

**SIMON FRASER UNIVERSITY
SUMMER SEMESTER 2007**

**EDUC 411-3
INVESTIGATIONS IN SECONDARY MATHEMATICS
(D01.00)**

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Office: EDB 8661
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TUESDAY 1:00-4:50 IN EDB 8620B

Prerequisite(s)/ Corequisite(s)

It is recommended to take this course concurrently with EDUC 415

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 10 times (No class June 12, July 10, July 24)

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 -- implications for base-ten

Critical 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 (affine, 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?

There is no textbook for this course. Materials will be provided by the instructor.
Duplicating fee: Approx. \$15.

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
Project and presentation