Course objectives: The organizing question of this course is: how can we model how systems are evolving over time, and how can we use those models to computationally predict future behavior and to “predict” unobserved past behavior. Our main focus will be on applications to biological systems including viruses, other genomes, and — most prominently — the evolution of biological networks. We will also consider applications in non-biological areas.

Instructor: Carl Kingsford; carlk AT cs.umd.edu; Office hours: by appointment in CBCB 3113.

Meeting Time: Fridays, 9:00–11:30.

Prerequisites: No previous biological knowledge is assumed. A certain amount of mathematical maturity is required (that any CS Ph.D. student will likely have), but the class will generally be self-contained. The ability to program (in some language) will be assumed.

Grading: There will be several homework sets (20%), one or two in-class presentations per person (20%), a take-home final (20%), and a class project (40%).

Textbook: We will cover several chapters in the textbook Evolutionary Dynamics by Martin Nowak. Much additional material will come from recent papers.

Credit: This course is not a core Ph.D. or M.S. course, and it does not count towards MS Comps. This is a lecture / seminar course about recent research in the field.

Web page: http://www.cs.umd.edu/class/spring2011/cmsc858m/

Homework policies:

- Written problem sets are due at the start of class. No late homework will be accepted — turn in what you have completed. If you will miss class, turn in the homework early.
- Answers to homework problems should be written concisely and clearly. Messy or poorly written homeworks will not be graded. Typesetting homeworks with LaTeX is encouraged.
- Homework problems that ask for an algorithm should present: a clear English description or pseudocode, a proof that the algorithm is correct, and an analysis of the running time.
- Graded homeworks should be picked up in class; if you miss the class when the homework is returned, please pick it up during office hours.
- Regrade requests should be made in writing within 1 week of the homework being returned.
- You may discuss the problems with classmates. You must list the names of the class members with whom you worked at the top of your homework. You must write up your own solution independently!
Class Project: You will complete a class project on a topic of your choosing (but approved by the instructor). Projects should be worked on in groups of 1 – 4 people (assuming ∼ 20 people remain in the class; if fewer, then groups of 3 or 4 may not be allowed). More details about the project will be given in a few weeks. The project consists of the following: a project proposal (due mid-semester; 1-2 paragraphs describing the plan for the project); a project presentation (∼ 10-minute “conference” talk on your project); a project write-up describing the project (∼ 5 pages).

Final exam: The take-home final exam must be done independently, without help or discussion with your classmates. The final exam will be due at the end of the university-assigned final exam time for this class. No extensions to the final exam deadline will be given.

Excused absences: Students claiming an excused absence must apply in writing and furnish documentary support (such as from a health care professional who treated the student) for any assertion that the absence qualifies as an excused absence. The support should explicitly indicate the dates or times the student was incapacitated due to illness. Self-documentation of illness is not sufficient to excuse the absence. Absences for religious observances must be submitted in writing to the instructor within two weeks of the start of the semester. The instructor is not under obligation to offer a substitute assignment or to give a student a make-up assessment unless the failure to perform was due to an excused absence. An excused absence for an individual typically does not translate into an extension for team deliverables on a project.

Academic accommodations: Any student eligible for and requesting reasonable academic accommodations due to a disability is requested to provide, to the instructor in office hours, a letter of accommodation from the Office of Disability Support Services (DSS) within the first two weeks of the semester.

Academic honesty: All class work should be done independently unless explicitly indicated on the assignment handout. You may discuss homework problems with classmates, but must write your solution by yourself. If you do discuss assignments with other classmates, you must supply their names at the top of your homework / source code. No excuses will be accepted for copying others work (from the current or past semesters), and violations will be dealt with harshly. (Getting a bad grade is much preferable to cheating.)

To quote the honor council: “The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit http://www.shc.umd.edu.”

Snow plan: If the University closes or delays opening to 10:45 or later, class is canceled. If opening is delayed to before 10:45, we will start 5 minutes after the university opening time. If more than 1 class is canceled due to snow, we may arrange a make-up meeting or assignment.