

MATH 2430 Discrete Mathematics section name section credit hours Credits Syllabus

Course Information

Meeting times and location: section meeting_times section location

Catalog description: An introductory course encompassing set theory, logic, induction, number theory, matrices, combinatorics, graph theory, trees, and models of computation.

Prerequisites: MATH-1510(MATH-188)

Terms offered: Fall Only

Section-specific Course Description:

Course Level Objectives

Upon successful completion of San Juan College programs and degrees, the student will demonstrate competency in...

BROAD AND SPECIALIZED LEARNING Students will actively and independently acquire, apply, and adapt skills and knowledge with an awareness of global contexts.

CRITICAL THINKING

Students will think analytically and creatively to explore ideas, make connections, draw conclusions and solve problems.

CULTURAL AND CIVIC ENGAGEMENT Students will act purposefully, reflectively, and ethically in diverse and complex environments.

EFFECTIVE COMMUNICATION

Students will exchange ideas and information with clarity in multiple contexts.

INFORMATION LITERACY

Students will be able to recognize when information is needed and have the ability to locate, evaluate, and use it effectively.

INTEGRATING TECHNOLOGIES

Students will demonstrate fluency in the application and use of technologies in multiple contexts.

Student work from this class may be randomly selected and used anonymously for assessment of course, program, and/or institutional learning outcomes. For more information, please refer to the Dean of the appropriate School.

Required Texts and/or Materials



Discrete Mathematics and Its Applications 978-1259676512 Rosen McGraw-Hill Education 2018 8th

Required Technology and Software

- Canvas
- Chrome, Safari, or Firefox

Technical Support

Technical support is available through the San Juan College Help Desk 24/7/365. The help desk can be reached at 505-566-3266 or by creating a ticket at <u>San Juan College Help Desk</u>.

For tickets and password reset: San Juan College Help Desk

For Canvas support information: Canvas Support

Accessibility/Privacy Policies for all Technology Tools Used

Scroll to the middle of the linked page to view

Accessibility/Privacy Policies for all Technology Tools Used

Course Requirements

Upon successful completion of the course, the student will:

A. Mathematical Logic and Mathematical Reasoning.

A1. Know what propositions are and how to obtain their truth values.

A2. Be able to test for propositional equivalences using truth tables.

A3. Be able to work with predicates and quantifiers and give their truth values.

A4. Be able to prove and/or disprove basic results involving integers utilizing direct methods, contradiction, contraposition and/or counterexample.

A5. Be able to prove results using mathematical induction.

A6. Understand structural recursion and be able to prove results using structural induction.

B. Elementary Set Theory & Integer-Valued Functions.

B1. Be able to construct sets from basic properties and test for set membership.

B2. Be able to perform the basic operations on sets including union, intersection and complementation.

B3. Understand the meaning of and be able to compare the cardinality of finite sets and certain infinite sets (\mathbb{N} , \mathbb{Z} , \mathbb{Q} , \mathbb{R} , etc.).

- B4. Be able to represent sets using bit strings (optional).
- B5. Be able to evaluate integer-valued functions.
- B6. Be able to find the nth term of sequences given by formulas or by recurrence relations.
- B7. Be able to find the sums of finite series.

C. Factorization, Prime Numbers, Modular Arithmetic and Matrices.

C1. Be able to apply prime factorizations of numbers to find greatest common divisors and least common multiples.

C2. Be able to use the Euclidean algorithm to find greatest common divisors.

C3. Be able to use modular arithmetic in applications.

C4. Be able to add, subtract and multiply matrices.

C5. Be able to perform basic operations and Boolean products for zero-one matrices.

D. Binary (Optional: Octal & Hexadecimal) Systems.

D1. Be able to convert decimal representations to binary [optional: octal and hexadecimal], and vice-versa.

D2. Be able to perform basic arithmetic in binary [optional: octal and hexadecimal], representations.

D3. Be able to convert binary representations to octal and hexadecimal representations and vice-versa (optional).

E. Combinatorics & Basic Probability.

E1. Be able to perform basic counting arguments involving addition and multiplication.

E2. Be able to use the pigeon-hole principle.

E3. Be able to solve basic problems involving permutations and combinations.

E4. Be able to calculate elementary discrete probabilities.

F. Graph Theory

F1. Be able to identify certain basic types of simple graphs (i.e., complete, cycles, bipartite, etc.).

F2. Be able to construct graphs from adjacency matrices and incidence matrices and vice-versa.

F3. Be able to identify when certain types of graphs are isomorphic.

F4. Be able to tell when a graph has an Euler circuit or path and find such circuits or paths if they exist.

F5. Be able to find Hamilton circuits and paths in certain graphs.

F6. Be able to find shortest paths in weighted graphs.

F7. Be able to use graph coloring in applications.

G. Trees

G1. Be able to identify when a given graph is a tree.

G2. Be able to construct spanning trees.

G3. Be able to construct minimal spanning trees using the Prim and Kruskal algorithms.

H. Computation Models & Languages (Optional)

H1. Be able to represent regular languages using regular expressions.

H2. Be able to represent context-free languages using a grammar.

H3. Be able to manipulate finite state machines with no output and describe the languages

they accept ..

H4. Understand the basic classification of formal languages & the corresponding computing machines which accept them.

COVID Safe Practices for Being on Campus

COVID Safe Practices for Being on Campus

What to do if you have COVID-19 symptoms, are exposed or test positive:

- Do NOT come to campus
- Contact your Instructor
- Complete the COVID Intake Form
 - link: <u>SJC COVID-19 Intake Form on SJC Work Order System (samanage.com)</u> you will need to scroll back to the top of the screen and click the Request Item button to submit the form
- The Pandemic Coordinator will review the intake form and contact you with further guidance including when you can return to campus

Additional SJC COVID-19 information and resources and be found at the website below:

https://www.sanjuancollege.edu/coronavirus/

Student Support

Student Services and Support

At San Juan College, we support your academic success and overall health. We know that students often experience a range of stressors that can impact learning and well-being. If you, or someone you know is experiencing mental health concerns, or could benefit from effective academic strategies, there are free and confidential resources available to enrolled students through the Counseling Center. To learn more, visit the counseling center website <u>https://www.sanjuancollege.edu/student-services/advising-and-counseling-center/counseling-center/</u> or call 505-566-3404.

The Student Support webpage provides information on counseling, tutoring, technical support, and many other support services available to San Juan College students.

Student Support

Academic Support

Academic Support webpage provides information on academic advising, the library, Testing Center, and the honors program.

Participation and Attendance Policy

Mathematics is a disciplined subject requiring dedication on the part of its students. Given this, it is expected that the student will attend the zoom lectures. Attendance will definitely be taken into account in borderline cases.

Inclement Weather Information

Students will receive notification of late-starts and class cancellations due to inclement weather via the SUNS Alert app. Classes scheduled to meet face-to-face will not meet, but if practical will meet remotely via Zoom. Online classes will be held as usual. Hybrid classes and classes with Zoom options will meet on Zoom.

Canvas Participation and Expectations

Students are expected to use Canvas on a regular basis to check their grades. You can find your homework by visiting the modules session.

Instructor Response Time

MISSED ASSIGNMENTS:

The best way to contact the instructor for missed homework is by email. However, please feel free to contact by phone if needed.

Course Time Commitment

To be successful in this course students should work regularly on their assignments every week. It is very difficult to do well by cramming on the last day before the exam.

Grading

Final grades are calculated based on the following...

Grade	Range
А	90 - 100
В	80 - 89
С	70 - 79
D	60 - 70
F	Below 60

Key Dates to Remember

Full Academic Calendar

Course Schedule

Time: 4:00 - 5:15 PM: M, W

College Policies

The following information also applies to your work in this class. If you have special needs for campus emergency situations, please inform me immediately.

1. Academic Accommodations - American with Disabilities Act (ADA)

If you believe you need academic accommodations due to physical or learning disabilities, you are encouraged to contact Disability Services as soon as possible. The coordinator can work with you in verifying your disabilities and developing accommodation strategies. Please go to the <u>Disability Services website</u>, click the button for "Request for Services" and complete all the steps.

You can also contact the college's disability coordinator in the Advising/Counseling Center at 566-3271 or disabilityservices@sanjuancollege.edu. More information is available on the website listed above.

2. The Family Educational Rights and Privacy Act (FERPA)

Refer to the catalog for information regarding FERPA: <u>https://catalog.sanjuancollege.edu/content.php?catoid=12&navoid=581</u>

3. Academic Honesty Rules

San Juan College expects all students to adhere to the <u>Academic Honesty Rules</u> as posted online. These are the official guidelines for all classes at San Juan College.

4. Student Conduct Statement

College is preparation for professional opportunities, and professional conduct is expected in courses, including online classes, as well as any written communications, and interactions with members of the college community. As part of our learning community, students are expected to interact and communicate in a mature, respectful, thoughtful, and supportive manner. Students who demonstrate disrespectful, hostile, belittling, bullying or other disruptive behavior will be subject to potential consequences and possible dismissal from the college. The college will take appropriate action when students demonstrate threatening behavior (to others or self). Students should refer to the Code of Conduct in the Student Handbook for additional information.

5. Student Safety

Keeping students safe is a priority, and part of that is ensuring that we have the ability to communicate emergency messages to you. SJC SunsAlert is San Juan College's Emergency Notification System that will provide you with real-time information about campus closures, extreme weather, and other emergencies through your San Juan College email, text alerts, and phone calls. Should an emergency occur prior to activating your SJC SunsAlert, you will only receive messages through your San Juan College email. To receive a phone call and text alert, you must activate your SJC SunsAlert account and register your phone number. To activate your SJC SunsAlert account, you will need to download the Everbridge App in the App Store or Google Play. Once the app is downloaded follow these steps:

- Open the app
- Click on "Find an organization or subscription" button
- In the search box, either type in San Juan College or 87402
- Click on "SJC SunsAlert"
- Sign on using your SJC email and password
- Once you sign in, you will want to click on "Manage My Profile"
- Click on "edit"

• Include your preferred communication methods.

• Enter your cell phone number in the personal text msg field to ensure you receive text messages.

• Confirm all information (phone number & email) is correct and up to date.

• If you need help with the app, please call John Myers at 505-566-4224 or Kenny Hibner at 505-566-3050.

In the event of an emergency, an SJC SunsAlert message will be sent, and depending on the situation, you will be instructed to do one of the following:

• Evacuate the building

Shelter in place (Campus doors are locked, and operations continue as normal. During this situation, no one other than law enforcement is allowed in or out of the campus.)
Lockdown (Campus doors are locked. All operations cease, and you should take cover in your immediate area. No one other than law enforcement is allowed in or out of the campus.)
The Department of Public Safety (DPS) is available 24 hours per day. In an emergency, you can reach DPS staff by calling (505) 566-4444.

6. Non-Discrimination, Sexual Harassment, and Retaliation.

San Juan College does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender identity, national origin, disability, age, genetic, veteran's status, or on the basis of any other category protected under federal, state and local laws. If you have experienced sexual harassment, sexual assault, or any other form of protected class discrimination, we encourage you to make a report. If you report to a faculty member, she/he/they are obligated by policy to share knowledge, notice, and/or reports of harassment, discrimination, and/or retaliation with the Title IX Coordinator. These disclosures include but are not limited to reports of sexual assault, dating/domestic violence, and stalking. You may also make a confidential report to a SJC Counselor. Please refer to San Juan College's <u>Title IX</u> site for further details.

San Juan College's Title IX Coordinator is Stacey Allen, Assistant Director of Human Resources/Equity, Diversity, and Inclusion Officer. The office is located at the Educational Services Center Building, 2nd Floor, Human Resources, Room 4243 at (505) 566-3515 or <u>allens@sanjuancollege.edu</u>.

7. Drop for Non-Attendance and/or Non-Participation

Class Attendance and Participation Expectation:

<u>Face-to-Face</u> -- Students are expected to attend and participate in class regularly. Any student missing more than 10% of consecutive class time, (For example, in a regular 15-week class that meets twice a week, this equates to the student missing 3 consecutive classes) without consultation with the instructor may be considered as having abandoned the course.

<u>On-line</u> -- Students are expected to participate regularly and submit all course assignments, based on the course guide definition. A student who does not submit any assignments during a consecutive 10% of the course (1.5 weeks of a 15-week semester) without consulting the instructor, may be considered as having abandoned the course. Logging in does not meet the attendance standard.

<u>Competency-Based Education Classes</u> -- Students are expected to have regular and substantive interactions with their instructor and to actively work on course content. A student who has not submitted coursework, nor had substantive interactions with the instructor over a consecutive 10% of the term, without the instructor's prior approval, will be considered to have abandoned the competency progression. Last date of attendance will be recorded as the last date that coursework was submitted or that the student met with the instructor. For on-line learners, logging in does not meet the attendance standard.

Failure to Meet Class Participation Expectation:

Students who fail to meet participation expectations will have their last date of attendance recorded. This date will be used to recalculate any financial aid received/veteran's benefits received, and the student may be required to repay the institution/government. If the student does not drop the course, an 'X' grade will be recorded. An 'X' grade impacts the grade point average the same as an 'F'.

8. Grading Policies

Incomplete: Incomplete Grade Assignment (Incomplete Grades Information)

The grade of I (Incomplete) is given for passing work that could not be completed during the semester because of circumstances beyond the student's control. Ordinarily, the assignment of an I is given by the course instructor at the time final grades are due.

In no case is an I grade to be used to avoid assignment of D or F grades for marginal or failing work or to require a student to enroll in the class the next semester because work was not completed on time. Circumstances warranting the issuance of an I grade must be beyond the student's control and must be documented on the appropriate form prior to approval.

I grades can be removed only during the subsequent 16 weeks from the end of term, or within the time limit set by the instructor. Removal of an I is accomplished by completing the work in a manner acceptable to the instructor. Re-enrollment in the course under the repeat option does not remove the prior grade of I. Students should not re-enroll for the course. An I not made up within 16 weeks or within the time limit set by the instructor will change to an F grade thereafter and cannot be changed by work completion.

9. Grade Appeals

The policy for grade appeals is in the Academic Catalog (Grade Appeal Policy).

Student Handbook

The Student Handbook provides information on Student support, student organizations, and San Juan College policies.

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