

SU DEPARTMENT OF MATHEMATICS & COMPUTER SCIENCE  
 SYLLABUS (*Tentative*)  
 MATH 508 *Seminar: Geometry*

**Objective:** To present students with an opportunity to study, in depth, the topic which best exemplifies abstract mathematics. To enhance their ability to formulate, test, and settle conjectures. To advance their ability to prove theorems and construct counterexamples. To enhance the ability of students who are teachers, prospective or in-service, to identify with the thought-processes and challenges of their students. To develop demonstrations, explorations and activities that use the current dynamical geometry software packages. The NCTM standards will be used to drive content and pedagogy.

**Intended for:** Graduate students.

**Prerequisite:** Admission to graduate study or approval by the department.

**Text:** None (notes will be distributed by the instructor).

<b>Topics</b>	<b>Weeks</b>
<i>Preliminary Concepts</i>	3
Preliminary concepts including axiomatic systems, the axioms of Euclidean geometry and parallelism, the role of conjecture, the role of proof, the role of constructions, and an introduction to GeoGebra.	
<i>Straightedge and Compass Geometry</i>	3
Congruency, similarity, constructions, triangle properties and theorems, circle properties and theorems, relations between triangles and circles, constructible numbers, Ceva's theorem, and the Fermat point.	
<i>Coordinate Geometry</i>	2
Cartesian and polar coordinate systems, trigonometry, parametric equations, triangle and circle relationships using coordinate systems.	
<i>Transformational Geometry</i>	3
Represent translations, reflections, rotations, and dilations of objects in the plane by using sketches, coordinates, vectors, function notation, and matrices.	
<i>Solid Geometry</i>	3
Three dimensional Euclidean space, polyhedral, regular polyhedral, cylindrical and spherical coordinate systems. .	
<b>Total</b>	<b>14</b>

**EVALUATION**

Homework	40-70%
Presentations	10-50%
Portfolio/Paper	10-25%