San José State University

Department of Mathematics and Statistics

Spring 2020

Math-42: Discrete Math
Sections 01, 02, 05

Course and Contact Information

Instructor:	Jeffery Cavallaro
Office Location:	Duncan Hall 209 (the TA room)
Email:	`jeffery.cavallaro@sjsu.edu`
Office Hours:	TR 9am–11:30am
Class Days/Time:	Section 01: MW 9:00am–10:15am Section 02: MW 10:30am–11:45am Section 05: TR 12:00pm–1:15pm
Classroom:	MacQuarrie Hall 424
Prerequisites:	A grade of B or higher in Math 19, or: A score of 80 or higher on the CPE.

Course Description

Discrete mathematics is a potpourri of topics involving the counting of a finite number of objects, studying the relationships between the elements of countable collections of objects, and studying processes involving a finite number of steps applied to such objects. It is the gateway to classes in mathematics involving logic and proof, number theory, combinatorics, probability, and graph theory. It is also the gateway to classes in theoretical computer science involving the study of computability and algorithms.

In this course we will concentrate on logic and methods of proof, naïve set theory, relations and functions, sequences and summation, counting with permutations and combinations, discrete probability, and some basic integer number theory.

The primary goal of this class is to train you to think mathematically and to develop some mathematical sophistication so that you are prepared for later courses.

Course Learning Outcomes

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

- Apply the rules of logic to analyze the truth value of simple, compound, and quantified mathematical statements.

- Construct mathematical proofs using the methods of direct proof, proof by contradiction, contrapositive proof, and proof by induction.
- Describe the basic tenets of naïve set theory and construct proper proofs related to subsets and set equality.
- Understand functions and construct proper proofs involving function images and preimages.
- Recognize sequences and series and determine closed forms in certain well-known cases.
- Describe how relations differ from functions and identify equivalence relations.
- Solve basic counting problems using permutations and combinations.
- Determine the probabilities of discrete events.

Required Texts/Readings

Textbook

Discrete Mathematics and Its Applications, Rosen, **8th edition**, ISBN: 978-1-259-67651-2. Either the physical book or the ebook is fine (your preference). If using the ebook then make sure that you have a device on which you can access it during class.

Web

We will use both Canvas and Connect. All class communications, including written homework assignments and grades, are available via Canvas (`sjsu.instructure.com`). Connect (`connect.mheducation.com`) is used for the major portion of the homework (see below). Once you are registered for the course you should be able to see the course listed on your Canvas account. Each student must purchase a Connect license.

Calculator

You should have a TI-84 calculator or equivalent to use on homework and exams; however, a calculator is generally not helpful since the emphasis is on closed-form, descriptive solutions as opposed to numerical answers.

Course Requirements and Assignments

Time

You will need to spend a *minimum* of 10 hours per week outside of class doing homework and studying. This class is intensive and requires disciplined study habits.

Reading

Reading from the textbook is assigned based on the course outline below. Please read each section prior to the corresponding lecture. Read everything (not just the stuff in the boxes) and make sure

that you understand and can work all of the example problems.

Web Homework

The web-based homework will be submitted via Connect. Due dates are listed with the assignments and there are no extensions. The problems assigned on Connect are problems from the book; however, the software may randomize some of the values involved.

Written Homework

In addition to the web-based homework, there are ten small written homework sets. Homework is assigned at the beginning of each week and is due at the beginning of class on the first class day in the following week. All assignments must be submitted on paper. Email and late submissions are not accepted.

Exams

There are two regular exams and a comprehensive final exam. The tentative regular exam schedule is as follows:

EXAM	SECTIONS 01 and 02	SECTION 05
1	Monday, 3/2	Tuesday, 3/3
2	Monday, 4/13	Tuesday 4/14

Prior to an exam, I will post an announcement on canvas telling you exactly what to expect on the exam. All exams are closed book and closed notes. A calculator (as described above) is allowed; however, any answers without supporting work receive zero credit.

Final

The final exam is comprehensive and is scheduled as follows:

Section 01: Monday, 5/18, 7:15am to 9:30am

Section 02: Friday, 5/15, 9:45am to 12:00pm

Section 05: Wednesday, 5/13, 9:45am to 12:00pm

Do not make any travel plans that occur prior to your exam date — attendance is mandatory.

Determination of Grades

Your semester grade is determined as follows:

Online Homework	20%
Written Homework	10%
Regular Exams	40%
Final Exam	30%

A+	100–97
A	96–93
A-	92–90
B+	89–87
B	86–83
B-	82–80
C+	79–77
C	76–70
C-	69–65
D+	64–60
D	59–55
D-	54–50
F	<50

Course Content

We will cover the following sections, tentatively scheduled on the following days:

DAY	SECTION(s)	DAY	SECTION(s)
1	1.1	16	4.1
2	1.2	17	4.2–4.3*
3	1.3	18	5.1
4	1.4–1.5	19	5.2
5	1.6	20	6.1
6	1.7	21	EXAM 2
7	12.1	22	6.2
8	12.2	23	6.3–6.4
9	2.1	24	6.5
10	2.2	25	7.1–7.2
11	EXAM 1	26	9.1
12	2.3	27	9.2–9.3
13	2.4	28	9.4
14	2.5*	29	9.5–9.6*
15	2.6*		

Sections marked with an asterisk (*) are optional and may be skipped depending on time. Please read the assigned sections prior to the corresponding class day.

Classroom Protocol

Attendance

I do not take attendance after the first week; however, it is important that you come (on time) to every class. The book has more information than we could possibly cover, so I will highlight in class what is important. Bring your book and calculator to every class meeting. If you miss a class, it is your responsibility to talk to your peers and find out what you missed.

Holidays

Class will not meet on the following days:

3/30–4/3 Spring Break

University Policies

Per University Policy S16-9 (`http://www.sjsu.edu/senate/docs/S16-9.pdf`), information relevant to all courses: academic integrity, accommodations, dropping and adding, consent for recording of class, etc., is available on the Office of Graduate and Undergraduate Programs' Syllabus Information web page at `http://www.sjsu.edu/gup/syllabusinfo`. Please make sure to review these university policies and resources.