

The University of the Incarnate Word

MATH 4341

Modern Geometry

Catalog description:

This course covers Euclidean and non-Euclidean geometries using both groups of transformations and sets of axioms to classify geometries. Applications and problem-solving within these geometries is addressed.

Context:

Prerequisite: MATH 3320, Foundations of Mathematics, or permission of instructor. The background of the student must include a simple knowledge of Logic and Set Theory. This three credit-hour course is an upper level course for mathematics majors and is particularly recommended for those preparing for secondary teacher certification. The course may not be repeated for credit.

Description of the course:

Modern Geometry presents the reformation of the foundations of Euclidean geometry and the basic theory of non-Euclidean geometry. This course covers Euclid's postulates, the Hilbert axioms, neutral geometry, hyperbolic geometry, a history of the parallel postulate, and the discovery of non-Euclidean geometry and its models.

Outcomes of the course:

Students will experience a rigorous treatment of the foundations of Euclidean geometry and an introduction to hyperbolic geometry. They will be able to discuss the history of the parallel postulate and the philosophical implications of the discovery of non-Euclidean geometry. With the perception of this profound discovery in modern mathematics, students will be better prepared to face the challenges in mathematics research or serve as perspective geometry teachers on the secondary level. Assessment may include both authentic and traditional formats, with group and individual activities, to be used in evaluation, validation, and decision-making.

Approval Date:

Spring, 1998