BIOL-GA1052 Frontiers in Microbiology: Principles of Genetic Circuit Design

Instructor:
Enrique Rojas

Course Description:
This course will examine the principles of genetic circuit design in microbes by comparing a variety of naturally occurring genetic circuits that perform various functions (logic gates, oscillators, switches, etc.) to engineered, synthetic circuits that perform similar functions. Coursework will include a review of gene regulation, reading of the primary literature concerning natural and synthetic genetic circuits, and mathematical/computational modeling of simple genetic circuits.

Pre-requisites:
Molecular and Cell Biology II (BIOL-UA 22)
College-level Calculus

Textbook and Required Materials:
Weekly class readings

Grading:
Problem sets 30%
Participation 30%
Final Exam 25%
Midterm 10%
Quizzes 5%

Topics:
Introductory level coding in MATLAB
Gene regulation
Natural genetic circuits
Synthetic genetic circuits
Mathematical/computational modeling of simple genetic circuits