

# **KALAMAZOO VALLEY COMMUNITY COLLEGE**

## **MATH 114 MATHEMATICAL IDEAS**

### **COURSE DESCRIPTION**

This is a liberal arts mathematics course primarily intended for students who are not majoring in business or science. This course will investigate several topics found in traditional mathematics courses but the approach will be nontraditional, encompassing aspects of constructing knowledge and understanding through a cooperative learning environment of shared discourse and demonstration of thinking. Emphasis will be placed on developing quantitative literacy in the following content areas: problem solving, probability, statistics, finance, and geometry.

### **PREREQUISITES**

Minimum ACT Math Test score of 20 or COMPASS Algebra Test score of 34 or successful completion of MATH 096 (Beginning Algebra) is required.

### **TEXTBOOK**

We use a custom published version of *Mathematical Excursions* by Aufmann, Lockwood, Nation, and Clegg. The custom textbook includes a chapter on Descriptive Statistics from *A Mathematical View of our World* and comes bundled with Enhanced Webassign. A course supplement full of class activities, created to support mathematical modeling and critical thinking is also available for instructors to use.

### **STUDENT OUTCOMES FROM THE OFFICIAL SYLLABUS**

Upon successful completion of the course, the student will be able to:

- Engage in problem solving using a variety of strategies.
- Use inductive and deductive reasoning to formulate and test conjectures.
- Use basic probability counting techniques to solve application problems.
- Create an appropriate statistical display for a given set of data.
- Demonstrate statistical reasoning by interpreting the validity of statistical statements and displays as well as calculating and interpreting measures of center, spread, and position.
- Demonstrate financial reasoning by solving problems involving simple and compound interest, finance charges, monthly payments and pay-off amounts on consumer loans.
- Demonstrate geometric reasoning by solving problems involving area, perimeter, surface area, volume, and concepts of similarity.

**Course Objectives – Students completing Math 114 will be able to:**

**1. Comprehend concepts of problem solving.**

- 1.1 Predict the next term of a sequence using inductive reasoning.
- 1.2 Formulate and test conjectures using inductive and deductive reasoning.
- 1.3 Generate a counterexample to disprove a mathematical statement.
- 1.4 Identify and utilize patterns to find the  $n$ th term formula for a sequence.
- 1.5 Use Polya's problem solving strategy to solve problems.
- 1.6 Use a variety of strategies to solve problems including drawing a picture, using a variable, making a table or list, working backwards, and trial and error.
- 1.7 Use basic probability counting techniques to solve application problems.

**2. Comprehend geometric concepts.**

- 2.1 Use geometric concepts to solve problems.
- 2.2 Solve problems involving area, perimeter, surface area, and volume.
- 2.3 Use the appropriate unit of measurement when solving geometric problems.
- 2.4 Apply concepts of similarity to solve problems.

**3. Understand the process of statistical investigation.**

- 3.1 Create appropriate statistical displays for a given data set.
- 3.2 Interpret graphical representations of data such as histograms, stem-and-leaf plots, box-plots, and line graphs.
- 3.3 Interpret the validity of statistical statements and displays.
- 3.4 Calculate, interpret, and solve problems relating to measures of center, spread, and position.
- 3.5 Demonstrate alternative strategies for the calculation of the mean.

**4. Comprehend the mathematics of finance.**

- 4.1 Solve problems involving simple and compound interest.
- 4.2 Solve problems involving finance charges, APR, and interest on credit card bills.
- 4.3 Solve problems involving monthly payments and pay-off amounts on consumer loans.

**5. Demonstrate a positive attitude towards mathematics.**

- 5.1 Engage in collaborative group work and remain on-task.
- 5.2 Participate in whole class discussion.
- 5.3 Understand the application and usefulness of mathematics in their daily lives.
- 5.4 Exhibit respect for others.
- 5.5 Submit professional quality work.
- 5.6 Increase the ability to communicate and reason mathematically.