Summer Semester 2003

EDUC 411 - 3

Investigations in Secondary Mathematics

D01.00

Tuesday 13:00-16:50

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PREREQUISITE:
Co-req EDUC 415 or appropriate Math background & permission of Instructor
DESCRIPTION
SCHEDULE
It is a 3-credit course. To fulfill the requirement of 39 instructional hours (3 x13) we will meet in a scheduled 4-hour slot for the first 10 weeks of the semester.

OUTLINE
-The goal of the course is to examine secondary mathematics from an advanced standpoint, to broaden the understanding of key topics by drawing connections among various topics and representations and by situating them in a broader context, both mathematical and historical. The means towards this goal is intensive problem solving experience, followed by reflection.
-The course will involve lecture, seminar and workshop format, without explicit distinction between the different formats.
-The following is the list of topics to be addressed. The list is not sequential, as the connections among various topics are of interest in this course:

Numbers and Number systems
-Number systems from different civilization
-Number representations in different bases
-Computation in different bases, fractions in different bases, divisibility rules in different bases -- i lications for base-ten
-C itical Number sets (natural, whole, integer, rational, irrational, real)
-Relevance of their historical development to the curriculum

Functions
Examination of various definitions for a function
Representation of functions in different coordinate systems (afine, focus-directrix)
Transformation of functions
Geometry
Axiomatic systems (Euclidean, finite)
Geometry on a sphere, implications for the plane
Taxicab Geometry, implications
Investigations in Euclidean Geometry with Geometer's Sketchpad
Conic Sections
Examination of various definitions, proving their equivalence
Probability and Statistics
Examination of popular games and winning chances (Monty's Dilemma, Bingo,Slot Machines)
How to lie with Statistics - a critical look
Calculus
(Some) Fascinating theorems and formulas of mathematics
Where do they come from?
Why do they "work"?
What is fascinating about them?

GRADING: The course will be graded pass/withdrawal. Students must get a passing grade on each assignment in order to pass the course. Assignments include:Weekly homework, Problem solving portfolio, 1 ject and presentation.

REQUIRED READING
No textbook for this course. Materials will be provided by the instructor. Duplicating fee: Approx. $15.