MTH U151
Mathematics for the Biological Sciences
1st Semester
Outline

Differential Calculus

Infinity and Infintesimals
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