Advanced Embedded IoT Course With Placements

Ademtek's IoT training course syllabus and curriculum is systematically designed in sync with industry needs. It will enable you to build a complete Embedded and IoT solution on your own(ex: setting up IoT platform). This advanced Embedded and Internet of Things Course Syllabus gets delivered as a classroom program starting with basics.

Followed by that deep dive programming topics (C and Python) and connectivity (IoT protocols) aspects are covered. This course also gives you non-functional perspectives of building security and performance tuning of IoT solutions.

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INTERNET OF THINGS COURSE SYLLABUS

1) Overview of IoT and High level Architecture
2) Setting up IoT Workflow
3) Advanced / Embedded C Programming
4) Micro-controller programming using Arduino platform
5) Programming with Python
6) Building IoT Applications using RaspberryPi
7) IoT Cloud Infrastructure
8) Performance and Security in IoT

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Module 1: LINUX SYSTEMS

Objectives:

✓To get familiar with Linux Operating system – Commands, tools and editors.

✓Enable you to write Shell scripts.

✓-Equip yourself to use Linux as a development platform for Embedded Systems.

Module topics:

✓*Overview of Linux OS*

✓*Evolution of Open Source software and Linux*

✓*Getting started with Linux*

✓*Command Line Interface*

✓*Linux Shell programming*

✓*Environment variables, shell commands, filtering commands*

✓*User accounts, remote login, redirection, pipes, Directory and File system structure*

✓*Visual editor(VIM)*

Module 2: ADVANCED C

Objectives:

- ✓Clearly understand concepts of C language
- ✓To obtain good quality and style in programming
- ✓Gear you up for programming in Embedded environment
- ✓To induce confidence in you!

Module topics:

✓*Problem solving and Algorithms*

✓*Basics of C - Operators, Conditionals, Arrays, Pointers*

✓*Structures, Unions, Functions, Files, Preprocessor directives, Recursion*

✓*Project environment - Creating & Building a project, Makefiles*

✓*Deep dive - Logic to program translation, Creating your own library, Dry-run*

Module 3: DATA STRUCTURES AND LOGIC ANALYSIS

Objectives:

✓Review methods for problem solving and algorithm analysis

✓Develop an understanding of Abstract Data Types (ADT) and their implementation

✓Understand the importance of information hiding, data abstraction, and modular design

✓Recognize programming needs - cost and benefits of each data structure

Enable you to select the data structure for the job

Module topics:

✓*Introduction to Data Structures & Algorithm Analysis*

✓*Makefiles*

✓*Coding guidelines and creation of project and libraries*

✓*Abstract Data Types (ADT)*

✓*Stacks, Queues and Linked Lists*

✓*Trees, Recursion*

✓*Sorting Algorithms*

✓*Hashing*

Module 4: LINUX INTERNALS & NETWORKING

Objectives:

✓To gain strong knowledge of OS programming
✓Proficiency on the Linux API's and system calls
✓To get the knowledge of high performance and secure coding by using OS capabilities
✓Enable you to write Network protocols using Socket

Module topics:

✓OS Basics – Process, CPU scheduling, Dead lock & starvation, priority
✓Components of Linux – Kernel structure, Shell basics, Linux file system–ext2 & ext3
✓POSIX Threads – Multi threaded programming, p-thread API's
✓Synchronization – Race condition & mutex, Semaphores
✓IPC – Pipes, FIFO, shared memory, System V-semaphores
✓Sockets - TCP and UDP sockets, Client-server programming

Module 5: MICRO CONTROLLERS

Objectives:

- ✓Enable you to read and understand data-sheets and hardware manuals
- ✓Setup, develop and download Embedded applications into a target hardware
- ✓To provide a basic idea of hardware/electronics aspects of programming
- ✓Enable you to program any micro controller
- ✓To get you started with basic Embedded application development with ease

Module topics:

- ✓*Introduction to embedded systems*
- ✓*Microprocessors vs. Microcontrollers with intense hardware focus*
- ✓*Hands-on working with GPIOs, Analog I/Os, Memory usage, interfacing etc.*
- ✓*Micro controller peripherals usage - Timers, Counters, Interrupts and its sources*
- ✓*Communication protocols – CAN, UART, SPI, I2C etc*

Module 6:EMBEDDED LINUX ON ARM

Objectives:

- ✓Get you exposed with various trends in Embedded OS
- ✓Making appropriate Open source choices for your Embedded device
- ✓Get hands-on with Flash memory usage, EEPROMS using development boards
- ✓Equip you with high end application Embedded development with ARM 9

Module topics:

- ✓*Embedded Development and Environment*
- ✓*Tool-chain: Configuration and Cross-compilation*
- ✓*Target Overview and Boot loading*
- ✓*Embedded Linux Kernel, File Systems*
- ✓*Linux Device Driver Overview*
- ✓*Embedded Application Programming*
- ✓*Remote Debugging Embedded Applications using GDB*

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Module 7: C++ PROGRAMMING

Objectives:

✓Introduce you to Object Oriented Programming (OOP)
✓Understand differences between C and C++ with respect to Embedded Programming
✓Hands-on programming with OOP

Module topics:

✓*Introduction to C++ and OOPS*
✓*Creation & destruction of objects*
✓*Data Members, Member Functions and this Pointer*
✓*Constructor & Destructor*
✓*Inheritance, Function overriding and Virtual functions*
✓*Polymorphism, Pure virtual functions and Virtual Base Class*
✓*Function and Class Template*

Module 8: QT PROGRAMMING

Objectives:

✓Get started with Qt and learn to develop GUI applications using Qt framework

✓Apply OOP concepts by making use of features provided by Qt

✓Develop elegant UI by learning design, development and debugging on your own

✓Get a view about building vertical specific applications

Module topics:

✓*Introduction to Qt and Development Environment*

✓*QT Core,Utility and container classes*

✓*Developing UI using Widgets and Designer*

✓*Painting, Multimedia and Animations using QT*

✓*Design Patterns, Multi-threading in QT*

✓*Introduction to Qt Quick and Composing UI*

✓*Integrating QML with C++*