

CS 271 – Computer Architecture and Assembly Language

Catalog Description: Introduction to functional organization and operation of digital computers. Coverage of assembly language; addressing, stacks, argument passing, arithmetic operations, decisions, macros, modularization, linkers and debuggers.

Credits: 4

Structure: Two 80-minute lectures per week.

Enforced Prerequisites: CS 161

Courses that require this as a prerequisite: CS 311

Instructors: D. Kevin McGrath

Course Content:

- Hardware, architectures
- Internal representation of data, instructions, and addresses
- Boolean Algebra
- Elementary circuits
- Instruction set architecture, micro-programs
- Assembly language
- Debuggers

Learning Resources:

- Irvine, Kip R., *Assembly Language for Intel-Based Computers* (5th edition), Prentice-Hall, 2007. (ISBN 0-13-238310-1).
- Tanenbaum, Andrew S., *Structured Computer Organization* (Special OSU edition.) Prentice-Hall, 1999

Course Learning Outcomes:

At the completion of the course, students will be able to...

1. **Identify** the major components of CISC and RISC architectures, and explain their purposes and interactions. (ABET Outcome I)
2. **Simulate** the internal representation of data, and **show** how data is stored and accessed in memory (ABET Outcome A).
3. **Explain** the relationships between a hardware architecture and its instruction set, and **simulate** micro-programs (ABET Outcomes A, I).
4. **Explain** the Instruction Execution Cycle (ABET Outcomes A, I).
5. **Explain** the differences among high-level, assembly, and machine languages (ABET Outcomes A, I).
6. **Write** well-modularized computer programs in an assembly language, **implementing** decision, repetition, and procedures (ABET Outcomes A, I).
7. **Use** a debugger, and **explain** register contents (ABET Outcomes I).

8. **Explain** how the system stack is used for procedure calls and parameter passing (ABET Outcomes A, I).
9. **Explain** how editors, assemblers, linkers, and operating systems enable computer programming. (ABET Outcome I).
10. **Explain** various mechanisms for implementing parallelism in hardware/software (ABET Outcome I).

Students with Disabilities:

Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098.

Link to Statement of Expectations for Student Conduct, i.e., cheating policies
<http://oregonstate.edu/admin/stucon/achon.htm>