UNIVERSITY COLLEGE of the FRASER VALLEY

COURSE IMPLEMENTATION DATE: January 2005
COURSE REVISED IMPLEMENTATION DATE:
COURSE TO BE REVIEWED: May 2009
(Four 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 the material will vary - see course syllabus available from instructor

FACULTY/DEPARTMENT: **Science, Health & Human Services / Mathematics & Statistics**

MATH 480		**3**
COURSE NAME/NUMBER	FORMER COURSE NUMBER	UCFV CREDITS

Selected Topics in Mathematics
COURSE DESCRIPTIVE TITLE

CALENDAR DESCRIPTION:

This course is designed for students who wish to examine in greater depth a particular topic in mathematics. It will be offered either as an individual reading course or as a seminar, depending on student and faculty interest.

Note: This course can be taken for further credit on different topics.

PREREQUISITES: **Four upper-level Mathematics courses. Certain programs of study may require more particular prerequisites. The written permission of the instructor is required.**

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:		Hrs
Seminar:	**60**	Hrs
Laboratory:		Hrs
Field Experience:		Hrs
Student Directed Learning:		Hrs
Other (Specify):		Hrs

TRAINING DAY-BASED INSTRUCTION
LENGTH OF COURSE:
HOURS PER DAY:

MAXIMUM ENROLLMENT: **24**
EXPECTED FREQUENCY OF COURSE OFFERINGS: **By student request and department approval**

WILL TRANSFER CREDIT BE REQUESTED? (lower-level courses only)	☐ Yes	☐ No
WILL TRANSFER CREDIT BE REQUESTED? (upper-level requested by department)	☐ Yes	☒ No
TRANSFER CREDIT EXISTS IN BCCAT TRANSFER GUIDE:	☐ Yes	☒ No

AUTHORIZATION SIGNATURES:

Course Designer(s): Erik Talvila
Chairperson: Gillian Mimmack *(Curriculum Committee)*
Department Head: Gillian Mimmack
Dean: Jacalyn Snodgrass
PAC Approval in Principle Date:
PAC Final Approval Date: December 10, 2004

LEARNING OBJECTIVES / GOALS / OUTCOMES / LEARNING OUTCOMES:

Note: Learning objectives will vary with the course and instructor. The following is a sample for a course on Hilbert spaces.
On completion of the course, the successful student will:

1. Use convergence and completeness arguments in Hilbert and Banach spaces.
2. Know the major examples of Hilbert spaces.
3. Expand elements of a Hilbert space in orthogonal functions and appreciate the importance of such expansions.
4. Be able to prove different types of convergence of Fourier series (mean-square and arithmetic mean of partial sums).
5. Know what the dual space is and what a linear functional is.
6. Know what a linear operator on a Hilbert space is and understand the importance of the spectrum.

METHODS:

Individual tutorials or small seminar groups

PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):

Credit can be awarded for this course through PLAR (Please check:) ☒ Yes ☐ No

METHODS OF OBTAINING PLAR:

Course challenge. Please check online at http://www.ucfv.ca/math/challenge.htm for the departmental challenge policy.

TEXTBOOKS, REFERENCES, MATERIALS:

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

The textbook is chosen by a departmental curriculum committee. Recommended texts for a course on Hilbert spaces are:

N. Young. 1988. An Introduction to Hilbert Space. Cambridge University Press.
L. Debnath and P. Mikusinski. 1997. Introduction to Hilbert Spaces with Applications. Academic Press.

SUPPLIES / MATERIALS:

STUDENT EVALUATION:

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

Assignments (4/5)	20%
Project (1)	20%
Midterm exams (2)	20%
Final exam	40%

Students must obtain at least 40% on the final exam in order to pass this course.

COURSE CONTENT:

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

This particular course content assumes the student has covered the content of MATH 211 and MATH 214.

1. Inner product spaces: linear spaces, inner products, parallelogram law.
2. Normed spaces: norms, completeness, Hilbert and Banach spaces, orthogonal expansions.
3. Fourier series: mean-square convergence, Bessel and Parvseval inequalities, Fejer kernel, Weierstrass approximation theorem.
4. Dual spaces: linear functionals, the dual space, Riesz representation theorem.
5. Linear operators: inverse, adjoint, Hermitian operators, spectral theory for compact operators, unbounded operators, differential and integral operators, contractions.