debugging, Embedded C.

Git: <https://github.com/MinhQuocNguyenHoang/LiteHouse>

Video project: <https://drive.google.com/drive/folders/1lyHeAX215S69uxc0pfSo29VWZflstxH?usp=sharing>

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## ACTIVITIES

### Robotics & IoT Lab (HCMUS & American Center)

Technical Supporter – Supported teams in **ROBOCUS 2024–2025**, handled **C/C++ & Arduino troubleshooting**, and assisted STEM workshops in Mekong Delta.

### Ngo Quyen High School

Technical Advisor – Optimized **Arduino + HC-05 (UART)** vehicle control and developed an **MIT App Inventor** mobile app.

### FRACE (2024)

Finalist – Line-following car competition.