MT Embedded Diploma Contents 2020

Instructor

Basic Information

- Name: Mohamed Tarek.
- Mobile: 01115154316.
- BSc. Communication and Electronics Department Cairo University with grade very good with honor.

Work Experience

- **Senior Embedded Software Engineer** at **Mentor Graphics** Company, from July 2017 till now.
- **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.
- Former Embedded systems **Instructor** at **AMIT-Learning** and **SGEC** Centers.

Why this diploma?

a) Instructor has more than 6 years' experience in the embedded systems industry.
b) Instructor will transfer to you his experience and how to work in the multinational embedded company's environment.
c) This diploma helped more than 1000 engineers to start their embedded systems careers in companies like Valeo, Mentor. Graphics, Avelabs, Silicon Vision, Si-Ware, Ejad, Thirdwayv, IBM, Bright-skies, Soft Lock and El-Swedey Meter.
d) Instructor will provide you with all the required materials, references, exercises and videos to master the embedded systems programming.
e) Learn how to write any embedded driver from the hardware specifications and datasheets (You will not use any vendor or ready-made libraries).
f) Learn how to divide the SW to several layers (SW Architecture).
g) Learn how to Design, implement, document and test your software.
h) Learn how to abstract your SW application from any tool, compiler, platform and HW changes.
i) Learn how to write high quality, reliable and readable code.
j) Hardware Labs.
k) Final project to apply all your gained knowledge in the diploma.
l) The diploma exams cover all embedded companies technical exams and interviews.
m) Courses Materials (+2000 slides), Courses Exercises (+200 Exercises).
n) 5 projects will be added to your CV.

MT 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.

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, 7-seg.
- External Interrupts.
- Timers in three different modes: Overflow, Compare and PWM.
- Watchdog timer.
- All motors types DC, Stepper and Servo.
- Two Mini-Projects 1 & 2.
- Hardware Labs for all the above points.

6. Embedded C Programming (25 Hours)

- Programming Languages for Embedded Systems.
- Embedded C Definition.
- C Compilation Process.
- Linking Types.
- 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.
- Microcontroller Memory Segments.
- Memory Padding and Alignment.
- Embedded Programming Concepts :
    - Interrupt vs. Polling.
    - Boot-loader, Startup file and finalizing code.
    - Foreground/Background System.
    - Call Back Function.
    - Synchronous vs. Asynchronous Function.
    - Reentrant vs. Non-Reentrant Function.
    - Critical Section.
    - Software Time Out.
- DMA Concepts.
- 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)

- How to interface with keypad and LCD.
- Analog to digital converter and know how to deal with analog and digital sensors.
- Universal Synchronous Asynchronous Receiver Transmitter (USART) and how to interface with PC.
- Serial peripheral Interface (SPI).
- Inter integrated Circuit (I2C) and how to interface with external EEPROM.
- Internal EEPROM.
- Input Capture Unit.
- Two Mini-Project 3 & 4.
- Hardware Labs for all the above points.

9. Real Time Operating Systems (12 Hours)

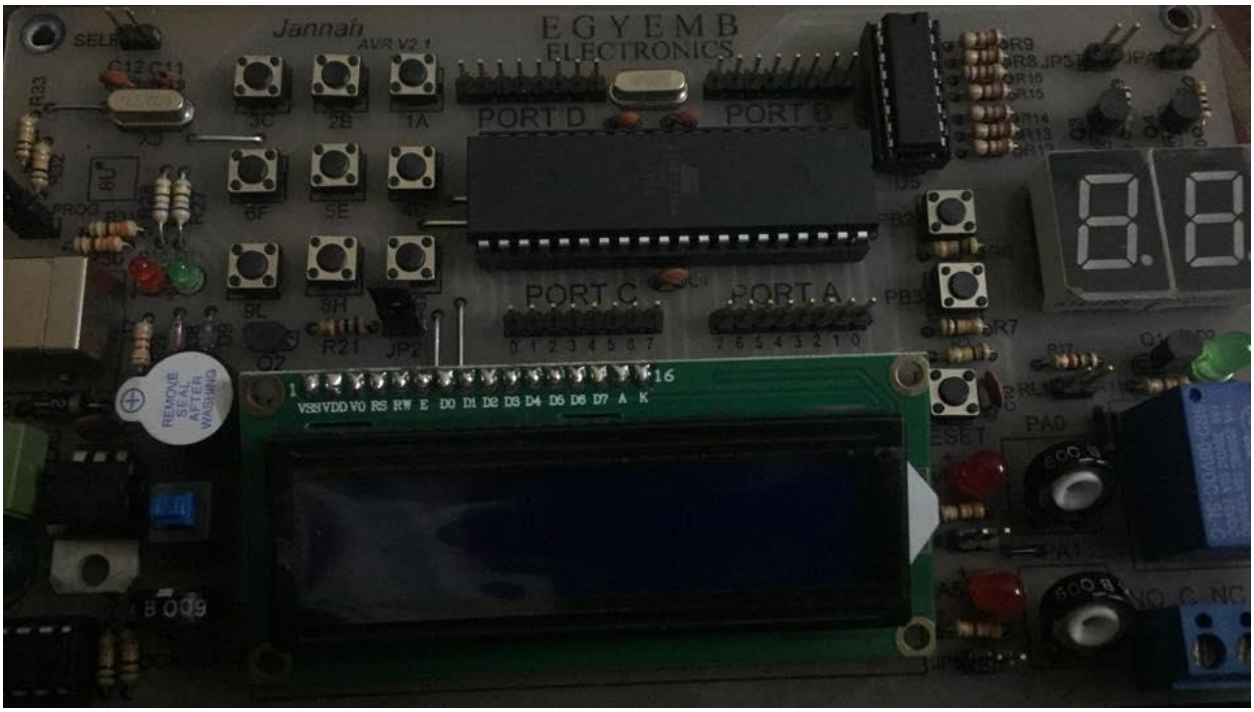
- Introduction to Real Time Systems.
- Introduction to Real Time Operating Systems.
- Real Time Systems Concepts.
- Time Management.
- Memory Management.
- Os Porting.

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).

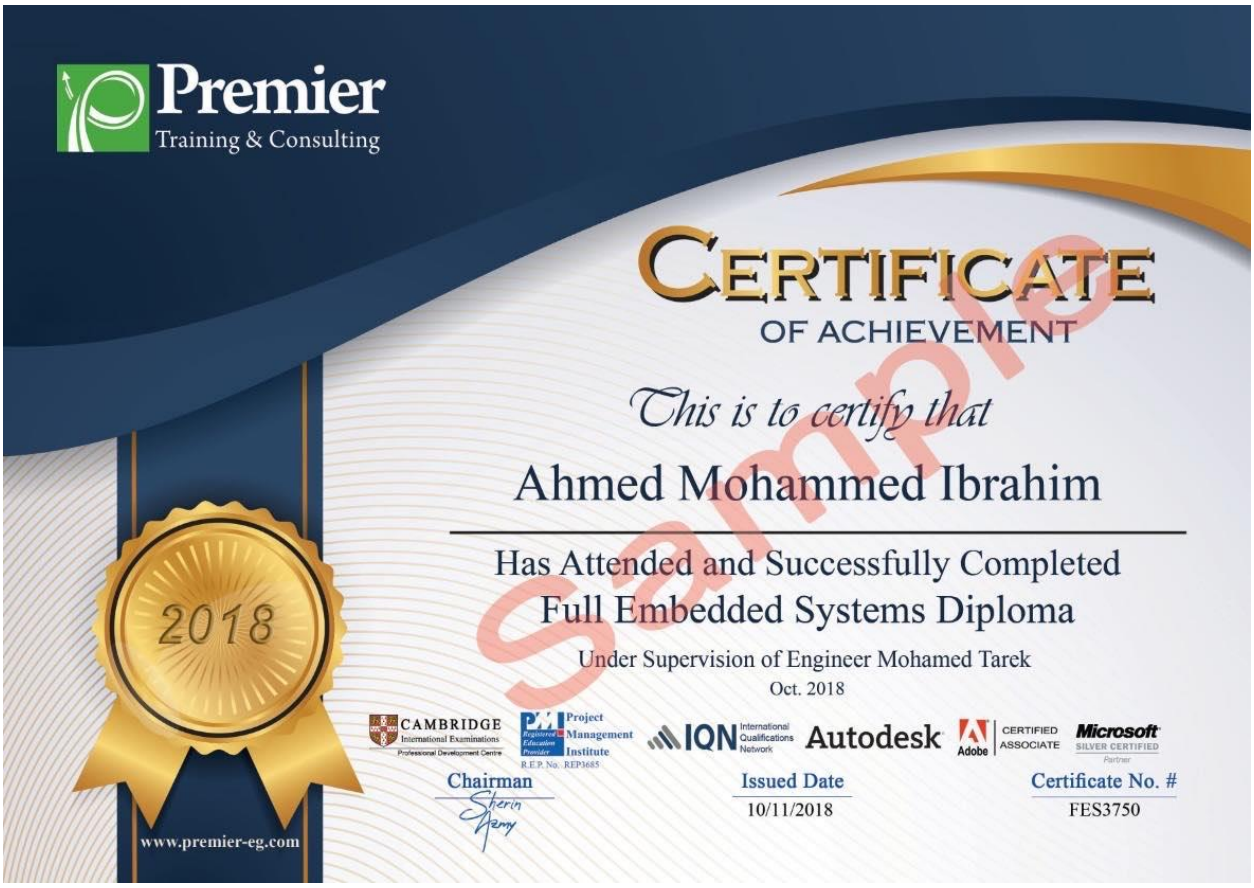
11. Final Project

Hardware Lab Kit



Certificate

- Certificate can be used as evidence that you takes 3.5 months training in different universities and companies.



Thanks and Good Luck