**MAT 304 Modern Plane Geometry**

*Prerequisites*: MAT 301 and high school geometry or 211

A study of Euclidean geometry from the modern axiomatic viewpoint. Some alternatives to Euclidean geometry will be considered.

**Rationale**

This course is an examination of the axiom systems that underlie plane geometry. It is intended to serve the needs of a general mathematics major to improve skills in theorem proving using the content area of geometry as well as prepare the prospective elementary or secondary mathematics teacher for a future role as an instructor of geometry.

**Professor:**

**Office Hours:** vary by semester

**Learning Objectives**

At the conclusion of the course, the successful student should be able to:

-evaluate the correctness of a purported proof to a geometric theorem

-develop proofs using a system of axioms, definitions and previously proven theorems

-articulate a brief history of geometry and explain the role of prominent mathematicians in its development

-compare and contrast axiomatic systems

-provide models to illustrate an axiom system

-state and prove the major concepts and theorems of Euclidean geometry

-illustrate the differences between Euclidean and non-Euclidean geometries

-understand the concepts/uses of analytic geometry proofs

**Academic Integrity**

Honesty and integrity are basic virtues expected of all students at Mississippi College. The *Mississippi College* *Undergraduate Catalog* lists the policies and penalties for plagiarism and cheating. Additional information is included in Policy 2.19 in the *Mississippi College Tomahawk*. On homework, tests, quizzes, and individual out-of-class projects, the work is assumed to be the student's own and no cheating will be tolerated.

**Outline of Topics**

Axiomatic Systems

Axiom Sets For Geometry

Neutral Geometry

Euclidean Geometry of the Plane

Analytic and Transformational Geometry

Non-Euclidean Geometries

**Methods of Instruction**

The method of instruction will include lecture, group problem solving, individual problem solving, and examinations. Each student is expected to have a copy of the text, a student copy of *Geometer’s Sketchpad* or lab access, writing materials, and an open mind. On homework, tests, quizzes, and individual out-of-class assignments, the work is assumed to be the student's own and no cheating will be tolerated.

**Required Practices**

Students are expected to read the text, take notes on the material presented in class and write their own solutions to problems as assigned by the instructor for homework. Students are expected to utilize *Geometer’s Sketchpad* to solve problems posed or to assist in problem solving. Students are also expected to contribute to the classroom discussion regarding previously assigned problems. Each day, the students should be prepared to write a short quiz over the homework assignment or hand in the homework assignment. Quizzes will be randomly given throughout the course without prior announcement; homework will also be checked occasionally. Students are expected to be fully prepared for unit examinations. Dates for unit examinations will be announced in class at least one week prior to the test.

**Instructional materials:** Materials required: **Pencils**, text, compass, straightedge, *Geometer’s Sketchpad*, and a calculator.

Text: Wallace, E. C., & West, S.F. (2004) Roads to Geometry. Upper Saddle River: Prentice Hall.

ISBN: 0-13-041396-8

**Assessment**

Assessment of the student's progress will be made through short quizzes/homework, individual proof assignments, out-of-class project, tests, and classroom participation. The final grade will come from the following sources: unit tests (two or three worth 100 points each), quizzes/homework (5-10 points each), projects (20 points each), class participation (0-25 points), and an exam (worth 150 points if comprehensive). The final grade will be determined by a ten-point scale.

**Other Policies**

* Makeup work is the responsibility of the student and should be cleared with the instructor **in advance** whenever possible. *Students are responsible for all material covered and all assignments given when they are absent.* If a student misses a grade due to being absent or tardy and wishes to make-up the work, they must have an excused absence as determined by Dr. Floyd. The college stipulates that the grade for the course is automatically an F in the event of 8 or more absences in a TR class. Three tardies will be counted as an absence. If a student is more than 5 minutes late they will be counted absent.
* **Final day to add** the class is (varies by semester)
* **Final day to drop** the class is (varies by semester)
* If you need special accommodations due to learning, physical, psychological, or other disabilities, please contact Dr. Amy Christian in the Counseling Center Alumni Hall Room 4. She may be reached by phone at 601-925-7790.

**STUDENT RESPONSIBILITIES**

* Attend all class meetings **ON TIME.**
* Read the assigned material.
* **Attempt** to complete all homework assigned **before** the next class meeting.
* See Dr. Floyd **before the next class meeting** if you are unable to complete most of the homework that is assigned.

**INSTRUCTORS RESPONSIBILITIES**

* Begin (and end) class on time.
* Be prepared to explain content, vocabulary, symbols, etc.
* Demonstrate mathematical relationships and proofs.
* Evaluate student comprehension of content, vocabulary, symbols, etc.

**MISSISSIPPI COLLEGE ACADEMIC POLICIES**:

Students should consult the Mississippi College policy manual located at http://www.mc.edu/resources/publications/policies/ for official information regarding:

* Class attendance - Policy 2.10
* Grading - Policy 2.15
* Cheating - Policy 2.19
* Counseling and Career Services - Policy 2.25
* Research - Policy 2.27
* Counseling and Testing Center - Policy 2.34

Students who may require accomodation due to a documented handicap should follow the procedures located at http://www.mc.edu/about/offices/counseling/disabilities/

The Generic Grading Scale for this course is A = 90-100, B = 80-89, C = 70-79, D = 60-69. Individual instructors are free to choose a different grading scheme so students should consult their section's particular syllabus for the official grading scale to be utilized.

**Tutoring Hours**:

Hours and location for the departmental tutoring center are posted at http://www.mc.edu/academics/academic-tutoring/ .