

**Instructor:** Mr. Thomas Luckner

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**CRN:** 70952

**Section:** 201

**Class Meeting Room & Time:** MTWR 4:30-6:10pm COL 3020D

**Office:** COL 4001A (In back of 4001)

**Office Hours:** 3:30 – 4:30 MTWR

## COURSE DESCRIPTION AND OBJECTIVES

**Prerequisites:** C or better in both MATH 142 and CSCE 146

**Learning Outcomes:** Upon successful completion of the course, students should be able to:

1. translate English sentences into predicates and vice versa.
2. evaluate truth values and verify tautologies using methods of logic.
3. write recursive algorithms, prove the correctness of simple algorithms, solve simple recurrences, and use mathematical induction, in particular to show the correctness of loops.
4. use the concepts of Relations, graphs and matrices in modelling of discrete real-world phenomena.
5. use basic concepts of graphs and trees in modeling.

**Bulletin Description:** Propositional and predicate logic; proof techniques; recursion and recurrence relations; sets, combinatorics, and probability; functions, relations, and matrices; algebraic structures.

## MATERIALS

- **Textbook:** The textbook for this course is *Discrete Mathematical Structures* by Kolman, Busby, and Ross. **NOT REQUIRED!** Here is a link to a pdf version of the textbook: [https://www.dbscience.org/wp-content/uploads/2020/03/Discrete\\_Mathematical\\_Structures-Kolman.pdf](https://www.dbscience.org/wp-content/uploads/2020/03/Discrete_Mathematical_Structures-Kolman.pdf). I will also be using this edition.
- **Access to computer and Blackboard:** I will use Blackboard regularly as will you.
- **NO CALCULATORS!**

## CLASS STRUCTURE

I am sure by now you are all sick of the effects of COVID on the structure of your classes. In this class, we will be back to a “normal” classroom environment. This entails the following:

1. All assignments will be done in person during class unless discussed with instructor prior. That includes quizzes, exams, and any other forms of assessment.
2. You will be expected to work in groups and collaborate with others throughout this class. If you are at all uncomfortable with this for COVID-related reasons, please do let the instructor know. This is an easy accommodation to make.
3. Masks will NOT be required in the classroom by students. The instructor WILL lecture without a mask.
4. The class will be taught with the following design:
  - a. 70% lecture
  - b. 10% discussion
  - c. 20% worksheets/problem-solving

I usually like to give more time to worksheets and less lecture, but the pace of a summer course makes it more important to cover material. Discussion refers to moments in my lecture where I will stop and ask questions or have example problems for the class to try to gauge understanding. Worksheets are expected to be done in groups. I will be assigning groups to work on the worksheets before I give them out.

5. All homework will be assigned on Monday of every week and due on Friday of the same week. Homework will be written so that the section/chapter it derives from is known. This is in an effort to make it easy for you to break up which parts of the homework you can do throughout the week. Typically, material on the homework will be covered Monday through Thursday of the assigned week. To submit the assignment, you will need to bring it either to class to submit or into my mailbox in the coliseum (yet to be determined).
6. Assignments will be structured in difficulty. I am a firm believer that the difficulty of an assignment should match the amount of material on the assignment. Thus, here is what I call my pyramid of difficulty:
  - a. Most difficult: Homework- this is the most focused assignment, so it will be the most challenging.
  - b. Quizzes- this will contain easier problems than homework since it will cover more material.
  - c. Exams- The most material and thus the easiest problems.Easy and hard are loose words here. These are easy and hard in the instructor's eyes and may be different in yours. If there is a problem, the instructor will know in grading. Thus, do not feel the need to explain to the instructor what is hard and what is easy. Your homework should directly help you on quizzes and both of those will help you on exams. Therefore, these are the best study materials along with the worksheets.

## COURSE POLICIES AND EXPECTATIONS

**Attendance:** Attendance is expected and will be recorded via attendance sheet passed out at the beginning of class. Note this means if you are late (NO MORE THAN 15 MINUTES) and miss the attendance sheet, it is YOUR responsibility to come to the instructor after class to sign in without penalty. Absences are broken down into 2 categories:

Excused-Athletic, military, illness, family illness or death, legal, professional obligation (WITH VALID DOCUMENTATION)

Unexcused-no documentation, does not include issues above

**Absence from more than 10 percent of the scheduled class sessions, whether excused or unexcused, is excessive and the instructor will drop the final grade of a student one letter grade if this is the case (ex: A to B, B to C, etc.).** In this class, that means missing 3 classes will drop you a letter grade.

**Participation:** All members are expected to participate during class and may be called upon to respond to classroom discussions.

All participants are expected to show respect to other students, the instructors, and any guests who may be visiting the class during the year (Golden Rule). This is even more important with the winding down of the pandemic. If a grade is borderline, participation will be a key factor in determining the final grade (ex: good attendance and borderline C+/B will lend to a B).

**Cell Phones:** Cell phones are to be **off and away** during class. If one is caught with their phone out or in use, a warning will be given first. If the student is caught with their phone out a second time, **the instructor will take a point off of the most recent quiz or exam without informing the student.** If there are more than 2 times, each additional time is another point off.

**Laptops:** Since math is a difficult subject to type notes for, I will expect all laptops to be **put away and not in use** during class. If a student has a laptop out, they will be asked to put it away. **However**, if a student demonstrates a need and/or an ability to use a laptop for notes to the instructor, an exception will be made.

**Other Technology/Objects:** Technology such as smart watches are to be taken off during assessment and are not to be used during class for anything other than necessities (such as time). If a student prefers to take notes via tablet, inform the instructor that this is your preferred way to take notes. During assessments, the instructor will ask for hats with bills to be removed and an I.D. be presented to deter cheating. This will be discussed in more detail in assessment part of syllabus. If you have any questions about what can or cannot be used during class, do not be afraid to ask the instructor.

**Academic Integrity:** I expect you to familiarize yourself with the Honor Code found in the current student handbook. Keep in mind that “Any student who violates this Honor Code or who knowingly assists another to violate this Honor Code shall be subject to discipline.” Honor Code & Carolina Creed: <https://www.sa.sc.edu/creed/>

**Students with Disabilities:** Students who would like to request accommodations for disabilities must talk to me as soon as possible (after class or during office hours). Students must register with the Office of Student Disability Services (LC 112A) before I can make any accommodations.

**Studying:** This class meets four times a week for lecture for 100 minutes. It is **very** important that you study at least 2-3 hours out of class for every hour within class. Study techniques, but not all, include: reading the book or doing practice problems from homework or quizzes.

**Late/Make-Up Policy:** Exams can be made up **ONLY** in the case of an emergency, and **ONLY** if you request a make-up exam before the scheduled time. It is your responsibility to contact me within a reasonable time to request a make-up exam. If a student misses an in-class assignment with an excused-absence (quiz, in-class assessment, etc.), then the above also applies.

## ASSIGNMENTS

**Homework: HOMEWORK IS THE MOST IMPORTANT PART OF THIS CLASS!!!!** Homework will be assigned on a regular basis, and due regularly. The homework sets for the week will be put up at the beginning of the week and will be due by the end of the week. It is my recommendation you do the assigned sections before the next session is taught. This will help you not fall behind as the course will move quickly. It is your responsibility to work through the homework problems in their entirety in order to gain mastery of the material. Students are encouraged to work together on homework, but each student must personally submit his or her own solutions. Late homework will **NOT** be accepted.

**Quizzes:** There will be 6 quizzes in the semester. The first of which will be to gain an understanding of you all both in school and outside of school. The 5 others will be done on Tuesdays the week after a homework assignment was due and graded so that you have time to review and see your mistakes (except for a few). They will be 15-20 minutes at the beginning or end of class depending on the class’s decision.

**Exams:** There will be a midterm exam, whose date will be announced in class at least one week in advance. The typical structure of exams I write are as follows: 110 possible points, graded out of 100 points, no more than 10 questions, most have multiple parts. The reason for the extra 10 points is 2 things: 1) I tend to write exams that are a little too long and 2) I do not think students should be penalized for small mistakes, unless it is excessive, and this accounts for that.

**Final Exam:** The final exam is cumulative and will be taken in-class. **Final Exam, Friday, JULY 30, 2021, in Coliseum 3020D from 4 pm to 6:30 pm.** Do not plan on leaving town before this day.

## EVALUATION

|                                 |     |
|---------------------------------|-----|
| Homework and Participation..... | 25% |
| Quizzes.....                    | 20% |
| Midterm Exam .....              | 25% |
| Cumulative Final.....           | 30% |

Final Grades will use the following scale

| A       | B+     | B      | C+     | C      | D+     | D      | F    |
|---------|--------|--------|--------|--------|--------|--------|------|
| 100-90% | 89-86% | 85-80% | 79-76% | 75-70% | 69-66% | 65-60% | <60% |

#### USEFUL WEBSITES:

- Blackboard Website: <https://blackboard.sc.edu>
- Software Support for Calculations: <http://www.wolframalpha.com/> or <http://www.khanacademy.org/>
- Good app to use for notes and handouts, “Notability”

#### SUPPORT:

- My Office Hours (top of page 1)
- Student Success Center – Offers FREE tutoring and FREE 1 on 1 ONLINE tutoring.  
(<http://www.sa.sc.edu/ssc/>)

**Hint for making learning easier:** Get to class 15 minutes early, read the book’s description of today’s lesson (Can determine this by looking at homework or can ask instructor). By seeing the material ahead of time, you can help make the learning curve with the new material manageable.

**Hint for making studying for exams easier:** When you complete a homework problem or a problem in class, don’t simply move on to the next problem, but ask yourself two questions: (1) How could this show up on an exam? (2) What common mistake might I make with this problem on an exam? Do this with EVERY homework problem.

#### Important Dates:

- 06/22/2021 Last day for students to DROP without a grade of “W”.
- 07/18/2021 Last day for students to DROP or withdraw without a grade of “WF”.
- Fourth of July/Independence Day: July 5<sup>th</sup>, 2021 is a day off aka no class
- 07/08.2021 I will not be in town. Thus, there will be no class.

I. *Schedule is tentative and subject to change - Will typically follow the structure of the textbook*

| Date   | Sections Covered                                 | Topics   |
|--------|--|--|
| Jun 21 | Syllabus, Intro Quiz, 1.1                        | Sets   |
| Jun 22 | 1.2, 1.3   | Operations on Sets, Sequences  |
| Jun 23 | 1.4  | Integers, Division over the Integers   |
| Jun 24 | 1.5, 1.6   | Matrices, Mathematical Structures  |
| Jun 28 | Review HW1, 2.1                                  | Basic mathematical logic   |
| Jun 29 | Quiz 1, 2.2                                      | Conditional logic  |
| Jun 30 | 2.3, 2.4   | Methods of Mathematical proof, Induction   |
| Jul 1  | Review Quiz 1, 2.4 cont.                         |  |
| Jul 6  | Review HW 2, 3.1                                 | Permutations   |
| Jul 7  | Quiz 2, 3.2                                      | Combinations   |
| Jul 12 | Midterm Review Day / Quiz 2 Review / HW 3 Review | <b>Midterm Topics: 1.1-1.6, 2.1-2.4, 3.1, 3.2</b><br><b>NOTE: No Quiz on 3.1 and 3.2 before exam</b> |
| Jul 13 | Midterm  |  |
| Jul 14 | 3.3, 3.4   | Pigeonhole Principle, Probability  |
| Jul 15 | Review Midterm, 3.5                              | Recurrence Relations   |
| Jul 19 | Review HW 4, 4.2, 4.4                            | Relations, Properties of Relations   |
| Jul 20 | Quiz 3, 4.5                                      | Equivalence Relations  |
| Jul 21 | 5.1  | Functions  |
| Jul 22 | Review Quiz 3 9.4                                | Groups   |
| Jul 26 | Review HW 5, Fields/Rings                        | Fields/Rings   |
| Jul 27 | Quiz 4, Choice!                                  |  |
| Jul 28 | Choice!  |  |
| Jul 29 | Review for Final                                 | <b>NOTE: No Quiz covering Fields/Rings and Choice topics</b>   |
| Jul 30 | Final Exam                                       |  |

\*There will be 1 more quiz based on what seems to be a subject that requires more practice before the exam.

\*\*Choice! – The class will be asked on quiz 1 if they would prefer to learn 1 of 2 subject areas: Number Theory or Graph Theory. Both areas are highly applicable in computer science and computer engineering

Number Theory – Congruences, Chinese Remainder Theorem, Wilson’s Theorem, Fermat’s Little Theorem, Euler’s Theorem, Arithmetic Functions

Graph Theory – Trees, forests, colorings, paths, circuits