COURSE DESCRIPTION

Department and Course Number: COMP 3510
Course Title: Embedded Systems Development
Total Credits: 3
Required: Yes (WIRS)
Prerequisites: COMP 3350 or ELEC 2220
Class meetings per week: 3 hours
Lab meetings per week: 0 hours
Course Coordinator: Dr. Saad Biaz
Date Prepared: February 14, 2004

Current Catalog Description:
Operating system design and analysis for embedded systems; Real-time issues, resource
management, scheduling, exception handling, device driver development, kernel
development, synchronization, network support.

Textbooks:
161569-X.

References:
2002.

Course Objectives:
1. Be able to design and implement applications on embedded systems.
2. Be able to apply concepts and techniques from digital design.
3. Be able to apply concepts and techniques from operating systems.
4. Be able to apply concepts and techniques from real-time systems.
5. Be able to perform fundamental interfacing hardware/software.

Prerequisites by Topic:
1. Fundamentals of digital systems
2. Fundamentals of microprocessor-based systems

Topics Covered: (specify number of hours on each)
1. Introduction (2 hours)
2. Hardware fundamentals for the software engineer (3 hours)
3. Microprocessor-based systems (3 hours)
4. Interrupts (3 hours)
5. Software architectures for embedded systems development (3 hours)
6. Operating system support for embedded systems development (3 hours)
7. Task scheduling (3 hours)
8. Task synchronization (3 hours)
9. Memory management (3 hours)
10. I/O system (3 hours)
11. Real-time operating systems (RTOS) (6 hours)
12. Embedded systems development tools (3 hours)
13. Debugging techniques (3 hours)
14. Exams (4 hours)

**Laboratory Projects:** (specify number of weeks on each)
1. Simple application on an SDK (Rabbit 2300) (3 weeks)
2. Development with interrupts without OS support (3 weeks)
3. Development with MicroC support (4 weeks)
4. Hardware and software development (4 weeks)

**Oral and Written Communications:**
All students are required to develop and apply program documentation skills as part of the course programming assignments.

**Social and Ethical Issues:**
None.

**Theoretical Content:**
None.

**Problem Analysis and Solution Design:**
All students apply fundamental hardware-software engineering practices to analyze, design, implement, test, and document solutions to all programming assignments. Students are responsible for applying a controlled, iterative process to develop software components that meet desired needs. The assignment requirements involve significant problem analysis and solution design with respect to embedded systems.