

CS-482—Topics: Functional Programming and Types  
Syllabus  
Spring'08  
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**Contact:** Scheduled office hours (tentative):

M 2:30–4:00, T 10:00–11:00, F 10:00–11:00 & 1:00–2:30.

Also other times by appointment. I strongly encourage you to send questions/requests for clarifications to me via e-mail. Unless you specifically request otherwise (or it seems inappropriate) I will strip identifying information off and send my response to the class list. Since most of your fellow students will have the same questions, you will be doing all of us a favor by making the effort to submit them—very much appreciated.

**Text:** Thompson, Simon. *The Craft of Functional Programming, 2nd ed.* Addison Wesley, 1999.

We will study functional programming, the predominant programming paradigm for AI, using Haskell, a modern functional language with strong typing. We will use this as a basis to study Types as first-class objects in programming. This is the most general approach to handling data abstraction and polymorphism and provides a clear framework for thinking about types and objects in programming languages in general.

**Coverage:** I am hoping to cover substantially all of the text. The text is intended to be usable for a first course in programming—albeit from a perspective which will not be familiar to many of you—so we should be able to move over some of the material fairly rapidly. I expect to cover the first four chapters in the first week and one-half. From there, I'm hoping to proceed at the rate of approximately one chapter per week, but we will vary our pace to suit the material and the class. To

that end, it is important to let me know if the class seems to be moving either too fast or too slow for you.

Initially, you should plan to read Chapters 1 through 3 for Tuesday, 15/Jan., Chapter 4 for Thursday 18/Jan. and Chapter 5 for Tuesday, 22/Jan.

**Structure:** Classes are intended to be a hybrid of lecture and discussion. It will help a great deal if you have done the reading before class. There will be exercise sets to go along with each chapter. Most, but not all, of the exercises will be small programming problems, many taken from the text. Usually you will have about a week to complete these. We will take time to discuss solutions on the due date, so it is important to have these done on time.

We will follow my usual late policy: you may *request* a short (no more than a day or two) extension *provided* you turn in what you have completed when the exercise is due and you meet with me to discuss what you plan to complete, when you plan to complete it and how much of a grade deduction should apply. I'm concerned that students have used this policy as a crutch in the past and, therefore, if you repeatedly request extensions they will not be granted.

There will also be a semester project, covering about the last month of the course. We will meet during the finals period (28/April, 4:30) to demo these.

Currently, I am planning for both the mid-term and final to be take home with one covering a Tuesday–Friday interval and one a Friday–Tuesday interval. You will have the option of whether to count the mid-term in your final grade or not. It is not, on the other hand, optional—everyone is expected to complete it.

There will also be a “final final”, a self-evaluation of the semester as a whole which is due at the scheduled final period. You will each meet with me during that period to discuss your self-evaluation as well as my own evaluation of your semester. This counts for 5% of your grade, but all that is needed to get the full 5% is to take it seriously.

Except when explicitly structured as a group project all of the assignments are to be done individually. While you are welcome to discuss the problems with each other and are encouraged to be available to help each other with the material, the solutions you submit must be your own work. So, break your discussions off before you get into the details—help each other with the concepts, not the specifics.

*I take academic honesty seriously—truth is the foundation of our community ethic. While I understand that recognizing the line between serving your fellow students as a resource and helping them inappropriately is not always easy to discern, you must keep these two separate. If you have any doubt at all, please discuss it with me either in person or by e-mail. (Questions of this sort will be kept confidential.) If any doubt remains, err on the side of being less helpful than you might.*

Similarly, as many of the exercises will be taken from the text, you can probably find solutions (occasionally even correct solutions) for many of these somewhere in the www. You may *not* use solutions you find outside of class even only to guide your thinking in formulating your own solutions.

**Grading:**

Exercises	40%
Project	20%
Mid-term	10%
Final	25%
Self-evaluation	5%

The mid-term is optional in that you have the choice of dividing the points for it and the final either 10% to the mid-term and 25% to the final or all 35% to the final.

While your participation in class can affect your grade, I don't generally give it an explicit weight. This is partly because I don't know how to quantify it and partly because your participation is expected.

**Disabilities:** Please let me know as early in the semester as possible if there are any adaptations or accommodations you require, if there is any emergency medical information I should know about, or if you might need special arrangements in the case that the building needs to be evacuated. I will be happy to work to accommodate any student with disabilities. The Earlham policy is:

Any student with a documented disability (e.g., physical, learning, psychiatric, vision, hearing, etc.) who needs to arrange reasonable accommodations must contact Academic Support Services and the instructor at the beginning of each semester. *Accommodation arrangements must be made during the first-two weeks of the semester.*

It is important to follow this procedure.