Math 4190: Discrete Mathematical Structures
SPRING 2019
TTh 8:00–9:15am, Martin M-203

Instructor	Matthew Macauley (`macaule@clemson.edu`) OFFICE: Martin Hall O-325 PHONE: (864) 656–1838 (no voicemail!) OFFICE HOURS: (tentative!) MWF 10:00–11:00am, or by appointment. WEBSITE: `http://www.math.clemson.edu/~macaule/classes/s19_math4190/`

Textbook

We will use several *Open Textbooks*, which means they are published under a Creative Commons license and freely available online.

- *Applied Discrete Structures*, by Ken Levasseur and Al Doerr. Version 3.5, 2018. Available at `http://faculty.uml.edu/klevasseur/ads2/`. A printed version can be purchased for $36 from `www.lulu.com`.

- *Discrete Mathematics: An Open Introduction*, by Oscar Levin. 2nd edition, 2016. Available at `http://discrete.openmathbooks.org/home.php`. A printed version can by purchashed for $12.50 on Amazon.

- *Discrete Mathematics for Computing*, by Wayne Goddard. Draft, 2018. `https://people.cs.clemson.edu/~goddard/texts/discreteMath/`

Course Description

This course is an introduction to discrete and algebraic mathematics and its applications, intended for students in computer science and engineering. Topics include set theory, counting, logic, proofs, algebra, relations, functions, recursion, generating functions, graph theory, trees, basic number theory, matrix algebra, Boolean algebra, monoids and languages, automata, basic group theory, cryptography, and coding theory.

Prerequisite MATH 3110 (Linear Algebra).

Access

All course materials will be freely available to everybody on the course webpage. *Warning*: Websites such as *Course Hero*, that download such materials and try to repackage and sell it to students, are a SCAM! (Spread the word!)

Homework

Weekly homework will be assigned using the open source program WeBWork, freely available online. There will be written homework as well, especially involving techniques such as proofs that are not well-suited for an online homework system. Late assignments will NOT be accepted.

Quizzes

There will be occasional unannounced quizzes in the beginning of class. Their purpose is to encourage you to keep with with the material, go back over the lecture notes, and give me a way to gague how everybody is doing.

Policies

- Use of cell phones and laptops are prohibited during lecture and exams. Tablets may be used for note taking only.
- I do not impose arbitrary numeric cutoff lines for final grades, e.g., A=90+, B=80–89, etc. Rather, I grade by natural "clusters." However, a final grade of 90% will guarantee an A, 80% will guarantee at least a B, 70% will guarantee at least a C, and 60% will guarantee at least a D.

- I prefer to know in advance if you cannot make a lecture, as that's just simple courtesy. Attendance will not factor into your final grade, but I will use it, and possibly your homework score, to decide borderline cases (e.g., if you end up "between clusters").
- If you get an A or B on the final exam, then you will get at least that grade in the course, as long as you (*i*) attend class very regularly, AND (*ii*) maintain a passing grade on the homework.

Learning Outcomes

By the end of the semester, students will be able to:

- Demonstrate knowledge and solve problems in several areas of discrete mathematics and number theory.
- Use basic combinatorics to count various sets of objects.
- Execute a few standard algorithms.
- Demonstrate knowledge about elementary discrete and algebraic structures.
- Read, write, and critique simple mathematical proofs.
- Apply discrete and algebraic mathematical structures to topics from cryptography, coding theory, and network / graph theory.

Grading

The final grade will be calculated as follows:

QUIZZES: 12%
HOMEWORK: 22%
MIDTERM 1: 22%
MIDTERM 2: 22%
FINAL EXAM: 44%

Note that this adds up to 122% – your lowest midterm grade OR half the weight of your final exam will be dropped.

Key Dates

Jan 9 (Wed)	Classes begin; late enrollment fee applies
Jan 15 (Tue)	Last day to register or add a class
Jan 21 (Mon)	Martin Luther King Jr. holiday
Jan 23 (Wed)	Last day to drop a class or withdraw from the University without a W grade
Mar 15 (Fri)	Last day to drop a class or withdraw from the University without final grades
Mar 18-22 (M-Fr)	Spring break
Apr 26 (Fri)	Last day of class
May 3 (Fri)	Final Exam, 7:00–9:30pm.
May 9-10 (Th-F)	Graduation

The official statement on Academic Integrity
As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a *high seminary of learning.* Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form.
When in the opinion of a faculty member, there is evidence that a student has committed an act of academic dishonesty, the faculty member shall make a formal written charge of academic dishonesty including a description of the misconduct, to the Dean of the Graduate School. At the same time, the faculty member may, but is not required to, inform each involved student privately of the nature of the alleged charge.