University at Albany / Computer Science

Discrete Mathematics

 ICSI 521

Fall 2016

**Meeting Time:** **Tuesday/Thursday 11:45 – 1:05pm**

 **Location:** BA 219

**Textbooks (required):**

* Kenneth H. Rogen Discrete Mathematics and its applications 7th Edition

**Suggested Readings**

* Steven G. Krantz, Discrete Mathematics Demystified
* Rowan Garnier and John Taylor, Discrete Mathematics
* Norman L. Biggs, Discrete Mathematics
* Roland Backhouse, Algorithmic Problem Solving

**COURSE DESCRIPTION / OVERVIEW**

This course will look at a deeper coverage of the content of CSI 210 at the graduate level. Proofs by induction, recursive definitions, and combinatorial analysis. Introduction to recurrence equations, graph theory, and abstract algebra. Applications to proofs, correctness, and analysis of combinatorial and algebraic algorithms.

We will look into practical applications to studied concepts in discrete maths and your current research.

 Prerequisite: CSI 210 or graduate standing.

**LEARNING OBJECTIVES / OUTCOMES:**

The aim is to give a better appreciation to discrete maths and how to better apply it to research, we will study

this course from a graduate perspective, looking in to how it applies to various disciplines and its usefulness

At the completion of the course the student will:

 Have a broader usefulness for discrete maths

 Applied to ongoing research

 Set the pace to future research and more formal approaches

**COURSE WEBSITE AND BLACKBOARD:**

Blackboard will be used to provide essential course materials, the most current syllabus, and assignment

documents and no separate course website will be maintained. However, this is not an online course and class attendance and participation is essential and required.

**ASSESSMENT AND POLICIES:**

The accomplishment of course objectives will be assessed by applying the concepts and tools for

engineering design in a combination of team and individual assignments/labs/projects, tests, and a final project that includes research and design, a written component, and an oral presentation.

**Exams:** Two exams will be given. A portion of the class period preceding each exam will be utilized for a review session. There is a take home final exam during finals week.

**Recitations:** A portion of the class period each week will be used to solve discrete math problems,

get students interacting in groups which they will maintain during the course of the semester.

**Final Project:** A final project will be required. The requirements for this assignment will be fully described in a Blackboard later in the course.

Grading

A final grade will be determined as a weighted average of these scores using the following weights:

2 Mid term Exams 20%

Recitations/Class participation 20%

Final Project 20%

Final Exams 30%

Assignment 10%

 Total possible points = 100

Grading Scale

A: 100-95 points A-: 94-90 points

B+: 89-87 points B: 84-86 points B-: 80-83 points

C+: 79-76 points C: 75-70 points

D: 69-60 points

E: 59 points and below

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, “…students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned.”

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**Attendance/Lateness/Use of Computers in class**

Students are expected to attend every class and to arrive on time. Please DO NOT disrupt the class by entering late or leaving early without instructor approval. Attendance will be taken at every class meeting.

Each unexcused absence (one approved by either instructor prior to class) will result in a 1-point deduction from your class participation grade. Computers may be used during class for note taking as long as the use is not disruptive or distracting. Also see [h](http://www.albany.edu/health_center/medicalexcuse.shtml)ttp://www.albany.edu/health\_center/medicalexcuse.shtml[.](http://www.albany.edu/health_center/medicalexcuse.shtml)

Responsible Computing

Students are required to read the University at Albany Policy for the Responsible Use of Information

Technology (<http://www.albany.edu/its/policies_responsible_use_of_IT.htm>). Students will be expected to apply the policies discussed in this document to all computing and electronic communications in the course.

**Students With Disabilities**

Reasonable accommodations will be provided for students with documented physical, sensory, systemic,

cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center

137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University’s

Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: <http://www.albany.edu/disability/docs/RAP.doc>. This website can be reached by

following the link under “Reasonable Accommodation Policy” at the following webpage [http://www.albany.edu/disability/faculty-staff.shtml.](http://www.albany.edu/disability/faculty-staff.shtml)

Academic Honesty and Overall Regulations

Every student has the responsibility to become familiar with the standards of academic integrity at the

University. Faculty members must specify in their syllabi information about academic integrity, and may

refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intelletual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (<http://www.albany.edu/undergraduate_bulletin/regulations.html>).

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| Content and Reading |
| **Topic** | **Week** | **Reading** |
| Unit 1 -Logic, Proofs and Induction |
| Introduction and Proofs | 1 | Chapter 1 |
| Induction I and II | 1, 2 | Chapter 5 |
| Number Theory | 3, 4 | Chapter 4 |
| Unit 2 - Structures, Graphs and Relations |
| Basic Structures: Sets, Functions etc. | 5,6 | Chapter 2 |
| Graph Theory and Coloring | 7 | Chapter 10 |
| Relations | 8 | Chapter 9 |
| Unit 3 - Counting |
| Basics of Counting | 9 | Chapter 6 |
| Divide and Conquer Recurrences  | 10 | Chapter 8.3 |
| Linear Recurrences  | 11 | Chapter 8.2 |
| Inclusion and Exclusion | 12 | Chapter 8.5 |
| Unit 4 - Probability |
| Probability and Applications | 13, 14 | Chapter 7 |

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| Exams, Quizzes and Recitations |
| **Exam/Quiz/Recitations** | **Date** | **Topics** |
| Exams |
| Quiz | TBD | TBD |
| Mid-term Exam 1 (Recitations)  | TBD | Logic, Proofs, Induction, Structures, Graph, Relations |
| Quiz  | TBD | TBD |
| Mid-term Exam 2  | TBD | Counting, Probability |
| Quiz  | TBD | TBD |
| Final Project | TBD | TBD |
| Final Exam (Take Home) | TBD | TBD |
| Recitations |
| Recitations 1 | Weak 1 - 4 | Induction and Proofs |
| Recitations 2 | Week 5 - 8 | Structures |
| Recitations 3 | Week 9 - 12 | Counting |
| Recitations 4 | Week 13 - 14 | Probability |
| Recitation 5 | Week 1 - 14 | Research Applications |

All dates are tentative. If you have a scheduling conflict due to extenuating circumstances, please discuss it with the instructor as soon as possible.