Salisbury University Department of Mathematical Sciences

MATH 198 : Calculus I For Biology and Medicine
Syllabus (Tentative)

Description: Introduction to analytic geometry, limits, continuity, derivatives of elementary functions, applications of derivatives and antiderivatives, integrals, Reimann sums, Fundamental Theorem of Calculus in a biological context. 4 Hours Credit: Meets four hours per week. Meets General Education IVB or IVC.

Prerequisites: C or better in MATH 140 or equivalent.

Credit: Credit may only be received for one of MATH 198 and MATH 201

Intended Audience: Students wanting an intermediate Calculus course that prepares them for further study in biology and medicine.

Objective: To better understand the mathematics; which is the foundation for modern science, with emphasis on applications, approximations, and the role of proof. To develop higher level thinking skills; in particular, to practice drawing on previous knowledge to approach new problems.

The Calculus ushered in modern science and challenged the vision of poets, theologians and philosophers. It serves as the basis for much of today's science and technology.

Textbooks: *Calculus for Biology and Medicine*, by Neuhauser; 3rd edition, Pearson, 2011. ISBN 978-0321644688.

Technology: Mathematica (computer software available in campus labs).

Topic	Weeks
Models from biology and medicine	.5
Introduction to basic lung and cardiac models	
Limits and Continuity (Chapter 3)	2.5
Tangent lines; velocity; definition of the derivative; graphical, and numerical approaches to limits; properties of limits; limits involving infinity; the Intermediate Value Theorem;	
Differentiation (Chapter 4)	4
Differentiation of algebraic and transcendental functions; the Chain rule; implicit differentiation; rates of change; higher order derivatives including acceleration; linear approximation; and finding derivatives using Maple. Exponential Growth and Decay Models, Discrete Logistic Equation, Ricker's curve,	
Applications of Differentiation (Chapter 5)	4
Finding and classifying extreme values; the Mean Value Theorem; the Extreme Value Theorem; slope, concavity and points of inflection; L'Hôpital's Rule; optimization; and antiderivatives.	
Integration (Chapter 6)	2
The definite integral, Riemann sums, and the Fundamental Theorem of Calculus	
Testing and Review	1
Total	**14**

Evaluation

Homework, Lab work, quizzes	20 – 40%
In-class examinations	40 – 60%
Comprehensive Final Exam	20 – 40%

- Free tutoring is available for this course in the Spring and Fall semesters.

- Clear descriptions of thought processes, evidence of critical thinking, and effective communication must be demonstrated in written work.
- **Writing Across the Curriculum:** Students will be expected to communicate mathematics and mathematical ideas effectively in speech and writing. At the University Writing Center, trained consultants are ready to help you at any stage of the writing process. In addition to the important writing instruction that occurs in the classroom and during professors' office hours, the Center offers another site for learning about writing. **All students are encouraged to make use of these important services.**
- **NOTE:** Once a student has received credit, including transfer credit, for a course, credit may not be received for any course with material that is equivalent to it or is a prerequisite for it.