Math 3321 **OUTLINE**
Butts, Spring 2005

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Office hours: MW 3:00pm- 5:00pm ; 7:00p – 8:00pm [in CB]
T 4:00pm - 6:00 pm and by appt. **1/10/05A**

"Let no one ignorant of geometry enter here" read the sign placed by Plato over the door to his Academy in Athens in 387 BC. As this quote indicates, during Euclid's and Plato's days geometry was the subject area of primary interest. In this course, we will recount some of the same topics in Euclidean Geometry explored by Greek mathematicians and some which were not explored until later. We will see that Euclidean Geometry is not the only possible geometry for our world, although it is certainly the most familiar.

Texts etc. : **Geometry for College Students [GC]** by Martin Isaacs; **Handouts ;**
Internet Sites: Symmetries and Their Properties [http://illuminations.nctm.org/index_o.aspx?id=138; http://illuminations.nctm.org/index_o.aspx?id=139; http://illuminations.nctm.org/index_d.aspx?id=474]
others TBA

Course Themes: The course will be organized around four main themes:
1. Visualization , Shapes, brief introduction to Spherical Geometry, review of basic Euclidean Geometry: GC - Ch. 1
2. Advanced topics in Euclidean Geometry and applications: selected sections GC Chap. 2,4
3. Topics in Geometric Transformations and applications: Web Sites, handout, and selected sections from GC
4. Geometry as a Deductive System and non-Euclidean Geometries [especially Spherical Geometry]: Handout and websites

Purposes and Objectives: The primary purpose of this course is to empower the student with a strong experience in *mathematical thinking.* Students will sharpen their critical thinking skills, learn to justify theorems using various formal and informal methods, make meaningful conjectures, and improve their visualization and problem-solving abilities. Some specific objectives: The student will
- understand selected concepts in Euclidean geometry including transformations
- understand selected basic concepts in some non-Euclidean geometries.
- understand the importance of deductive systems of geometry and the subsequent development of the theorems.
- be able to justify theorems in geometry using appropriate mathematical rigor involving synthetic methods, coordinate methods, trigonometric methods, and transformational methods.
- explore geometric concepts from an intuitive perspective through the use of drawings, physical models, technology, etc. often in a small-group setting.
- solve problems involving geometric concepts.
- be able to distinguish between Euclidean geometry and non-Euclidean geometries as exemplified by spherical geometry and a bit of hyperbolic geometry.

Participation
You are expected to come to class prepared and to participate actively. I suggest you read the text before class. It is a waste of time to simply listen and take notes – you must be **thinking** throughout each class.

Each **Monday** [beginning Jan. 24], you will be asked to respond to a Question of the Week [sometimes] and to the following questions regarding this class:
1. What was the most important thing you learned during the last week?
2. What was the most confusing aspect of the work during the last week?
3. State any questions you have about the ideas and concepts in the readings or the class discussions of the last week.

These submissions will be part of your participation grade. You will earn full credit by submitting a thoughtful response each week. [You may miss once in awhile if you have no real comments and there is no Question of the Week] You may submit your report via e-mail - preferably to my home email address.

Assessment:
- Participation, Homework, Monday Reports, Class Participation, etc. : [25%]
- Examinations: [45%] Each exam is partially take-home. Sample questions will be provided.
  Tentative dates: Feb. 16; , Mar. 23 , Apr. 13/20 and possibly an optional test TBA.
- Comprehensive Final Exam: [30%] April 27
- Approximate **test** standards: A 88% B 75% C 60% D 50%

over

Handouts: Each assignment will have several accompanying handouts.

1. **CLASS EXAMPLES/PROBLEMS** – problems to be considered in class and/or problems that you should be able to do but will not be submitted as written problems

2. **WRITTEN PROBLEMS** - a subset of these will be assigned to written up neatly and submitted.

3. **NOTES:** An overview of the relevant sections of the textbook; additional theorems and proofs; historical information; etc.

Software:

• **Geometer's Sketchpad**: You may purchase a student version for $39.95:
http://www.keymath.com/store/software/gsp.html

• **WINGEOM:** http://math.exeter.edu/rparris/wingeom.html [for Windows only] freeware

Review of HS Geometry - Resources

Books

•You might consider borrowing/buying a HS Geometry text [Teacher's Edition if possible]

• Self-help books:
The Geometry Problem Solver :
http://www.amazon.com/exec/obidos/ASIN/0878915109/ref=ase_starwarsportal/104-7012224-2285541

Geometry for Dummies:
http://www.amazon.com/exec/obidos/tg/detail/-/0764553240/ref=pd_bxgy_text_1/104-7079056-8187139?v=glance&s=books
http://www.josseybass.com/cda/product/0,,0764553240%7Cdesc%7C2711,00.html

Complete Idiot's Guide to Geometry: http://www.amazon.com/exec/obidos/tg/detail/-/1592571832/ref=cm_custrec_gl_rec/103-9452818-7239835?v=glance&s=books

Web sites. Try a search with the keywords "geometry" and "help" and/or the specific topic e.g. "isosceles triangles".

Ask Dr. Math - Questions and Answers about HS Geometry
http://mathforum.com/dr.math/tocs/geometry.high.html

Ask Dr. Math - Questions and Answers about College Geometry
http://mathforum.org/library/drmath/sets/college_geom.html

Ask Dr. Math - Formulas - see especially Geometric Formulas
http://mathforum.com/dr.math/faq/faq.formulas.html

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Academic Honesty: In this course students will conform to the University rules for academic honesty. For more information see http://www.utdallas.edu/student/slife/dishonesty.html. **See attached page**

Students with disabilities: Information from this course can be provided to students with disabilities through University services. For more information see http://www.utdallas.edu/student/slife/hcsvc.html.