Embedded Systems ECSE 421
Winter 2004

Instructor: Cedric Guss
TR 7-8:30pm, Trottier Rm 1080 for lectures and project meetings
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Course Objectives:
To acquire a knowledge and gain experience in embedded systems requirements, development, and usage.

Prerequisites:
-General knowledge of computer architecture and semiconductor devices
-Understanding of concepts of hardware and VHDL software design and development

Instruction:
This course emphasizes teamwork and real-life work experiences in both VHDL software and hardware design of a proposed customer-specified embedded product that will serve as a class team project. There will be hands-on assignments and lectures to aid with the implementation of such a product. In class, along with lectures, team and project meetings, and documentation reports will be conducted and required. Teaching assistants and the instructor will be available to assist in these efforts.

Grading:
The course grade will be determined on the following factors:
60% on weekly homework or exam assignments: 8 assignments (5% each), 2 exams (10% each)
40% on **team** project performance: system requirements specification (SRS-10%), system design document (SDD-10%), system test cases document (STC-10%), project demo (DEMO-10%).

Recommended Book for course:
S. Heath, Embedded Systems Design, Newnes, 1997.
Recommended References:
J. Cooling, Software Engineering for Real-Time Systems, Addison-Wesley, 2003.
S.R. Ball, Embedded Microprocessor Systems: Real World Design, Newnes, 3rd ed., 2002.
S. Hall, G. Hall, J. McCall, High-Speed Digital System Design, John Wiley & Sons, 2000.
M. Sze and S. Wang, Physics of Semiconductor Devices, John Wiley & Sons, 1981.
D. Perry, VHDL, McGraw-Hill 3rd ed., 1997.

Week	Schedule and Course Topics	Assignment subject/exams/reading
1 – Jan 6	Introduction, Embedded systems definitions	Cooling/Heath
2 – Jan 13	Semiconductor technology	real-time asgnmt due; Sze/Heath
3 – Jan 20	Embedded design issues	physics asgnmt due; Ball/Heath
4 – Jan 27	Embedded digital design, PLDs, FPGAs	circuit asgnmt due; Ball/Heath
5 – Feb 3	Embedded digital design, VHDL	VHDL asgnmt due; Perry/Heath
6 – Feb 10	Memory communication tools, smartcards	SRS due; Ball/Heath
7 – Feb 17	Wi-Fi technology	**exam**
8 – Feb 24	Study Break	
9 – Mar 3	Concurrency, Kernels	wifi asgnmt due; Heath/Cooling
10 – Mar 10	Embedded real-time and interrupt issues	SDD due; Heath/Cooling
11 – Mar 17	Interrupt and Priority handling	intrupt asgnmt due; Heath/Cooling
12 – Mar 24	Scheduling and task management	inheritance asgnmt; Heath/Cooling
13 – Mar 31	Scheduling and task management	scheduling asgnmt; Heath/Cooling
14 – Apr 7	I/O, Memory management	STC due, **exam**; Ball/Heath
15 – Apr 14	Team project demonstrations	DEMOs
16 – Apr 21	Team project demonstrations	DEMOs