

Syllabus for MTH 1251

Instructor: Thao Tran (email: tran.thao1@neu.edu)

Office: 519 Lake Hall **Office Hours:** Wed 12-1:30 pm; Thurs 2:45-4:15 pm; by appointment (email me)

Text: Goldstein, Lay & Schneider, *Calculus and Its Applications*, 11th edition

Course Description:

MTH U 1251 is the first semester of the two semester Calculus, Differential Equations and Linear Algebra Sequence for Biology Majors. The course will cover the first four or five chapters of the “text” roughly (and I do mean roughly) as a (re)introduction to Differential Calculus, in order to get quickly into Differential Equations commonly used by biologists, which form the main body of the course. This is a totally innovative “Mathematics for Biologists” course, which explains the use of quotes around the word text. There just is no book yet doing what we want to do at the level we need.

Prerequisites:

YOU MUST KNOW HIGH SCHOOL ALGEBRA COLD! If you are weak in this area you'll be better off in Math 1241 (Calculus 1). If you have had no calculus at all and feel unsure about your math skills you you'll be better off in Math 1120 (Precalculus).

Grading: Quizzes 50%, Final 50%

Homework: You're old enough to do this without my collecting it and checking up on you. You are responsible for having done the problems at the end of the section discussed in last class, even if I don't specifically assign them. Discussion of the homework will form the first part of the class.

Quizzes: There will be no make-ups. Excuses only for documented, severe medical problems. There will be no make-ups. Quizzes will be every other week or so.

Class participation: Encouraged but not required. Don't feel bad about coming in late, just try not to disrupt the class. If for some reason you must leave early see me before class, no other early departures will be tolerated with the exception of severe medical problems. All cell-phones must be turned off! Points will be deducted for each time your phone rings in class.

Tutoring (provisional schedule):

Math. Dept: 540B Nightingale Hall starting Sept 18

M Tue W 10:00 - 9:00; Th 10:00 - 6:00; F 10:00 - 1:00

Calculators: A scientific calculator (one with “sin” and “cos”) is required. A graphing calculator is useful but not required.

Additional Notes:

- It is your responsibility to be aware of any changes the instructor may make to the syllabus as they are announced in class. Students are responsible for all information given when they are absent.
- If you have a concern about the course or the instructor that is not or cannot be resolved by speaking with the instructor, the next step is to speak with the course coordinator, S. Blank (blank@neu.edu). If the course coordinator does not settle the matter, contact Professor S. Jekel (Undergraduate Advisor), 525LA, x5639, jekel@neu.edu.
- It is University policy that no grade, including an incomplete, can be changed after one year. Exceptions must be authorized by the Academic Standing Committee.
- **All students without legitimate conflicts (approved by the instructor) will take the final exam at the scheduled time. Do not make travel plans that conflict with the final exam. Go to: <http://www.registrar.neu.edu/finexsched.html> to see the dates of your final exam.**

Course Outline

Differential Calculus

Infinity and Beyond

Standard Parts

Smooth Graphs

The derivative

The Rules of Differentiation

Second Derivatives

Curve Plotting

The Function That is Its Own Derivative

Exponentials and Logarithms

Pharmacokinetics

How to use semilog graph paper

Zero-order and first-order processes

Processes tending toward equilibrium

**Bi-exponential processes*

**"Peeling" Data*

Biological Half-life

Differential Equations

First steps

Homogeneous Linear Equations with Constant Coefficients

First Order Linear Non-homogeneous Differential

Equations with Constant Coefficients

Non-homogeneous Linear Equations with Constant Coefficients I

(particular solutions)

Non-homogeneous Linear Equations with Constant Coefficients II

(general solution)

Deeper into non-homogeneous equations

Systems of differential equations

Compartmental Problems

Non-zero initial concentration

Two compartment series dilution

Diffusion between compartments

***Tracer experiments**

Quantification of radioactivity

Inflow and outflow through cell membranes

Trigonometric Functions

Radian Measure

Sine and Cosine

Calculus of trig functions

More Differential Equations

Complex Numbers

Complex Roots of Characteristic Polynomials

Nonhomogeneous Diff. Eq with Trigonometric Right Hand Side

*optional – if time permits