

**UNIVERSITY COLLEGE OF THE FRASER VALLEY**

**COURSE INFORMATION**

**DISCIPLINE/DEPARTMENT:** Mathematics **IMPLEMENTATION DATE:** March 1977

**Revised:** December 1996

Math 214	Analysis	3
<b>SUBJECT/NUMBER OF COURSE</b>	<b>DESCRIPTIVE TITLE</b>	<b>UCFV CREDITS</b>

**CALENDAR DESCRIPTION:** This course provides a first contact with a more analytic approach to many of the themes used in calculus. Topics include induction, limits of sequences and functions, and continuous and differentiable functions.

**RATIONALE:**

**COURSE PREREQUISITES:** Math 112 with at least a C (B recommended)

**COURSE COREQUISITES:** None

<b>HOURS PER TERM FOR EACH STUDENT</b>	<b>Lecture</b>	<b>60</b>	<b>hrs</b>	<b>Student Directed</b>	
	<b>Laboratory</b>		<b>hrs</b>	<b>Learning</b>	<b>hrs</b>
	<b>Seminar</b>		<b>hrs</b>	<b>Other - specify:</b>	
	<b>Field Experience</b>		<b>hrs</b>		<b>hrs</b>
				<b>TOTAL</b>	<b>60</b>

**MAXIMUM ENROLMENT:** 35

Is transfer credit requested?     Yes     No

**AUTHORIZATION SIGNATURES:**

Course Designer(s): D. McDowell      Chairperson: N/A  
**Curriculum Committee**  
 Department Head: S. Milner      Dean: W. Welsh  
 PAC: Approval in Principle \_\_\_\_\_ PAC: Final Approval: December 1996  
(Date) (Date)

**Math 214**

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**SYNONYMOUS COURSES:**

(a) replaces       N/A        
(course #)

(b) cannot take       N/A       for further credit  
(course #)

**SUPPLIES/MATERIALS:**

**TEXTBOOKS, REFERENCES, MATERIALS** (List reading resources elsewhere)

**The Theoretical Side of Calculus, Clark.**

**OBJECTIVES:**

To master the basic terminology, statements of definitions, and theorems used in the course.

To be able to read and understand proofs of the major results and to prove some easier results with no help.

To appreciate the method behind the madness in mathematics and to be able to decide what is a proof and what is not.

**METHODS:**

Traditional lectures, problem sessions, and longer assignments.

**STUDENT EVALUATION PROCEDURE:**

Midterms  
Assignments  
Final exam

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**COURSE CONTENT**

- I. Logic:
  - 1. Logical connectives
  - 2. Quantifiers
  
- II. Mathematical Induction:
  - 1. Introduction to proof by induction
  - 2. Axiom of mathematical induction
  - 3. Examples
  
- III. Sequences, Limits, Real Numbers:
  - 1. Sequences
  - 2. Properties of the real number system
  - 3. Limit of a sequence, examples
  - 4. Elementary theory of limits
  - 5. Completeness property
  - 6. Growth properties of certain sequences (optional)
  - 7. Further properties of the real number system (optional)
  - 8. Infinite series
  
- IV. Limits, Continuity, Differentiability:
  - 1. Limit of a function
  - 2. Other types of limits
  - 3. Continuity
  - 4. Differentiability
  
- V. Properties of Continuous Functions:
  - 1. Least upper bound, greatest lower bound
  - 2. Bolzans-Weierstrass property
  - 3. Cauchy sequences
  - 4. Properties of continuous functions
  - 5. Uniform continuity
  
- VI. Some Theorems of Calculus
  - 1. Mean value theorem
  - 2. Riemann integral
  - 3. Improper integrals
  - 4. Uniform convergence
  - 5. Power series, uniform convergence
  - 6. Taylor's theorem