

ARM Mbed

Course Overview

The Mbed platform is becoming widely used in academic circles for teaching embedded systems at undergraduate level, and within companies where often there is a need to self-teach or be trained in new microcontroller skills. The Mbed allows quick engagement in advanced topics, and to facilitate this further we have put together a set of course notes, in the form of presentation slides, to help academic and workshop tutors teach, using Mbed as the platform.

The notes are in the form of presentation slides, so can be used as standalone pre-developed content as well as taking things further with extended topics and projects.

Development of nodes for the Internet of Things (IoT) requires a robust set of tools. Along with the usual tools used in embedded systems such as compilers and debugging tools, there is a need for a modular set of software tools for connectivity, software interoperability, and flexibility. Such a system is the mbed platform for the ARM Cortex series of embedded processors. With the recent introduction of version 5, the ARM mbed group has a mature yet still growing platform of open-source tools that are being developed and refined by a network of partners around the globe. In this introductory course, we will look at the history and structure of mbed, the tool chains that are supported, and the direction that mbed is taking in the development of the IoT.

Course Outline:

The content of the course notes is outlined below. We have chosen the topics that allow a quick introduction to the most commonly used technologies and interfaces while providing the background design and programming skills to allow students to learn effectively.

The Mbed course notes content and structure is as follows:

- Digital input and output-3 hours
- Analog input and output- 3 hours
- Pulse width modulation-5 hours
- Modular design and programming-5 hours
- Parallel data and communication-4 hours
- Serial communication with I2C-6 hours
- Serial communication with SPI-3 hours
- Timers and interrupts- 3 hours
- Memory and data management-3 hours

There are a number of topics which have been chosen to naturally support an undergraduate course, or a workshop run over a few days. In all cases examples and exercises are provided to support hands on learning. We also hope the slides stand as a useful self-learning program for anyone new to the Mbed.