CMPSC 250: Analysis of Algorithms  
Course Syllabus Spring 2015  
Allegheny College

Meeting Times:  TTH 9:30-10:45 in Alden 101  (Lab W 2:30-4:20 in Alden 101)  
Instructor:  Mr. John Wenskovitch  
Email:  jwenskovitch@allegheny.edu  
Office:  Alden 104  
Office Hours:  M 10:00-12:30, T 1:00-3:30, W 10:00-11:00, Th 11:00-12:00, F 2:30-5:30

Course Catalog Description  
A treatment of selected topics from the analysis of algorithms including models of  
computation, design of efficient algorithms, computational complexity, and NP-  
completeness. Students develop expertise in mathematical analysis and algorithmic  
programming methodology. One laboratory per week.  
Prerequisites:  Computer Science 112 and Mathematics 205, or permission of instructor.

Required Texts and Materials  
- **Required Text:**  *Algorithms*, Robert Sedgewick & Kevin Wayne, 4th Edition  
- **Course Website:**  [http://www.cs.allegheny.edu/~jwenskovitch/teaching/CMPSC250/](http://www.cs.allegheny.edu/~jwenskovitch/teaching/CMPSC250/)

Learning Objectives  
1. Learn how to implement and analyze algorithms for common tasks such as sorting,  
   searching, and operations for common data structures.  
2. Learn algorithm design techniques such as recursion, divide and conquer, and dynamic  
   programming.  
3. Understand how computational complexity is measured in terms of time and space;  
   examine the classes P and NP, and become familiar with the notion of NP-Completeness.

Teaching and Learning Methods  
The main mode of learning in this class is reading the textbook and attending the course  
lectures. Additionally, homework assignments and labs will be used as a way to test  
knowledge. Students are responsible for reading assigned portions of the textbook, whether  
or not the topics are discussed in class. Lectures will provide explanation and emphasis for  
material and examples in the textbook. The instructor will ask questions to stimulate  
thinking and participation. Students’ comments and questions are highly encouraged. Some  
Internet resources will also be used to supplement lectures and discussions.
Grading and Evaluation

Your total grade for the course will be based on the following, weighted appropriately:

- Exams 1&2 (15% each)
- Final Exam (20%)
- Labs (30%)
- Final Project (10%)
- Attendance & Participation (10%)

Three exams will be given in this class, spaced roughly five weeks apart. The final will be cumulative, as later parts of the course will build on your knowledge from previous weeks. Raw grades for the exams are based on the accuracy and merit of the content. In addition, the grades for the exams will be affected negatively if the quality of language use or the mechanics of the calculations undermine the overall logic and credibility of the content.

The participation grade will be based on attendance (includes arriving on time, remaining until class is dismissed, and notifying the instructor in advance if you know you will be absent), asking pertinent questions demonstrating evidence of completing reading assignments, and participation in the class discussions and problem-solving sessions.

Assignment Submission and Late Policy

Every assignment has a due date and time. Failure to hand in the assignment by the deadline will result in a late submission penalty.

Assignments handed in within one week of the deadline will receive automatic grade reductions of 20% (in addition to any points deducted for errors). Assignments will not be accepted more than one week past the deadline, unless you can provide documented extenuating circumstances. Any extenuating circumstances must be documented through the Learning Commons, Counseling Center, Dean of Students office, Health Center, or other authoritative source.

If you are unable to attend class for any reason beyond illness or injury, you must make arrangements with me to turn in assignments before class. Exams must be taken at scheduled times. This includes the final exam. Please check the syllabus and with the instructor before making any travel plans for the end of the semester or around breaks. Missed exams will receive a grade of zero without a documented illness or emergency.

Disability Statement

Students with disabilities who believe they may need accommodations in this class are encouraged to contact Student Disability Services (SDS) at (814) 332-2898. SDS is part of the Learning Commons and is located in Pelletier Library. Please do this as soon as possible to ensure that such accommodations are implemented in a timely fashion.
**Participation Evaluation**

While it is difficult to quantify the success of a student’s contributions to class discussion (at our best we all of course contribute differently), here are the general standards I will use to grade participation:

**A range:** Participation at this level is marked by its active nature, its consistency, and its quality. When A participants read an assignment, they prepare to participate in a class discussion; they read the assignments fully, carefully and critically enough to be ready not just to respond to my questions but also to initiate discussion with comments and questions of their own. Such participants will also come to class ready to make and argue assertions about the reading and to think out loud about a text’s relation to its contexts; they will attend to the comments of others in class, agree, elaborate or civilly disagree with them, bring our attention to passages from the reading to make their point and at times connect such thinking with earlier readings or previous class discussions. In short, students who by their engagement in class discussion throughout the semester show themselves to be true students of the course material--persistently conscientious and inquiring--will get an A for their efforts. They will also make the course a lot better. (By the way, substituting quantity of participation for quality will not work.)

**B range:** Students who come to every class, have almost always done all the reading, and consistently respond to the questions of others in a way that demonstrates their command of the reading will earn a B participation grade. What separates this effort from an A one is not so much quantity (teachers are remarkably good at detecting BS) as the level of preparation--one's reading and thinking--that has gone on before one gets to class, especially the kind that enables students to initiate discussion. But you can't get a B participation grade by just showing up, either, or by talking every once and a while.

**C range:** A C participant comes to almost all the classes, usually has done most of the reading most of the time, but not with the energy necessary to demonstrate through participation their ongoing engagement with the material. Such a discussant contributes infrequently, maybe one time every week.

**D range:** Automatic pilot mode. You were physically there most of the time, spoke a few times all semester maybe, but that was it.

**F:** Not coming to class is the traditional route.

**Please Note:** Students who are reluctant to talk in class can partially compensate for their silence by e-mailing me comments and questions about the reading before the class discussion of it. If you define yourself as “shy,” though, please don’t convert this definition into permission not to talk. People get “writer’s block” but still must hand papers in on time; others have “test anxiety” and take tests. In this class, participating in discussions is an obligation as important as test and papers, so keeping mum isn’t really an option for those who expect to succeed.

(Credit for this participation policy goes to Prof. Ben Slote, English Department)
Email
“Th... an email account and address while enrolled at Allegheny and are expected to check the account on a regular basis.” [The Compass, the Allegheny College student handbook]

I will occasionally need to send out announcements to the class with items such as clarifications, changes in the schedule, or other matters. I will use your Allegheny College email account to do this. It is your responsibility to check your email (I suggest at least once a day) and to make certain that your email is working correctly (able to send and receive messages). Please include “CMPSC230” in the subject line when emailing me questions.

You can count on my reading and responding to emails from roughly 10AM to 6PM, Monday through Friday, although I will certainly check at other times.

Use of Laboratory Facilities
Throughout the semester, we will investigate many different software tools that computer scientists use during the design, implementation, and evaluation of algorithms and data structures. The course instructor and the department’s systems administrator have invested a considerable amount of time to ensure that our laboratories support the completion of both the laboratory assignments and the final project. To this end, students are required to complete all assignments and the final project while using the department’s laboratory facilities. The course instructor and the systems administrator normally do not assist students in configuring their personal computers.

Class Preparation
In order to minimize confusion and maximize learning, students must invest time to prepare for the class discussions and lectures. During the class periods, the course instructor will often pose demanding questions that could require group discussion, the creation of a program or data set, a vote on a thought-provoking issue, or a group presentation. Only students who have prepared for class by reading the assigned material and reviewing the current assignments will be able to effectively participate in these discussions. More importantly, only prepared students will be able to acquire the knowledge and skills that are needed to be successful in both this course and the field of computer science. In order to help students remain organized and effectively prepare for classes, the course instructor will maintain a class schedule with reading assignments and presentation slides. During the class sessions, students will also be required to download, use, and modify programs and data sets that are made available through the course website. Students who are not comfortable with compiling, editing, and running Java programs should see the course instructor.
**Attendance**

It is mandatory for all students to attend all of the class and laboratory sessions. If you will not be able to attend a session, then please see the course instructor at least one week in advance to describe your situation. Students who miss more than five unexcused classes, laboratory sessions, or group project meetings will have their final grade in the course reduced by one letter grade. Students who miss more than ten of the aforementioned events will automatically fail the course.

**Honor Code**

All students enrolled at Allegheny College are bound by the Honor Code. It is expected that your behavior will reflect that commitment. To this end, we expect that you will adhere to the following Department Policy:

**Department of Computer Science Honor Code Policy**

It is recognized that an important part of the learning process in any course, and particularly in computer science, derives from thoughtful discussions with teachers, student assistants, and follow students. Such dialogue is encouraged. However, it is necessary to distinguish carefully between the student who discusses the principles underlying a problem with others, and the student who produces assignments that are identical to, or merely variations on, someone else’s work. It will therefore be understood that all assignments submitted to faculty of the Department of Computer Science are to be the original work of the student submitting the assignment, and should be signed in accordance with the provisions of the Honor Code. Appropriate action will be taken when assignments give evidence that they were derived from the work of others.

You are encouraged to periodically review the specifics of the Honor Code as stated in the College Catalogue, *The Compass*, and elsewhere.

**Structure of the Semester**

This is a rough outline of the topics covered this semester. A detailed version will be updated at: [http://cs.allegheny.edu/~jwenskovitch/teaching/CMPSC250/schedule.html](http://cs.allegheny.edu/~jwenskovitch/teaching/CMPSC250/schedule.html)

Some shifting in the schedule of topics is possible, but the exam dates are firm.

**Course Structure**

- Weeks 1-2 – Analysis of Algorithms
- Weeks 3-5 – Sorting Algorithms
- Weeks 6-8 – Searching Algorithms
- Weeks 9-11 – Graph Algorithms
- Weeks 13-14 – String Algorithms
- Week 15 – P/NP, NP-Completeness

**Exam Dates**

- Exam 1 – February 18
- Exam 2 – April 1
- Final Exam – April 30, 7:00 PM