**ICSI 210 Discrete Structures – *Draft Version***

**University at Albany**

**Computer Science**

**Instructor**: Dr. Jackson Marques de Carvalho

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**Office Location**: UAB 441

**Office Hours**: To be announced.

**Term**: Spring 2023

**Class Location**: Campus Center Auditorium **Class Day/Time**: M/W 11:40 – 1:00  **TA**: To be announced.

**Office H (TA):** To be announced.

**COURSE/CATALOG DESCRIPTION**

[4 hours] (Formerly I CEN/I CSI 210) Mathematical reasoning, propositions, predicates, and quantifiers; Boolean algebra, logic minimization; sets, functions, sequences, matrix algebra; mathematical induction and recursion; number theory, modular arithmetic, counting, permutations and combinations. Only one of I CEN/I CSI/I ECE 210 may be taken for credit.

## PREREQUISITES

Prerequisite(s) or corequisite: A MAT 112.

## COURSE OVERVIEW

This course introduces the mathematical foundation for computer science. It covers set theory, functions, logic, relations and functions, Boolean algebra, combinatorics, graphs, trees, algorithms, finite-state automata, and formal languages, with an emphasis on applications in computer science.

## OBJECTIVES

Gain exposure to discrete mathematical structures and algorithms and to understand their fundamental importance in a variety of areas of computer science.

**Student Learning Objectives:**

The students will be able to:

1. Apply various methods of formal proof to determine the validity of arguments.
2. Apply discrete mathematical concepts and techniques which should serve as a preparation for more advanced courses.
3. Understand discrete mathematical structures and algorithms and their fundamental importance in a variety of areas of computer science.

## TEACHING STRATEGIES

Lecture goal: The instructor will deliver face-to-face lectures where students are encouraged to actively participate in discussions as part of the learning activities. Some of the materials regarding lectures will be available. They are provided as a courtesy by the course instructor. Students are cautioned that only studying the course notes for the course is not a suitable substitute for attending class.

## REQUIRED TEXTS

Title: Discrete Mathematics and its Applications, 8th edition  
Author: Kenneth Rosen  
Published by: McGraw-Hill, ISBN13: 978125967651

### POLICIES

### Academic Integrity

It is every student’s responsibility to become familiar with the standards of academic integrity at [University](http://www.albany.edu/studentconduct/standards_of_academic_integrity.php) at Albany. Claims of ignorance, of unintentional error, or of academic or personal pressures are not sufficient reasons for violations of academic integrity. Any incident of academic dishonesty can result in *(1)* no credit for the affected assignment, project, or exam; *(2)* report to the appropriate University authorities (e.g., Dean of Undergraduate Education or Graduate Studies), and/or *(3)* a failing grade (E) for the course.

For all assignments and papers, make sure to do your own work, except where collaboration is explicitly permitted or required. Also, make sure that you properly cite any resource from which you borrow ideas and that you clearly distinguish them from your contributions.

**Academic Dishonesty**

Issues involving dishonesty are taken very seriously and are dealt with according to College and Department policy. Academic dishonesty includes:

1) Improper access to evaluation material or records.

2) Submission of material which is not the student’s own work.

3) Conduct which interferes with the work or evaluation of other students.

Specifically, for this course, dishonesty involves:

1) Copying from another person, book, magazine, or other electronic or printed media.

2) Obtaining another person’s exam answer or answers.

3) Assisting another student in submitting work that is not the student’s own.

4) Any activity that falls under the general University at Albany definition.

Any act of academic dishonesty will result in a minimum penalty of a grade of zero (0) for that item for the first occurrence. An automatic E in the course will result for the second offense. This policy holds for homework assignments and programs, projects as well as for exams. In essence this policy applies to all work submitted by the student. Penalties will be applied to all parties involved.

**Attendance Policies**

Students are expected to attend every class meeting of courses in which they are registered. Only in specific, unavoidable situations absences from class will be excused. Unavoidable situations include illness, death in the family, religious observances, participation in university- sponsored activities, government-required activities, and any other absence which the professor approves.

## COURSE EXPECTATIONS

1. Students are expected to attend classes in adherence to the University’s Missed Class Policy.

1. Assignments are expected to be submitted on the date and according to the specific instructions included in the assignment description. On-time assignments must be submitted electronically through Blackboard as determined by the assignment and by the due date provided in the assignment description. Any assignment received after this time will be considered late. **Assignments will be accepted up to one class day after due dates, but 20% will be deducted from the grade if an assignment is late.** No assignment will be accepted more than one class day after its due date.
2. All Exams will be announced about one week in advance. All exams will be in-class. Students are expected to be present for all exams. Make-up exam will only be given in the event of an emergency, and **only if the instructor is informed in advance**. In case you cannot contact the instructor directly, you are to contact the instructor through email or call the Department and leave a message for the instructor. Failure to notify the instructor prior to missing an exam will result in a zero for the exam. Whether an absence is “excusable” is determined by the instructor. A makeup exam may have the grading weights adjusted. **There will be NO makeup quizzes for any reason.**
3. If a student is unable to appear for an exam due to serious and unavoidable circumstances, he/she must immediately contact the instructor and submit a written letter with supporting documents at the earliest opportunity.

## GRADING

There are four basic components that will be used to determine a student's grade in the course:

* + Assignments 40%
    - concept (homework) and/or programming exercises,
    - unannounced quizzes (no makeup).
  + Exam 1 30%
  + Exam 2 30%

## COMMUNICATION GUIDELINES

1. Emails will be answered within reasonable time frames during the daytime on the weekdays.

**LECTURE TOPICS**

Each week covers one or more topic(s). Lectures will cover fundamentals, not details. Students must read the text; class notes and other reference material thoroughly to learn details. The list of topics may be updated/altered as the term progresses. Also, the sequence by which topics will be covered may not necessarily be as presented here. Blackboard will be used to provide essential course materials, the most current syllabus (which may change at the instructor’s discretion), and assignments. The course will address as many of the following topics as time will allow.

1. Logic
2. Introduction to formal proof
3. Sets, functions, sequences, and sums
4. Algorithms and asymptotic notation
5. Elementary number theory
6. Induction and recursion
7. Introduction to counting
8. Introduction to probability
9. Relations
10. Recurrences
11. Graphs
12. Trees
13. Boolean Algebra and minimization of circuits
14. Languages, grammars, and language recognition