EDGES

OUR EDGE IS YOUR SUCCESS

Edges Standard Embedded Diploma 86 and 87 Reservation

Edges Standard Embedded Systems Diploma Reservation

- **Fees: 4550LE**
  - Attend all course sessions + Labs
  - Hardcopy version for the course materials
  - Attend any missing sessions in the next courses
  - Use the Kit + HW components owned by Edges academy in the Labs
  - Certificate
- **Extra Fees: 1310LE** for the HW Kit as mentioned in the **Link**
  exact board fees will be sent later in email by edges academy.
- **Course Start Date:** Friday 1/3/2024
- **Course Dates:** Every Friday and Saturday
- **Session Duration:** 4-Hours
- **Diploma Duration:** 14 weeks – 28 Sessions
- **Reservation Steps:**
  - **Step 1, Please fill this form: Reservation Link**
  - **Step 2, Wait for an email from edges academy.**
  - **Deadline to reserve the course and pay the course Fees is Saturday 24/2/2024**

Course Pre-requisites

- Undergraduate or Graduate from one of the next departments Computer Engineering, Communication and Electronics Engineering, mechanical Engineering, Mechatronics Engineering, power Engineering, Biomedical Engineering, Aviation Engineering or Computer science (is a MUST).
- Basic Knowledge of C Programming (is a MUST).
- Basic Knowledge of Digital Electronics (is PREFERED).

Why Edges Standard Embedded Diploma?

- The Standard Embedded Diploma is offered at Edges Academy, which was established by Engineer Mohamed Tarek. With over 10 years of experience in various embedded industries such as Embedded Automotive, Linux, and Communications, Engineer Mohamed Tarek brings a wealth of expertise to the academy.
- The Embedded Diploma has been running for over 10 years, successfully supporting the career beginnings of over 3000 engineers in the field of embedded systems.
- Upon completing the Embedded Diploma, students will have the opportunity to easily enroll in our upcoming advanced courses, to be announced later this year.
- In all microcontroller course examples, students will utilize the hardware board for practical hands-on experience.
- Throughout the duration of the embedded diploma, students will test their knowledge and skills through assignments, exams, and projects.

- The courses are conducted in an offline format, allowing students to interact directly with the instructor, ask questions, and make use of hardware during the sessions. This hands-on approach greatly accelerates the progress of students in the course.
- Upon successful completion of the course, students will receive a certificate that can serve as valuable training when applying to various universities.
- Instructor will transfer to you his experience and how to work in the multinational embedded company environment.
- Instructor will provide you with all the required materials, references, exercises and videos to master the embedded systems programming.
- Learn how to write any embedded driver from the hardware specifications and datasheets (You will not use any vendor or ready-made libraries).
- Learn how to divide the SW to several layers (SW Architecture).
- Learn how to Design, implement, document and test your software.
- Learn how to abstract your SW application from any tool, compiler, platform and HW changes.
- Learn how to write high quality, reliable and readable code.
- Final project to apply all your gained knowledge in the diploma.
- The diploma exams cover all embedded companies' technical exams and interviews.
- Courses Materials (+2500 slides), Courses Exercises (+300 Exercises), 3 Exams and +20 assignment & challenges.
- 5 projects will be added to your CV.

Instructor

Basic Information

- **Name: Mohamed Tarek.**
- **Linkedin account: Link**
- **Facebook group: Link**
- **Facebook page: Link**
- BSc. Communication and Electronics Department Cairo University.

Work Experience

- **Senior Software Team Lead** at **Siemens** Company, from January 2023 till now.
- **Software Team Lead** at **Siemens** Company, from January 2021 till now.
- **Senior Embedded Software Engineer** at **Mentor Graphics** Company, from July 2017 till December 2020.
- **Embedded Software Engineer** at **Mentor Graphics** Company, from April 2014 till July 2017.
- **Embedded Software Engineer** at **Intel Mobile Communications** Company, from August 2013 till April 2014.
- Embedded Systems **Instructor** for Intake34 2013-2014, Intake35 2014-2015 and Intake36 2015-2016 classes at **Information Technology Institution (ITI)**, Suez Canal Branch.
- Embedded Systems **Instructor** for Intake40 2019-2020 Mechatronics Track at **Information Technology Institution (ITI)**, Smart Village Branch.

Edges Standard Embedded Systems Diploma Contents

1. C Programming Course (30 Hours)

- Introduction to C Programming.
- Structured Program Development in C.
- C Data types and Casting.
- C Operators.
- Decision Making Statements.
- C Loops.
- C functions.
- C Arrays.
- C Strings.
- C Pointers.
- C Structures, Unions and Enumerations.
- C Programming Interview tricks and codes ☺
- 6 Assignments + C Exam + C Project.

2. Data Structure Course (12 Hours)

- Sorting and Searching Algorithms.
- Single, Double and Circular Linked-List Algorithms.
- Queue Algorithm.
- Stack Algorithm.
- Assignment + Exam.

3. Introduction to Embedded Systems (12 Hours)

- Embedded Systems Definition.
- Embedded Systems Characteristics.
- Embedded Systems Applications.
- Embedded Systems Design.
- Embedded HW.
- Processing Engines.
- Micro-processor vs. Micro-controller.
- Micro-controller main components.
- Micro-controller other components.
- Embedded Systems Constrains.
- Embedded Systems Market.
- Exam.

4. Computer Architecture (12 Hours)

- Micro-processor architecture and design.
- Memory types and interfaces.

5. Microcontroller Interfacing Course Part I (20 hours)

- Introduction to AVR Microcontrollers.
- I/O Ports and interfacing with Switch, Led, Buzzer, 7-Segement and PIR sensor.
- External Interrupts.
- Timers in three different modes: Overflow, Compare and PWM.
- Watchdog timer.
- All motors types DC, Stepper and Servo.
- Hardware Labs for all the above points.
- Project.

6. Embedded C Programming (25 Hours)

- Programming Languages for Embedded Systems.
- Embedded C Definition.
- Microcontroller Memory Segments.
- C Build Process.
- C Preprocessor Directives.
- Pragmas.
- In-line Assembly (How to write assembly with C code).
- Error Types.
- C Variable Scope and Life time.
- C Storage Classes.
- Memory Mapped Registers.
- Bit-Fields and its usage.
- Static & Dynamic Memory Allocation.
- Memory Padding and Alignment.
- Embedded Programming Concepts :

- Interrupt vs. Polling.
- Foreground/Background System.
- Call Back Function.
- Synchronous vs. Asynchronous Function.
- Reentrant vs. Non-Reentrant Function.
- Critical Section.
- Startup Code and Linker File.
- Boot-loader.
- Software Time Out.

- Modular Programming.
- Coding Style and Comments.
- Embedded Systems Programming Interview tricks and questions.
- Assignment + Exam.

7. Software Engineering (6 Hours)

- Software Definition.
- Attributes of good software.
- Software Engineering.
- Software Engineering Definition.
- Software Development Life Cycle.
  - Waterfall Model.
  - V-Model.
  - Agile Scrum.
- Software Design Documents.

8. Microcontroller Interfacing Course Part II (30 Hours)

- Keypad Driver.
- LCD Driver.
- Analog to Digital Converter (ADC) and interfacing with analog sensors.
- Universal Synchronous Asynchronous Receiver Transmitter (USART) Driver.
- Serial peripheral Interface (SPI) Driver.
- Inter integrated Circuit (I2C) Driver.
- Internal EEPROM Driver.
- External EEPRM Driver.
- Input Capture Unit Driver.
- Ultrasonic Driver.
- Hardware Labs for all the above points.
- Two Projects.

9. Introduction to Real Time Operating Systems (12 Hours)

- GPOS .vs RTOS.
- Introduction to Real-Time Systems.
- Introduction to Real-Time Operating Systems.
- Real Time Operating System Concepts:
    - Foreground/Background Systems.
    - Definition of Task and its related topics.
    - Definition of Multi-tasking.
    - Task Context Switching.
    - Reentrancy.

- RTOS Kernel and Scheduler.
- Resources and Critical Section.
- Task Priorities.
- Mutual Exclusion.
- Deadlock.
- Task Synchronization.
- Event Flags.
- Intertask Communication.

10. Embedded Systems Tools (8 Hours):

- How to use Eclipse and external Tool-chains.
- How to build C files using command line interface.
- Embedded SW tools (Tool-chains, compilers and Simulator).
- Embedded HW tools (Emulator, Debugger and Flasher).
- How to debug your code (Debugging Skills).

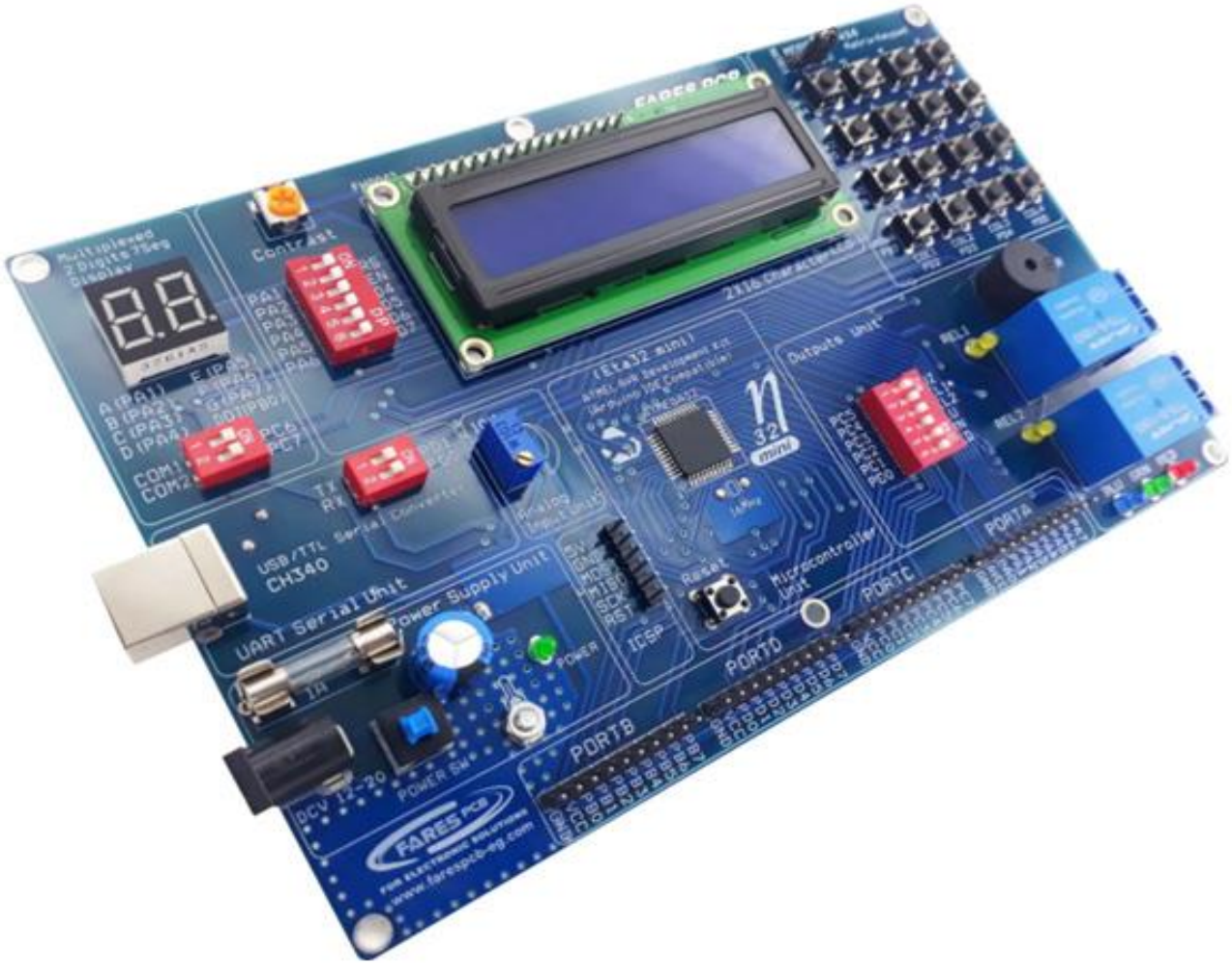
11. Final Project

12. Soft Skills Course (Partnership with Career Developers)

- CV vs. Resume.
- Writing Tips and CV Samples
- What to include and not to include in CVs and Resumes.
- Employment Gaps.
- Getting ready for an interview.
- Interview Hacks.
- Body Language Dos and Don’ts

- Frequently Asked Interview Questions

Hardware Lab – Eta32mini AVR Kit



Thanks, and Good Luck