OBSERVATORY UNIVERSITY
SPRING SEMESTER 2008

EXPLORATIONS IN MATHEMATICS (II) ***SYLLABUS***

Course description

Our experience of mathematics, whether in daily life, our careers, or our education, is often one of exposure to its applications. Some of us, if involved in fields such as engineering or finance, may see mathematics as a *tool*. If involved in science, we may experience it primarily as a *language*. Mathematics certainly encompasses these uses, but mathematics *itself* is something different. The objective of this course is to explore mathematics *as mathematicians do*, and to develop an appreciation for it as the exciting "Queen of the Sciences" that it is.

Classes meet on the 2nd and 4th Sundays (with a few exceptions).

Dates: January 13 and 27, February 10 and 24, March 9, April 13 and 27, and May 25

Time: 7-9 p.m.

Place: The Cincinnati Observatory Center
3489 Observatory Place
Cincinnati, Ohio 45208

Cost: $150 for General Public, High School Students (non-credit), & Friends of the Observatory members.
$300 for 1 Graduate Credit Hour, $150 for PDU,
$300 High School Students for Undergraduate Credit*

*(*Check with your school for possible financial support)*

To register contact: Nancy Downing 513 745-3477
Xavier University Center for Excellence in Education

Course schedule & outline

Class 1, Sunday 13 January
Introduction and exploration of questions and issues to be addressed in this course
Review of the "Monte Hall" three-door problem
(Surprising probabilities, goats, religion, and who *was* Bayes, anyway)

Class 2, Sunday 27 January
Euler's mysterious number, and pieces of *pi*
(Infinite sequences, series, Buffon's Needle, and "meditations" on transcendental numbers)

Class 3, Sunday 10 February
And I thought ALL numbers were imaginary!
(The real number system, the complex number system, and the *really complex* number system)

Class 4, Sunday 24 February
Chaos, which is anything but random
(Chance, determinism, Pink Floyd, and the Mandelbrot "monster")

Class 5, Sunday 09 March
Schoolyard rumble over parallel lines
(The Parallel Postulate, non-Euclidean geometries, gravitation, and Einstein)

Class 6, Sunday 13 April
Crisis in mathematics!
(The early 20th century and the foundations of mathematics; Russell's paradox and Godel's incompleteness theorem)

Class 7, Sunday 27 April
OPEN TOPIC

Class 8, Sunday 25 May
PROJECT PRESENTATIONS *or* FINAL EXAM