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Industrial Embedded Systems with STM32

Real-time systems • Hardware-aware firmware • Professional debugging

Online
Live

Engineer-Level

Almikatro Engineering Learning Path

From foundations to real engineering systems.

01

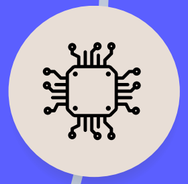
Engineering Fundamentals

Build the core foundations required for modern engineering systems.

02

IoT Systems Engineering (ESP32)

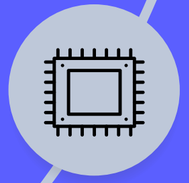
Connect embedded systems to networks and cloud platforms.
Applications: smart agriculture, monitoring systems.



03

Embedded Systems Engineering (STM32)

Control sensors, actuators, and machines using real-time firmware.
Applications: robotics, machines, instrumentation.Bio-tech



04

Hardware Development (PCB Design)

Transform prototypes into real electronic products.

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WHY EMBEDDED SYSTEMS MATTER?

Embedded systems power modern engineering:

Industry

- Machine monitoring
- Motor control

Agriculture

- Smart irrigation
- Environmental sensors

Biotech / Lab

- Measurement devices
- Data acquisition

IoT / Smart Devices

- Connected sensors
- Edge systems

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EMBEDDED SYSTEMS ACROSS ENGINEERING

Industry

- Machine monitoring
- Motor control

Agriculture

- Smart irrigation
- Environmental sensors

Biotech

- Measurement devices
- Data acquisition

IoT

- Connected sensors
- Edge devices

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WHY THIS COURSE?

Many engineers use microcontrollers but struggle with:

- Real-time timing
- Hardware behavior
- Professional debugging
- Scaling complex systems

Industry requires **reliable** embedded systems.

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WHAT MAKES THIS COURSE DIFFERENT

01

Hardware-aware development

02

Deterministic behavior

03

Debugging with ST-Link

04

Industrial mindset

Same C language ; **different way of thinking.**

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WHAT YOU WILL LEARN

Core technical skills

- ARM Cortex-M & STM32 architecture
- Memory: Flash, RAM, stack, heap
- GPIO, timers, interrupts
- Clock system & timing
- UART, SPI, I^2C (industrial validation)
- ADC & DMA
- FreeRTOS fundamentals
- Professional debugging

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HOW PRACTICE WORKS

Practice philosophy

- Real hardware
- Minimal components
- Engineering tasks (not tutorials)
- Debugging is part of learning

If you can debug **simple hardware**,
you can debug **complex systems.**

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Course Roadmap

1. Embedded Systems Foundations

Embedded mindset, Arduino vs STM32, industrial expectations

2. ARM Cortex-M & STM32 Architecture

MCU architecture, memory model, reset & boot process

3. GPIO, Interrupts & Timers

GPIO modes, EXTI, timers, real-time behavior

4. Clock System & Performance

Clock tree, PLL, prescalers, timing issues

5. Communication Protocols (Industrial View)

UART, SPI, I^2C, protocol validation

6. Analog & System Efficiency

ADC architecture, sampling, DMA, CPU load optimization

7. FreeRTOS & Firmware Architecture

Tasks, scheduling, synchronization, RTOS pitfalls

8. Hardware Awareness & Reliability

Power design basics, reset, boot pins, watchdogs

9. Final Embedded Project

System architecture, debugging strategy, code review

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HARDWARE APPROACH

Minimal hardware, maximum understanding

Required:

- STM32 board + debugger
- Breadboard & wires
- LED, button, potentiometer
- USB-to-UART
- One I^2C sensor (enrichment only)

What You Need for This Course

Laptop (8GB RAM or more preferred)

STM32Cube IDE & STM32CubeMX

Internet connection

🟦 Required Background

- Basic programming knowledge (C Language)
- Basic electronics concepts (Ohm’s law, resistors, voltage)

What You Need for This Course

🧠 Phase 1 Simulation (Required at Start)

- Wokwi online simulator (Free)
- Used to learn STM32 concepts, peripherals, and logic
- No hardware required in the first phase

✔️ Industry-style workflow: simulate → validate → build

🔧 Phase 2 Hardware Kit (Required Later)

- STM32 development board
- ST-Link debugger
- Breadboard & jumper wires
- LED + resistor
- Push button
- Potentiometer
- I2c Sensor

💰 Approximate cost: ~6000 DA

♻️ One-time investment, reusable for future projects

📦 How to Get the Hardware

- ✅ Contact us for the official course hardware pack

Logistics

Format

- Live sessions
- Online (Zoom Platform & recorded)

Schedule

- Session duration: 2.5hours
- Total sessions: 16

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WHAT YOU CAN DO AFTER

Design and debug STM32 systems

Interface communication protocols

Build sensor-based systems

Prepare for IoT / robotics / industrial systems

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WHO THIS COURSE IS FOR

- **Electronics & Embedded Engineers**
- **Mechatronics Engineers**
- **Mechanical Engineers working with machines or sensors**
- **Automation engineers**
- **Computer Science students interested in hardware systems**
- **Engineers building IoT, robotics, or smart devices**

STM32 is used in automotive, industrial automation, robotics, and smart devices worldwide.

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COURSE PRICE & PAYMENT

1. CHOOSE YOUR TRACK

***Standard Track:** For professionals and graduates.*

Pay in Full:
15,000 DA

OR

Pay in Installments:
18,000 DA total.

***Student Track (Limited Seats):** For verified current students only.*

13,500 DA

Requires valid Student ID.
Full payment only (no installments)

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COURSE PRICE & PAYMENT

2. INSTALLMENT BREAKDOWN

- Registration: 2,000 DA (Secure your seat).
- Session 01: 8,000 DA.
- Session 08: 8,000 DA.

Installments apply to the Standard Track only.

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HOW TO REGISTER

01

Read this PDF carefully

02

Confirm your seat

Pay a 2,000 DZD seat reservation

Contact us for payment details

03

Fill the registration form

Contact us to send you the form link

04

Receive confirmation message

05

Join the course group

Get added to the official course group

Remaining payment completed in 3 installments during the course

Contact

WhatsApp / Facebook / Instagram

WhatsApp: +213540401638