Course Syllabus - Math 250 - Intuitive Geometry
Spring 2010 / 11:00-11:50 AM / 1:00 - 1:50 PM / MTWR
Bouillon Hall 106 / Hertz Hall 120

Professor:	Dr. Jane Whitmire
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Office Hours:	MTWRF 2:00-2:50 PM
Prerequisites:	Math 164

Course Description

The purpose of this course is to enable certification candidates to develop a solid knowledge of geometry and its applications. The use of manipulatives is one way for linking experience with students' mathematical understanding. Thus, while enhancing ones individual understanding of geometrical properties, certification candidates will learn to help students move from the concrete to abstract levels of geometry by incorporating manipulative activities and, when appropriate, pictorial, symbolic, and verbal representations.

Supplies

Students are responsible their own writing materials such as pencil, colored pens, protractor, compass, highlighter, stapler, glue, ruler and paper (plain, grid, and lined). Maintain your supplies, notes, homework, and examinations in a organized portfolio.

Grading

Everyone is graded the same way. NO EXCEPTIONS. Letter grades A/A-/B+/B/B-/C+/C/C-/D+/D/D-/F are based on a strict 93-100/90-92.9/87-89.9/83-86.9/80-82.9/77-79.9/73-76.9/70-72.9/67-69.9/63-66.9/60-62.9/BELOW 60 cutoff. Grades are not rounded either up or down. The course grade can be calculated at any time using the following weights:

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\begin{aligned}
Homework &\longrightarrow 20\% \\
Exams &\longrightarrow 30\% \\
Activities &\longrightarrow 20\% \\
Final &\longrightarrow 30\%
\end{aligned}
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Homework:

Homework exercises should be written with attention to detail, correct spelling, complete sentences, and proper grammar. Pictorial representations for manipulatives should be neat, accurate, and written in pencil. Homework is due, during or before class, the second class period after it is assigned. No late assignments will be accepted - no exceptions.

Exams:

Exam dates are Thursday, April 29, 2010 and Thursday May 20, 2010. Exams are comprehensive. Completing the exam in the time allotted is part of the exam. Scheduling complications sometimes occur. An alternate procedure for taking an exam due to a scheduling complication must be arranged in advance. There are no make-up exams.

Activities:

In-class activities will include solving problems using manipulatives, classroom discussion, and practice exercises to reinforce skills. Activities cannot be completed outside of class. Participation and consequently attendance, is fundamental. If you miss an activity, or equivalently, a day of class when an activity is presented, the score for the activity will be zero, or approximately 2 percent of your overall grade. Activities require full participation. The professor reserves the right to grade activities according to participation and accuracy.

Final Exam

The final exam MUST be taken to pass the course and is comprehensive. The exam will be administered on Friday, June 4, 2010. This is NOT the date scheduled by the university. If time conflicts exist, it is the responsibility of the student to schedule another time to take the exam.

Learning Outcomes

Tools of Geometry
• Identify and model points, lines, and planes.
• Identify collinear and coplanar points and intersecting lines and planes in space.
• Find segment and angle measures using segment and angle postulates.
• Describe relationships between segments and angles (congruent, midpoint, segment bisector, angle bisector, perpendicular) and use the relationships to solve problems.
• Identify special pairs of angles (vertical, linear pair, complementary, supplementary) and use their relationships to solve problems.

Exploring Lines and Planes
• Develop midpoint and distance formulas using the coordinate plane.
• identify the relationships between to lines or planes (parallel, perpendicular, skew, intersecting, oblique).
• Name angles pairs formed by lines and a transversal.
• Use properties of parallel lines to determine congruent angles and to find angle measures.
• Find slopes of lines and use slopes to identify parallel and perpendicular lines.
• Write equations of parallel and perpendicular lines.
• Recognize angle conditions necessary to prove lines parallel.
• Identify and use properties of perpendicular bisectors and angle bisectors.

Reasoning and Proof
• Make conjectures based on inductive reasoning.
• Analyze statements in if-then form (conditional statements).
• Write the converse, inverse, and contrapositive of a conditional statement and determine the truth value of the statements.
• Use properties of algebra and congruence to make and justify conclusions.
• Use deductive reasoning with different styles of proofs to verify segment and angle relationships.

Triangle Properties
• Identify and classify triangles by side and angle measures.
• Determine the relationships among the measures of the interior and exterior angles of a triangle and apply these relationships.
• Identify and use properties of isosceles and equilateral triangles.
• Identify special segments; angle bisectors, perpendicular bisectors, medians, altitudes, mid-segments of a triangle, determine their relationships and apply those relationships to solve problems.
• Recognize and apply properties of inequalities to the relationships between the sides and and angles of a triangle.
• Recognize and apply properties of inequalities between the sides and angles of two triangles.

Congruent Triangles
• Identify congruent triangles and their corresponding parts.
• Identify methods (SSS, SAS, ASA, AAS, HL) of proving triangles congruent.
• Find missing sides of triangles and other figures based on congruence relationships.
• Use deductive reasoning to prove corresponding parts of congruent triangles congruent.
• Use triangle congruence to solve problems in real-life situations.

Polygons and Quadrilaterals
• Identify, name, and classify polygons.
• Find measures of interior and exterior angles of polygons.
• Recognize and apply properties of the sides and angles of parallelograms.
• Use properties of parallelograms to solve problems.
• Recognize the conditions that ensure a quadrilateral is a parallelogram.
• Identify special parallelograms(rectangle, rhombus, square), identify their properties, and apply the properties to solve problems.
• Recognize and apply properties of trapezoids and special trapezoids.
• Recognize the conditions that ensure polygons are congruent.

Similarity and Proportional Reasoning
• Compute ratios and use proportions to solve problems.
• Solve percent and probability problems.
• Identify the conditions that ensure two polygons are similar.
• Use properties of similar polygons to solve problems.
• Recognize the conditions that ensure two triangles are similar.
• Use similar triangles to solve real-life problems.
• Identify proportional parts of a triangle and use them to solve problems.
• Recognize and use proportional relationships of perimeters and other corresponding segments of similar triangles.

Right Triangles
• Identify the geometric mean of two numbers.
• Solve problems involving relationships between parts of a right triangle and the altitude to the hypotenuse.
• Use the Pythagorean Theorem and its converse to solve problems.
• Use the Pythagorean theorem to classify a triangle as acute, right, or obtuse.
• Identify a pattern in the side lengths of special right triangles $(45^o, 45^o, 90^o)$, $(30^o, 60^o, 90^o)$ and use special right triangles to solve problems.
• Trigonometric ratios (sine, cosine, tangent) using right triangles and solve problems using these trigonometric ratios.
• Solve problems involving angles of elevation and depression.

Transformations
- Identify translation, reflection, rotation, and dilation transformations.
- Use properties of reflections to find reflection images and relate reflections and line symmetry.
- Use properties of rotations to find rotation images and identify figures with rotational symmetry.
- Properties of translations to find translation images.
- Use algebra notation to define translations, reflections, and rotations.
- Identify tessellations.
- Use compositions of transformations and identify their properties.
- Identify, use properties of, and determine the scale factor of dilations.

Circles
- Identify and use parts of circles.
- Recognize major arcs, minor arcs, semicircles, and central angles, find their measures and use their measures to solve problems.
- Recognize and use relationships between arcs and chords to solve problems.
- Recognize inscribed angles and use their properties to solve problems including inscribed polygons.
- Identify and use properties of tangents to solve problems including circumscribed polygons.
- Find measures of angles formed by segments or lines intersecting on a circle, inside a circle, or outside a circle (chords, secants, tangents).
- Determine the equation of a circle.

Perimeter, Area, and Volume
- Find perimeters and areas of triangles and quadrilaterals (including rectangles, squares, parallelograms, trapezoids, rhombi, and other quadrilaterals).
- Identify regular polygons and find their perimeters and areas.
- Find circumference and area of a circle and use them to find the length of an arc or the area of a sector.
- Find perimeters and areas of composite figures.
- Identify properties of areas of similar polygons and use the relationships to solve problems.
- Relate nets to different solids.
- Identify three dimensional figures, recognize different views of three-dimensional figures, and investigate cross sections of three-dimensional figures.
- Find surface areas of prisms, pyramids, cylinders, cones, and spheres.
- Use surface areas to solve problems.
- Find volumes of prisms, pyramids, cylinders, cones, and spheres.
- Use volumes to solve problems.
- Discover properties of surface areas and volumes of similar figures and use the relationships to solve problems.

Academic Integrity

Cheating, plagiarism, and copying material that is copyrighted will not be tolerated. If evidence of this occurs, then full academic disciplinary action will be initiated.

Special Needs Statement

Students with disabilities who wish to set up academic adjustments in this class should provide a copy of their "Confirmation of Eligibility for Academic Adjustments". Eligible students without this form should contact the Disability Support Services Office by visiting Bouillon 205, emailing dssrecept@cwu.edu, or calling the phone number 509-963-2171.