Common Course Outline
MATH 132
Concepts of Mathematics II: Geometry and Measurement
4 Credits
Community College of Baltimore County

Description

MATH 132 – 4 credits – Concepts of Mathematics II: Geometry and Measurement
examines the concepts and principles of geometry; covers geometric vocabulary, concepts and skills in two and three dimensions, coordinate geometry, metric and non-metric geometry, and measurement.

4 Credits

Prerequisites: (MATH 083 or MATH 101) or sufficient placement test score; and ACLT 052 or ACLT 053.

Overall Course Objectives

Upon successfully completing this course students will be able to:

1. apply appropriate problem solving strategies, including the use of appropriate computer technology and calculators, to solve a variety of geometric problems (both standard and non-standard);
2. distinguish between two-dimensional geometric figures through notation, classifications, properties, and relationships with other figures;
3. distinguish between three-dimensional geometric figures through notation, classifications, properties, and relationships with other figures;
4. perform constructions and analyze both the constructions and the resulting figures, both manually and using appropriate computer technology;
5. analyze the various properties of shapes within a plane using transformations (translations, rotations, reflections) and symmetries;
6. use the concepts of magnification, similarity, and congruence to classify geometric figures;
7. create tessellations using both regular polygons and non-regular figures as well manually and using appropriate computer technology;
8. use both the customary (English) and metric systems in an appropriate manner to perform measurements (e.g. length, mass, capacity, temperature, time);
9. perform multistep conversions involving global currencies, as well as metric and customary measure units (distance, weight, volume, time, etc.) to solve real world application problems;
10. apply appropriate measurement formulas (i.e. perimeter, area, volume, etc.) and properly interpret the results;
11. use appropriate instruments to perform measurements (i.e. geoboards, rulers, etc.);
12. illustrate geometric concepts and interpret information from coordinate graphs;

13. relate the concepts discussed throughout the course to the physical world with an emphasis on the significance of geometry on culture and society (e.g., architecture, art, etc.);
14. examine the mathematical contributions made by people from diverse cultures throughout history, and their cultural, and social significance;
15. discuss the origin and development of fundamental geometric concepts, and their implications for the present and in the future of math and its related concepts;
16. write formal proofs for properties of geometric objects and constructions;
17. construct and articulate solutions to real world problems, including ethical considerations, using geometry to support the argument, and
18. find, use, evaluate and cite academic resources for conducting research in mathematics.

Major Topics

I. Introductory Geometry
   A. Definition of geometry
   B. Basic notions (point, line, plane, etc.)
II. Two-Dimensional Geometry
   A. Angles, lines and planes
   B. Polygons and circles
   C. Proofs regarding properties of two-dimensional figures
III. Three-Dimensional Geometry
   A. Lines and planes in space
   B. Polyhedra and spheres
   C. Cultural and artistic applications
IV. Coordinate Geometry
   A. Cartesian (rectangular) coordinate system
   B. Linear equations and related concepts
V. Transformational Geometry and Tessellations
   A. Translations, rotations, reflections, magnification
   B. Symmetries
   C. Tessellations
   D. Societal and cultural examples of tessellations and geometry
VI. Constructions and Similarity
   A. Congruence of figures
   B. Constructions involving two-dimensional figures
   C. Proofs regarding constructions
   D. Analysis of similar figures
   E. Proofs regarding similar figures
   F. Fractals
VII. Measurement
   A. Customary and metric units
   B. Perimeter, area, and volume
   C. Pythagorean Theorem

Course Requirements

Students will be given opportunities to collaborate via groupwork and/or oral presentation of problem solutions.

There will be multiple opportunities for the instructor to assess student progress through classwork and/or homework.

Multiple assignments wills infuse CCBC General Education Program objectives; at least one assignment worth a minimum of 10% of the total course grade will allow students to demonstrate at least 5 of the 7 General Education Program outcomes.

Grading: Grading procedures will be determined by the individual faculty member but will include the following:

1. A minimum three (3) written examinations (note: a portfolio packet may be submitted in place of one written exam) (80% applications based)
2. A separate cumulative final examination or comprehensive portfolio
3. At least three (3) written projects, two of which must include a research component
4. Oral presentation of problem solutions

Other Course Information

This course is an approved General Education course in the Mathematics category. Please refer to the current CCBC Catalog for General Education course criteria and outcomes.

Date revised: 5/17/19