MATH 302 – Concepts in Geometry
Course Syllabus

Course Description: Survey of geometric topics with an emphasis on trigonometry and Euclidean geometry. Includes historical and grades 4-8 classroom connections.

Credit hours: 3

Course Prerequisites and Corequisites: MTH 300

Course Outline:

- **Topics in Geometry**
  - Geometric constructions using compass, straight-edge, reflection devices and dynamic software
  - Geometric relationships within the axiomatic structure of Euclidean geometry
  - Parallel postulate
  - Geometric transformations using matrices
  - Algebra and geometry of conic sections
  - Historical and classroom connections

- **Topics in Trigonometry**
  - Trigonometric ratios from right triangles
  - Circular functions
    - Degree measure
    - Radian measure
  - Applications of trigonometric functions
  - Fundamental trigonometric identities
  - Historical and classroom connections

Approximate time spent

- Topics in Geometry: 60%
- Topics in Trigonometry: 40%

Student Learning Outcomes (SLO): At the end of MTH 302, a student who has studied and learned the material should be able to:

1. Develop, perform, and justify basic geometric constructions using a variety of tools, including dynamic geometry software such as Geometer's Sketchpad. [SBEC: III]
2. Develop and prove conjectures concerning basic geometric relationships within the axiomatic structure of Euclidean geometry. [SBEC: III, V]
3. Demonstrate an understanding of the significance of the parallel postulate on the development of Euclidean and non-Euclidean geometries. [SBEC: III]
4. Demonstrate an understanding of the basic trigonometric functions as well as their graphs and properties. [SBEC: III]
5. Relate geometry to algebra and trigonometry by using the Cartesian coordinate system in the study of trigonometric functions and a geometric development of the conic sections. [SBEC: II, III]
6. Apply knowledge of trigonometric ratios and functions to model and solve problems in mathematics and other disciplines. [SBEC: III]
7. Prove and apply basic trigonometric identities. [SBEC: III]
8. Communicate orally and in written form an understanding of the connections among geometric, graphic, numeric, and algebraic solutions to problems. [SBEC: II, III, V]
9. Demonstrate an understanding of the historical development of geometric ideas. [SBEC: VI]
Syllabus Continuation

There are no specific program learning outcomes for this major addressed in this course. It is a general education core curriculum course and/or a service course.

Texas State Board for Educator Certification (SBEC): Mathematics Standards

*Standard II.* Patterns and Algebra: The mathematics teacher understands and uses patterns, relations, functions, algebraic reasoning, analysis, and technology appropriate to teach the statewide curriculum (Texas Essential Knowledge and Skills [TEKS]) in order to prepare students to use mathematics.

*Standard III.* Geometry and Measurement: The mathematics teacher understands and uses geometry, spatial reasoning, measurement concepts and principles, and technology appropriate to teach the statewide curriculum (Texas Essential Knowledge and Skills [TEKS]) in order to prepare students to use mathematics.

*Standard V.* Mathematical Processes: The mathematics teacher understands and uses mathematical processes to reason mathematically, to solve mathematical problems, to make mathematical connections within and outside of mathematics, and to communicate mathematically.

*Standard VI.* Mathematical Perspectives: The mathematics teacher understands the historical development of mathematical ideas, the interrelationship between society and mathematics, the structure of mathematics, and the evolving nature of mathematics and mathematical knowledge.

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