UCFV
UNIVERSITY COLLEGE of the FRASER VALLEY

OFFICIAL UNDERGRADUATE COURSE OUTLINE (page 1)

COURSE IMPLEMENTATION DATE: May 1994
COURSE REVISED IMPLEMENTATION DATE: January 2009
COURSE TO BE REVIEWED: April 2012
(four years after UPAC approval) *(month, year)*

OFFICIAL UNDERGRADUATE 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 – see course syllabus available from instructor

MATH 439	Faculty of Science	3
COURSE NAME/NUMBER	FACULTY/DEPARTMENT	UCFV CREDITS

Modern Algebra
COURSE DESCRIPTIVE TITLE

CALENDAR DESCRIPTION:

This course is a detailed study of some of the fundamental structures of modern algebra: groups, rings, and fields, which are core to much of mathematics and have applications in physics and other sciences. The emphasis will be on the logical development of the subject and the study of fundamental examples. Precise thinking, writing, and the ability to abstract are essential.

PREREQUISITES: MATH 339 or MATH 355
COREQUISITES:
PRE or COREQUISITES:

SYNONYMOUS COURSE(S):
(a) Replaces:
(b) Cross-listed with:
(c) Cannot take: for further credit.

SERVICE COURSE TO: *(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

TRAINING DAY-BASED INSTRUCTION:
Length of course:
Hours per day:

OTHER:
Maximum enrolment: **36**
Expected frequency of course offerings: Annually
(every semester, annually, every other year, etc.)

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

Course designer(s): **Greg Schlitt/Robin Endelman**

Department Head:	**Gillian Mimmack**	Date approved:	**Feb. 26, 2008**
Supporting area consultation (UPACA1)		Date of meeting:	**Mar. 7, 2008**
Curriculum Committee chair:	**Barbara Moon**	Date approved:	**April 4, 2008**
Dean/Associate VP:	**Wanda Gordon**	Date approved:	**April 2008**
Undergraduate Program Advisory Committee (UPAC) approval		Date of meeting:	**April 25, 2008**

LEARNING OUTCOMES:

Upon successful completion of this course, students will be able to:

1) demonstrate the techniques used in abstract algebra
2) give precise definitions of the major constructions in modern algebra
3) build examples and counterexamples to demonstrate algebraic properties
4) construct and present logical arguments (proofs) in the theories of groups, rings, and fields
5) be able to use the constructions and theories in other sciences (for example, physics, chemistry).

METHODS: *(Guest lecturers, presentations, online instruction, field trips, etc.)*

The course will be primarily lecture-based and may included student presentations..

METHODS OF OBTAINING PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):

☐ Examination(s) ☐ Portfolio assessment ☐ Interview(s)

☒ Other (specify): Please check online at http://www.ucfv.ca/math/challenge.htm for the departmental challenge policy.

☐ PLAR cannot be awarded for this course for the following reason(s):

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 text is:
Papantonopoulou, A. (2002) Algebra Pure and Applied. Prentice Hall.

SUPPLIES / MATERIALS:

STUDENT EVALUATION:

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

Assignments	25%
Term tests	35%
Final exam	40%

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

COURSE CONTENT:

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

Groups (7 weeks)
Basic definitions and examples
Cyclic groups, permutation groups, and Cayley's Theorem
Cosets and Lagrange's Theorem
Homomorphisms, normal subgroups and quotient groups, the Isomorphism Theorems
As time permits, selected topics from:
Direct products and the Fundamental Theorem of Finite Abelian Groups
Conjugacy classes, the Class equation
Sylow's Theorems

Rings and Fields (6 weeks)
Basic definitions and examples; matrix rings and polynomial rings
Iideals, homomorphisms, and quotient rings and fields
Integral domains, field of quotients
Euclidean domains, principal ideal domains and unique factorization domains

As time permits
Algebraic extensions, Fundamental Theorem of Algebra