

EECE416 :Microcomputer Fundamentals and Design ("Microcomputer & Microprocessor")

Intel Atom-based Course

Fall 2011

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A big change from Fall 2011

Before

- 68000 Motorola 16/32-bit microcomputer architecture and programming experiences
- PIC 16F877 8-bit microcontroller for embedded-computing project – interfacing with external world
- Drawbacks: Simple text based coding via a simulator for Motorola and sensor-based I/O handling for PIC

After (from Fall 2011)

- Intel Atom-based curriculum based on Intel gift of Atom-based boards
- Networked and media rich application is now possible
- Emphasis 1: IA 32 and x86 Architecture as background information – MASM32
- Emphasis 2: Embedded SW Development and Debug Tools (Application Environments) and Real Time Programming (Hardware/Software) for Atom boards.

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2011 Intel Gift Awardees

- ⌘ Arizona Stat University
- ⌘ Carnegie Mellon University
- ⌘ Cornell University
- ⌘ Howard University
- ⌘ MIT
- ⌘ Oregon State University
- ⌘ Portland State University
- ⌘ Southern Illinois University
- ⌘ University of Michigan
- ⌘ University of Texas – Austin
- ⌘ Washington University St. Louis
- ⌘ Oregon Inst of Technology
- ⌘ UC Berkeley
- ⌘ UCLA
- ⌘ UCSD
- ⌘ UC Riverside
- ⌘ Umass – Amherst
- ⌘ Umass- Lowell
- ⌘ University of Missouri, Kansas City
- ⌘ University of Colorado, Boulder
- ⌘ VCU
- ⌘ Worchester Polytechnic Institute

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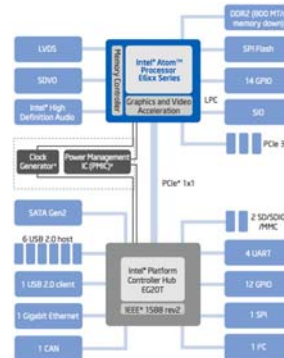
Learning Outcomes - ABET

- ⌘ **(c) An ability to design a system component, or process to meet desired needs**
 - ☒ Programming of assigned works
- ⌘ **(e) An ability to identify, formulate, and solve engineering problems**
 - ☒ Programming of class projects
- ⌘ **(g) An ability to communicate effectively**
 - ☒ Writing Class Project Reports
 - ☒ Presentation of Class Projects
- ⌘ **(h) A knowledge of contemporary issues**
 - ☒ Assignment on emerging technologies and their socio-cultural impact
 - ☒ Go-green
 - ☒ Sustainability
 - ☒ E-waste
 - ☒ Robots
- ⌘ **(i) An ability to use the techniques, skills and modern engineering tools necessary for engineering practice**
 - ☒ Familiarity in assembly language coding environment

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Course Structure

- ⌘ Computer Architecture in General
 - ☒ Computer History
 - ☒ Computer Architecture-brief (ISA)
- ⌘ IA32 and MASM (Microsoft Assembler)
 - ☒ Architectural Study
 - ☒ Instruction Sets
 - ☒ MASM32 and Code Viewer
 - ☒ Programming Practices
- ⌘ Atom-Based Board ("Tunnel Creek")
 - ☒ Architectural study
 - ☒ Programming Environments
 - ☒ Programming Practices
 - ☒ Projects
- ⌘ Textbook
 - ☒ 1. Art of Assembly Language Programming
 - ☒ Randall Hyde
 - ☒ <http://www.arl.wustl.edu/~lockwood/class/cs306/books/artofasm/toc.html>
 - ☒ Chapter 3 →
 - ☒ 2. TBD



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Course Expectations

- ⌘ Lecture/Programming Lab Combination
 - ☒ Lecture: Tuesday
 - ☒ Lab: Thursday (TA: Ravi Jaglal)
- ⌘ Active Participation in Lecture and Lab
- ⌘ Timely Submission of Program Practices
- ⌘ Could be an Early Start of Senior Design Project Implementation & a must for Embedded-Computing Class (Spring 2012)
- ⌘ Individual/Group Works –PC/Laptop use in Classroom is a MUST (especially in Thursday's Class)

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Class Schedule (Tentative)

⌘ August:

- ☒ Week 1 – Class Introduction and Computer History

⌘ September:

- ☒ Weeks 1 – 4: IA32 & MASM32 & Coding practice
- ☒ Week 5: Mid-term Exam

⌘ October

- ☒ Weeks 1- 4: Atom Board Intro and Example Codes

⌘ November

- ☒ Weeks 1-4: Atom Board Coding Project

⌘ December

- ☒ Week 1: Submission and Presentation of Project
- ☒ Week 2: Final Exam

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Grading

⌘ Mid-term Exam - 20%

⌘ Final Exam – 20 %

⌘ Coding Assignments and Projects – 40 %

⌘ Essay Writing on Contemporary Issues (emerging technology in computer and embedded systems) – 10%

⌘ Attendance – 10% (On-time arrival only)

⌘ Grades:

- ☒ A: 90% or above
- ☒ B: 80 – 89 %
- ☒ C: 70 - 79 %
- ☒ D: 60 – 69 %
- ☒ F: 59% or below

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Advice for success in the class

- ⌘ Be on time – Important things are covered at the very first moment and at the very first few classes.
- ⌘ Finish work in the class – Do not postpone or extend the work to the evening/night hours.
- ⌘ Bring your own Laptop – It would be more convenient and productive than using a PC in the class.
- ⌘ Do your first coding work yourself and master it – all other coding practices will be built on the first work.
- ⌘ **Classroom**
 - ☒ LKD3121
- ⌘ **Office Hour**
 - ☒ T 2 – 4 pm
 - ☒ W 4 – 5 pm
 - ☒ By appointment (or just walk-in)

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Intel Cup 2011

- ⌘ USA national contest for embedded systems - Intel Atom board based **Design and Implementation**
- ⌘ College-level embedded design competition created to empower student teams to become the inventors of the newest innovative applications of embedded technology.
- ⌘ Expected Launch Date: August 19, 2011 (??)
- ⌘ Year-long experience and 2-day summit at Walt Disney World
- ⌘ Open to all **Undergraduate** or **Masters** Engineering and Computer Science students in any accredited US university
- ⌘ **Teams of 3-5 students** will create detailed **design plans**, a **working prototype**, and a **final presentation** that effectively demonstrates the **capabilities and robustness of their ideas**.
- ⌘ Status: Preparation underway
 - ☒ **Leaders: Ravi Jaglal & Gerard Spivey**
 - ☒ **uC students will be given priority in team formation**

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