Course Syllabus

MATH 3302, FOUNDATIONS OF GEOMETRY

Spring Semester, 2013-14

Mathematics Department, Dr. Ernest Pyle, Department Chair

COURSE DESCRIPTION

A study of classical Euclidean geometry using both analytic and synthetic techniques, with an emphasis on the formal development of geometry. Topics include axiomatic systems, congruence and similarity, transformations, area and volume, Euclidean construction, finite geometries, and a brief introduction to non-Euclidean geometry. This course is required for the mathematical studies major but may not be counted as part of a mathematics major.

COURSE SEQUENCE IN CURRICULUM

Math 3302 is not a prerequisite for any other math course.

PRE-REQUISITE INFORMATION

MATH 1451 or consent of the instructor; MATH 1452 is strongly recommended.

INSTRUCTOR INFORMATION

Name:	Dr. Paul Lewis
E-mail:	plewis@hbu.edu
Office Phone:	281-649-3688
Office Location:	N209
Office Hours:	to be announced
Web Page Address, Web Board, ListServ:	None

LEARNING RESOURCES

Course Text(s):	Advanced Euclidean Geometry by Alfred S. Posamentier The Shape of Space by Jeffrey Weeks
Laboratory Text(s):	None
Supplementary Text(s):	None
Other Required Materials:	None

COURSE OBJECTIVES

Purpose of the course:

Math 3302 is a study of classical Euclidean geometry using both analytic and synthetic techniques, with an emphasis on the formal development of geometry. Topics include logic, axiomatic systems, congruence and similarity, transformations, area and volume, Euclidean construction, finite geometries, and a brief introduction to non-Euclidean geometry.

Aims for the course:

To prepare students seeking teacher certification to teach geometry on a high school level. To develop an understanding of and an appreciation for the axiomatic method. To explore other geometries such as non-Euclidean geometry.

On completion of this course, students should be able to:

1. develop an appreciation and understanding of the axiomatic method as it relates to Euclidean geometry and other mathematical systems.
2. gain an insight into the development of geometry from a historical perspective including a study of some of the mathematicians that contributed to it.
3. develop teaching strategies that will be effective in both formal and informal geometry courses in high school.
4. review the basic concepts of formal plane Euclidean geometry, including proofs of similarity and congruence theorems, properties of right triangles, arcs and circles, areas and volumes, and the parallel postulate.
5. review topics from coordinate geometry, vectors, and trigonometry as well as learn about the varieties of non-Euclidean geometry.
6. develop the ability to communicate mathematical ideas orally through student presentations.
7. develop the ability to communicate mathematical ideas through writing.
8. develop the ability to work independently
9. develop the ability to utilize sources of information other than a textbook.

RELATION TO DEPARTMENTAL GOALS AND PURPOSES

The Mathematics/Physics Department "…will offer an academically rigorous, undergraduate curriculum in classical and modern mathematics. The curriculum will prepare students majoring in mathematics and mathematical studies for careers and further education in mathematics and will encourage a lifetime of learning."

"…will provide academically rigorous and modern courses in mathematics to support other programs at the University."

"…will offer courses to enable all graduates of the University to become mathematically literate and develop useful skills in mathematics."

"…will provide the appropriate administrative processes, facilities, research experiences, and faculty to achieve the goals stated above."

RELATION TO COLLEGE GOALS AND PURPOSES

"…to prepare students for careers and further education in the natural sciences and mathematics in a nurturing Christian environment. The College will also serve the HBU community by providing science and mathematics classes that empower HBU students to meet the goals and requirements of their field of study and enrich their liberal arts education."

RELATION TO THE PURPOSE STATEMENT OF THE UNIVERSITY

University mission and purpose statement from the Houston Baptist University Catalog, 2009-2010: "…to provide a learning experience that instills in students a passion for academic, spiritual, and professional excellence as a result of our central confession, "Jesus Christ is Lord"

"…Committed to providing a responsible and intellectually stimulating environment that:

- fosters spiritual maturity, strength of character, and moral virtue as the foundation for successful living

- develops professional behaviors and personal characteristics for life-long learning and service to God and to the community

- meets the changing needs of the community and society

- remains faithful to the **'Nature of the Institution'** statement"

"…Promotes learning, scholarship, creative endeavor, and service".

ATTENDANCE

Please see the official Attendance Policy in the HBU Classroom Policy on Blackboard. Students missing more than 25% of the class will be given a failing grade.

ACADEMIC ACCOMODATIONS

Students needing learning accommodations should inform the professor immediately and consult the Academic Accommodations section of the HBU Classroom Policy posted on Blackboard.

COURSE REQUIREMENTS & GRADE SCALE

Course requirements:

Each student will take four exams and a comprehensive final exam. Students will have regular homework as well as required presentations and projects.

Grading standards

Exams (4 worth 15% each) 60%
Class presentations and projects 20%
Final Exam 20%

The following grading scale will be used:

A=90-100,B=80-89, C=70-79, D=60-69, F=below 60

PROFICIENCIES:

Technology component:

Maple and other computer software will be used to enhance the visual and constructive aspect of geometry. The internet will be used as an additional source of information pertaining to the course.

Designated essay/writing component:

The students are required to write and understand the structure of a formal mathematical proof.

Reading component:

Students are required to read the textbook and other textbooks that emphasize proofs and the formal development of geometry.

Oral communication component:

Oral presentations and class discussions are an integral part of the course.

Mathematics component:

The entire course.

Critical thinking component:

This course emphasizes the axiomatic development of Euclidean geometry. Applying the fundamental laws of logic to prove theorems is central to the course.

LATE WORK & TEST POLICY

Late work:

No work will be accepted late.

Missed tests:

The final exam grade will replace the grade of one exam missed by a verifiable excused absence. A make up exam will be given for any additional exams missed due to a verifiable excused absence..

EVALUATION

Method of student appraisal of faculty:

Students will be given an opportunity to appraise the professor by completing the IDEA Faculty Evaluation Questionnaire, and/or the COSM course evaluation at the end of the semester. The instructor, the department chairman and dean will review the responses of the students after the completion of the course.

Method of evaluating student response to course:

Students will be given an opportunity to describe their response to the course by completing the IDEA Faculty Evaluation Questionnaire and/or the COSM course Evaluation at the end of the course. The instructor, the department chairman and dean will review the responses of the students after the completion of the course.

LABORATORY DRESS CODE

Students may be asked in advance to wear closed-toed shoes and long pants during certain experimental procedures.

LABORATORY CONDUCT AND SAFETY

Not applicable.

TOPICAL OUTLINE - ***include table, calendar, or topical outline with dates***

Euclidean Geometry (from Advanced Euclidean Geometry)

Chapter 1:	Elementary Euclidean Geometry Revisited
Chapter 2	Concurrency of Lines in a Triangle
Chapter 3:	Collinearity of Points
Chapter 4:	Some Symmetric Points in a Triangle
Chapter 5:	More Triangle Properties
Chapter 6:	Quadrilaterals

Non-Euclidean Geometry and Topology (from The Shape of Space)

Part 1:	Surfaces and Three-Manifolds
Part 2:	Geometries on Surfaces
Part 3:	Geometries on Three-Manifolds

Exam 1 will cover chapters 1-3 of Advanced Euclidean Geometry	2/12/14
Exam 2 will cover chapters 4-6 of Advanced Euclidean Geometry	3/19/14
Exam 3 will cover Part 1 of The Shape of Space	4/16/14
Exam 4 will cover Part 2 and Part 3 of The Shape of Space	5/7/14

The above exam dates are tentative.

The content of this outline and the attached schedule are subject to change at the discretion of the professor.

Student Signature – I have read and understand the syllabus for this class. I understand that the content of this syllabus and the topical outline are subject to change at the discretion of the professor. I have read and understand the HBU Classroom Policy posted on Black Board. **I promise to uphold the Code of Academic Integrity at Houston Baptist University and will not tolerate its violation by others**.