

Introduction to Synthetic Biology - Syllabus

BME 494/598 – Spring 2013

Course Information

Professor Dr. Karmella Haynes
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Classroom ECG 237
Dates & time M, W, 3:00 pm – 4:15 pm

TA help sessions Schedule will be posted on Blackboard

Introduction to Synthetic Biology is a transitional course that is designed to guide single-discipline students in biology, math, and engineering toward multidisciplinary thinking and problem-solving. The platform for this transition will be the exciting new engineering field of synthetic biology. Emphasis will be placed on using biological components to build useful, reliable functions.

Overview

Unit 1: DESIGN

We will review engineering concepts that are central to synthetic biology. You will organize into teams and practice efficient, collaborative, multidisciplinary design. Your team will design a living, self-replicating toggle switch “device.”

Unit 2: BUILD

You will be introduced to tools and techniques (e.g. manipulating DNA) for creating synthetic organisms for useful applications. Your team will present a strategy for building the toggle switch cell.

Unit 3: TEST

You will learn experimental and mathematical modeling techniques for testing the function of living synthetic devices. Your team will create a Wiki web page to present your design/ test/ build process.

Course Materials

Laptop computer
Slide presentation software (e.g., PowerPoint)
Open Wetware account (free)
MATLAB
ImageJ
No textbook - Reading materials will be posted on Blackboard

Key Calendar Dates

Session C: 15 weeks

M 1/7 First day of class
M 1/21 No class (MLK Day)
W 2/6 Unit 1 Exam (due 2/11)
M 3/11 No class (Spring break)
M 3/13 No class (Spring break)
W 3/20 Unit 2 Exam (due 3/25)
W 4/24 Unit 3 Exam (due 12/5)
12/19 Final Project (finals week)

A complete lecture/ assignment schedule will be posted on Blackboard.

Assignments:

In-class Exercises – 2/Unit, 6 total – 30%

Solve challenges using tools for synthetic biology

Exams – 1/Unit, 3 total – 30%

Take-home essay-style exams; research article comprehension

Presentations – 1/Unit, 6 total – 30%

Slide presentation. PowerPoint is recommended.

Final Project – 10%

Team project Wiki web page

Policies: Exams, -10% per 24 late. Excused absence is required to reschedule an exam. Make-up assignments for missed in-class exercises: given/ scored at the professor's discretion. Presentation absentees, -20% from individual score.

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