Syllabus for *Computation for the Life Sciences*
CS 5046, Spring 2007

Meeting times	206A Randolph Hall, TR 11AM–12:15PM
Instructor	T. M. Murali
Office	2160B Torgerson Hall
Office hours	1–3PM Tuesday and by appointment
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Description

This course is the second part of a two-course introduction to computer science designed for graduate students enrolled in a life science department or the Ph.D. programme in Genetics, Bioinformatics, and Computational Biology but not having a computer science background. It builds upon the background developed in CS 5045.

The first part of the course introduces students to object-oriented programming using the Perl language and teaches them basic principles of software engineering. The second part of the course deals with the design, analysis and implementation of fundamental algorithms and data structures. The course ends with special topics in Perl of relevance to life science students interested in doing research in bioinformatics and computational biology.

Pre-requisites

You must have graduate standing in a Life Science department or GBCB. CS 5045 is a pre-requisite for this course. Please talk to me if you have not taken CS5045. You cannot use this course to obtain CS major or minor credit. The course is not open to students with graduate standing in the CS programme.

Textbooks

Required

- *Mastering Perl for Bioinformatics*, James Tisdall, O'Reilly & Associates, 2003.

Recommended

- *Object Oriented Perl*, Damien Conway, Manning Publications Co., 2000.

Useful

- *Perl Best Practices*, Damian Conway, O'Reilly & Associates, 2005.

- *Programming Perl*, Larry Wall, Tom Christiansen, and Jon Orwant, third edition, O'Reilly & Associates, 2001.

- *Perl Cookbook*, Tom Christiansen and Nathan Torkington, second edition, O'Reilly & Associates, 2003.

Grading Policy

Grading for the course is based on homeworks, two mid-terms and a final project.

Homework assignments: 10	30%
Midterm exam: February 22, in class	20%
Midterm exam: April 5, in class	20%
Final project: due May 8, 5PM	30%

A typical homework assignment consists of two to four programming problems or exercises, distributed in class or posted on the course web site. You must submit homework before the beginning of class on the due date. **I will not accept any late homework, which means homework submitted after the class starts.**

Ethics

The Honor Code applies. You must submit only your own work. Students may solicit help only from me.

Announcement

If any student needs special accommodations because of a disability, please contact me during the first week of classes.

Intended Topics

This schedule is subject to change. Please consult the course web page for updated schedules.

MPB refers to *Mastering Perl for Bioinformatics.*

Week	Topic	Chapter
1	Perl background; Packages and modules	Chapter 1, MPB
2	CPAN; Plain old documentation	Chapter 1, MPB,
3	References and data structures	Chapter 2, MPB
4,5	Two-dimensional data structures	
6	Review, Midterm 1	
7	Intro to OOP, Classes	Chapter 3, MPB
8, 9	Gene expression data	
10	Interaction networks	
11	Review; Midterm 2	
12	Databases and SQL	Chapter 6, MPB
13	Web programming	Chapter 7, MPB
14, 15	To be decided	