EL CAMINO COLLEGE
COURSE OUTLINE OF RECORD

I. COURSE DESCRIPTION

Course Title and Number :	Mathematics 116 (Official)
Descriptive Title :	Geometry and Measurement for Prospective Elementary School Teachers
Discipline :	Mathematics
Division :	Mathematical Sciences
Course Length :	☑ Full Term ☐ Other (specify:)
Hours Lecture :	4
Hours Laboratory :	0
Course Units :	4
Grading Method :	☑ Letter ☐ Pass/No Pass ☐ Both ☐ No Grade
Course Type :	☑ Credit, Degree Applicable ☐ Credit, Not Degree Applicable ☐ Non-Credit
Transfer CSU :	☑ Yes (Effective Date: 1-22-02) ☐ No
Transfer UC :	☑ Yes (Approval Date: Fall 2002) ☐ Pending ☐ No

Conditions of Enrollment: Specify Prerequisite, Corequisite, Recommended Preparation, Enrollment Limitation, or None.

> Prerequisite: Mathematics 60 and Mathematics 110 with a minimum grade of C in prerequisite or equivalent

Catalog Description :

> In this course, designed for prospective elementary school teachers, students focus on the conceptual and procedural understanding of geometry and measurement. Students explore informal geometry, congruence, similarity, constructions, transformations, tessellations, and measurement involving both English and metric units in one, two, and three dimensions. The use of appropriate units in real-world geometric situations is emphasized throughout the course. Group activities, hands-on activities and use of computer software are integrated throughout the course.

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II. COURSE OBJECTIVES

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List the major objectives of the course. These must be stated in behaviorally measurable terms.

> 1. Given common two- or three- dimensional shapes, determine the perimeter and area or surface area and volume using both English and metric units.
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> 2. Using a straightedge and compass, construct two-dimensional geometric figures.
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> 3. Using transformations, construct two- and three- dimensional designs and tessellations.
>
> 4. Solve analytical geometry problems involving lines and slopes.
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> 5. Recognize and analyze attributes of plane and solid geometric figures, testing for congruence and/or similarity, when appropriate.
>
> 6. Compare and contrast aspects of non-Euclidean geometries with Euclidean geometry.
>
> 7. Solve a variety of application problems, using various modes of visualization, pattern recognition techniques, data table analysis, spatial reasoning, geometric modeling, and, where appropriate, computer software.

III. OUTLINE OF SUBJECT MATTER

The topics should be detailed enough to enable an instructor to determine the major areas that should be covered and so that the course may have consistency from instructor to instructor and semester to semester.

Approximate Time in Hours	Major Topics
20	**GEOMETRY OF LINES** A. Basic terms, concepts and relationships among points, lines, and planes, including types and measurements of angles. B. Linear measure: length, perimeter, and circumference and appropriate use of units C. Conversion of units between English and metric systems D. Construction of angles, parallel lines, perpendicular lines, and angle bisectors
28	**GEOMETRY OF PLANE FIGURES** A. Curves and polygons: definitions, properties and classifications, with an emphasis on triangles and quadrilaterals B. Perimeter and area of rectangles, triangles, parallelograms, trapezoids, regular polygons, and circles including use of appropriate units C. Formal construction of regular, inscribed n-gons (n = 3, 4, 6, 8, 12) D. Similar and congruent figures E. Indirect measurements, including the connection between slope and tangent ratio F. Symmetries, rigid and nonrigid transformations, including translations, rotations, and reflections G. Tessellations of geometric figures in the plane H. The Pythagorean Theorem and real world applications I. Comparing aspects of non-Euclidean and Euclidean geometries J. Applications using data tables, pattern recognition, and computer software
24	**GEOMETRY OF SOLIDS** A. Definition and attributes, including Euler's formula, of polyhedra; prisms, pyramids, cones, cylinders, and spheres B. Representations of three-dimensional figures in two-dimensions: isometric and orthogonal drawings C. Measurement of mass, capacity, surface area, and volume in both English and metric units D. Tessellations on the surface of a sphere
72	**TOTAL HOURS**

IV. METHODS OF EVALUATION

A. CREDIT, DEGREE APPLICABLE AND CREDIT, NOT DEGREE APPLICABLE COURSES

Check the PRIMARY method of evaluation for this course.

- ☐ Substantial writing assignments
- ☑ Problem solving demonstrations (computational or non-computational)
- ☐ Skill demonstrations

A minimum of one response in 1, 2, or 3 below, as applicable, is required. However, you may check all that apply.

1. Indicate the types of writing assignments used as primary or secondary methods of evaluation for this course.

   - ☐ Essay exams
   - ☑ Written homework
   - ☐ Term or other papers
   - ☐ Reading reports
   - ☐ Laboratory reports
   - ☐ Other (specify)

2. Indicate the types of problem-solving demonstrations used as primary or secondary methods of evaluation for this course.

   - ☑ Exams
   - ☐ Laboratory reports
   - ☑ Quizzes
   - ☑ Homework problems
   - ☐ Fieldwork
   - ☐ Other (specify)

3. Indicate the types of skill demonstrations used as primary or secondary methods of evaluation for this course.

   - ☐ Class performance
   - ☐ Performance exams
   - ☐ Fieldwork
   - ☐ Other (specify)

4. If objective exams are also used, check all that apply.

   - ☐ Multiple choice
   - ☐ Completion
   - ☐ Matching items
   - ☐ True/false
   - ☐ Other (specify)

B. NON-CREDIT COURSE

Indicate the methods of evaluation that will be used to determine that the stated objectives have been met.

V. COURSEWORK

A. TYPICAL ASSIGNMENT

Provide an example of a typical assignment. This assignment must correspond to the PRIMARY method of evaluation indicated in Section IV, Methods of Evaluation. That is, it must be a writing assignment or, if more appropriate, an assignment involving problem solving or skill demonstration.

> A pentagon has interior angle measures that form an arithmetic sequence. Determine the measure of each interior angle if the least measure is 60 degrees.

B. COLLEGE-LEVEL CRITICAL THINKING ASSIGNMENTS

Cite two specific assignments that demonstrate college-level critical thinking. (Required for degree applicable courses only.)

1. Verify Euler's formula for a cube, a tetrahedron, an octahedron, and a sphere. Write one or two complete and substantive sentences explaining how Euler's formula differs for each of these solids.

2. Present to your classmates a complete explanation of why the formula for the area of a circle is πr^2. Use manipulatives to illustrate your reasoning, where appropriate.

C. WORK OUTSIDE OF CLASS

Two hours of work outside of class are required for each hour of lecture or equivalent. Each student in this course will be required to participate in the following work outside of class time. Check all that apply.

- ☑ Study
- ☑ Answer questions
- ☐ Skill practice
- ☑ Required reading
- ☑ Problem solving activity
- ☐ Written work (such as essay/composition/report/analysis/research)
- ☐ Journal (done on a continuing basis throughout the semester)
- ☐ Observation of or participation in an activity related to course content (such as theatre event, museum, concert, debate, meeting)
- ☐ Course is lab only - minimum required hours satisfied by scheduled lab time
- ☑ Other (specify)
  Problem solving using computer software

VI. INSTRUCTIONAL METHODOLOGY

Check all planned instructional activities that apply:

- ☑ Lecture
- ☐ Lab
- ☐ Discussion
- ☐ Multimedia presentations
- ☐ Demonstration
- ☑ Group activities
- ☐ Role play/simulation
- ☐ Guest speakers
- ☐ Field trips
- ☑ Other (specify)
     Problem solving using computer software

NOTE: In compliance with Board Policies 1600 and 3410, Title 5 California Code of Regulations, the Rehabilitation Act of 1973, and Sections 504 and 508 of the Americans with Disabilities Act, instructional delivery shall provide access, full inclusion, and effective communication for students with disabilities.

VII. TEXTS AND MATERIALS

If multiple selection is offered, only representative texts need be listed. An up-to-date list of required and recommended materials is maintained in the division office.

A. REQUIRED TEXTS (title, author, publisher, year)

GEOMETRIC STRUCTURES, AN INQUIRY-BASED APPROACH FOR PROSPECTIVE ELEMENTARY AND MIDDLE SCHOOL TEACHERS; Douglas Aichele and John Wolfe; Pearson Prentice-Hall; 2008

B. REQUIRED SUPPLEMENTARY READINGS

C. OTHER REQUIRED MATERIALS

Straight edge, compass, protractor, and scientific calculator

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VIII. CONDITIONS OF ENROLLMENT

If this course has a prerequisite or corequisite, complete section A. If this course has an Enrollment Limitation, complete section B.

A. PREREQUISITE AND/OR COREQUISITE

1. Indicate if this course has a prerequisite, corequisite, both, or none.

   ☑ Prerequisite
   ☐ Corequisite

2. Indicate Type. Check all that apply.

   ☑ Sequential
   ☐ Computational/Communication Skills
   ☐ Health and Safety
   ☐ Non-Course
   ☐ Standard (If this is a Standard Prerequisite or Corequisite, attach CCC Form D.)

3. Entrance Skills/Knowledge

   List the required skills and/or knowledge without which a student would be highly unlikely to receive a grade of A, B, C, or Credit (or for Health and Safety, would endanger self or others) in this course.

   a. solve problems using the Pythagorean Theorem (Mathematics 60)

   b. demonstrate a proof of the Pythagorean Theorem (Mathematics 60)

   c. utilize congruence theorems to recognize congruent triangles (Mathematics 60)

   d. recognize and utilize the properties of operations on real numbers (Mathematics 110)

   e. recognize and solve arithmetic and geometric sequence problems (Mathematics 110)

   f. ability to use various problem solving strategies, including the use of tables, indirect reasoning, and pattern recognition (Mathematics 110)

B. ENROLLMENT LIMITATION

1. Indicate the category which describes the Enrollment Limitation for this course.

   ☐ Band/Orchestra
   ☐ Theater
   ☐ Speech
   ☐ Chorus
   ☐ Journalism
   ☐ Dance
   ☐ Intercollegiate Athletics
   ☐ Honors Course
   ☐ Blocks of Courses
   ☐ Other (specify)

2. List Degree and/or Certificate requirements that are met by this course.

3. List all El Camino College courses that also satisfy the requirements listed above in section B.2.

Originator: Linda Ho

Submittal
Date: November, 2001

BOARD APPROVAL DATE: 1-22-02

Reviewed and/or Revised by:

Susie Tummers Stocum

Date: September, 2008

Date:

Date: