

Columbus State Community College
Mathematics Department

Course and Number: Conceptual Mathematics for Teachers II - MATH 1126

CREDITS: 5 **CLASS HOURS PER WEEK:** 5

PREREQUISITES: MATH 1125 with a grade of "C" or higher

DESCRIPTION OF COURSE (AS IT APPEARS IN THE COLLEGE CATALOG):

This course is a continuation of MATH 1125. It is designed as an in-depth study of the basic concepts of proportional reasoning, geometric proof, transformations, measurement, counting, probability, and problem solving as appropriate for primary and middle school teachers. Development of these concepts will be based on the current Common Core State Standards for Mathematics. Instruction will focus on the development of these concepts through demonstration, exploration, and discussion using hands-on manipulatives and appropriate technology.

GOALS OF THE COURSE:

To introduce the student to a deeper understanding of the concepts, methods and applications of proportional reasoning, geometry, measurement, counting, probability, and problem solving in the context of a primary and middle school teacher. Students should learn and develop an appreciation for mathematical constructs and algorithms and be familiar with a variety of ways to approach and illustrate problems involving proportional reasoning, geometry, measurement, counting, and probability.

LEARNING OUTCOMES:

- Persevere in problem solving while using a variety of problem-solving strategies.
- Construct viable arguments, express them orally and in writing, and critique the reasoning of others.
- Attend to precision in vocabulary, computation, and symbolization.
- Use proportional reasoning to solve a variety of problems
- Analyze and construct the graphs of functions and identify which are linear and which are not.
- Relate functions to proportional reasoning
- Classify basic geometric shapes in a variety of ways.
- Explore the meaning of measurement and be able to perform measurement conversions.
- Analyze plane figures and examine how to determine perimeters and areas in a variety of ways.
- Write proofs of geometric formulas for area.
- Analyze solids and examine how to determine volumes, surface area, nets, and the number of faces, edges, and vertices.
- Analyze transformations and relate them to congruency and similarity.
- Examine sampling and a variety of ways to display data and use data to make predictions.
- Discover the concepts of combinatorics and use these concepts to determine and interpret probabilities

OUTCOMES BASED ASSESSMENT OF STUDENT LEARNING:

For this course, students are expected to demonstrate the skills associated with the Institutional Learning Goals (ILG) identified below:

- Critical Thinking
- Communication Competence
- Quantitative Skills

In class students are assessed on their achievement of these outcomes. Names will not be used when reporting results. Outcomes-based assessment is used to improve instructional planning and design and the quality of student learning throughout the college.

TEXTBOOK, MANUALS, REFERENCES, OTHER READINGS, AND OTHER SUGGESTED MATERIALS:

Beckmann, S. (2018). Mathematics for Elementary Teachers with Activities (5th ed.), Boston: Pearson.

Ohio Department of Education (2017). Ohio's Learning Standards: Mathematics. Retrieved August 7, 2017, from

<http://education.ohio.gov/getattachment/Topics/Learning-in-Ohio/Mathematics/Ohio-s-Learning-Standards-in-Mathematics/MATH-Standards-2017.pdf.aspx>

Although not required, students may find the following to be useful:

Colored pencils	Ruler
Compass	Calculator
Protractor	

UNITS OF INSTRUCTION:

- Ratio and Proportional Relationships (Chapter 7)
- Functions (Chapter 9, sections 9.6 - 9.8)
- Geometric Shapes and Proofs (Chapter 10)
- Measurement (Chapter 11)
- Coordinate Proofs (Supplemental material)
- Area and Proof (Chapter 12)
- Solid Shapes and Volumes and Surface Area(Chapter 13)
- Transformations (Chapter 14 and supplementary material)
- Statistics (Chapter 15 and supplementary material)
- Combinatorics (supplementary material)
- Probability (Chapter 16 and supplementary material)

GENERAL INSTRUCTIONAL METHODS:

This course relies heavily on classroom activities and small and large group discussion. A minimal amount of lecture may also be used.

STANDARDS AND METHODS FOR EVALUATION:

Final Exam and Midterm Combined = 60% of course grade (midterm and final exam are 100% departmental)

Group Work = 15% of the final grade (graded with a predetermined rubric)

Weekly Learning Products = 15% of the final grade

Homework and Discussion = 10% of the final grade

Eliminate extra credit assignments or limit them to no more than 2% of the overall grade for the course.

GRADING SCALE:

Letter grades for the course will be awarded using the following scale:

≥ 90% - A 80-89% - B 70-79% - C 60-69% - D < 60% - E/EN

Course grades are NOT to be curved, skewed, or otherwise inflated.