William Paterson University of New Jersey
College of Science and Health
Department of Mathematics
Course Syllabus

1. <u>Professor:</u> Dr. David Miller

2. <u>Contact information:</u> millerd@wpunj.edu. 973-720-3386. Office: Science East 3048

3. <u>Title of Course, Course Number and Credits:</u> **Business Math – Math1170 080   3 credits**
   Winter Semester, 2022, January 3rd-January 21st, 2022

4. <u>Description of Course:</u> A study of algebraic and transcendental functions, including their properties and graphs with a focus on applications to business. Topics include algebraic fundamentals, equations and inequalities, polynomial functions and graphs, exponential and logarithmic functions and mathematics of finance.

5. <u>Course Prerequisites:</u> Successful completion of Math Basic Skills Requirements.

6. <u>Course Objectives:</u>   Students majoring in business and related fields are provided with a study of mathematical fundamentals necessary for developing quantitative thinking and basic problem solving skills. This includes the creation and evaluation of linear and nonlinear mathematical models and interpretation of results.

7. <u>Student Learning Outcomes.</u>

> This is an approved UCC – 3E course.

<u>UCC Area SLOs</u> students will meet upon the completion of this course.

<u>Area Three:</u> Ways of Knowing, Quantitative Thinking SLOS

Students will be able to:

Interpret and evaluate quantitative or symbolic models such as graphs, tables, units of measurement, and distributions.

In the Functions and Graphs section as well as in the Exponential and Logarithmic Functions section, students learn how mathematical functions can be expressed algebraically, graphically and numerically (via tables). They investigate methods for determining which type of function model is most appropriate given certain data or a certain situation. The use of linear models (as in a cost function or supply and demand lines) is compared to the use of nonlinear models (quadratic models for profit analysis or exponential growth of investments). In the Mathematics of Finance section, students investigate modeling common financial situations using function models requiring properly expressed quantities in order to provide meaningful results.
(Also meets UCC Program SLOs 2,4 and 8)

Perform algebraic computations and obtain solutions using equations and formulas.

> In the Algebraic Fundamentals section, students explore computations involving exponents, polynomials, factoring and rational expressions. The study of Equations and Inequalities focuses on the different computational methods used in dealing with an equation versus an inequality. In solving systems of linear equations, students learn how structured techniques facilitate algebraic evaluations using large amounts of data. In the Mathematics of Finance section, commonly used financial formulas are derived, explained and employed to obtain solutions.
> (Also meets UCC Program SLOs 2,4 and 5)

Acquire the ability to use multiple approaches - numerical, graphical, symbolic, geometric and statistical - to solve problems.

> In the Functions and Graphs section as well as in the Exponential and Logarithmic Functions section, students study various representations of functions (algebraic, graphical and numerical) including each of their benefits in terms of calculations and interpretations of both data and results. For example, they see how an algebraic representation of a function can be computationally efficient but a graphical representation may be more informative. In the Equations and Inequalities section, students experience the connections between symbolic and graphical/geometric representations. For example, in solving systems of equations, students learn to relate the algebraic/symbolic solutions of a system to the geometrical representation of that particular system.
> (Also meets UCC Program SLOs 5 and 8)

Develop mathematical thinking and communication skills, including knowledge of a broad range of explanations and examples, good logical and quantitative reasoning skills, and facility in separating and reconnecting the component parts of concepts and methods.

> In the Equations and Inequalities section and again in the Functions and Graphs section, students use both linear and quadratic models to characterize and explain real-world occurrences and trends. They deal with cost and revenue analysis and supply and demand analysis in order to learn how to make logical decisions based on quantitative results. Then, in the Exponential and Logarithmic Functions section, students investigate situations in which those particular nonlinear functions are more appropriate for certain models. In the Mathematics of Finance section, students analyze different financial situations in order to determine which formulas are appropriate and how to translate the financial information into the quantities required by the formulas.
> (Also meets UCC Program SLOs 1 and 5)

<u>Other Course Specific SLOs</u> students will meet upon the completion of this course:
Students will be able to:

1. Implement standard mathematical techniques for solving equations, inequalities and systems of equations.
    (Meets UCC Program SLO 4)

2. Formulate linear and nonlinear models by translating real-world data (numerical, graphical and tabular) and situations into appropriate symbolic mathematics.
    (Meets UCC Program SLO 5)

3. Interpret linear and nonlinear models with an emphasis on graphical interpretations and logical conclusions.

4. Consider the appropriateness and effectiveness of various approaches to solving a problem, such as a graphical approach vs. an algebraic approach.
    (Meets UCC Program SLO 5)

5. Analyze different financial situations and choose from a number of mathematical finance formulas to calculate and interpret investment quantities.
    (Meets UCC Program SLOs 2 and 8)

6. Develop and enhance multi-step problem solving strategies involving the creation of a model, the mathematical solution process and the interpretation of results.
    (Meets UCC Program SLO 5)

8. <u>Topical Outline of the Course Content</u>:

I. Algebra Fundamentals   2 weeks
   - Real Numbers
   - Exponents and Radicals
   - Polynomials
   - Factoring
   - Rational Expressions

II. Equations and Inequalities   3 ½ weeks
   - Linear Equations and Inequalities
   - Applications of Linear Equations and Inequalities
   - Polynomial and Rational Equations and Inequalities
   - Applications of Polynomial and Rational Equations and Inequalities
   - Systems of Linear Equations
   - Applications of Systems of Linear Equations

III. Functions and Graphs   3 ½ weeks
   - Functions: Definition, Notation and Terminology

- Graphs of Functions
- Linear Functions and their Applications
- Quadratic Functions and their Applications
- Polynomial and Rational Functions

IV. Exponential and Logarithmic Functions   2 weeks
- Exponential Functions and Graphs
- Applications of Exponential Functions
- Logarithmic Functions and Graphs
- Applications of Logarithmic Functions

V. Mathematics of Finance   2 weeks
- Simple Interest
- Compound Interest
- Present and Future Value
- Annuities and Sinking Funds

9. <u>Textbook and myMathLab subscription</u>:
The textbook is: "Mathematics with Applications In the Management, Natural, and Social Sciences", 12th Edition
Margaret L. Lial, American River College, Thomas Hungerford, Saint Louis University, John P. Holcomb, Cleveland State University, Bernadette Mullins, Birmingham Southern College, ©2019 |Pearson

In addition to the textbook, you need to obtain access to the myLab homework system associated with the book. The campus bookstore is bundling an electronic version of the textbook along with myLab access. However these two products can be purchased either bundled or separately in a variety of formats from many other textbook suppliers or directly from the publisher, Pearson.

When you register for myLab, you should use the following Course code

miller51489

10. <u>GRADING AND EVALUATION</u>

All homework and assessments will be delivered through myMathLab.

There will be regular homework assignments throughout the semester.

There will also be two 75 minute tests, and a 150 minute final exam final exam.

The tests will be 20% of the grade each (40% total). The final exam will account for 40% of the grade. The entirety of all homework assignments will count for 20% of the grade