

Sul Ross State University
Course Syllabus
Mathematics 5302 Geometry for Educators
Summer 2 2019

- Instructor:** Dr. Angela M. Brown
E-mail: abrown4@sulross.edu
Phone: (432)837-8223
Office: ACR 107B
Class Meetings: Set by class
Office Hours: by appointment
Course Goals:
- Enhance your understanding of the geometric properties of the plane, spheres and other surfaces through direct experience, group work, and problem-based learning.
 - Using your understanding of these geometric properties to devise your own mathematical arguments and proofs.
 - Challenging your existing notion of what mathematics is all about.

Overview: The primary aims of this course are outlined in the goals stated above. The course will be organized around a series of problems—from your text and others I will bring to class.

We will cover chapters 1–6 and parts of 8–11, 15, 19, and 22. We will cover more if time permits including topics from fractal geometry (I will provide readings on fractals as supplements to the textbook).

I expect that many aspects of what we will do will be new for you. This course will be taught with an emphasis on writing and collaborative learning. Memorization and formulae will not be emphasized in this course. For most of the course problems, there is no one “right answer” that you will be trying to “find.” You will see a diversity of approaches and proofs in class. You will also be asked to share your own findings.

- Materials:** The text, *Experiencing Geometry Euclidean and Non Euclidean with History*, third edition, by D. Henderson and D. Taimina, 2005, Prentice Hall. ISBN 9780131437487
- A problem folder or “portfolio.”
 - Software: The software package Geogebra will be used.
 - A ball and some elastics, or a plastic sphere such as those available at craft shops. A cone and a cylinder, homemade or store-bought varieties to be discussed in class. (In class, we will also use *Lénárt Spheres*.)
 - Other inexpensive household objects as the need arises.

Details about the course are given on the next page. If at any time you have questions, please do not hesitate to ask.

Details About the Course

Writing Assignments:

Writing Assignments (WAs) are the backbone of this class. You will be asked to write your individual solution to each problem presented in class. Expect at least 7 WAs, more if time permits. You are encouraged to discuss and work on the WAs in groups as we will often do in class, but each of you should always submit individual work. Turn in your WAs by the due date and you will get feedback, including comments and questions, to which you must respond by resubmitting, in an ongoing dialogue. You are free to either just respond to questions and comments or to completely rewrite the paper. All of your work must be kept in your portfolio (so you always submit older versions of your work with the new one). On each assignment, you will be allowed three drafts. After the submission of the final draft, the WA will be graded according to the criteria you find below (see EVALUATION CRITERIA). Each draft of every WA MUST satisfy the following list of minimal requirements. Papers which do not meet all of the minimal requirements will not be read.

Minimal Requirements for WAs:

1. The text of the paper must be legible. Please type the text of your papers and draw in the pictures by hand (or use *Geometer's Sketchpad* to draw pictures)
2. You must leave ample space for your instructor's comments and questions (about a three-inch column).
3. Papers must be submitted as part of your portfolio. Drafts should be grouped together and placed in order of most recent submission to first submission.
4. Papers must be free of mistakes in both grammar and spelling.

Computer Assignments:

Computer Assignments (CAs) will be used to supplement the material covered in class. Assignments are to be turned in on Blackboard or on a flash drive. CAs will be graded on a 1-10 scale. Expect at least 2 CAs.

Exams:

There will be two in-class quizzes and a final exam. Quizzes will be announced in advance and will pertain to a recent course topic. You will be free to use your portfolio and text for the quizzes. If you stay connected in the course and work to your potential, you will find the quizzes to be a welcome challenge rather than a cause for concern. The final exam is cumulative.

Grades:

| | |
|-------------------------------|-----|
| Portfolio of Problems and CAs | 80% |
| Quizzes | 10% |
| Final Exam | 10% |

Americans With Disabilities Act:

As an instructor, I am required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing the instructor for MATH 3301 of their need for accommodation and in providing authorized documentation through designated administrative channels. If you need to request such accommodations, please contact the ADA Coordinator in Counseling and Accessibility Services, Ferguson Hall 112, 432-837-8203.

Evaluation Criteria for Writing Assignments

Writing assignments will be graded in their commonly agreed final draft according to the following criteria, divided into two categories, broadly defined as CONTENT and FORM.

CONTENT

| | |
|-----|--|
| 5 | <ul style="list-style-type: none"> • The problem was brilliantly analyzed. • All ideas and notions were fully explored. • All questions raised in class were fully addressed. • Challenging new questions were raised and/or independent investigations were carried on expanding the problem under examination. |
| 4.5 | <ul style="list-style-type: none"> • The problem was fully and successfully analyzed. • All ideas and notions were fully explored. • All questions raised in class were fully addressed. |
| 4 | <ul style="list-style-type: none"> • The problem was successfully explored. • The main ideas and notions were mastered. • Minor topics may not be adequately treated. • Some minor questions raised in class were not addressed. • The paper is free of major conceptual errors. |
| 3.5 | <ul style="list-style-type: none"> • The problem was sufficiently explored, although some minor conceptual errors might be present. • Minor confusion might be present on some of the main ideas. • Minor topics might be missing or not adequately treated. |
| 3 | <ul style="list-style-type: none"> • The problem was not sufficiently explored. • Some of the main ideas and new notions may be missing or not fully treated. • Substantial confusion may be present on some of the main ideas. • Erroneous and/or unnecessary items might be present. |
| 2.5 | <ul style="list-style-type: none"> • The exploration of the problem was unsatisfactory. • Most main ideas and concepts are missing or poorly presented. • Questions from the instructor may have been ignored. • Major errors are present. |
| 2 | <ul style="list-style-type: none"> • The exploration of the problem was very poor. • Losing strategies may be used. • Most main ideas and concepts are missing or erroneously presented. • No effort to improve the paper between the drafts is visible. |
| 1 | <ul style="list-style-type: none"> • Minimal work was done on the problem. • All ideas and concepts are missing or very poorly presented |

FORM

| | |
|-----|---|
| 5 | <ul style="list-style-type: none"> • The paper has a solid logic structure. • All claims are clearly motivated. • All implications are clear. • Terminology is always used appropriately. |
| 4.5 | <ul style="list-style-type: none"> • The logic structure of the paper is globally sound. • Most claims are clearly motivated • The main implications are clear. • Terminology is used appropriately in most cases. |
| 4 | <ul style="list-style-type: none"> • The paper has a visible logic structure but it may contain some unnecessary, verbose or unclear passages. • The main claims are clearly motivated. • Most implications are clear. • Terminology is used appropriately in most cases. |
| 3.5 | <ul style="list-style-type: none"> • The logic structure of the paper lacks rigor. It may be difficult to follow some of the presented arguments. • It may contain unmotivated implications, several unnecessary passages. • Terminology may at times be used incorrectly. |
| 3 | <ul style="list-style-type: none"> • The logic structure of the paper is unsatisfactory. • Some arguments may be circular. • It may contain confused passages. • Correct terminology is not used or used mostly inappropriately. |
| 2.5 | <ul style="list-style-type: none"> • The logic structure of the paper is poor. • Arguments and implications are missing or presented in a confused fashion. • The use of correct terminology is poor. |
| 2 | <ul style="list-style-type: none"> • The logic structure of the paper is extremely poor. • Arguments and implications are missing or presented in a very confused fashion. • The use of correct terminology is almost non-existent. |
| 1 | <ul style="list-style-type: none"> • The paper is logically chaotic. • No effort to clearly motivate assertions was made. • The use of correct terminology is totally absent. |

The scheme above and structure of the syllabus were adapted from the syllabi of Dr. Gian Mario Besana (Indiana University Northwest) and Dr. Kelly Gaddis (Buffalo State College). (Adapted from Dr. James Alvarez, University of Texas at Arlington)