

**AS MATHEMATICS COURSE**  
**(Offered in AY 2017/18 Semester 1)**

**Course Code:** AAM43K  
**Course Title:** Geometry  
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**Course Description:**

Geometry is one of the most fundamental and important mathematics topics. The modern Euclidean geometry was built as an axiomatic system. But most of the people do not have chance to go through the whole geometry axiomatic system, which is important for a school mathematics teacher. This course will introduce a complete rigorous axiomatic system for Euclidean plane geometry. It will also cover briefly the non-Euclidean geometries such as Elliptic geometry and Hyperbolic geometry. By taking this course, students will have a better understanding of the following:

- (1) What is an axiomatic system? What are axioms, undefined and defined terms? What are the differences between axioms, postulations, theorems and propositions, etc.?
- (2) What are the different types of parallel postulations? How do they determine the specific type of geometry? Which geometry theorems rely on the respective parallel postulation?
- (3) What are the rigorous definition of parallel lines, triangles, angles, rays, line segments?
- (4) What is the rigorous definition of similar triangles, congruent triangles? Which of the triangle similarity tests is the fundamental one? How to deduce the rest of the similarity test from the given one?
- (5) What are the relationships between the various triangle congruency tests?
- (6) Is the summation of three interior angles of every triangle always equal to  $180^\circ$  (in every geometry)?
- (7) What are the different non-Euclidean geometries? How are they different from the Euclidean Geometry?

**Reference:**

1. Gerard A. Venema, Foundation of Geometry, Person Prentice Hall, Upper Saddle River, New Jersey 07458, 2004.
2. Judith N Cederberg, A course in modern geometries, Springer 1989, 2001

**Assessment:**

In-class participations, two tests, final exam