UNIVERSITY COLLEGE of the FRASER VALLEY

COURSE IMPLEMENTATION DATE: September 2006
COURSE REVISED IMPLEMENTATION DATE:
COURSE TO BE REVIEWED: March 2010
(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 345		**3**
COURSE NAME/NUMBER	FORMER COURSE NUMBER	UCFV CREDITS

Modern Geometries
COURSE DESCRIPTIVE TITLE

CALENDAR DESCRIPTION:

This course will study Euclidean and non-Euclidean geometries, such as projective geometry, spherical geometry, and hyperbolic geometry, including transformations, symmetries, and applications.

PREREQUISITES: **MATH 265, MATH 211, and MATH 221, all with a C or better.**
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: **45**
STRUCTURE OF HOURS:

Lectures:	**45**	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: _____

MAXIMUM ENROLLMENT: **36**
EXPECTED FREQUENCY OF COURSE OFFERINGS: **alternate years**
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): Robin Endelman
Chairperson: Gillian Mimmack *(Curriculum Committee)*
Department Head: Gillian Mimmack
Dean: Jacalyn Snodgrass
PAC Approval in Principle Date:
PAC Final Approval Date: March 31, 2006

LEARNING OBJECTIVES / GOALS / OUTCOMES / LEARNING OUTCOMES:

Students in this course will learn about non-Euclidean geometries - e.g., projective, hyperbolic, and spherical. Students will study transformations and symmetries in Euclidean and non-Euclidean geometric settings.

Successful students will:

1) exhibit an understanding of the foundations of at least 3 different geometries,

2) provide precise definitions of fundamental concepts in the geometries studied,

3) prove basic theorems in geometry,

4) discuss transformations and symmetries in different geometries, and

5) exhibit an understanding of the general notions of distance and geodesics, independent of any particular geometry.

METHODS:

The course will be primarily lecture-based.

PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):

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

METHODS OF OBTAINING PLAR:

Examination. 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:]

G.A. Jennings, Modern Geometry with Applications, Springer-Verlag Universitext, 1994

J.N. Cederberg, A course in Modern Geometries, 2nd ed, Springer, Undergraduate Texts in Mathematics, 2001

SUPPLIES / MATERIALS:

Possible computer software: Geometer's Sketchpad, NonEuclid (freeware), Maple.

STUDENT EVALUATION:

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

Assignments	25%
Term tests	35%
Final exam	40%

COURSE CONTENT:

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

Euclidean geometry:

n-dimensional Euclidean space

Isometries: reflections, rotations, and translations

The parallel postulate, angles, and the Pythagorean theorem

Symmetries

Projective geometry:

- Projective coordinates
- Projective line, plane, and n-space
- Projective transformations
- Perspective drawing, Desargues' theorem
- Homogeneous polynomials, algebraic curves

Hyperbolic geometry:

- Parallels in hyperbolic geometry
- Area and angular defect
- Circles and distance
- Poincare's model
- Hyperbolic transformations

Spherical geometry:

- Geodesics on spheres
- Spherical triangles
- Spherical symmetries
- Application: mapmaking

Other geometries:

- Fractal geometry
- Spacetime geometry