Week 1: August 18

Organizational Meeting

Week 2 - August 23, 25

1.1 The Empirical Nature of pre-Hellenic Mathematics
1.2 Induction Versus Deduction
1.3 Early Greek Mathematics and the Induction of Deductive Procedures

Week 3 August 30, September 1

1.4 Material Axiomatics
1.5 The Origin of the Axiomatic Method
2.1 The Importance and Formal Nature of Euclid's *Elements*

Week 4: September 6, 8

2.2 Aristotle and Proclus on the Axiomatic Method
2.3 Euclid's Definitions, Axioms, and Postulates
2.4 Some Logical Shortcomings of Euclid's *Elements*

Week 5: September 13, 15

2.5 The End of the Greek Period and the Transition to Modern Times
3.1 Euclid's Fifth Postulate
3.2 Saccheri and the *Reductio ad Absurdum* Method

Week 6: September 20, 22

3.3 The Work of Lambert and Legendre
3.4 The Discovery of Non-Euclidean Geometry
3.5 The Consistence and the Significance of Non-Euclidean Geometry

Week 7: September 27, 29

4.1 The Work of Pasch, Peano, and Pieri
4.2 Hilbert's *Grundlagen der Geometrie*
4.3 Poincaré's Model and the Consistency of Lobachevskian Geometry

Week 8: October 4, 6

4.4 Analytic Geometry
4.5 Projective Geometry and the Principle of Duality
5.1 Emergence of Algebraic Structure

Week 9: October 11, 13

5.2 The Liberation of Algebra
5.3 Groups
5.4 The significance of Groups in Algebra and Geometry

Week 10: October 18, 20

5.5 Relations
6.1 Statement of the Modern Axiomatic Method
6.2 A Simple Example of a Branch of Pure Mathematics

Week 11: October 27

6.3 Properties of Postulate Sets – Equivalence and Consistency
6.4 Properties of Postulate Sets – Independence, Completeness, and Categoricalness
6.5 Miscellaneous Comments

Week 12: November 1, 3

7.1 Significance of the Real Number Systems for the Foundations of Analysis
7.2 The Postulational Approach to the Real Number System
7.3 The Natural Numbers and the Principle of Mathematical Induction

Week 13: November 8, 10

7.4 The Integers and the Rational Numbers
7.5 The Real Numbers and the Complex Numbers
8.1 Sets and Their Basic Relations and Operations

Week 14: November 15, 17

8.2 Boolean Algebra
8.3 Sets and the Foundations of Mathematics
8.4 Infinite Sets and Transfinite Numbers

Week 15 : November 22

8.5 Sets and the Fundamental Concepts of Mathematics
9.1 Symbolic Logic
9.2 The Calculus of Propositions

Week 16 : November 29

9.3 Other Logics
9.4 Crises in the Foundations of Mathematics
9.5 Philosophies of Mathematics

Finals Week

Final Presentations, Thursday, December 1, 2022, 3:00 pm - 4:50 pm