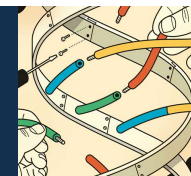


Molecular Synthetic Biology

Syllabus for BME 598/494 – Spring 2014



Course Information

Professor Dr. Karmella Haynes
Office: ISTB4, 273
Phone: 480-965-4636
E-mail: karmella.haynes@asu.edu

Office hours By appointment only

Classroom **ECG G140**

Schedule Tues, Thurs, 10:30 – 11:45 am

Molecular Synthetic Biology will focus on **molecular biology** and **empirical data collection**, and their **relationship with mathematical models**. Familiarity with molecular biology (DNA, RNA, & proteins), calculus, and basic engineering language are strongly recommended. **BME 598** assignments will culminate as a design project proposal to support Ph.D.-level training. **BME 494** assignments will culminate as a Wiki web page to present your design/ test/ build process.

Overview

The field of **synthetic biology** is based on the premise that living systems are modular, and thus, able to be engineered. This idea has spurred a new movement and has made a big impact on application-driven molecular biology.

Unit 1: DESIGN

We will review how engineering concepts are integrated into biology. You will design a living, self-replicating toggle switch “device” as the basis for a final project proposal/ report.

Unit 2: BUILD

You will learn techniques for creating synthetic organisms for useful applications. You will complete a strategy for building your toggle switch system.

Unit 3: TEST

You will learn experimental and mathematical modeling techniques for testing the function of living synthetic devices. You will propose assays to validate your new system.

Course Materials

Reading: reading materials will be posted on Blackboard

Hardware: laptop computer is strongly recommended

Computer software: Safari internet browser, Microsoft Office, Microsoft Excel, MATLAB, ImageJ

Key Calendar Dates

Session C: 15 weeks

1/14 First class
1/21 No class
2/11 Unit 1 Exam (due 2/18)
3/11 No class (Spring break)
3/13 No class (Spring break)
3/20 Unit 2 Exam (due 3/25)
4/24 Unit 3 Exam (due 4/29)
5/8 Final projects due

A complete daily schedule & policies will be posted online.

BME 598 Assignments:

Problem Sets - 2/Unit, 6 total – 12%
Article Summaries - 1/Unit, 3 total – 15%
Proposal Drafts - 1/Unit, 3 total – 18%
Exams - 1/Unit, 3 total – 30%
Final – 25%. Finished project proposal

BME 494 Assignments:

Graded Participation - 2/Unit, 6 total – 30%
Discussion Notes - 1/Unit, 3 total – 15%
Presentations - 1/Unit, 3 total – 18%
Exams - 1/Unit, 3 total – 30%
Final – 25%. Finished project proposal

Policies - Only 2 make-up assignments will be allowed. Exams can be re-scheduled, but only prior to the **assignment** date (e.g., 9/24), and must be submitted up to 1 week after the original **due** date (e.g., 9/26).

Grading Scale

100..97 ..94 ..90 ..87 ..84 ..80 ..77 ..74 ..70 ..67 ..64 ..60 <60
A+ A A- B+ B B- C+ C C- D+ D D- E