**Master Syllabus**

**MTH 103 – Finite Mathematics**

**University Studies Cluster 1D – Mathematics**

This master syllabus serves as a guide and standard for all instructors teaching this course as part of the University Studies program. Individual instructors have full academic freedom in teaching their courses but agree to focus on the outcomes listed below, cover the identified material, use these or comparable assignments as part of the course work, and make available the agreed-upon artifacts for assessment of learning outcomes.

**Course Overview**

Math 103 is the first semester math course for all majors in the Charlton College of Business at UMass Dartmouth. The goal of this course is to provide mathematical analysis techniques used in today’s global business community. Topics include a review of linear, quadratic and exponential functions, systems of linear equations and inequalities, linear programming, simple interest and compound interest, annuities, loans and bonds, set theory, counting principles, basic probability rules, and a brief introduction to descriptive statistics. After this course, students will be able to represent and solve business and economics problems using systems of linear equations and inequalities; apply the basic techniques of linear programming to solve maximum or minimum values of linear functions of two variables subject to a number of linear constraints (linear inequalities); determine the compound interest, present and future values, and payments for annuities and sinking funds; solve problems using fundamental concepts and techniques of sets and counting and probability and statistics. This course meets for either three 50-minute periods or two 75-minute periods per week with an emphasis on maintaining an interactive learning environment. There will be frequent written and/or online homework and several exams during the semester. Some instructors may also give quizzes. The graphing calculator will be used to help students visualize and solve problems. Video examples, course website, office hours, review classes, and other tutorial resources will help prepare students for the exams.

**Learning Outcomes:**

Learning outcomes specific to this course:

 After completing this course, students will be able to:

1. Graph linear functions, write their equations, and interpret slopes and intercepts.

2. Represent and solve business and economics problems using elementary functions (linear, quadratic, and exponential functions).

3. Solve systems of linear equations and inequalities in two variables both algebraically and graphically.

4. Solve two-variable linear programming problems graphically by graphing the systems of linear inequalities and determining the feasible region, vertices (corner points), and maximum or minimum values of linear expressions.

5. Calculate the simple and compound interest and solve time value of money problems.

1. Determine the present and future values and payments of annuities and sinking funds.
2. Apply sets and set operations, Venn diagrams, the addition and multiplication principles, and permutations and combinations to solve problems involving cardinality or counting.
3. Recognize and apply the concepts of simple events, compound events, independence, and conditional probability.
4. Calculate probabilities using counting techniques and other basic probability rules.
5. Calculate the descriptive statistics (mean, median, variance, standard derivation).
6. Develop critical thinking and problem-solving skills though class activities, team work, and using the tools (such as the TI 83/84+).
7. Develop good oral and written communication skills.

 Learning outcomes with respect to Cluster 1D – Mathematics

1. Recognize when to apply mathematical concepts and methods to specific problems.
2. Manipulate mathematical expressions to solve for particular variables.
3. Draw conclusions from quantitative information and communicate these conclusions verbally and graphically.
4. Implement mathematical models to obtain accurate or approximate solutions using appropriate tools.
5. Apply mathematical techniques to social and scientific problems.

**Textbook**

 Waner and Costenoble, *Finite Mathematics, 5th ed.,* Custom Edition for UMASS Dartmouth,

 Belmont, CA: Thomson/Brooks Cole, 2010.

**Assignments**

**Homework Assignments**: Timely submission of assigned homework in the requested format will help students learn and apply the concepts taught in the course.

**Quizze**s: may be given at the instructor’s discretion.

**Tests**: There are at least three in-class tests which will ask students to apply knowledge and skills from the corresponding chapters to solve problems.The following **Test 2 for Chapter 2 & 4** is designed to assess student mastery of the computational and quantitative reasoning skills presented in those chapters and their ability to apply those skills to solve linear programming problems. Students are required to show complete work to support their final answer; calculators are allowed, and one formula sheet may also be used at the discretion of the instructor. The following map indicates which problems are associated with which of the five Gen Ed learning outcomes in mathematics. Suggested solutions and partial points for problem 1 are attached. The degree ofsuccess achieved on each learning outcome will be measured by the average percentage correct.

|  |  |  |
| --- | --- | --- |
| **Gen Ed Outcome** | **Problems** | **Points (Total 50)**  |
| Recognize when to apply mathematical concepts and methods to specific problems. |  1a), 1c)-1e) |  6 |
| Manipulate mathematical expressions to solve for particular variables. |  1b) |  2 |
| Draw conclusions from quantitative information and communicate these conclusions verbally and graphically. |  2 |  14 |
| Implement mathematical models to obtain accurate or approximate solutions using appropriate tools. |  3 |  8 |
| Apply mathematical techniques to social and scientific problems. |  4 |  20 |

**Final Exam:** The final exam will be cumulative, but weigh more heavily on the latter material.

**Course Outline**

Week 1 Chapter 1 Functions from the Numerical, Algebraic, and Graphical Viewpoints

Week 2 Chapter 1 Linear Functions and Linear Models, Linear Regression

Week 3 Chapter 2 Systems of Linear Equations in Two Unknowns

Week 4-5 Chapter 4 Graphing Linear Inequalities, Linear Programming in Two Variables

Week 5-6 Chapter 5 Linear Programming (Continued), Simple Interest

Week 6-7 Chapter 5 Compound Interest, Annuities, Loans, and Bonds

Week 8 Chapter 6 Sets Operations, The Addition and Multiplication Principles

Week 9-10 Chapter 6 Permutation and Combinations, Sample Spaces and Events
Week 10-11 Chapter 7 Estimated and Theoretical Probability

Week 11-12 Chapter 7 Probability Distribution, Probability and Counting Techniques
Week 12-13 Chapter 7 Conditional Probability, Independence

Week 13 Chapter 8 \* Selected Topics: Random Variables (such as Binomial) and Distributions

Week 14 Chapter 8 Measures of Central Tendency, \* (optional) Measures of Dispersion

Week 15 Review