University of West Georgia

Course Syllabus
Geometry for P-8 Teachers (MATH 3703)
Spring 2018

Instructor: M. Yazdani, Ph.D.
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Conference Hours(Appointment):

Tuesday	11:00 –2:00
Thursday	11:00 –2:00

Text: Billstein, R., Libeskind, S., Lott, J., (2016) A Problem Solving Approach to Mathematics for Elementary School Teacher , 12th edition, Addison Wesley, Boston, MA.

Required Supplies: graphing calculator, compass, straight edge, and protractor.

Catalog Description: Special emphasis for teachers of grades P-8. Logic, real numbers, basic and transformational geometry, measurement, including the metric system, problem solving, methods and materials for teaching at the P-8 level

Instructor's Emphasis: This research-based course provides the conceptual framework for understanding and applying properties, models, and operations related to selected topics in applied geometry including real world applications and technology. This course is designed to have the students learn mathematics through a process of inquiry which differs in significant ways from traditional mathematics classes. Students will work together as members of a community to do mathematics, which involves solving problems, making claims and conjectures, justifying and critiquing claims and conjectures, and modifying or rejecting claims and conjectures as needed.

Student Learning Outcomes

After completion of the course, the student will:

Geometric shapes & figures
1. Identify, sort, and contrast attributes of geometric curves using appropriate mathematical language
2. Use physical, visual, and numerical models to represent a given problem or mathematical procedure
3. Understand shape in terms of dimension, direction, orientation, and perspective
4. Analyze and solve problems involving 1D, 2D and 3D objects (lines, angles, circles, polygons, polyhedrons, cylinders, cones, spheres)
5. Analyze relationships between 3D figures and 2D representations (projections, cross-sections, nets)

Measurement
1. Recognize the effects of error on measurement
2. Develop, explain and use formulas to find length, perimeter, circumference, area, surface area and volume of basic geometric figures
3. Convert measurements between standard and metric systems

Similarity & symmetry
1. Recognize similar figures and identify scale factor
2. Use translations, rotations, reflections, dilations and contractions to illustrate similarities, congruencies and symmetries of figures
3. Use reflection devices to perform constructions and justify conclusions

Non-Euclidean geometries
1. Apply correct mathematical reasoning to derive valid conclusions from a set of premises
2. Explore axiomatic systems leading to non-Euclidean geometries such as taxicab, spherical, hyperbolic and torus geometries

Fractals
1. Use symmetry to describe and create tessellations
1. Distinguish between tessellations and fractals

In the context of the above expectations, a student will --
Mathematical processes
1. Recognize that a mathematical problem can be solved in a variety of ways, evaluate the appropriateness of various strategies, and select an appropriate strategy for a given problem
2. Evaluate the reasonableness of a solution to a given problem
3. Use physical and numerical models to represent a given problem or mathematical procedure
4. Recognize that assumptions are made when solving problems and identify and evaluate those assumptions

Mathematical Perspectives
1. Understand and apply how mathematics progresses from concrete to representation to abstract generalizations

Communication
1. Communicate mathematical ideas and concepts in age-appropriate oral, written and visual forms for a class presentation

2. Use mathematical processes to reason mathematically, solve mathematical problems, make mathematical connections within and outside of mathematics, and communicate mathematically
3. Reflect on personal learning, change of attitude and beliefs, and growth in understanding through mathematical journaling
4. Translate mathematical statements among developmentally appropriate language, standard English, mathematical language, and symbolic mathematics

Technology
1. Use appropriate technology such as calculators, computer software, and the Internet to explore, research, solve, create and compare mathematical situations and representations

Professional Development
1. Be familiar with the National Council of Teachers of Mathematics and the Principles and Standards for School Mathematics, the NCTM website, and NCTM journals

Instructional Methods and Activities:

Class lectures will include the following: presentation of material and concepts, activities, problem solving techniques, and class discussions. Quizzes will be given throughout the semester. There is no make up for daily quizzes. There is no make up for the tests unless the student presents a legitimate excuse.

Evaluation and grade Assignment:		Final grade will be determined by point accumulation as follows:	
Quizzes	20%	A	90% - 100%
Test 1	20%	B	80% - 89.99%
Test 2	20%	C	70% - 79.99%
Test 3	20%	D	60% - 69.99%
Final Exam	20%	F	0%- 59.99%

Class Policies:

Class Rules: You are not allowed to be late for the class more than 5 minutes; you may not leave the class early. You are to turn off your cellular phone during the class, no texting, and no eating.

Attendance: Attendance is mandatory. There are only 4 unexcused or excused absences allowed per semester. If you exceed 4 absences you will **fail** the course. Attendance will be checked each class period and it is your responsibility to sign the attendance sheet.

Conferences: Conferences can be beneficial and are encouraged. All conferences should occur during the instructor's office hours, whenever possible. If these hours conflict with a student's schedule, then appointments should be made. The instructor is very concerned about the student's achievement and well-being and encourages anyone having difficulties with the course to come by the office for extra help.

Note: If you have a documented disability, which will make it difficult for you to carry out the course work as I have outlined and / or if you need special accommodation or assistance due to disability, please contact me as soon as possible.

Course Schedule

Week 1	Introduction, Euclidean Geometry,
Week 2	Angles
Week 3	Perpendicular lines
Week 4	Curves & polygons, Simple, closed
Week 5	Congruent Segments and Angles
Week 6	Triangles & quadrilaterals, Congruent
Week 7	Polyhedra & solids
Week 8	Measurement
Week 9	Networks
Week 10	Problem Solving
Week 11	Similarity & symmetry
Week 12	Transformations: translation, Reflection & rotation
Week 13	Trigonometry
Week 14	Trigonometry Ratios
Week 15	Non-Euclidean geometry, Taxicab geometry, hyperbolic & spherical geometry
Week 16	Course Review

Midterm exam: Thursday Feb. 22
Last day to drop with a grade of W is February 28
Final Exam: Thursday May 3, 2:00-4:00