

# CS 3366 Programming Languages

## Spring 2015

Instructor Muller

### Syllabus

Welcome to CS3366 Programming Languages. This course sits at the intersection point of computer science theory and computer systems. In this course we will study the design, specification and implementation of programming languages. This is a rigorous, hands-on course that follows the learn-by-doing philosophy. Students will learn about the design and specification of programming languages and will learn how to implement various language features. Two major subplots are: 1. to give you better insight into the nature of software and the software engineering process, and 2. to reduce the time it will take you to develop a deep understanding of the programming language that you might be using.

Good program design methodology will be stressed throughout the course. There will also be a study of some of the basic notions of computer science, including computer systems organization, files, and some algorithms of fundamental importance.

### Course Goals

The main goal of the course is to help the student develop an understanding of programming language structure and implementation. Students will learn how various language features are implemented and learn some of the trade-offs of using various features.

### Basic Information

CS 3366 has two 75-minute lectures each week. Lectures will be held on Tuesdays and Thursdays 3PM in Fulton Hall 415. Attendance at the lectures is important, as all new material will be presented there. **Note:** Laptops are not allowed in lecture. If you have special circumstances that require you to bring one, please see me.

### Course Web Site

Please bookmark the course homepage:

<http://www.cs.bc.edu/~muller/teaching/cs3366/s15/>

We will use this site very heavily throughout the semester and most of the course materials will be distributed through this site. Some lab materials will

be distributed through the linked Piazza site. Problem sets are to be submitted through the linked Canvas website. Note that we will not have a course homepage on Canvas.

## Staff

**Instructor:** Robert Muller, robert.muller2@gmail.com, office: St. Mary's Hall Rm S277, hours: Mondays 10AM - 12PM, Thursdays 8:15AM - 10:15AM, 617-552-3964.

**Teaching Assistant:** Ziyuan Chen, zcxxiv AT gmail DOT com, office: Fulton 160, hours: Fridays 3-4, Sundays 8PM-10PM.

## Problem Sets

Problem sets will be assigned weekly. Unless otherwise specified, all problem sets are due on 5PM on the specified due date. The single best indicator of success for computer science is *starting problem sets early*.

Problem sets should be submitted for grading by uploading an appropriately named zip file through the course Canvas web site. (As linked from the course home page.) Problem sets cannot be submitted as email attachments. Attempts to submit problem sets as email attachments will not receive an email reply indicating that the attempted submission failed.

### Tentative Course Outline

<i>Week</i>	<i>Topic</i>
1-13, 1-15	Introduction, Core FSharp
1-20, 1-22	More FSharp
1-27, 1-29	Syntax
2-3, 2-5	Natural Semantics, First-order Recursive Schemes
2-10, 2-12	Stack Machines, <i>First Exam</i>
2-17, 2-19	Evaluation Order
2-24, 2-26	Higher-Order Functions
3-3, 3-5	Spring Break
3-10, 3-12	Types, Type Systems, Type Inference
3-17, 3-19	Type Inference Algorithms, PCF
3-24, 3-26	More on Types
3-31, 4-2	<i>Second Exam</i> , Easter Break
4-7, 4-9	Imperative Languages
4-14, 4-16	Compiling Micro-C
4-21, 4-23	State
4-28, 4-30	Catchup and Review

## Exams

There will be two midterm exams and a final exam. The exams are in class and are closed notes and closed book. You will have 75 minutes to complete each midterm, and 2.5 hours to complete the final. If you require extra time for documented reasons, please let us know.

## Midterms

**First Midterm** Thursday February 12,

**Second Midterm** Tuesday March 31,

**Final Exam** TBA.

## Reading

There is one required textbook for the course *Programming Language Concepts* by Peter Sestoft. There are several other books listed on the course homepage. *Functional Programming Using FSharp* by Hansen and Rishel is recommended if you would like further background on the FSharp programming language. We will use extensive code and lecture notes which will be posted to the course web site.

## Grading

Your grade for this class will be a combination of your homework, exam, and participation work. Participation is largely based on effort (not correctness). Class participation and Piazza involvement will be incorporated into the participation score. Final grades will be computed, roughly as follows:

- Eight to ten problem sets, these account for 45% of your grade,
- Two midterm exams, each accounts for 12.5% of your grade and a final exam which accounts for 20% of your grade,
- Class, lab and piazza forum participation, together, these account for the remaining 10% of your grade.

Important! If you fail one of these components, you will fail CS 3366, even if your weighted-average scores are mathematically above the passing threshold.

## Late Homework Policy

Homework is due on the day indicated at 5PM. *This is a strict deadline.* Homework submitted at 5:01PM is one day late as is homework submitted 23:59 late. Late homework is penalized 25% per 24-hour period.

In the case of medical exigencies, students may petition the the Instructor for an extension. Medical problems or family emergencies are the only conditions under which extensions will be granted.

## Honor Code

All solutions and code should be produced by you alone, or by you and a partner, where appropriate. For pair-programmed assignments, each partner needs to submit the assignment and each needs to acknowledge the other partner when submitting.

You may discuss algorithms at a high level with any student in the class. You may also help any student find a small bug in their code. However, you may not copy solutions from anyone, nor should you collaborate beyond high-level discussions with anyone who is not your partner. For pair programming problems, you must follow the guidelines given above.

If you have any questions about what behavior is acceptable, it is your responsibility to come see one of the instructors before you engage in this behavior. We are more than happy to answer any questions you may have.