Embedded C++ Diploma

Content

C/C++ Programming (40 Hrs)

- Operators
- Flow of control
- References
- Raw pointers
- Structures and Unions
- Objects
- Classes
- Polymorphism and inheritance
- C++ Type System
- Heap/stack semantics
- Stream I/O
- Overloading
- Lambdas
- Exceptions
- Scope management
- Templates
- C++ Standard Library
- Concurrency

Data Structure and algorithms (10 Hrs)

- Searching
- Sorting
- Linked lists
- Binary Trees
- A* Algorithm

SOLID Principles (10 Hrs)

- S - Single-responsibility Principle
- O- Open-closed Principle
- L - Liskov Substitution Principle
- I - Interface Segregation Principle

- D - Dependency Inversion Principle

Design patterns (10 Hrs)

- Intro. To patterns and common problems
- Singleton, is a pattern or an anti-pattern
- Model View Presenter
- State Pattern

Software Engineering (3 Hrs)

- Software Development life cycle
- Learn Agile and SCRUM
- V-Model

Software Testing (10 Hrs)

- Test Driven Development
- Unit Testing GoogleTest Framework
- Integration testing
- System Testing

DevOps (10 Hrs)

- Source code version control –GIT
- Docker Containers
- Continuous Integration

Microcontroller Interfacing in Real-Time C++ (70 Hrs)

- GPIO
- Keypad
- LCD
- External Interrupt
- Sensors and Analog to Digital Converter
- Startup Code and linker script
- Timers
- Serial Communication Concepts and USART
- Serial Peripheral Interface (SPI)
- Inter-integerated circuit (I^2C)
- Introduction to ARM

- Systic Timer
- bootloader

Real time Operating Systems with FreeRTOS (20 Hrs)

- What is RTOS?
- Why it's useful
- Scheduling Algorithms
- Porting FreeRTOS
- Task communication
- Task Synchronization
- Resource management
- Interrupt management