Salisbury University Department of Mathematical Sciences

MATH 105 :   Liberal Arts Mathematics: Math in a Changing World
Syllabus (Tentative)

Description: Study of the beauty and structure of mathematics, with emphasis on quantitative and analytical reasoning skills. Various areas of mathematics or its applications will be used as a vehicle for this study. Designed for students whose major area of study does not have specific requirements in mathematics. 4 Hours Credit: Meets 4 hours per week. Meets General Education IVB or IVC.

Prerequisites: Three years of high school mathematics including geometry or college-level intermediate algebra.

Intended Audience: Liberal Arts majors requiring a mathematics course to satisfy a Gen-Ed requirement.

Objective: Introduce applications of math, especially in biology, money, and ecology, where important things change over time. Students will learn how to formulate, analyze, test, and interpret mathematical models that will solve important, practical problems.

Textbooks: *Elementary Mathematical Modeling: A Dynamic Approach*, James Sandefur, Thomson/Brooks-Cole, 2003. ISBN-13: 978-0534378035

Technology: A calculator is required, but students may not use cell phone calculators on exams. Students will also use Microsoft Excel, which is available in campus computer labs.

Topic	Weeks
INTRODUCTION TO MODELING	2
Dynamical Systems. Examples of Modeling in Biology, Finance, Ecology. Affine Dynamical Systems. Parameters.	
ANALYSIS OF DYNAMICAL SYSTEMS	2
Biology & Ecology Applications. Equilibrium. Stability. Ratios and Proportional Change. Stable Distributions. Cycles.	
FUNCTION APPROACH	2
Introduction to Function Approach. Linear Functions. More Biology & Chemistry Applications. Algebraic Analysis.	
HIGHER ORDER DYNAMICAL SYSTEMS	2
Introduction. Counting Sets. Analyzing Higher Order Dynamical Systems. An Economic Model. Controlling an Economy. Algebraic Analysis of Higher Order Systems.	
NONLINEAR DYNAMICAL SYSTEMS	1
Introduction. The Dynamics of Alcohol Metabolism. Stability. Web Analysis.	
POPULATION DYNAMICS	2
Introduction to Population Growth. The Logistic Model for Population Growth. Nonlinear Growth Rates. Graphical Approach to Harvesting. Economics of Harvesting.	
GENETICS	2
Introduction to Population Genetics. Basics of Genetics. Mutation. Selection.	
Exams	1
Total	**14**

Evaluation

Homework	$10 - 15\%$
Tests	$30 - 40\%$
Project	$15 - 25\%$
Final Exam	$25 - 45\%$

- 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.