Required Texts
Navigating through Geometry in Grades 9-12 at NCTM.org, ISBN: 0-87353-514-6
(or Navigating through Geometry in Grades 6-8 ISBN 0-87353-513-8)

and

The van Hiele Model of Thinking among Adolescents, Monogram #3 of JRME also from NCTM.org, ISBN: 0-87353-266-X.

Course Description
A focus on current research and practices on teaching and learning geometry and other issues related to the geometry curriculum. The course also contains approaches to the teaching and learning of geometry from conceptual and problem solving points of view.

Course Objectives
• Study appropriate content for teachers of middle and high school geometry along with appropriate instructional and assessment techniques.

• Include mathematical concepts, such as those contained in NCTM's Principle and Standards and Colorado's Content Standards in Mathematics, into the course.

• Include the use computers and calculators as tools for teaching and learning mathematics.

• Provide both content and pedagogical content so that participating teachers are able to not only learn new content but are able to use appropriate tools and instructional methods in their classrooms.

• Provide opportunities to develop curriculum materials for your classes.
Content of Course
The following content, as related the NCTM and State *Standards*, will be addressed in some form in this course: Geometry from Synthetic Perspective, Geometry from an Analytic Perspective. In particular in helping students to: (a) develop an understanding of an axiomatic system through investigating and comparing various geometries, (b) represent geometry situations with geometric models and apply properties to figures, (c) translate among synthetic and coordinate representations, and (d) apply transformations, coordinates, and vectors in problem solving. We will also address students use of geometric concepts, properties, and relationships in problem-solving situations and the difficulties that many students have with them, problem solving and its significance in mathematics instruction, use of calculators and computer graphics software (such as *Geometer's Sketchpad*), common mistakes make by students in geometry, differences between informal and formal geometries, significance of ‘proof’ in geometry, and real world applications of mathematics.

Pedagogical Content
In small "chat" groups or as a class, we will discuss reading assignments, problem assignments and various techniques that might be appropriate for student understanding of mathematics.

One or two projects (group and/or individual project) will be required. You are recommended to choose projects that you expect to use in your classrooms this semester or next.

Keeping in line with new instructional roles in the teaching of mathematics, a variety of instructional methods will be adopted, including the use of technology. In particular, we will refer to graphic technology via both computer and calculator.

I see myself taking on such roles as facilitator, coach, resource person, moderator, as well as presenter of new materials at various times during the semester.

Online discussions will ensue related to the integration of appropriate content into the secondary mathematics classroom.

Online time will be devoted mainly to discussions and presentations.

Part of the semester will be devoted to discussion of common assignment and readings. All will participate as one group.

Part of the semester will be devoted to one individual report, individual presentation, and/or activity for all to participate - led by various class members.

Each of you may be responsible to develop and organize an activity that you will describe and present online.
Assessment
A letter grade will be assigned based on the following:

1. Weekly (or bi-monthly) Discussion Board entries on assigned readings and/or problems (quality and quantity) - 40% of course grade.

2. Chat Room entries on assigned readings and problems (quality and quantity) - 15% of course grade.

3. One Individual Project - 20% of course grade.

4. One Group Project - 20% of course grade.

5. Online presentation (abstract) of Projects - 5% of course grade.

A letter grade will be assigned based on the following:

A: 90 - 100%  B: 80 - 89%  C: 70 - 79%

Course Relationship to Standards
We will address recommendations that relate to course content and to the teaching and learning of geometry as identified in the *Principle and Standards for School Mathematics* of the National Council of Teachers of Mathematics and to the Colorado Content Standards in Mathematics.

Research Reference


Bibliography


