

CSCI 243 SYLLABUS

COURSE NAME, NUMBER Discrete Mathematics and Functional Programming, CSCI 243
SEMESTER, YEAR Fall 2009
INSTRUCTOR T. VanDrunen
OFFICE / TELEPHONE / EMAIL Armerding 112 752-5692 Thomas.VanDrunen@wheaton.edu
OFFICE HOURS Tu 9:30-11:30am and 1:00-3:00pm; MWF 3:15-4:15pm
COURSE WEBSITE <http://csnew.wheaton.edu/~tvandrun/cs243>

RESOURCES VanDrunen, Thomas. *Discrete Mathematics and Functional Programming*. 2009. Available only at the Wheaton College bookstore.

COURSE DESCRIPTION
Sets, logic, the nature of proof, induction, algorithms, algorithm correctness, relations, lattices, functions, and graphs. Functional programming and recursion using the ML programming language.

GOALS AND OBJECTIVES

1. Students will be able to articulate the operations of formal reasoning.
 - Using sets for categorical thinking.
 - Using the rules of logic for deduction and inference.
 - Using relations, functions, and graphs for modeling relationships among categories.
 - Using types in ML for representing sets and functions.
2. Students will be able to compose mathematical proofs.
 - Using direct proof, proof by contradiction, and mathematical induction.
 - Proving properties of sets, correctness of algorithms, properties of relations, properties of functions, and properties of graphs.
3. Students will be able to compose algorithms.
 - Using imperative/iterative techniques.
 - Using a recursive system of functions.
4. Students will be able to compose programs in the ML programming language.

ASSESSMENT PROCEDURES

1. Proof-writing assignments will give students practice in writing proofs on the various topics and help them identify concepts on which they need more work.
2. Program-writing assignments will give students practice in writing programs and implementing algorithms; they will also demonstrate the connection between mathematical propositions and algorithms.
3. Tests and final exam will evaluate students' mastery of these skills.

Grading:

	<i>weight</i>
Homework	25
Test 1	15
Test 2	15
Test 3	15
Final exam	30

I also will give one homework point of extra credit for every minor error in the textbook which you are the first to bring to my notice. Discovering bigger mistakes or making higher-level suggestions may be rewarded more significantly, on my discretion.

SPECIAL EXPECTATIONS

Academic Integrity

Students are encouraged to discuss homework problems and ideas for solutions. However, your solutions, proofs, and programs must be your own. If you are having trouble debugging a program you have written, you may show it to a classmate to receive help; likewise you may inspect a classmate's incorrect program to give help. However, you should not show *correct* code to a classmate, nor should you look at another student's correct code, to give or receive help. Programs on which students have unfairly corroborated will not be accepted.

Assignments

Unless otherwise specified, assignments are technically due at 5:00 pm on the day of the next class period after it was assigned (for example, an assignment given in class on Monday covering Monday's material is due at 5:00 Wednesday.) However, the intent is that students will complete the assignment *before* the next class period and give it to the instructor at that time; if the student does not complete the assignment until later that day, the assignment should be put in the instructor's box in the department office. Late assignments will not be accepted. If you have not completed an assignment on time, hand in what you have completed by the due date for partial credit.

Attendance

While I was an undergraduate, I missed a grand total of two classes, and one of them was to take the GRE. I expect the same from my students. Since being a student is your current vocation, since your learning now will affect your ability to support a family and church later in life, and since you, your family, and/or a scholarship fund are paying a large sum of money to educate you, being negligent in your schoolwork is a sin. I do not take attendance, but I do notice. When missing a class is unavoidable, it is courtesy to inform the instructor, ahead of time if possible.

Readings

We will be following the course manual closely in this course. It serves as an extended syllabus, a textbook, and a set of handouts. The course website tells you what sections will be covered on what class days. Generally it's a good idea to read the sections covered that day before coming to class, but to some extent you need to figure out what works best for you—some people learn best by reading something first, then hearing about it, while others learn best by hearing about it first, then reading about it later to reinforce the ideas. However, sometimes I will actually assign a section to be read before class; in those cases I will not go over that material in class (except briefly to review) but will expect that you are familiar with it as prerequisite knowledge for the day's discussion.

Special needs

Whenever possible, classroom activities and testing procedures will be adjusted to respond to requests for accommodation by students with disabilities who have documented their situation with the registrar and who have arranged to have the documentation forwarded to the course instructor. Computer Science students who need special adjustments made to computer hardware or software in order to facilitate their participation must also document their needs with the registrar in advance before any accommodation will be attempted.

Examinations

There will be three tests this semester, currently scheduled for Sept 30, Oct 28, and Dec 2. The final exam is Tuesday, Dec 15, at 10:30 AM. I do not allow students to take finals early (which is also the college's policy), so make travel appropriate travel arrangements.

For an outline of topics in the course, see your course manual. For a schedule, see the course website.