

## DEPARTMENT OF MATHEMATICS SYLLABUS

Course # & Name: MAT 17B "Calculus for Biology and Medicine"

Recommended Text(s) & Price: Neuhauser's "Calculus for Biology and Medicine" 2<sup>nd</sup> Edition (\$67.00 - \$133.00)

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Lecture(s)	Sections	Comments/Topics
1	6.1	Definite Integral / Introduction
2	6.1	Definite Integral / Examples
3	6.2	Fundamental Theorem of Calculus
4	6.3	Geometric application of integrals / Easy on definition and theorems; emphasis on examples. Examples: sedimentation (schlieren optics and concentrations from area under $dc/dx$ curve). Energy from area under force-distance curve.
5	7.1	Substitution rule
6	7.2	Integration by parts
7	7.4	Improper integrals
8	7.5	Numerical integration / Theory
9	7.5	Numerical integration and convolution integrals / Practice, use Matlab, computer; mention tables of integrals (7.6)
10	7.7	Taylor approximation / Theory
11	7.7	Taylor approximation / Examples
12	8.1	Solving differential equations
13	8.2	Equilibria and stability
14		Numerical solution of ODEs / This lecture is web-based; computer and Matlab are to be used

15		More examples of ODEs / This lecture is web-based; computer and Matlab are to be used
16	9.1	Solving linear systems of equations
17	9.2	Matrices
18	9.2	Matrices / Continued
19	9.3	Eigenvalues and eigenvectors / Theory
20	9.3	Eigenvalues and eigenvectors / Examples; interference/diffraction; some are web-based; computer and Matlab are to be used
21	9.4	Elements of analytical geometry
22	10.1, 2	Functions of a few variables / Limits, continuity – very briefly
23	10.3	Partial derivatives
24	10.4	Geometric applications, linearization / Differentiability – very briefly
25	10.5	Directional derivatives and gradient vector / Chain rule – very briefly
26	10.6	Maxima and minima, level curves
27	10.6	Diffusion equation

### Additional Notes:

This course covers Chapters 6 – 10: Integration, Applications of integrals in biology; differential equations and their applications in biology; Linear algebra; Multivariable calculus; elements of discrete math (matrices).