

CSCI 222 – Computer Organization

Fall 2010

Instructor: Dr. Matthew Lang
Office: PPHAC 213
Email: lang@cs.moravian.edu
Office Phone: (610) 625-7786

Class: MWF 10:20am–11:30am in PPHAC 301
Office Hours: TBD (or by appointment)

Course Description

“What is happening when a program is being executed?”

This course is a study of the answer to that question. We will examine the organization of a modern computer from the perspective of a programmer. This examination will include the set of instructions that a processor supports, how a processor carries out those instructions, the memory hierarchy, and storage systems.

Since our perspective is that of a programmer rather than a computer engineer, we will focus on issues in computer organization and architecture related to programming. This means that we will forsake in-depth discussion of processor architecture and a ground-up approach to understanding its design in favor of investigating how elements of a system affect program performance, how high-level languages are translated into a format that can be executed by the processor, *etc.*

Course Objectives

At the completion of this course, you should be able to:

- Understand how computer systems represent data and programs.
- Implement C language programs that contain multiple threads, interact with the operating system, and make use of dynamic memory allocation.
- Translate small algorithms and programs to Intel assembly language.
- Understand how the memory hierarchy, the processor architecture, and processor instruction set affect program performance.
- Perform optimizations that improve the performance of programs.

Texts

“Computer Systems: A Programmer’s Perspective” by Bryant and O’Hallaron.

Schedule

Topic	Weeks
Representing data	2
Assembly language	4
Architecture-informed optimization	2
The memory hierarchy	2
Linking	1
Exceptional behavior	1
Shared memory concurrency	2

Attendance Policy

This course does not have a rigid attendance policy in the sense that there is a rule describing the number of lectures that you must attend. However, please do not take this as a license to never show up to class; I expect you to be at each class meeting. Your attendance in lecture is important (beyond the usual reasons) in that homeworks, due dates, and readings will be assigned in person during lecture.

Academic Honest Policy

Please read and understand the College's Academic Honesty Policy (which you can find in the Student Handbook). I will let you know what materials are appropriate to use for reference for specific assignments when they are assigned.

Since collaboration with your colleagues will be an important part of your careers, collaboration is permitted on all graded assignments (with the exception of exams). However, unless I state otherwise, you must turn in your own copy of each assignment *in your own writing*. If the ideas/algorithms expressed in an assignment are not entirely your own (*i.e.*, you worked with one of your colleagues), you must include a note stating who you worked with and the percent contributions of everyone who contributed to the work (including your contribution).

Grading Policy

There are four components to your grade:

- **Homework:** Homework will be handed out periodically throughout the semester; assignment details and due dates will be describe upon being distributed. **Weight: 20%**
- **Programming Projects:** Throughout the semester, you will be assigned larger programming projects. **Weight: 40%**
- **Tests:** There will be two midterm exams given during the semester. **Weight: 30%**
- **Final:** A cumulative final exam will be given. **Weight: 10%**

Other policy matters:

- **Grading Scale:** I will use the standard 90-80-70-60 scale with pluses and minuses to assign grades.
- **Late Homework:** I will accept homework beyond its due date with the penalty of 30% of the assignment's value per day. For example, if a homework is work 10 points and it is turned in two days late, the maximum amount of points one can receive is 4 points.
- **Exam Absence:** If you are going to miss an exam due to conflict, you must let me know before the exam. If you miss an exam due to some other circumstance, you must let me know as soon as possible and provide me with documentation. Valid circumstances include events like illness and family trauma. Invalid circumstances are events like hangovers and faulty alarm clocks.
- **Academic Accommodations:** Please let me know immediately if you have any disability that requires accommodation. Students who wish to request accommodations in this class for a disability should contact Mr. Joe Kempfer, Assistant Director of Learning Services for Disability Support, 1307 Main Street (extension 1510). Accommodations cannot be provided until authorization is received from the office of Learning Services.

This syllabus is subject to change.