Chapter 0: Introduction

Time ½ Hour

After completing Chapter 0 you will understand the objectives for the Wireless Internet Connectivity for Embedded Devices (WICED) Bluetooth 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

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

Some experience with standard MCU concepts and peripherals (Serial communication, PWMs, ADCs).

0.2 Scope

What this class is:

- A survey of the WICED Wi-Fi Ecosystem (Chips, Modules, WICED Studio IDE, Software Development Kit (SDK), Forum etc.)
- A survey of using the WICED SDK to create a Bluetooth device by connecting common MCU I/O peripherals to an external Bluetooth client (e.g. a smartphone)
- An introduction to Bluetooth Low Energy (BLE)
- An introduction to Classic Bluetooth (Basic Rate and Extended Data Rate).

What this class is not:

- A discussion/debate of what WICED or ModusToolbox should be.
- A C-programming primer.
- A detailed examination of Bluetooth or RF Parameters.
- An introduction to Wi-Fi.
- An introduction to ZigBee.
- A discussion of Linux integrated WICED.
- A discussion of how to pick the correct Bluetooth module or device
- A detailed examination of MCU peripherals.

0.3 Agenda

Day	Time	Duration	Chapter	Topic	Purpose
1	8:00 – 8:30	0:30	00 Intro	Lecture	An Introduction to the class (this document)
1	8:30 – 8:45	0:15	01 Tour	Lecture	A tour of the WICED Bluetooth SDK, Bluetooth Standard, Chips, Modules, and Kits.
1	8:45 – 9:00	0:15		Lab	
1	9:00 – 9:30	0:30	02 Peripherals	Lecture	How creating/build/program a project and how to use chip peripherals such as GPIOs, interrupts, UART, I2C, etc.
1	9:30 – 11:00	1:30		Lab	
1	11:00 – 11:30	0:30	03 RTOS	Lecture	How to use the ThreadX RTOS in a WICED chip.
1	11:30 – 12:30	1:00		Lab	
1	12:30 – 1:15	0:45	04A The Essential BLE Peripheral Example	Lecture	Introduction to BLE, advertising, connecting, and exchanging data.
1	1:15 – 2:45	1:30		Lab	
1	2:45 – 3:30	0:45	04B More Advanced BLE Peripherals	Lecture	Notification, Indication, Pairing, Bonding, and Security.
1	3:30 – 5:00	1:30		Lab	
1	N/A	0:00	04C BLE Protocol Details	Lecture	Lower level details on the BLE protocol.
1	5:00 – 5:15	0:15	Wrap-Up	Lecture	Day 1 Wrap Up
2	8:00 – 8:45	0:45	05A Classic Bluetooth – The Wireless Serial Port	Lecture	Introduction to Classic Bluetooth (BR/EDR) and SPP.
2	8:45 – 11:45	3:00		Lab	
2		0:00	05B Classic Bluetooth Part 2	Lecture	Classic Bluetooth HID, etc.
2		0:00		Lab	
2	N/A	0:00	05C Classic Bluetooth Protocol Details	Lecture	
2	11:45 – 12:15	0:30	06 Debugging	Lecture	How to use WICED SDK debugger. How to use 3rd party debugging tools.
2	12:15 – 12:45	0:30		Lab	
2	12:45 – 1:00	0:15	Open Lab Time	Lecture	Experimentation with Classic/BLE combo devices, Bluetooth/Wi-Fi combo devices, Bluetooth mesh, etc.
2	1:00 - 5:00	4:00		Lab	
2	5:00 – 5:15	0:15	Wrap-Up	Lecture	Class Wrap-Up and Surveys
N/A	N/A	0	07 Shield	Reference	Details on the PSoC AFE shield board

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.