ROWAN UNIVERSITY
Department of Mathematics

Syllabus
Math 01.202 - Introduction to Geometry

CATALOG DESCRIPTION:

Math 01.202 Introduction to Geometry, 3 s.h.
Prerequisites: Basic Algebra II

This course develops the fundamental concepts of Euclidean geometry from a modern point of view. Its topics include sets, points, lines, space, betweeness, incidence, congruence, parallelism, similarity, transformations, areas, and volumes. Non-Euclidean geometries are introduced. Not open to mathematics majors. Use of calculators is required. Students are expected to have completed an equivalent of Intermediate Algebra.

OBJECTIVES:

Students will be able to:

1. Discuss a variety of great geometric ideas in ways that transcend mathematics.
2. Use synthetic, analytic, and transformational techniques.
3. Discuss the similarities and differences between Euclidean and non-Euclidean geometries.
4. Apply the concepts of incidence, dimension, parallelism, congruency, similarity, self-similarity, perpendicularity, cardinality, and transformational geometry.
5. Use a variety of tools, physical models, and appropriate technology to develop and describe geometric concepts and relationships and their uses.
6. Demonstrate the kinds of proofs found in geometry.
7. Present written and oral arguments to justify conjectures and generalizations based on explorations.

CONTENT:

1. History of Geometry

- Theorems and proof
- Pythagorean Theorem
- Golden Rectangle
- Axioms

2. Geometric Constructions

- Congruence, similarity, and incidence
- Parallelism and perpendicularity
- Polyhedra

- Duality
- Extenstions to higher dimensions

3. Symmetry, Transformations and Equivalences

- Reflections, rotations, translations
- Isometries and symmetries
- Topological equivalence
- Projections
- Self-similarity and fractal geometry

4. Non-Euclidean Geometries

- Axiomatic systems
- Finite geometries
- Spherical geometry
- Hyperbolic geometry
- Comparing Euclidean and non-Euclidean geometries
- Concepts of infinities

TEXTBOOKS:

Edward B. Burger and Michael Starbird: THE HEART OF MATHEMATICS, 2/E, Wiley, 2005.

L. Christine Kinsey and Teresa E. Moore: SYMMETRY, SHAPE, AND SPACE, Key Collegle, 2002.

Gary L. Musser and Lynn E. Trimpe: COLLEGE GEOMETRY: A PROBLEM SOLVING APPROACH WITH APPLICATIONS, PrenticeHall, Upper Saddle, NJ, 1994.