# UW COLLEGES
## DEPARTMENT OF MATHEMATICS

### COURSE GUIDELINES

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Topics in Geometry</th>
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</thead>
<tbody>
<tr>
<td>Course No:</td>
<td>MAT 081</td>
</tr>
<tr>
<td>No. of Credits</td>
<td>1-3</td>
</tr>
<tr>
<td>Contact hrs/wk:</td>
<td>Lecture 1-3</td>
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<tr>
<td></td>
<td>Lecture/Discussion</td>
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<tr>
<td></td>
<td>Lab</td>
</tr>
<tr>
<td>Course Prerequisites:</td>
<td>None</td>
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</tbody>
</table>

**Catalog description:**

Designed for students who have not had high school geometry. Includes methods of proof, properties of simple plane figures, congruence, and similarity. This course is offered through a contractual arrangement with the local WTCS institution as Mat 085. This course is offered by the campus TRIO/minority/disadvantaged program as Mat 087.

**Course content** (list of topics normally covered).

Topics marked optional (*) may be covered at the discretion of the course instructor.

- The Nature of Deductive Reasoning
  - Direct Proof
  - Postulates
  - Preparing for a Proof
  * Indirect Proof

- Points, Lines and Planes
  - The Ruler Postulate
  - Line Segments
  - Polygons
  - Perimeter and area of polygons

- Rays and Angles
  - The Protractor Postulate
  - Complementary, Supplementary and Vertical Angles
  - Parallel and Perpendicular Lines
  * Elementary Constructions

- Congruent Triangles
  - Congruent Polygons
  - Isosceles Triangle Theorem
  * Proving Triangles Congruent
  * Proving Corresponding Parts Equal
  * Triangle Constructions

- Parallel Postulate
  - The Parallel Postulate
  - Consequences of the Parallel Postulate

- Quadrilaterals
  - Parallelograms
  - Rectangles, Rhombi, Squares and Trapezoids
Area
Polygonal Regions
Squares, Rectangles and Triangles
Parallelograms and Trapezoids

The Right Triangle
Proportions in a Right Triangle
Isosceles and 30°-60° Right Triangles
The Pythagorean Theorem

Circles
Circles, Radii
Circumference and Area of Circles
*Chords and Tangents
*Central Angles and Arcs
*Inscribed and Secant Angles
*Tangent, Chord and Secant Segments
*Circle Constructions
* Sectors and Arcs

Solid Geometry
Lines and Planes in Space
Volumes of Solid Figures

* Inequalities
Exterior Angle Theorem
Triangle Side and Angle Inequalities

Similarity
Ratio and Proportion
Similar Polygons
Similar Triangle Theorem
Perimeters and Areas of Similar Polygons

* Regular Polygons

* Coordinate Geometry
Two-dimensional Coordinate Systems
Distance Formula
Parallel and Perpendicular Lines
Midpoint Formula
Coordinate Proofs

**Content-based department proficiencies:**
The successful student will:

- recognize connections between geometry and real world objects.
- understand the principles of inductive and deductive reasoning.
- understand common geometric terminology and recognize geometric shapes.
- be able to estimate, measure, and deduce measures of length, angles, area, and volume.
- understand concepts relating to triangles and quadrilaterals.
- know the Pythagorean Theorem and how to use it to determine lengths of sides in a right triangle.
- be able to use formulas appropriately for finding perimeter, area, surface area and volume.
Colleges-wide proficiencies assigned to course:

Students should be able to demonstrate the following:

A. Analytical skills Performance Indicators: Students should be able to:
1. Interpret and synthesize information and ideas.
4. Select and apply scientific and other appropriate methodologies.

B. Quantitative skills Performance Indicators: Students should be able to:
1. Solve quantitative and mathematical problems.
2. Interpret graphs, tables, and diagrams.

Representative textbooks used for the courses:

* College Geometry, Musser/Trimpe (Prentice Hall)
* Elementary Geometry for College Students, 2nd ed., Alexander/Koeberlein (Houghton-Mifflin)
* Geometry, Hirsch/Schoen (Scott, Foresman & Co.)
* Geometry, 2nd ed., Jacobs (W.H. Freeman)
* Informal Geometry, Smith (Addison-Wesley)

Approved April 22, 2006