COURSE DESCRIPTION:

MAT 320 College Geometry Fall 2009
Semester Hours: 3

Instructor: Dr. J. Bauer
Office: CS 107
Office Hours:
Telephone: (402) 375-7334
Email: jebauer1@wsc.edu
Website: http://academic.wsc.edu/faculty/jebauer1

Prerequisite: MAT 140 or consent of instructor.

Description: The course presents a formal axiomatic development of neutral and Euclidean geometry with an emphasis on valid arguments. Non-Euclidean geometry will also be investigated.

The course is required for the Mathematics field endorsement and the Theoretical Mathematics major. The course is also strongly recommended for the Middle School Mathematics endorsement. The course can also be used as an elective for the Applied Mathematics major.

Class Meeting Time/Place: 9:00-9:50 MWF, CS 101

COURSE COMPETENCIES: College geometry has experienced a reform similar to that experienced by calculus. The reform emphasizes three main concepts.

1. New approaches in concepts are supported by reformed pedagogy.
2. Computer technology is incorporated into the course material.
3. Students are expected to understand more about mathematics and its connections, and be able to express these understandings verbally and in writing.

The conference proceedings sponsored by COMAP, Inc., Geometry’s Future, has also provided many goals and recommendations for the study of geometry. These include the use of an experimental and inductive point of view, applications of geometry, inclusion of recent developments in geometry, the use of figures and diagrams, the use of physical models, collaborative learning, and an emphasis on transformations. Furthermore, there is an emphasis on the
distinction between the mathematics of geometry and physical geometry. The meaning of and examples of mathematical proofs is also very important.

The Curriculum and Evaluation Standards for School Mathematics (1989) published by the National Council of Teachers of Mathematics (NCTM), strongly influence the study of geometry. Standard 7 refers to the study of geometry synthetically, and Standard 8 refers to the study of geometry algebraically. The Standards also advocates the inclusion of the synthetic, coordinate, and transformational aspects of geometry. The Principles and Standards of School Mathematics (2000) also published by NCTM has geometry as a common thread throughout the K-12 curriculum. The course will follow these findings in content and manner of presentation.

INSTRUCTIONAL MATERIALS:


**References:**


**Required Equipment:** Small straightedge and compass.

**Resources/Equipment:**  *The Geometer’s Sketchpad*  
(accessible on the college’s computer network)

**COURSE OUTLINE:**

Foundations of Geometry: Point, Lines, Segments, Angles
- Introduction to Axiomatic Structures
- Models
- Incidence Geometry
- Metrics
- Angle Measure
- Basic Convexity

Foundations of Geometry: Triangles, Quadrilaterals, Circles
- Triangles, SAS Hypothesis
- SAS, ASA, SSS Congruence
- Exterior Angle Inequality
- Inequality
- Additional Congruence
- Quadrilaterals
- Circles

Euclidean Geometry
- Parallelism, Rectangles
- Parallel Projection
- Similar Triangles and Trigonometry
- Regular Polygons
- Circle Theorems
- Area and Volume
- Modern Geometry

Non-Euclidean Geometries
- Foundations
- Hyperbolic Geometry
- Two Models
- Circular Inversion
- Elliptic (Spherical) Geometry

**COURSE REQUIREMENTS:**
1. Student is expected to attend class.
2. Student is to contact instructor prior to planned absences.
3. Student will be given 4 unit exams and a comprehensive final.
4. No test shall be made up unless arrangements are made before the test is given.
5. The final must be taken at the time and place scheduled. (____________________________________)

6. Student is expected to work assignments in the text and be prepared to discuss them during the next scheduled class meeting. Assignments might be collected occasionally.

EVALUATION: Student may be evaluated on the basis of test scores, lab assignments, homework, and attendance. Grades are determined on 10% intervals, i.e. the 90s are an A, the 80s a B, and... Student will be given a comprehensive final. The student’s score will be based on the following: 60% on test scores, 40% on homework and lab assignments, and borderline cases determined by attendance. The score received on the final by the student will be incorporated into the student’s score in the following manner:

- If the score on the final exam is higher than the student’s final class average then the final exam will count 50%.
- If the score on a final exam is the same or no more than 30 points below the student’s final class average, then the final will counts 0%.
- If the score on the final exam is more than 30 points below the student’s final class average, then the final counts 20%.
- If the student does not take the final exam then a 0% will be averaged into the student’s score at 50%.
WSC STATEMENT OF STUDENT RESPONSIBILITIES:

Wayne State College strives to develop students of a wide range of academic abilities through quality teaching and support. It is our desire to prepare students to accept the privileges, duties, and responsibilities of global citizens; to develop moral and ethical values, to encourage creative ability and develop aesthetic judgments, to encourage the ability to think critically about their world and work; and to promote competence in and understanding of fields of knowledge which required of educated people. To this end we, the faculty and staff of WSC, have established a standard of student responsibilities in the following statement:

All students will:

Take responsibility for their education. This will include:
• Being knowledgeable of academic requirements and college policies concerning registration, academic standing, payment of tuitions and fees, withdrawal and graduation.
• Initiating communication with faculty, advisors and administration regarding questions, concerns and intellectual dialogue.

Cultivate an attitude of integrity both in and out of the class. Integrity is demonstrated by:
• Showing courtesy, dependability, honesty and respect for instructor expectations concerning attendance, assignments, deadlines and appointments.
• Showing courtesy and respect toward others with diverse points of view in and out of class.
• Displaying a positive work ethic and a genuine interest in welfare of others.
Assignments

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