ANTELOPE VALLEY COLLEGE
Academic Affairs
Course Outline of Record

Academic Affairs Only

- ☐ New Course
  - ☐ Effective Date (for articulation)
- ☒ COR Revision 2/25/2010
- ☐ Pre Req/Advisories
- ☐ Other Changes
- ☒ SLOs 4/10/2008

COURSE SUBJECT & NUMBER: MATH 080

COURSE NAME: Plane Geometry

COURSE UNITS: 4 **COURSE HOURS:** 4 hours weekly

COURSE REQUISITES: ***(Follow format of similar courses found in the college catalog.)***

Advisory: Completion of MATH 070, or Eligibility for MATH 102 (AVC Assessment) and READ 099.

COURSE DESCRIPTION: ***(Write a short paragraph providing an overview of topics covered. Be sure to identify target audience--transfer, major, GE, degree/certificate, etc. If repeatable, state the number of times at end of description as (R#)***.

This pass/no pass course covers plane Euclidean geometry and includes an introduction to solid geometry. The first part of the course emphasizes the development of the theorems and properties of geometric figures and the concept of proof in an axiomatic system. The second part of the course covers the derivation and application of measurement formulas for area, volume, trigonometric ratios, and applications. Recommended for students intending to take algebra-based courses beyond MATH 070, drafting, nursing, or graphics courses. **NOTE**: No grade will be given for this class; student will receive "pass" or "no pass" only. (Credit course not applicable to the associate degree and certificate programs.)

COURSE OBJECTIVES: ***(Title 5 requires that courses show evidence of critical thinking skills. Use Bloom's taxonomy to formulate concise, performance-based measurable objectives common to all students. Objectives must be closely aligned with course content, assignments, and methods of evaluation)***

Upon completion of course, the successful student will be able to:

1. Draw, label, and refer to geometric figures using appropriate notation and terminology.
2. Write and solve equations about the measure of angles and line segments.
3. Apply postulates, definitions, and theorems to prove propositions about parallel lines, triangles, and quadrilaterals, using methods of direct and indirect proof.
4. Recognize, classify, and identify the properties of triangles, quadrilaterals, and circles and use them to deduce the measure of unknown sides, angles, arcs, diagonals, and other auxiliary components of geometric figures.
5. Solve problems about right triangles using special angles, the Pythagorean Theorem, and right triangle trigonometry.
6. Use formulas to calculate area and volume and recognize the correct dimensions/units used to express area and volume.
7. Algebraically solve application problems involving area and volume.
8. Use compass and straight-edge to construct geometric figures.

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COURSE CONTENT: ***(Enter course content in terms of specific topics or a specific body of knowledge that each instructor must cover. Put topics in outline form with major and minor headings. Each instructor must cover all material listed below.)***

The following outline does not necessarily represent a chronological presentation of topics.

I. Nature of Deductive Reasoning
- A. Conditional propositions
- B. Categorical propositions
- C. Converses
- D. Deductive Systems
  1. Postulates, definitions, theorems
  2. Direct Proof
  3. Indirect Proof

II. Undefined terms: Points, Lines, Planes
- A. Basic postulates
- B. Definitions: collinear and coplanar
- C. Ruler Postulate and distance
- D. Segments and Segment Addition

III. Rays and Angles
- A. Definitions
- B. Protractor Postulate and angle measure
- C. Classifying angles by measure
- D. Angle Addition
- E. Vertical angles and linear pairs
- F. Perpendicularity

IV. Congruent Triangles
- A. Proofs of congruent triangles
  1. SAS
  2. ASA
  3. SSS
  4. AAS
  5. HL
- B. Corresponding parts
  1. Proving corresponding parts equal
  2. Proofs using corresponding parts
- C. Isosceles and Equilateral triangles
- D. Auxiliary, concurrent lines, and midsegments
- E. Angles sums and remote interior angles

V. Parallel Lines
- A. Transversals and angle pairs
- B. Parallel Postulate
- C. Proofs of parallel lines
- D. Proofs using parallel lines

VI. Properties and Proofs of Quadrilaterals
- A. Parallelograms
- B. Rhombuses and kites
- C. Rectangles and squares
- D. Trapezoids
- E. Area and angle sum formulas

VII. Similarity
- A. Ratio and Proportion
- B. Polygons
- C. Triangles
  1. Proofs by AA
  2. Using corresponding sides
  3. Using split sides
  4. Application problems

VIII. Right Triangles
- A. Geometric mean theorem and formulas
- B. Pythagorean Theorem and Converse
- C. Special Angles
- D. Intro to Trigonometry
  1. Definition of sine, cosine, and tangent
  2. Solving right triangles
  3. Right triangle application problems

IX. Circles
- A. Congruence, arcs, and central angles
- B. Chords and inscribed angles
- C. Tangents and secants
  1. Formulas for lengths
  2. Formulas for angles
- D. Arc length and sectors
- E. Circumference and area

X. Solid Geometry
- A. Planes and three-dimensional space
- B. Properties, surface area, volumes
  1. Right prisms, cylinders, and cones
  2. Regular pyramids (volume only)
  3. Spheres

Optional Topics:
- A. Inequalities in a triangle
- B. Regular polygons
- C. Angles of a polygon
- D. Coordinate geometry

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TYPICAL HOMEWORK ASSIGNMENTS: (Do not include in-class work, quizzes, or tests)
This information is necessary for all credit courses. Assignments should be closely related to course objectives, content, and methods of evaluation. (See sample of a "Model Outline" in the AP&P Standards & Practices Handbook.) Include a range of assignments (minimum of three) from which faculty may choose when designing their syllabus.

1. ***Describe nature and frequency of typical reading assignments if applicable; note if any are required:***

Students will be required to read approximately three sections per week from a textbook chapter that typically runs 4-7 sections. Section lengths are typically 3-4 pages.

2. ***Describe nature and frequency of typical writing assignments if applicable; note if any are required:***

N/A

3. ***Describe nature and frequency of typical computational assignments if applicable; note if any are required:***

Students will be required to complete daily homework assignments from textbook exercise sets and/or worksheets designed to practice concepts from assigned reading and classroom lessons.

4. ***Describe other types of homework assignments that students may be asked to complete (oral presentations; special projects; visual/performing arts; etc); note if any are required:***

Students will be required to complete construction projects using compass and straight-edge.

For categories 1-4 above, list the estimated hours per week it would take a student to complete assignments. *Title 5 (section 55002)* requires that *each unit must be shown to require three hours of work per week by the student either in or out of class.* Homework formula: 3 hours of class work *times* each unit of credit *minus* classroom hours *equals* required homework hours.

Reading Assignments: .5 ***Writing Assignments***:

Computational Assignments: 7 ***Other Assignments***: .5

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METHODS OF INSTRUCTION: ***(Methods must be consistent with content and appropriate to objectives; state in terms of what instructor will be doing in order to present course content to students: for example, lecture, demonstration, present audio/visual materials; facilitate group work, etc. Do not list specific instructional equipment.)***

Lecture presentations rely heavily on visual 2-D and 3-D media, models, and manipulatives. Activities include use of compass and straight-edge by instructor and students, discussion/ Q & A, group work, warm-up activities, and boardwork.

METHODS OF EVALUATION: ***(These must be clearly related to course objectives and reflect course content and assignments in order to comply with Title 5 requirements. Describe what instructor will be looking for when evaluating various assignments and tests in order to determine whether students have met course objectives. Grades must be based on demonstrated proficiency in subject matter and determined, where appropriate, by essays, objective and essay tests, research papers or projects, problem solving exercises, or skills' demonstrations.)***

Daily homework assignments from text and/or worksheets; periodic quizzes; and at least four written unit examinations. All methods are used to evaluate proficiency and/or mastery of notation and terminology (1), proofs (3), use of formulas (2,6,7), applications and problem solving (2,4,5,7), and constructions (8).

Suggested Texts or Other Instructional Materials
(List several when possible; include title, author, publisher, date, and latest edition. If older than five years, provide brief rationale.)

"Essentials of Geometry for College Students," by Lial, Brown, Steffensen, and Johnson; Pearson Addison-Wesley, 2nd Ed.., 2004. Textbook is best available for 16-week college-level class with only beginning algebra as an advisory. Material in Euclidean geometry texts has remained largely unchanged over long periods of time.