

Math 10 – Discrete Structures
Santa Monica College – Spring 2019
MW 5:15-6:35pm (Section 4265)
Room MC 73

Instructor: Dr. Andrew Nestler

Office: MC 61

Contact: (310) 434-8515, http://homepage.smc.edu/nestler_andrew/

Class homepage: http://homepage.smc.edu/nestler_andrew/math10/math10.htm

Office hours: MW 1:30-2:00pm, T 3:30-5:00pm, Th 4:35-5:05pm; and Math 13 workshop Th 3:30-4:30pm in MC 84B. These are for drop-in assistance. No appointments are necessary.

Personal Statement: In my classes, **each student has the right to feel comfortable asking questions**, making mistakes and offering good guesses and correct solutions. I understand that students learn at different rates and respond to a variety of instruction methods. **It is important to me that we all be courteous to and respectful of one another.**

Catalog description: This course is intended for computer science, engineering, and mathematics majors. Topics include sets and relations, permutations and combinations, graphs and trees, induction, and Boolean algebras.

Text: Rosen, Kenneth, Discrete Mathematics and its Applications, McGraw Hill, 7th Ed., 2012

Prerequisite course: Math 8 (Calculus 2)

Course objectives: Upon completion of the course, students will be able to

- Determine whether a function between sets is injective, surjective or bijective.
- Determine whether an infinite set is countable or uncountable.
- Prove propositions using techniques including mathematical induction, contradiction and contrapositive.
- Prove logical equivalence of compound statements using truth tables and properties of conjunction, disjunction and negation.
- Translate an English argument into symbolic form using logical connectives, and determine whether or not an argument is valid, both with and without using truth tables.
- Find a disjunctive normal form for a Boolean function.
- Demonstrate the application of Boolean functions to logic circuits.
- Refine logic circuits using Karnaugh maps.
- Determine whether a relation is reflexive, symmetric, antisymmetric or transitive.
- Prove and use theorems about equivalence relations and orderings.
- Use the multiplication principle, permutations, combinations, and multinomial coefficients to solve basic combinatorial problems.
- Solve combinatorial problems using the pigeonhole principle, distributions, and the principle of inclusion-exclusion.
- Verify identities using combinatorial arguments.
- Create recurrence relations to model theoretical and practical problems, and solve first and second order recurrence relations.
- Prove theorems and use algorithms from graph theory related to connectedness, Eulerian graphs, and trees.

Homework and Assistance: On most days I will give a list of suggested homework problems. You will not turn in homework to me. It is essential that you spend a considerable amount of time and effort to study your notes and solve homework problems. I strongly recommend that you consider asking questions of the tutors in the

Math Lab (MC 84), open 8am-10pm Monday through Thursday and 8am-4pm on Friday. Also, you may review course concepts at Supplemental Instruction (SI) sessions, which are led by SMC students who have successfully completed this course. Visit www.smc.edu/si for schedules and locations. **As part of your homework, practice writing formal definitions and statements of important results until you know and understand them well.** Study so that you can solve exercises without the use of notes or the help of others. **I strongly recommend that you show me some of your homework solutions prior to exams, so that I may offer feedback.** An exam is your opportunity to demonstrate what you have learned as a result of your studying and my assistance. See the included “How to study for this class” page for more information.

Exams: There will be three in-class midterm exams. The approximate dates are:

Wednesday, March 13

Wednesday, April 17

Monday, May 13

Exams must be taken on schedule or earlier with instructor permission. Exceptions to the schedule may be made on a case by case basis for students with disabilities.

The final exam will be cumulative and will be at 3:30pm on Monday, June 10, according to the page

<http://www.smc.edu/EnrollmentDevelopment/Admissions/Pages/Final-Exam-Schedules.aspx>

All you need to bring for exams is pens or pencils, and perhaps an eraser. You will do all of your writing on paper provided to you. Scratch paper, notes, books, calculators and electronic devices are not permitted. Ordinarily you are expected to show all relevant work for full credit, and indicate and explain your answers clearly. **Solutions presented during lectures are models for your work.** Unless you think that there is a typographical error, or you are unable to read part of the exam, you may not ask any questions during an exam. You will be told in advance which material may be covered on an exam.

Grading: The weight of each exam score is given by:

Each of 3 midterm exams	25%
Final exam	25%

There are no make-up exams. **If you do not take one of the midterm exams** then, in a first such instance, your score for that exam will be the same as your score on the final exam. Missing additional exams results in scores of zero on those exams. A score of zero assigned due to academic dishonesty will not be replaced by the final exam score.

Your final course grade is based on your total T of points out of 1000 given by the formula $T = 2.5(E + F)$, where E is the sum of 3 midterm exam scores out of 300, and F is the final exam score out of 100. Any opportunities for extra credit will be announced to the class. With one exception, the following scores will guarantee you the corresponding grades:

<u>Points</u>	<u>Letter grade</u>	<u>Meaning</u>
900-1000	A	Excellent
760-899	B	Good
640-759	C	Satisfactory
500-639	D	Passing, less than satisfactory
0 – 499	F	Failing

The exception is that if your score on the final exam is less than 50% then you are not guaranteed a course grade of C or higher. If an illness, accident, emergency, or special circumstance beyond your control prevents you from taking the final exam, and if you are passing the class with a grade of C or better, an Incomplete grade (I) may be approved. There is no additional information regarding grading. Requesting special grading consideration due to your transfer plans or other personal situations is inappropriate and may result in disciplinary action.

Attendance: You are responsible for all material covered and all announcements and assignments made at each class, whether you are present or not. Therefore, **I recommend that you share contact information with at least one other student in this class**, so that you can find out what you missed in the event of an absence. According to SMC policy, students who do not attend each class meeting of the first week may be withdrawn. Unexcused absences may result in your being withdrawn from the course. It is your responsibility to withdraw from the course if you wish to do so. It is important to come to class on time. Students arriving late cause distractions and may miss important announcements in addition to course material; therefore, **late students may be prevented from attending class.**

Email: I may answer questions about the course material sent to my email address nestler_andrew@smc.edu. Here are the rules that apply when sending me messages for this purpose:

- (1) To ensure that I distinguish your message from unsolicited spam, send it using an SMC student email address, which you may obtain for free using Corsair Connect at <http://www.smc.edu/cc>
- (2) Include the course designation “Math 10” in the subject line, and your first and last name and SMC ID number in the body of the email.
- (3) Send me an email only to ask questions about the course material.

Email messages that do not follow these rules may be deleted without being read and do not guarantee a response.

Classroom Conduct: When you come to class, please ensure that your phones are silenced and put away. **Please do not use or check phones when class is in session.** This will help ensure that you are enjoying and contributing to a learning environment free of behavior that could cause a distraction for you, your classmates or me. **Failure to respect this instruction may result in your being removed from the classroom for up to two class meetings.** If there is a serious need to leave your cell phone on, such as a family emergency, please put it on vibrate and let me know. If you leave the classroom to take a call, I’ll understand why.

Laptops, tablets and other devices may be used in class for educational purposes such as viewing a digital copy of the textbook, taking notes, performing calculator functions, and looking up definitions in a dictionary. **All devices should be silenced.** Photos or recordings may not be taken without prior permission. Devices should not be used for any other purpose, including texting or emailing, accessing social media or surfing the Web, and gaming. If a peer tells me that your actions on your device are distracting during a lecture, **you may lose the privilege of using your device in class.**

Food, gum and beverages, other than water, are not allowed in the classroom.

Important College Policies

Withdrawal Policy: It is your responsibility to make sure that all conditions of eligibility are met. According to the schedule of classes, Saturday, May 11 is the last day to withdraw from a class with a guaranteed W. Withdrawn students will not be readmitted except in case of administrative error. Auditing classes (attending while not enrolled) is not permitted. **If you are thinking of dropping the class, please contact me** so that we can talk about your progress in the course and about your options.

Codes of Conduct: All SMC students are required to affirm their commitment to the College Honor Code. As testament to your commitment and readiness to join the Santa Monica College academic community, you and all students are expected to uphold the Honor Code. By enrolling in courses at SMC, you are certifying the following statement:

In the pursuit of the high ideals and rigorous standards of academic life, I commit myself to respect and uphold the Santa Monica College Honor Code, Code of Academic Conduct, and Student Conduct Code. I will conduct myself honorably as a responsible member of the SMC community in all endeavors I pursue.

I will pursue any suspected cases of plagiarism or cheating or other violations of the SMC Code of Academic Conduct, whether completed or merely attempted. An occurrence of academic dishonesty will result in a score of zero and an Academic Dishonesty Report form will be filed with the Campus Disciplinarian. If you touch your cell phone or it makes a sound in class, then you may receive a disciplinary sanction for violating the SMC Student Conduct Code, and you may forfeit the ability to acquire any available extra credit.

Tentative Schedule for Spring 2019 Math 10

Day	Homework assignment (additional details given in class)
M 2/11	2.1 #1-11, 17, 18, 21-32, 35-37, 39, 40; 2.2 #1-25, 29-31
W 2/13	2.3 #1-7, 10-23, 32-42
M 2/18	Campus closed
W 2/20	2.5 #5-9, 18-20, 22; #1-6 on supplemental HW in packet
M 2/25	2.5 #1-4, 10-12, 14, 15, 17, 29; #7-9 on supplemental HW in packet
W 2/27	1.7 #1-7, 10, 11, 15-18; 5.1 #5, 7, 21, 31-34, 40-43, 49; 5.2 #1, 3, 4, 29, 30
M 3/4	1.1 #1-18, 22-26, 29-31, 35-40; 1.2 #1-8; 1.3 #9, 10
W 3/6	1.1 #27, 28; 1.3 #1-33; 1.4 #59-61; 1.6 #11, 15, 16
M 3/11	12.1 #5, 6, 12, 13; 12.2 #1-4; 12.3 #1-6; 12.4 #3, 4, 6, 12, 14
W 3/13	Exam 1
M 3/18	9.1 #1, 3-7, 26-29, 51, 53; 9.3 #18, 19, 22-28, 31, 32
W 3/20	9.5 #1-23, 25-42, 44-46, 57, 58, 61, 62
M 3/25	4.1 #11-14, 24-29, 34, 35, 40 and supplemental HW in packet
W 3/27	HW given in class
M 4/1	9.6 #1-6, 9-11, 14, 15, 18-27, 32-36, 40, 41, 61, 62, 66, 67
W 4/3	6.1 #1-19, 22gh, 23c, 24bc, 25-31, 23a-g, 33-37, 40, 41, 59, 70 6.2 #1-19, 36, 44
M 4/15	6.3 #1-3, 5, 7-10, 13, 21-26, 31, 39-41
W 4/17	Exam 2
M 4/22	6.3 #6, 11, 12, 14-20, 23, 24, 27, 28, 30, 33-38
W 4/24	6.4 #1-9, 12, 13, 15, 20, 21a, 22a, 27a, 28a, 29, 30 and supplemental HW in packet
M 4/29	2.4 #16-19; 8.1 #7-9, 11-14; 8.2 #3cdefg, 4
W 5/1	6.5 #1-19, 21-23, 27, 30-32, 36-46
M 5/6	6.1 #22-24, 32h, 50; 8.5 #1-17, 20; 8.6 #1, 2, 13, 16, 21, 24, 26
W 5/8	10.1 #11-13, 10.2 #1-6, 18, 19, 20ade, 35abc, 37abc, 41, 43, 49, 50, 51, 53abc, 55; 10.4 #1, 29
M 5/13	Exam 3
W 5/15	10.4 #1, 3-6, 42, 51; 10.5 #1-10, 13-15, 26abc, 27abc
M 5/20	10.2 #20bc, 35d, 37d; 10.3 #34-45, 55, 56, 66; 10.4 #24; 10.5 #28; 10.7 #1-9, 12, 13, 18-22, 24, 25
W 5/22	11.1 #1, 2, 11a, 12a, 13a, 14, 16, 17, 31; 11.4 #2-10, 13-16, 17abc, 18abc; 11.5 #1-9
M 5/27	Campus closed
W 5/29	11.2 #1-5, 19 and supplemental HW in packet
M 6/3	Review
M 6/10	Final Exam 3:30pm

How to study for this class (and most mathematics classes)

Your goal when studying should be to obtain deep understanding of the material. This is difficult at first, because what you are learning is new to you. Often it takes hours of focused concentration to demonstrate mastery of course objectives. You may have heard that, typically, college instructors recommend that you spend between 2 and 3 hours studying for each hour spent in the classroom. But how should your study time be spent? Should you start with the first assigned homework problem and work your way forward? In my opinion: No. There is much work that you can (and should) do in between attending class and beginning work on a homework assignment.

Before you start trying to solve a single exercise from the textbook:

- 1) Read through your notes from class. Typically a lecture introduces new concepts and notation, applications of the material, and examples. Sometimes your instructor will skip some steps in calculations, or omit other verification or proofs, and suggest that you fill in these blanks after the lecture; if this is the case, make certain to do this work. Make notes of any questions that you have based on your notes, and be sure to ask someone (e.g. your instructor, a classmate, an instructional assistant at the Math Lab) if you still have questions after successfully solving homework exercises.
- 2) Memorize any new definitions that were given during the lecture. Commit these to memory by practicing writing them down. Knowing what words mean is essential. Learning definitions without understanding them has no value. Be sure that you could illustrate a definition with some examples.
- 3) Read some worked examples from the textbook. Understand each step of the solution. Again, reading without understanding is pointless.

Reading through your class notes, learning definitions, and studying textbook examples could easily take 30-60 minutes or more. This is time well spent, **before** you have even begun solving homework exercises.

Remember: work without understanding is worthless. Your work on an exercise is not done just because you have matched your answer to what appears in the back of the book; instead, your goal is to obtain the correct answer and also to understand and be able to explain each step of your solution.

Other actions you may take in order to improve understanding of the material (see syllabus for details)

Do not isolate yourself. In the first week or two of the term, introduce yourself to some other students in the class, and share contact information. Try to study or at least discuss the course material with fellow students. As the course goes on, reach out to additional students who appear to be successful.

Visit your instructor during office hours. These are times that the instructor sets aside in order to answer your questions on course material and provide feedback on your written work. No appointments are necessary. You may be able to ask questions on course material remotely, e.g. via email.

You may study and ask questions in the Math Lab (MC 84), where you also may make appointments for private tutoring appointments. For many courses, you may have the option of attending Supplemental Instruction (SI) sessions that are run by students who have achieved success in those courses and who are paired with particular instructors teaching those courses. Some instructors hold shared office hours that are available to all students taking particular courses.

Long story short: In a transfer-level math course, there is a lot for you to do to achieve success, but also, at SMC, you have many opportunities for obtaining assistance that you might need in order for you to reach your goals.

Please see other side

Some information for me

Please fill out this entire page and return this entire syllabus to me on the first day of class. You may obtain another copy of this syllabus from our class homepage.

Print your name:

SMC ID number:

Have you enrolled in Math 10 (or CS 10) at SMC in a previous term? If yes, when?

How did you place yourself in this course? Circle one of these four options:

- Grade of C or better in Math 8 at SMC
 - If yes, please give your grade, teacher's name and when you took it:

- Grade of C or better in a Calculus 2 course at another school
 - If yes, please give the school's name and your grade:

- SMC Math Assessment Test
 - If yes, when did you take the test?

- Counselor waiver
 - If yes, please explain why you have a waiver:

Has it been more than 1 year since you completed a Calculus 2 course?

When did you last successfully complete a math class (examples: "Fall 2018," "Three years ago"), and what was it?

Are you currently enrolled in high school?

Do you have a bachelor's degree?