MATH 132
Concepts of Mathematics II: Geometry and Measurement
4 Credits

Community College of Baltimore County
Common Course Outline

Description

MATH 132 – Concepts of Mathematics II: Geometry and Measurement: is a course that covers the concepts and principles of geometry taught in elementary education; students cover geometric vocabulary, concepts, and skills in two and three dimensions; coordinate geometry; metric and non-metric geometry; and measurement.

Pre-requisites: ESOL 052 and ESOL 054; MATH 083
Co-requisites: ACLT 053

Overall Course Objectives

Upon completion of this course, students will be able to:

1. apply appropriate problem-solving strategies, including the use of computers and calculators, to solve a variety of geometric problems (using both traditional and alternative algorithms);
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 straight edge and compass constructions manually and using computer technology;
5. analyze constructions and their resulting figures;
6. analyze the various properties of shapes within a plane using transformations (translations, rotations, reflections) and symmetries;
7. classify geometric figures using the concepts of magnification, similarity, and congruence;
8. create tessellations using both regular polygons and non-regular figures;
9. perform measurements (i.e., length, mass, capacity, temperature, time) using the customary (English) and metric systems in an appropriate manner;
10. apply appropriate measurement formulas (i.e., perimeter, area, volume, etc.);
11. interpret the results of applying appropriate measurement formulas (i.e., perimeter, area, volume, etc.);
12. perform measurements using appropriate instruments (i.e., geoboards, rulers, etc.);
13. illustrate geometric concepts using coordinate graphs;
14. interpret information from coordinate graphs;
15. relate the concepts discussed throughout the course to the students' physical surroundings;
16. construct ethical solutions to real world problems using mathematical principles;
17. communicate clearly in writing and/or orally about topics in mathematics;

18. find, evaluate, use, and cite academically appropriate resources to research mathematical and related topics;
19. examine the mathematical contributions made by people from diverse cultures locally, globally, and throughout history; and
20. discuss the origin and development of fundamental geometric concepts and their implications for the present and the future (worldwide).

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, and 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's Theorem

Course Requirements

Grading will be determined by the individual faculty member, but shall include the following, at minimum:

- two proctored written examinations;
- a separate cumulative proctored written final examination; and
- three written projects, at least one of which is presented orally.

Instructors will provide opportunities for students to collaborate via group work and/or oral presentation of problem solutions.

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

Written assignments and research projects: Students are required to use appropriate academic resources in their research and cite sources according to the style selected by their professor.

Other Course Information

This course is an approved 4–credit General Education course in Mathematics.
One or more assignments will infuse CCBC General Education Program outcomes and will account for a minimum of 10% of the total course grade. The assignment(s) will allow students to demonstrate at least 5 of the 7 General Education program outcomes.
Individual faculty members may include additional course objectives, major topics, and other course requirements to the minimum expectations stated in the Common Course Outline.

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