Chapter 0: Introduction

Time 1 Hour

After completing this chapter, you will understand the objectives for the Wi-Fi® 101 Class, you should be able to explain the learning objectives, agenda, scope of the class, and format of the lab manual.

0.1   Prerequisites

This course requires solid fundamentals in C-Programming (data types, operators, expressions, control flow, functions, program structure, pointers and arrays, data structures, multi-file module programming).

You should have some experience with standard MCU concepts and peripherals (Serial communication, PWMs, ADCs).

0.2   Assumptions

There is literally a 96-page PowerPoint presentation in which Infineon presents compelling data that:

- Infineon has the most robust Wi-Fi in terms of RF, Chips, Power, Stability, and Partner Integration.
- You should use a partner and buy modules (you should NOT try to design using bare chips).
- You should use a Cloud partner (e.g. AWS, IBM, Ali etc.).

So… that is what we are going to assume, and we are not going to address any of those topics.

0.3   Scope

What this class is:

- A survey of the Infineon Wi-Fi Ecosystem (Chips, Modules, Eclipse IDE for ModusToolbox, Software Development Kit (SDK), Forum, etc.).
- A survey of using the AnyCloud SDK to create an IoT device by connecting common MCU I/O peripherals to the "Cloud".
- An introduction to the "TCP/IP Network Stack".
- An introduction to Wi-Fi.
- An introduction to common cloud application protocols: HTTP, MQTT, COAP, AMQP.
- An introduction to JSON and REST.
- An introduction to one cloud provider (Amazon AWS, IBM Bluemix, Microsoft Azure) and a taste of their programming model.

What this class is not:

- A C-programming primer.
- A detailed examination of Wi-Fi or RF Parameters.
- An advanced network programming class.

- An introduction to Bluetooth.
- An introduction to ZigBee.
- A discussion of how to pick the correct Wi-Fi Module.
- A detailed examination of MCU peripherals.
- A tutorial of the advanced uses of Wi-Fi (Streaming Audio, Bluetooth/Wi-Fi Combos, TCP/IP Bridging/Routing, Wi-Fi Station Introducers, BLE Introducers).

0.4 Typical Agenda

Day	Time	Duration	Chapter	Topic	Purpose
1	8:00 – 9:00	1:00	00-Intro	Lecture	An Introduction to the class (this document)
1	9:00 – 9:30	0:30	01-Tour	Lecture	A tour of ModusToolbox, Wi-Fi Standard, Chips, Modules, and Kits.
1	9:30 – 10:00	0:30		Lab	
1	10:00 – 10:30	0:30	02-Peripherals	Lecture	How to create a new project and how to use chip peripherals such as GPIOs, interrupts, UART, ADC, etc. The basic process of building and programming a project is introduced.
1	10:30 – 12:00	1:30		Lab	
1	12:00 – 12:30	0:30	03-RTOS	Lecture	How to use the FreeRTOS RTOS in a PSoC chip.
1	12:30 – 2:00	1:30		Lab	
1	2:00 – 2:15	0:15	04-AnyCloud	Lecture	An introduction to the AnyCloud libraries and details on how to use the JSON parser libraries.
1	2:15 – 3:00	0:45		Lab	
1	3:00 – 3:45	0:45	05-Wi-Fi	Lecture	How to connect to and interact with Wi-Fi access points
1	3:45 – 4:45	1:00		Lab	
1	4:45 – 5:00	0:15	Wrap-Up	Lecture	Summary of Day 1
2	8:00 – 8:30	0:30	06a-TCP/IP Sockets	Lecture	Establishing communication using TCP/IP sockets
2	8:30 – 9:30	1:00		Lab	
2	9:30 – 10:00	0:30	06b-TCP/IP Sockets with TLS	Lecture	Using TLS with TCP/IP sockets for secure communication.
2	10:00 – 10:30	0:30		Lab	
2	10:30 – 10:45	0:15	07a-Cloud	Lecture	An introduction to cloud Application Layer protocols (HTTP, MQTT, AMQP, COAP)
2	10:45 – 11:15	0:30	07b-HTTP	Lecture	Using HTTP in ModusToolbox
2	11:15 – 12:45	1:30		Lab	
2	12:45 – 1:15	0:30	07c -MQTT-AWS	Lecture	Using MQTT in ModusToolbox with Amazon Web Services (AWS)
2	1:15 – 3:15	2:00		Lab	
2	3:15 – 3:30	0:15	08-Project	Introduction	Class project
2	3:30 – 4:45	1:15		Lab	
2	4:45 – 5:00	0:15	Wrap-Up	Lecture	Class Wrap-Up and Surveys

Most of the chapters have exercises. Some are marked as "Advanced". You should focus on the basic exercises first and work on the advanced ones as time allows.

0.5   Electronic Material

A GitHub repository is available at the following location:

https://github.com/cypresssemiconductorco/CypressAcademy_WiFi101_Files

This repository contains, among other things:

1. **PDFs**: An electronic copy of this manual
2. **Projects**: Complete solutions to all the lab exercises. Use these AFTER attempting to solve the exercises on your own.

0.6   Document Conventions

Convention	Usage	Example
`Courier New`	Displays code	`CY_ISR_PROTO(MyISR);`
Italics	Displays file names and paths	*sourcefile.hex*
[**bracketed, bold**]	Displays keyboard commands in procedures	[**Enter**] or [**Ctrl**] [**C**]
Menu > Selection	Represents menu paths	**File > New Project > Clone**
Bold	Displays commands, menu paths and selections, and icon names in procedures	Click the **Debugger** icon, and then click **Next**.