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| WINONA STATE UNIVERSITY  COLLEGE OF SCIENCE AND ENGINEERING  DEPARTMENT OF MATHEMATICS AND STATISTICS  **Course Outline - MATH 204** |

**Course Title:** Technology Based Geometry

**Catalog Description:** The study of geometry using technology including transformational, coordinate, and Euclidean geometry and informal geometry and measurement. Prerequisite: MATH 202 or MATH 140 or MATH 212. Grade only.

**Number of Credits**: 3

**Text:**  *A Problem Solving Approach to Mathematics for Elementary School Teachers,*

***12th edition*** by Billstein, Libeskind, and Lott

**Topics Covered**

1. Introductory Geometry
2. Basic Notions
3. Linear Measure
4. Curves, Polygons, and Symmetry
5. More about Angles
6. Congruence and Similarity with Constructions
7. Congruence Through Constructions
8. Additional Congruence Properties
9. Additional Constructions
10. Similar Triangles and Other Similar Figures
11. Congruence and Similarity with Transformations
12. Translations and Rotations
13. Reflections and Glide Reflections
14. Dilations
15. Tessellations of the Plane (Optional)
16. Area, Pythagorean Theorem, and Volume
    1. Areas of Polygons and Circles
    2. The Pythagorean Theorem, Distance Formula, and Equation of a Circle
    3. Geometry in Three Dimensions
    4. Surface Areas
    5. Volume, Mass, and Temperature

**Listing of Sections in Departmental Text to be Covered**

Chapter 11 - Introductory Geometry – all sections

Chapter 12 – Congruence and Similarity with Constructions – all sections

Chapter 13 – Congruence and Similarity with Transformations – all sections

Chapter 14 – Area, Pythagorean Theorem, and Volume – all sections

**Approximate pace of coverage:**

Two to three 50 minute class period should be sufficient time for each section.

**Method of Instruction:** Lecture/presentation, discussion, question and answer sessions, use of calculators and/or computers, extended and in-class group work.

**Evaluation Procedure:** Homework, quizzes, projects, midterm exams, and a final exam.

**Minnesota Transfer Curriculum:** *The following language should appear on each**instructor’s syllabus for the course:*

**Student Learning Outcomes**

1) Students will identify 2-D and 3-D shapes according to their properties.

**Assessment: Students will be assessed on their ability to name, describe, create, and measure 2-D and 3-D shapes.**

2) Students will create 2-D and 3-D shapes according to their properties using GSP and a compass

**Assessment: Students will be assessed on their ability to create 2-D and 3-D shapes with the compass and using GSP.**

3) Students will solve Euclidean proofs using appropriate symbols and mathematical language.

**Assessment: Students will be assessed on their ability to solve geometric proofs using logical reasoning, mathematical theorems, and accurate mathematical language.**

4) Students will apply geometric skills to the mathematical modeling of the real world including volume, area, and surface area.

**Assessment: Students will be assessed on their ability to create analyze 2-D and 3-D shapes to accurately measure and calculate area, surface area, and volume.**

5) Students will understand and apply motion geometry including transformations, rotations, dilations, and reflections.

**Assessment: Students will be assessed on their ability analyze motion geometry of 2-D shapes and to create transformational 2-D shapes with the compass and using GSP.**

6) Students will interpret word problems to understand the geometry and apply it in real-life models.

**Assessment: Students will be assessed on their ability to geometric thinking in real-life mathematical applications.**

7) Students will evaluate transversal problems including parallel and non-parallel lines.

**Assessment: Students will be assessed on their ability to analyze geometrical problems and apply accurate theorems to solve indicated problems.**

**Last Revised:** Spring 2018 by the Math Ed Subgroup