Chapter 0: Introduction

Time 1 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.

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# 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).

# 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.

# 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 – 9:00 | 0:30 | 01-Tour | Lecture | A tour of the WICED Bluetooth SDK, Bluetooth Standard, Chips, Modules, and Kits. |
| 1 | 9:00 – 9:30 | 0:30 | Lab |
| 1 | 9:30 – 10:00 | 0:30 | 02-Peripherals | Lecture | How creating a new project and how to use chip peripherals such as GPIOs, interrupts, UART, I2C, etc. The basic process of building and programming a project is introduced. |
| 1 | 10:00 – 11:30 | 1:30 | Lab |
| 1 | 11:30 – 12:00 | 0:30 | 03-RTOS | Lecture | How to use the ThreadX RTOS in a WICED chip. |
| 1 | 12:00 – 1:00 | 1:00 | Lab |
| 1 | 1:00 – 1:30 | 0:30 | 04a-Bluetooth Low Energy (BLE) Essentials | Lecture | How to connect to and interact with Bluetooth BR and EDR clients. |
| 1 | 1:30 – 3:00 | 1:30 | Lab |
| 1 | 3:00 – 3:30 | 0:30 | 04b-Bluetooth Low Energy Advanced | Lecture | Notification, Indication, Pairing, Bonding, and Security. |
| 1 | 3:30 – 4:30 | 1:30 | Lab |
| 1 | 4:30 – 4:45 | 0:15 | 04c-Bluetooth Low Energy Protocol | Lecture | Lower level details on the protocol. |
| 1 | 4:45 – 5:00 | 0:15 | Wrap-Up | Lecture | Day 1 Wrap Up |
| 1 | 8:00 – 8:30 | 0:30 | 05-Bluetooth BR and EDR | Lecture | How to connect to and interact with BLE clients such as PCs and smartphones. |
| 1 | 8:30 – 10:30 | 2:00 | Lab |
| 2 | 10:30 – 11:00 | 0:30 | 06-Debugging | Lecture | How to use WICED SDK debugger. How to use 3rd party debugging tools. |
| 2 | 11:00 – 12:00 | 1:00 | Lab |
| 2 | 12:00 – 12:15 | 0:15 | 07-Class Project | Lecture | Class project |
| 2 | 12:15 – 4:00 | 3:00 | Lab |
| 2 | 4:00 – 4:15 | 0:15 | Wrap-Up | Lecture | Class Wrap-Up and Surveys |
| N/A | N/A | 0 | 08-Shield | Reference | Details on the PSoC AFE shield board |
| N/A | N/A | 0 | 09-Glossary | Reference | Glossary of terms |

? Should we include a Wi-Fi/BLE/BR/EDR project in chapter 5 or a separate BT/WiFi chapter?

? Should we include a Library chapter? If so, what library functions should be covered?

YFS: IMHO we only need this if the projects require a library – once you can do Bluetooth figuring out libraries is easy.

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.