MATHEMATICS AND BIOLOGY

MATH-UA 255 and BIOL-UA 255

Syllabus

Professors Daniel Tranchina

Fall 2020

Required Textbook

Hoppensteadt, F. and Peskin, C.S. (2002), Modeling and Simulation in the Life Sciences, 2nd ed., Springer. Available online (pdf) through NYU Library Springer Link

Prerequisites

Calculus I and Introductory Biology

Week 1

The Heart and Circulation

Week 2

The Heart and Circulation

Week 3

The Heart and Circulation

Week 4

Gas Exchange in the Lungs

Week 5

Gas Exchange in the Lungs

Week 6

Control of Cell Volume and Electrical Properties of Cell Membranes

Week 7

Control of Cell Volume and Electrical Properties of Cell Membranes

Week 8

Control of Cell Volume and Electrical Properties of Cell Membranes

Week 9

The Renal Countercurrent Mechanism

Week 10

The Renal Countercurrent Mechanism

Week 11

The Renal Countercurrent Mechanism

Week 12

Muscle Mechanics

Thanksgiving

Week 13

Muscle Mechanics

5.2 Crossbridge Dynamics 173

Week 14

Epidemiology

Epidemics (Lecture notes to be distributed)

Endemics (Lecture notes to be distributed)

Week 15

Epidemiology

Endemics (continued)

Discussion of final exam questions

Closing remarks

Course Grades

Course grades are based on graded homework assignments, midterm and final examinations. Each accounts for one-third of the overall grade.

Office Hours

Zoom sessions, TBA

Appointments are welcome.