

COURSE SYLLABUS

Name of the Group: *Embedded System Group*

Name of the Course: *Certificate Course on Embedded RTOS*

Course Code: *ED503*

Starting Date: *21st October 2019*

Duration: *4 Weeks (140 Hours)*

Course Description

- **Introduction**
Embedded Software – Real-time Vs Non Real-time
Introduction to Real-time systems and Embedded Real-time Systems
Discussion of popular RTOS VxWorks and freeRTOS
Comparison of Embedded RTOSs
Design Goals for Real-time software
Discussion on Embedded Real-time applications
Considerations for real-time programming
- **System architecture of VxWorks**
Introduction to VxWorks
Task Creation and management
Inter Task Communication Mechanisms
Semaphores, Message Queues, Pipes
Interrupts, Tornado tools
- **System architecture of freeRTOS**
Introduction to Free RTOS
Task Management in Free RTOS
Synchronization in FreeRTOS
Peripheral Interfacing and porting freeRTOS on ARM
- **Practical Sessions**
Application Development with VxWorks and freeRTOS

Learning Outcomes

After successful completion of the module, the students shall be able to:

- Develop an Embedded Real Time software that is required to run embedded systems
- Develop real-time applications using VxWorks RTOS
- Develop real-time applications using free RTOS
- Port free RTOS applications on ARM
- Build real-time embedded systems using freeRTOS and VxWorks RTOSes

Reading List

1. Embedded Systems Architecture Programming and Design: Raj Kamal, Tata McGraw Hill
2. Embedded/Real Time Systems Concepts, Design and Programming Black Book, Prasad, KVK
3. Software Design for Real-Time Systems: Cooling, J E Proceedings of 17th IEEE Real-Time Systems Symposium December 4-6, 1996 Washington, DC: IEEE Computer Society
4. Real-time Systems – Jane Liu, PH 2000
5. VxWorks Programmers Guide
6. freeRTOS Users Guide
7. Real-Time Systems Design and Analysis : An Engineer's Handbook: Laplante, Phillip A
8. Structured Development for Real - Time Systems V3 : Implementation Modeling Techniques: Ward, Paul T & Mellor, Stephen J
9. Monitoring and Debugging of Distributed Real-Time Systems: TSAI, Jeffrey J P & Yang, J H
10. Embedded Software Primer: Simon, David E.