ECE 48500 – Embedded Real-Time Operating Systems

Type of Course
Required for CmpE Program, Elective for EE Program

Catalog Description
An introduction to embedded real-time operating systems, with an emphasis on embedded system software development, tasks, inter-task communications and synchronization as well as network software.

Credits
4

Contact Hours
Lecture 3, Lab 3

Prerequisite Courses

Co-requisite Course
ECE 36200, MA 17500 or MA 27500

ECE 36800

Prerequisites by Topics
Experience programming in C, experience programming microcontrollers, understanding of circuits and electrical components

Textbook
Embedded Systems: Real-Time Operating Systems for ARM Cortex-M Microcontrollers Volume 3, current edition, Jonathan Valvano , ISBN: 978-1466468863

Course Objectives
The course provides an introduction to embedded real-time operating systems. Topics covered include general embedded systems concepts, general embedded software development, real-time operating systems concepts.

Course Outcomes

Students who successfully complete this course will have demonstrated
1. an ability to program an embedded system with high-level programming language (1).
2. an ability to program an embedded system with mixed language of assembly language and C/C++ language (1).

3. an ability to understand the concepts of real-time operating system, such as task scheduling, intertask communication (semaphore, mutex, queue, mail box, etc). (1)
4. an ability to design an embedded system with a real time operating system (2)
5. an ability to report engineering experimental results (3)

Lecture Topics

1. C language review, pointers, etc.
2. Embedded C & C
3. Debug, C Code standard
4. ARM Processor, Cortex-M
5. TivaWare & TI EK-TM4C123GXL Launchpad
6. Theory and Principle of RTOS
7. FreeRTOS
8. RTOS Middleware
9. RTOS Case Studies

Computer Usage

High

Laboratory Experience

High

Design Experience

High

Coordinator

Guoping Wang, Ph.D.

Date

10/08/2018