



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:

	<u>Approximate time spent</u>
<ul style="list-style-type: none">● Topics in Geometry	60%
<ul style="list-style-type: none">○ 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	
<ul style="list-style-type: none">● Topics in Trigonometry	40%
<ul style="list-style-type: none">○ Trigonometric ratios from right triangles○ Circular functions<ul style="list-style-type: none">▪ Degree measure▪ Radian measure○ Applications of trigonometric functions○ Fundamental trigonometric identities○ Historical and classroom connections	

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]

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.