METHODS IN THE HISTORY OF MODERN MATHEMATICS (MHF4401)

Prerequisites: Multivariable Calculus with a grade of "C" or better.

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Textbook. I will provide lecture notes, and I will also cover several chapters of the textbooks

- *Riemanian geometry: a beginners guide* by F. Morgan, Publisher: A K Peters/CRC Press; 2 edition (January 1, 1998) ISBN-10: 1568810733
- ISBN-13: 978-1568810737

I will also use
Space, Time and Gravitation: An Outline of the General Relativity Theory by Arthur Stanley Eddington, Cambridge University Press, 1920, (available as e-books).

Course Theme

The course focuses on the mathematics, the physics and the history of gravitation. We will start with Galileo's famous falling body experiment, then will move to Newton's formalization of the laws of gravitation, and then to Einstein's theory of special and general relativity, which include a redefinition of the gravitational force. One of the key ideas of Einstein's general relativity is that gravity is not an ordinary force, but a consequence of the curvature of the space-time. In order to present the mathematics behind Einstein's theory of gravitation, we will provide a 5 weeks crash course in differential geometry and non Euclidean geometries.

Learning outcomes: Upon completion of this class, the student should be able to understand and explain some of the laws of Physics as predicted by theories of gravitation.

Assessment tools

- Two Tests at 100 points per test (at the end of Weeks 5 and 10)
- Homework worth 100 points (every 2-3 weeks)
- Comprehensive Final Exam worth 200 points.

Total Points Possible: 500 = 100%

Letter Grades: Letter grades will be assigned *approximately* as follows;

A 85-100%, B 72-84 %, C 62-71 %, D 45-57 %, F 0-44%.

(+'s and -'s will be used). I will set the official scale at the end of the semester, after all grades are in, but I may announce a new approximate scale after each exam.