UNIVERSITY COLLEGE of the FRASER VALLEY

COURSE IMPLEMENTATION DATE:
COURSE REVISED IMPLEMENTATION DATE: September 2005
COURSE TO BE REVIEWED: September 2009
(Four years after implementation date) (MONTH YEAR format)

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 225	**MATH 243**	**3**
COURSE NAME/NUMBER	FORMER COURSE NUMBER	UCFV CREDITS

Topics in Discrete Mathematics
COURSE DESCRIPTIVE TITLE

CALENDAR DESCRIPTION:

This course introduces the student to some of the most useful types of combinatorial structures: graphs, trees, generating functions, and recurrence relations, all of which play an important role in the mathematics of computers and computation.

PREREQUISITES: **MATH 125 (Effective September 2005: MATH 112 with a C+ or higher)**
COREQUISITES:

SYNONYMOUS COURSE(S)
(a) Replaces: **MATH 243** *(Course #)*
(b) Cannot take: **MATH 243** *(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

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

MAXIMUM ENROLLMENT: **36**
EXPECTED FREQUENCY OF COURSE OFFERINGS: **Every second year**

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): Joseph Yu
Chairperson: Peter Mulhern *(Curriculum Committee)*
Department Head: Gillian Mimmack
Dean: Jackie Snodgrass
PAC Approval in Principle Date:
PAC Final Approval Date: February 25, 2004

LEARNING OBJECTIVES / GOALS / OUTCOMES / LEARNING OUTCOMES:

This course introduces the students to some basic counting techniques, recurrence relations, generating functions, several of the important combinatorial objects such as graphs, trees, matchings, and graph algorithms.

On completion of the course, the successful student will:

a. be proficient with basic concepts, including definitions and major theorems;
b. be able to use the Principle of Inclusion and Exclusion for enumeration problems that arise in many different situations;
c. be able to construct generating functions and apply them to counting problems;
d. be able to apply some standard graph algorithms (Dijkstras shortest path algorithm, maximum matching, minimum weighted spanning tree, etc.) to solve practical problems.

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 (Please check :) ☒ Yes ☐ 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 is chosen by a departmental curriculum committee. Recent text used:
Epp, Susanna. *Discrete Mathematics with Applications*. 2nd edition. Brooks/Cole.

SUPPLIES / MATERIALS:

STUDENT EVALUATION:

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

The weighting of the components of the course may vary from instructor to instructor, although there must be at least two tests and a comprehensive final exam which must be worth at least 40% of the final grade. A student must obtain at least 40% on the final exam in order to pass the course.

An example of student evaluation for the course:

Quizzes and Assignments	20%
Midterm Exams (2)	40%
Final Exam	40%

COURSE CONTENT:

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

1. Counting
   a. The addition rule and multiplication rule
   b. The inclusion and exclusion rule
   c. Combinations and permutations

2. Generating Functions
   a. Definition and examples
   b. Partitions of integers

3. Recurrence Relations

a. The first-order linear recurrence relation
b. The second-order linear homogeneous recurrence relation
c. The method of generating functions

4. Graph Theory and Applications
    a. An introduction to graph theory
    b. Basic structures: paths and cycles
    c. Graph colouring and chromatic polynomials
    d. Trees
    e. Algorithms: shortest path, minimal spanning trees and maximal matchings