Math 123: General Course Outline

Catalog Description

123. Foundations of Geometry. (4) Lecture, three hours; discussion, one hour. Requisite: course 115A. Axioms and models, Euclidean geometry, Hilbert axioms, neutral (absolute) geometry, hyperbolic geometry, Poincarémodel, independence of parallel postulate.

Textbook

Henderson, *Experiencing Geometry,* 3rd Ed., Prentice Hall.

Reviews & Exams

The following schedule, with textbook sections and topics, is based on 24 lectures. The remaining classroom meetings are for leeway, reviews and midterm exams. These are scheduled by the individual instructor.

Schedule of Lectures

Lecture	Section	Topics
1-2	Chapt. 1	Euclid's geometry; Euclid's Elements, common notions, Euclid's five axioms, Propositions 1, 2 and 4 from Book 1. Instructor should consult Book 1 of Euclid's Elements.*
3-6	Chapt. 2	Logic; incidence geometry, affine and projective planes, finite geometries.
7-11	Chapt. 3	Hilbert's axioms.
12-16	Chapt. 4	Neutral geometry.
17-19	Chapt. 5	History of the parallel postulate; Wallis' postulate, Clairaut's axiom.
20-21	Chapt. 6	(pp. 177-191) "Discovery" of non-Euclidean geometry, AAA criterion in hyperbolic geometry.
22-24	Chapt. 7	(pp. 223-241) Beltrami-Klein and Poincaré models, isomorphism of the models.

Comments

*The standard source for Euclid's Elements is the Heath translation published in three volumes by Dover Press. It is important to cover at least the items from Book 1 listed above.

Outline update: T. Gamelin, 4/00

For more information, please contact Student Services, ugrad@math.ucla.edu.