Math 104: Finite Mathematics
Spring 2024

Instructor: Suzanne Cox **Office:** 338 Madeleva
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Office Hours (in the Math Center, Madeleva 354):

Monday	2:00 pm – 3:00 pm
Tuesday	9:00 am – 11:00 am and 1:00 pm – 2:00 pm
Wednesday	Noon – 1:00 and 2:00 pm – 3:00 pm
Thursday	9:00 am – 11:00 am
Friday	9:00 am – 10:00 am and noon – 1:00 pm

Additional hours available by emailing me and requesting an appointment.

Dr. Chris Dwyer Math Center Hours:

Monday	9:00 am – 10:00 am, 1:00 pm – 2:00 pm and 3:00 pm – 4:00 pm
Tuesday	11:00 am – 1:00 pm
Wednesday	9:00 am – 10:00 am and 1:00 pm – 2:00 pm
Thursday	11:00 am – 1:00 pm
Friday	1:00 pm – 2:00 pm and 3:00 pm – 4:00 pm

Textbook: These is no textbook required for this course. Outlines for notes, homework problem sets and other needed information are available on Blackboard.

Other Tools: You will need a calculator with the capability for computing powers, roots, and binomial coefficients. If you are taking this course as a prerequisite for Math 114: Introduction to Statistics, you will want a graphing calculator of at least the level of the TI-83/84 series for that course and should therefore also use it for this course. The calculator used on quizzes and exams must be a stand-alone device (no cell phones, etc).

Course Description: The mathematical content of the course is taken from discrete (non-continuous, not calculus based) mathematics. Topics to be studied are those useful in a variety of applications and in understanding many public issues (economics, medical research, politics, and business planning) in which uncertainty or variation are important or optimization is a goal. The topics are

1. Set Theory (as a basis for classification and description);
2. Numerical Combinatorics (enumeration, counting of possibilities);
3. Probability (the mathematical approach to uncertainty and the language used for stating conclusions in medical, economic and other statistical studies);
4. Basic Statistical Terminology (random variables, basic description of “typical value” and variation);
5. Linear Programming (the current work-horse for maximizing gain, minimizing costs in constrained situations).

This course meets the general education requirements for the Mathematical Arts.

Learning Outcomes: The Sophia Learning Outcomes are formatted in italics. Elaboration as to the application of these outcomes in this course follow in plain formatting.

1. *A Saint Mary's student uses mathematical language and concepts to phrase and answer questions pertaining to a variety of real-world contexts.* In particular, she will use the language and notation of mathematics correctly and be able to
   (a) read problems (both theoretical and applied) for comprehension to obtain information necessary to solve the problems;
   (b) identify posed problems as to type studied in class;
   (c) identify representations of appropriate sets and variables according to the type of problem; and
   (d) articulate the solution to posed problems using precise language and notation.

1. *A Saint Mary's student formulates mathematical models using abstract and logical reasoning.* In particular, she will use the concepts of set theory, combinatorics, probability theory, statistics, and linear programming to formulate mathematical models.

1. *A Saint Mary's student uses and interprets models to analyze systems and patterns.* In particular, she will
   (a) interpret and translate complex problems by modeling word problems in mathematical form and carrying out the solution;
   (b) choose an appropriate technique for a posed problem;
   (c) carefully implement the technique;
   (d) explain the answer in context of the model and originally stated problem; and
   (e) adapt techniques to a more general context.

Procedures and Policies:

Attendance: A student is expected to attend class. Attendance will be taken for record keeping purposes, but will not directly affect your grade. Makeup for unexcused absences for a quiz or an exam are at the discretion of the professor.

Cancellation Policy: Class cancellations will be announced during class time or through e-mail. In the event of a last-minute cancellation, a member of the math department will make an announcement or post a note on the door.

Assignments: You should expect to work **6 – 9 hours per week** outside of class time plus 3 hours of class time. (This includes watching videos, reviewing/rewriting notes, study for quizzes and exams, and homework assignments.)

Homework is assigned for the benefit of the student. It provides the student with an opportunity to improve her understanding of the material, to reinforce her knowledge, and to catch weaknesses in her understanding before they become critical. It is expected that a student do every assignment and turn it in on the date due. Homework will be assigned on a regular basis and will be posted on Blackboard. Unless otherwise stated, homework will be due at the beginning of class every Wednesday. For unexcused absences, homework is expected to be submitted by the due date.

Send your written work with another student in the course or scan and email the work to me if you absent. Late homework may be accepted but will not receive full credit. It is fine (and often helpful) to discuss notes, assignments and solutions with other students, but all submitted work should be your own.

Quizzes: Unless otherwise announced, short quizzes will be given each Friday over the previous week's material. Unannounced and unscheduled quizzes may also be given.

Academic Honesty Policy: The college policy on academic honesty as detailed in the student handbook will be enforced. In this course academic dishonesty will result in a grade of 0 for the work involved. On quizzes and tests, no assistance (including other people, books, notes, etc.) is permitted. You should work together and/or seek help from the instructor on regular assignments, but each student must hand in her own work and is responsible for her own understanding. Copying of results is never acceptable. For more information, see the College Policy on Academic Honesty on the Academic Affairs and First Year Studies website on Academic Policies.

For students with disabilities: Any student who is eligible or believes she may be eligible for accommodations to complete the requirements and expectations of this course because of a disability should contact the Accessibility Resource Office (103C Madeleva, x4262). The ARO will review documentation and arrange for appropriate and legal accommodations. Requests for accommodations will not be honored without notification from the ARO.

Grading:	3 Exams worth 100 points each	50% of total grade
	Cumulative Final Exam	25% of total grade
	Quizzes	15% of total grade
	Homework	10% of total grade

Exam Dates: Friday, February 16
Friday, March 8
Friday, April 19

Cumulative Final Exam: Wednesday, May 8, 1:45 pm – 3:45 pm

Grading Scale:	91.5% - 100%	A
	89.5% - 91.5%	A-
	87.5% - 89.5%	B+
	81.5% - 87.5%	B
	79.5% - 81.5%	B-
	77.5% - 79.5%	C+
	71.5% - 77.5%	C
	69.5% - 71.5%	C-
	67.5% - 69.5%	D+
	59.5% - 67.5%	D
	below 59.5%	F

An important note on withdrawing from this course: Prior to 5:00 pm on Friday, April 5, you may withdraw from this course without detriment to your GPA even if your course average is below 60%. After 5:00 pm on Friday, April 5 if you withdraw and have a course average below 60%, you will receive a failing grade.

Anticipated Weekly Schedule:

Week 1	Course Introduction, Section 1.1 (Sets: terminology)
Week 2	Sections 1.2 and 1.3 (Sets: combinations, Venn diagrams, partitions)
Week 3	Sections 1.3 and 1.4 (Sets: outcomes, tree diagrams)
Week 4	Sections 2.2 and 2.3 (Counting: arrangements, partition)
Week 5	Section 2.1 (Probability, equally likely outcomes), **Exam 1**
Week 6	Sections 2.4 and 3.1 (Probability: counting, in general)
Week 7	Sections 3.2 and 3.3 (Probability: conditional probability, independence, stochastic processes and trees)
Week 8	Section 3.4 (Bayes probability), **Exam 2**
	**** SPRING BREAK *****
Week 9	Sections 3.4 and 3.5 (Bernoulli trials)
Week 10	Sections 3.5 and 4.1 (Random variables and probability density)
	***** EASTER BREAK *****
Week 11	Section 4.2 (expected value and standard deviation)
Week 12	Sections 4.2 and 7.2 (systems of linear inequalities)
Week 13	Sections 7.2, **Exam 3**
Week 14	Sections 7.1 and 7.3 (formulation of linear programming problems, graphical solutions)
Week 15	Section 7.3 (graphical solution of LP), Review
Week 16	Final Exam, Wednesday, May 8, 1:45 – 3:45