UNIVERSITY COLLEGE of the FRASER VALLEY

PAC FORM #2

COURSE IMPLEMENTATION DATE:	Mar-77	
COURSE REVISED IMPLEMENTATION DATE:	Sep-03	
COURSE TO BE REVIEWED:	Sep-07	
(FOUR (4) YEARS AFTER IMPLEMENTATION DATE)	MONTH / YEAR	

OFFICIAL COURSE OUTLINE INFORMATION

Students are advised to keep course outlines in personal files for future use.

Shaded headings are subject to change at the discretion of the department and material will vary - see course syllabus available from instructor

FACULTY/DEPARTMENT: Mathematics and Statistics

COURSE NAME/NUMBER: Math 214

FORMER COURSE NUMBER:

UCFV CREDITS: 3

COURSE DESCRIPTIVE TITLE: Introduction to Analysis

CALENDAR DESCRIPTION:

This course provides an introduction to some of the fundamental ideas of mathematical analysis; the subject which forms the rigorous foundation for calculus. It also introduces the students to the concept of proof, and provides techniques for constructing and analyzing proofs. It serves as a very good preparation for upper level mathematics course. Topics include: logical connectives and quantifiers, elementary set theory including the ideas of infinite cardinality, properties of the real numbers such as density and completeness, limits and convergence of sequences and functions, continuity, differentiability, Cauchy sequences, in the Extreme and Mean value theorems, uniform continuity, and series convergence.

PREREQUISITES: Math 112 with at least a C, (a B is recommended).

COREQUISITES:

SYNONYMOUS COURSE(S)

(a) Replaces: ________ (Course #)

(b) Cannot take: ________ (Course #) for further credit

SERVICE COURSE TO:

________ (Department / Program)

________ (Department / Program)

TOTAL HOURS PER TERM: 60

STRUCTURE OF HOURS:

Lectures:	60	hrs.
Seminar:		hrs.
Laboratory:		hrs.
Field Experience:		hrs.
Student Directed Learning:		hrs.
Other (Specify):		hrs.

Combination of Lecture and Lab Hours: ________ **YES/NO**

TRAINING DAY-BASED INSTRUCTION

LENGTH OF COURSE: N/A

HOURS PER DAY: N/A

MAXIMUM ENROLMENT: 36

EXPECTED FREQUENCY OF COURSE OFFERING: every second year

	YES	NO
WILL TRANSFER CREDIT BE REQUESTED?: (Lower-level courses only)	X	
WILL TRANSFER CREDIT BE REQUESTED?: (Upper-level requested by department)		
TRANSFER CREDIT EXISTS IN BCCAT TRANSFER GUIDE:	X	

AUTHORIZATION SIGNATURES:

Course designer(s): Greg Schlitt

Chairperson: Greg Schlitt **(Curriculum Committee)**

Course reviewed by: (type name in this field)

Department Head: Greg Schlitt

Dean: (type name in this field)

PAC Approval in Principle Date: (type date in this field)

PAC Final Approval Date: 2002 12 04

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COURSE NAME / NUMBER

LEARNING OBJECTIVES / GOALS / OUTCOMES / LEARNING OUTCOMES:

This course serves two functions:

(1) To introduce the students to some of the fundamental ideas and arguments of analysis, in particular the epsilon-delta-N notions of limit and convergence, and attending arguements, results and techniques. These are the notions which form the theoretical framework for calculus, already studied in the students' first year with an informal approach.

(2) To equip the students with the tools to understand the means by which mathematics is communicated, and to criticize and construct elementary mathematical arguments, or proofs. It will thus serve as a valuable resource for students intending to study upper-level mathematics.

On completion of the course, the successful student will be able to:

(a) interpret a sentence in first-order logic, and construct such sentences

(b) recognize and construct elementary arguments using the techniques of proof by contradiction, induction, contrapositive, etc.

(c) exhibit an understanding of the notion of convergence and limit by stating definitions, establishing via formal epsilon-N-delta arguments the convergence/divergence of specific sequences, series, or functions, and constructing formal arguments which establish elementary results.

(d) be able to define the notions of supremum, density and cardinality and exhibit his/her understanding of these concepts by correctly carrying out the appropriate calculations, establishing the truth or falsity of elementry statements, and by constructing arguments for various facts.

(e) show that they understand the statements and proofs of some central analytical results, such as the Extreme Value Theorem.

METHODS:

This course will be primarily lecture-based. Evaluation will include quizzes, tests, assignments and a final exam.

PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):

Credit can be awarded for this course through PLAR **YES __X__** **NO ______**

METHODS OF OBTAINING PLAR:

Course Challenge

TEXTBOOKS, REFERENCES, MATERIALS:

[Textbook selection varies by instructor. An example of texts for this course might be:]

The text was chosen by a department curriculum committee

A First Course in Analysis, G. Pedrick, Springer Verlag (1994)

Introduction to Real Analysis, M. Stoll, Addison-Wesley (2001)

SUPPLIES / MATERIALS:

STUDENT EVALUATION:

[An example of student evaluation for this course might be:]

The weighting of the various components may vary from instructor to instructor and from year to year, although there must be at least two midterms, and the comprehensive final exam must be worth from 30% to 50% of the final grade. A student must obtain at least 40% on the final exam to pass the course.

An example of student evalution for this course:

Quizzes	10%
Assignments	20%
Tests (2)	30%
Final Exam	40%

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COURSE CONTENT:

[Course content varies by instructor. An example of course content might be:]

I. Logic:

l. Logical Connectives

2. Quantifiers

3. Argument techniques: contradiction, contrapositive, direct argument, etc.

II. Mathematical Induction:

III. Sequences, Limits, Real Numbers:

1. Sequences
2. Properties of the real number system (density, cardinality, completeness)
3. Limit of a sequence, examples
4. Elementary theory of limits

IV. Limits, Continuity, Differentiiablity:

1. Limit of a function
2. Other types of limits
3. Continuity
4. Differentiability

V. Properties of Continuous Functions:

1. Bolzano-Weirstrass property
2. Cauchy sequences
3. Properties of continuous functions (Extreme Value Theorem, Mean Value Theorem)
4. Uniform continuity

VI. Infinite Series:

1. Convergence
2. Convergence tests (with proofs)
3. Power series