## Mathematical Modeling Syllabus, Fall 2016

- INSTRUCTOR: Dr. Hundley
  - OFFICE: Olin 222

OFFICE HOURS: 2PM on Mon, Thur. Fridays by appt.

The rule of thumb for office hours: If my door is open (and no one else is in my office), then feel free to drop by with questions. If my door is closed, that means that I'm working on something with a deadline- Please interrupt me then only if it is something important. Feel free to drop me an email anytime- I will probably respond to that faster than a voice message.

OFFICE PHONE: 527-5151

EMAIL: hundledr@whitman.edu

Class Webpage: http://people.whitman.edu/~hundledr/courses/M350.html

- **Text:** "Introduction to Empirical Modeling", in progress. The course notes will be distributed as we go, and are available on our class website (as they are distributed) or on CLEo.
- **Technology:** We'll be using Matlab extensively. We'll have some sporadic "Lab Days" where we'll meet in the computer lab to talk about Matlab specifics.
- Grading Criteria.
  - HOMEWORK/LAB WORK:

Homework and lab work is extremely important for the class, and will be assigned daily and collected weekly. You are expected to produce your own solutions to all homework problems! There may be occasions when we do "group work", and even in those cases, each student should turn in their own copy of the work.

We'll discuss turning in solutions later (sometimes this can be done electronically). Collectively, homework will account for 25% of the overall grade.

– EXAMS:

We will have two midterms, one during week 5 (Friday, Sep 30), one at week 11 (Tuesday, Nov 11) and a final exam. They will all be weighted equally, and will take 75% of the overall grade. Some of these may have a take home (Matlab) component.

GRADING: Grading is done on a standard scale:

90-100%=A, 80-89%=B, 70-79%=C, 60-69%=D, 59 and below=F

I will use the plus/minus grading only sparingly in those borderline cases.

• Help! I encourage you to come see me. If you can't make it during office hours, either email me if you have short questions, or make an appointment.

- Academic Honesty. Academic standards will be *strictly* adhered to as outlined in the College's policies. This means that cheating will not be tolerated. Looking at another student's exam or quiz (whether or not you mean to copy answers) while taking it will be considered cheating. *Please don't test this policy!* Students caught cheating for the first time will fail the exam or quiz during which the cheating took place, and the Dean of Students will be notified. Continuation of this behavior will lead to an automatic failing grade for the course, and may include other administrative action.
- If you have a learning disability, please let me know as soon as possible so that we can make alternative assessment methods. Please do not wait until the day of the exam!

## • General Discussion of Topics

Mathematical modeling is the process by which we translate some physical process into mathematical statements. There are several ways of doing this- Some modeling classes are mostly statistics, some are mostly differential equations (or partial differential equations), and still others are physics-based.

The first portion of the course will be some review and will focus on models built from theory. As such, we will stick primarily with systems of differential equations, then we will see what happens when time goes from being continuous to being discrete.

Next, we go to some simple statistical models, where we look at the n armed bandit, learn Matlab, then we'll look at "genetic algorithms".

We then go back into linear algebra, discuss some topics from statistics, and we'll look at some basic face recognition algorithms.

Once we've looked at building linear functions, we move to general nonlinear functions. We'll select from topics in Data Clustering, and Neural Networks.