



IMT School (I Make Technology School) is not a place where you can take some courses; it is a place in which you practice technology. We believe that listening to someone speaking about something is not a good way of learning, so, “Do it yourself” is our way. Our learning methodology totally depends on hands on labs that transfers the knowledge you get from being just information to be an experience. Our staffs are engineers from leading companies in the same field. In other words, if you want to go Professional, IMT School is your destination! Let’s meet the experts, let’s practice technology.

S C H O O L

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Introduction

IMT is an Egyptian company that started in 2015 by embedded systems engineers based in Egypt and Germany who have graduated from ITI 9-month program, Embedded Systems and currently working in Valeo. Total graduates till the date of releasing this document is more than 800 Engineers. The following image is one of the recommendation letters we honored to have released by United Nations Development Program.

United Nations Development Programme



Empowered lives.
Resilient nations.

10th September, 2017

To Whom It May Concern,

In the efforts to implement cooperation projects within the work of the United Nations Development Programme (UNDP), and within the cooperation between the programme and the Information Technology Institute (ITI) under the “Supporting ITI Activities” project.

This letter is to acknowledge that “IMT School” has been one of the technical implementation partners within the aforementioned project starting the year 2015 and until moment. “IMT School” has designed and implemented distinguished technical programs in several areas in cooperation with the UNDP and ITI. These programs included:

- Embedded systems diplomas for university instructors and seniors through the EDUTronics program in collaboration with several Egyptian Universities.
- Robotics diplomas for juniors and young adult learners.

It is worth noting that “IMT School” has continuously demonstrated an outstanding level of quality, flexibility and excellence throughout their work with project partners.

This letter is issued with no liability on project the Programme Office and/or project partners.

Best Regards,



Nadine Abou Elgehit
Team Leader in charge
Innovation for Development
UNDP-Egypt

Embedded Systems Diploma

IMT is offering professional Embedded Systems diploma recommended by national universities and institutes like Cairo University and ITI. The diploma duration is 160 hours consisting of 7 courses. By the end of the diploma students shall deliver a professional graduation project utilizing all the concepts learned during the course on the presence of high level committee from the industry.

The number of students per group is between 14 to 16 students as maximum to ensure maximum quality. The diploma is divided into 20 weeks. Two lectures per week each 4 hours. The lectures are Fridays and Saturdays only because all instructors are from the industry (Mainly from Valeo) so they work in their weekends.

All instructors are graduated from ITI, working in multinational companies and have very high skills in teaching and delivering information. We use a unified content selected carefully and ensure all technical and practical aspects. Currently we have 3 branches in Dokki, Nasr City and 6th of October.

80% of the diploma is about making your own embedded system (Set your HW environment and start developing your projects) and the rest 20% is embedded systems concepts that you must know. Each student gets a very professional kit developed by our team and its components is listed below.

- AVR Atmega32 Microcontroller and AVR Programmer.
- Motors (DC, Servo and stepper motor).
- Character LCD and Seven Segment Displays.
- Analog Sensors (Temperature and Light).
- Mechanical Switches (DIP Switches, Keypad)
- Electrical Switches (Relay, Transistors, Darlington pair and Optocouplers).
- Basic Elements (Buzzer, LEDs, Power circuit and Op Amp)
- EEPROM
- USB to TTL converter
- MultiMeter
- Jumper wires to be used to build various circuits



Course 1

C Programming for Embedded Systems – 40 hours

Lectures	Outline	Hours
<i>Lecture 1</i>	<ul style="list-style-type: none">• Introduction to C programming• Code building process• Standard I/O library• Using printf function• Hello world program• Basic Data types in C• Variables in C• Using scanf function• C operators:<ul style="list-style-type: none">• Arithmetic operators• Assignment (= , *= , += , -= , /=)• Relational (> , < , >= , <= , == , !=)• Logical (&& , , !)• Bit wise (& , , ^ , << , >> , ~)• Ternary (?:)• Operator "sizeof"• Operator precedence	4 hours
<i>Lecture 2</i>	Conditional Statements <ul style="list-style-type: none">• If statement• Switch statement	4 hours
<i>Lecture 3</i>	Loops <ul style="list-style-type: none">• "while" Loop• "for" Loop• "do..while" Loop• "break" and "continue"	4 hours
<i>Lecture 4</i>	Functions <ul style="list-style-type: none">• Defining and calling functions• Function prototypes• Function parameters and return• Special types of functions	4 hours
<i>Lecture 5</i>	<ul style="list-style-type: none">• Arrays in C• Sorting Algorithms• Searching Algorithms	4 hours

<i>Lecture 6</i>	<i>Pointer</i> <ul style="list-style-type: none"> • <i>Introduction to Basic Pointers</i> • <i>Pointer Syntax</i> • <i>Pointer arithmetic</i> • <i>Pointers Vs Arrays</i> 	<i>4 hours</i>
<i>Lecture 7</i>	<i>Data Modifiers</i> <ul style="list-style-type: none"> • <i>Sign modifier</i> • <i>Size modifier</i> • <i>Storage modifier</i> • <i>Constant modifier</i> • <i>Volatility modifier</i> 	<i>4 hours</i>
<i>Lecture 8</i>	<i>User defined data types</i> <ul style="list-style-type: none"> • <i>Structures</i> • <i>Unions</i> • <i>Enum</i> 	<i>4 hours</i>
<i>Lecture 9</i>	<i>C Preprocessor</i> <ul style="list-style-type: none"> • <i>#include directive</i> • <i>Macros in C</i> • <i>Conditional directives</i> • <i>#error and #warning</i> 	<i>4 hours</i>
<i>Lecture 10</i>	<ul style="list-style-type: none"> • <i>Dynamic Memory Allocation</i> • <i>Linked List</i> • <i>Multidimensional arrays</i> 	<i>4 hours</i>

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Couse 2

Embedded Systems Concepts – 8 hours

Lectures	Outline	Hours
<i>Lecture 1</i>	<ul style="list-style-type: none">• Embedded Systems definition• Embedded Systems design challenges• Inside the processor<ul style="list-style-type: none">○ Control Unit○ Arithmetic Logic Unit○ Register File○ Processor Buses• Instruction Set Architecture<ul style="list-style-type: none">○ RISC Processor○ CISC Processor• Processor Cycle Example	<i>4 hours</i>
<i>Lecture 2</i>	<ul style="list-style-type: none">• Volatile Memory Types<ul style="list-style-type: none">○ Static RAM○ Dynamic• Non Volatile Memory Types<ul style="list-style-type: none">○ Masked ROM○ OTP ROM○ EPROM○ EEPROM○ FLASH ROM○ NVRAM• System Architecture<ul style="list-style-type: none">○ Von Neumann Architecture○ Harvard Architecture• Input Output peripherals• Microcontroller main suppliers• Reading the datasheet and specifications	<i>4 hours</i>

Couse 3

Embedded Systems Interfacing – 64 hours

Lectures	Outline	Hours
<i>Lecture 1</i>	<ul style="list-style-type: none">• Digital Input Output Part 1<ul style="list-style-type: none">○ <i>Interfacing LEDs</i>○ <i>Interfacing 7-Segments</i>○ <i>Mechanical Switches</i>	<i>4 hours</i>
<i>Lecture 2</i>	<ul style="list-style-type: none">• Introduction to layered architecture• Defining Microcontroller Registers• Developing DIO Driver	<i>4 hours</i>
<i>Lecture 3</i>	<ul style="list-style-type: none">• Keypad Interfacing and driver	<i>4 hours</i>
<i>Lecture 4</i>	<ul style="list-style-type: none">• LCD Interfacing and driver	<i>4 hours</i>
<i>Lecture 5</i>	<ul style="list-style-type: none">• Electrical Switches<ul style="list-style-type: none">○ Transistors○ Relays○ Opto-couplers○ Darlington Pair	<i>4 hours</i>
<i>Lecture 6</i>	<ul style="list-style-type: none">• Introduction to Interrupts• Interrupt Handling Techniques• Digital External Interrupt• Motors<ul style="list-style-type: none">○ DC Motor○ Stepper Motor	<i>4 hours</i>
<i>Lecture 7</i>	<ul style="list-style-type: none">• Analog to digital converter driver	<i>4 hours</i>
<i>Lecture 8</i>	<ul style="list-style-type: none">• Analog sensor<ul style="list-style-type: none">○ Temperature sensor○ Light sensor	<i>4 hours</i>
<i>Lecture 9</i>	<ul style="list-style-type: none">• Interval timers driver• Timer in counter mode	<i>4 hours</i>
<i>Lecture 10</i>	<ul style="list-style-type: none">• Pulse Width Modulation<ul style="list-style-type: none">○ Servo Motor Interfacing○ Controlling Light Intensity	<i>4 hours</i>
<i>Lecture 11</i>	<ul style="list-style-type: none">• Input Capture Unit• Watchdog timer	<i>4 hours</i>
<i>Lecture 12</i>	<ul style="list-style-type: none">• UART Serial Communication – Part 1	<i>4 hours</i>
<i>Lecture13</i>	<ul style="list-style-type: none">• UART Serial Communication – Part 2<ul style="list-style-type: none">○ USB To serial	<i>4 hours</i>

Lecture 14	<ul style="list-style-type: none"> • SPI Serial Communication 	4 hours
Lecture 15	<ul style="list-style-type: none"> • I2C Serial Communication – Part 1 	4 hours
Lecture 16	<ul style="list-style-type: none"> • I2C Serial Communication – Part 2 <ul style="list-style-type: none"> ○ EEPROM Interfacing 	4 hours



Course 4

Real Time Operating Systems – 16 Hours

Lectures	Outline	Hours
<i>Lecture 1</i>	<ul style="list-style-type: none">• <i>Building Real time Scheduler</i>	<i>4 hours</i>
<i>Lecture 2</i>	<ul style="list-style-type: none">• <i>Real time operating systems concepts</i><ul style="list-style-type: none">○ <i>Basic definitions</i>○ <i>Scheduling Techniques</i>○ <i>Dynamic Design Concepts</i>○ <i>Shared Resources Analysis</i>○ <i>Mutual exclusion Techniques</i>○ <i>Inter task communications</i>	<i>4 hours</i>
<i>Lecture 3</i>	<ul style="list-style-type: none">• <i>Porting Free RTOS on AVR – Part 1</i>	<i>4 hours</i>
<i>Lecture 4</i>	<ul style="list-style-type: none">• <i>Porting Free RTOS on AVR – Part 2</i>	<i>4 hours</i>



Course 5

Embedded Systems Testing – 8 Hours

Lectures	Outline	Hours
<i>Lecture 1</i>	<ul style="list-style-type: none">• <i>Embedded Systems Development Cycle</i>• <i>Basic Development Patterns</i>• <i>Basic Testing Principles</i>• <i>Unit Testing</i>• <i>Module Testing</i>• <i>Integration Testing</i>• <i>Validation Testing</i>	<i>4 hours</i>
<i>Lecture 2</i>	<ul style="list-style-type: none">• <i>White Box Testing</i><ul style="list-style-type: none">○ <i>Statement Coverage</i>○ <i>Decision Coverage</i>• <i>Black Box Testing</i><ul style="list-style-type: none">○ <i>Equivalence Portioning</i>○ <i>Boundary Values Analysis</i>○ <i>State Transition</i>○ <i>Decision Table</i>• <i>Exercise</i>	<i>4 hours</i>

Course 6

Embedded Systems Tooling – 4 Hours

Lectures	Outline	Hours
<i>Lecture 1</i>	<ul style="list-style-type: none">• <i>Memory Sections</i>• <i>Linker Script</i>• <i>Startup Code</i>• <i>Boot loaders</i>• <i>Make files</i>• <i>Batch script</i>• <i>ICP, ISP and IAP</i>	<i>4 hours</i>

Course 7

Automotive Bus Technology – 4 Hours

Lectures	Outline	Hours
<i>Lecture 1</i>	<ul style="list-style-type: none">• <i>CAN Protocol Specifications</i>• <i>LIN Protocol Specifications</i>	<i>4 hours</i>

Graduation Project – 16 Hours

We offer more than 12 practical and attractive ideas, the students are divided into teams each team maximum of 3 members and implement one idea. Then each team shall provide a prototype of the implementation in a formal presentation in front of a high level technical committee.