

Nature of Mathematics
Math 102.5, MTR 9-10, PLC 101
Math 102.6, 1-2, PLC 101

Syllabus
Fall 2009

Course Description

This is a seminar course devoted to close reading, discussion, and student demonstration of four great ideas in mathematics: geometry, probability, calculus, and logic. There are two goals for this course - for each student to a) acquire introductory content knowledge of these great ideas and b) attain the thinking skills necessary to solve classical problems drawn from each sub-discipline. As a result of engaging with this content and skill acquisition, the student will learn how to think like a mathematician. The objectives required to achieve this goal are as follows: 1) The student will be able to enumerate the primary definitions, postulates and propositions found in each area, 2) The student will be able to describe the fundamental limitations, paradoxes, and contradictions found in each area, and 3) The student will be able to solve classical problems found in each area, both in oral and written form.

Instructor

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RAC 132

Office Hours

M 2-3, T 10-11, W 11-12, R 2-3

Reading List

Euclid. *The Thirteen books of Euclid's elements, Books 1 and 2. (Volume 1)*. Translated by T.L. Heath. 1956. 2nd Edition. Dover Publications. Mineola, NY. ISBN 978-0486600888.

K. Devlin. *The unfinished game: Pascal, Fermat, and the seventeenth-century letter that made the world modern*. 2008. Basic Books. NY, NY. ISBN978-0-465-00910-7.

S.P. Thompson & M. Gardner. *Calculus made easy*. 1998. St. Martin's Press. New York, New York. ISBN 978-0312185480.

E. Nagel & J.R. Newman. *Godel's proof*. Revised Edition. 2001. New York University Press. Washington Square. NY, NY. ISBN 978-0-8147-5837-3.

Discussion (10%)

To participate in this class is to be prepared and ready to discuss each day. This means that each person should anticipate each class session as if they themselves were responsible for leading the discussion that day. Every student is expected to be fully participatory.

Demonstrations (30%)

Mathematics is not a spectator sport. Therefore, every student will be asked to demonstrate mathematics concepts and problems periodically.

Attendance

Our class lives by virtue of you, the students enrolled in, attending, and participating in it. As such, the discussion, inquiry, and demonstration of the concepts in these texts cannot occur fully if you are absent. All students have two free absences, following which any and all absences will result in the lowering of student's final class grade by 1% for each subsequent absence.

Examinations

Euclid – September 29 (20%)

Probability & Differential Calculus – November 3 (20%)

Integral Calculus & Logic - 102.5: December 14; 102.6: December 15 (20%)

Getting Started

For August 31, read the definitions, postulates, and common notions delineated in Book I of <http://aleph0.clarku.edu/~djoyce/java/elements/toc.html>

Be prepared to discuss their meaning. These same items are also in the Euclid textbook, on pp. 153-155.

Reading, Discussion, & Writing Schedule

Geometry (12) August 31; September 1, 3, 8, 10, 14, 15, 17, 21, 22, 24, 28

Probability (5) October 1, 5, 6, 8, 12

Calculus (16) October 13, 19, 20, 22, 26, 27, 29;
November 2, 9, 10, 12, 16, 17, 19, 23, 24

Logic (6) November 30; December 1, 3, 7, 8, 10