

Boise State University
Electrical and Computer Engineering Department
Course Syllabus for ECE 332
Microprocessors
Spring 2010

Instructor: Arlen Planting

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Office Hours: Monday, Wednesday and Friday, 2:30 PM - 4:30 PM

Catalog Description:

Microprocessor architecture, software development tools, and hardware interfacing. Emphasis is placed on 16 and 32 bit microprocessor systems. Machine and assembly language programming, instructions set, addressing modes, programming techniques, memory systems, I/O interfacing, and interrupt handling are among the topics studied with practical applications in data acquisition, control, and interfacing. *Prereq: ECE 230.*

Required:

ECE 332 Microprocessors Course Reference

Nios II Processor Reference Handbook, Version 7.1, Altera, May 2007.

Optional References:

Brian W. Kernighan, Dennis M. Ritchie, *The C Programming Language*, Prentice Hall Software Series, 2nd Edition, 1988.

Nios II Software Developer's Handbook, Version 7.1, Altera, May 2007.

Quartus II Version 7.1 Handbook, Volume 5: Embedded Peripherals, Altera, May 2007.

Time and Place: (Lecture) MWF 1:40 PM to 2:30 PM, ET 103

Course Webpage: <http://coen.boisestate.edu/aplanting/ece332spring2010>

Topics to be covered:

- General-Purpose & Single-Purpose Processors
- Altera Nios II EDS Development Environment
- Altera Nios II Processor (Instruction Set, Registers, etc)
- Altera Nios II Software (Programming Model, Assembly, C etc)
- Object-Oriented C Programming
- Interrupts, Timer, Memory Systems
- Processor Bus Cycles
- Direct memory Access
- Interfacing (LEDs, Seven-Segment LEDs, Switch, Button, Parallel, Serial, Wireless, I²C, USB, etc)
- Performance Metric

Grading:

Homework (includes Programming)	15%
Quiz	15%
Test (2 @ 15% each)	30%
Final Exam	20%
Laboratory	20%

Grade determination: 100%-90% = A, 89%-80% = B, 79%-70% = C, 69%-60% = D, < 60% = F
(+ and - will be used accordingly)

Notes and disclaimers:

There will be rough spots. Question and comments are expected and encouraged. Homework will be assigned on Wednesdays. Sufficient time will be given to complete the work. NO LATE work will be accepted. The latest list of homework problems will be posted on the class webpage. No conversation will be allowed during lecture. If you disturb the lecture, you will be asked to leave the lecture room. If you have a question, ask the instructor. If you have something we need to discuss, let's get the whole class involved.

Code of Conduct:

Discussing the assignments with other students is encouraged, as this could be one way to understand the materials. However, the work submitted must be your own. Copying from any source (from someone else, old files, or solution manual!) and turning it in is not permitted. Penalties for copying/cheating range from receiving a 0 on the assignment to receiving an F for the course.

Student Code of Conduct, Article 3, Section 1, Academic Dishonesty

Cheating or plagiarism in any form is unacceptable. The University functions to promote the cognitive and psychosocial development of all students. Therefore, all work submitted by a student must represent her/ his own ideas, concepts, and current understanding. Academic dishonesty also includes submitting substantial portions of the same academic course work to more than one course for credit without prior permission of the instructor(s).

Course Objectives:

After taking this course, students should be able to:

- Program Nios II with assembly language using Altera Debug Client
- Program Nios II with C programming language using Altera Debug Client and Nios II EDS
- Write program in layers to increase code portability
- Understand code retarget
- Measure program performance
- Interface to wide range of input and output devices
- Understand the differences between desktop systems and embedded systems
- Understand the differences between microprocessors and microcontrollers
- Understand the differences between “hard” processors and “soft” processors
- Understand the differences among application specific processors, general purpose processors, and digital signal processors

Schedule:

Week	Topic	Week	Topic
1	Introduction	10	Buses
2	Architecture & Nios II	11	Spring Break
3	Assembly 1	12	Memory
4	Assembly 2	13	PWM
5	C Programming I	14	Other Devices
6	C Programming II	15	Softcore processors
7	Cache	16	Linux on Nios II
8	Interrupts 1	17	Final: Wed. May 12, 2010 1:00pm – 3:00pm
9	Interrupts 2		