

**MATH 3012L: Applied Combinatorics**  
**8 Jan - 26 April 2018**  
**TR 3:00 - 4:15 in Instructional Center 105**  
[Course Webpage](#)

|            |                          |                   |                    |
|------------|--------------------------|-------------------|--------------------|
| Instructor | Shane Scott              | Lecture Assistant | Jack Olinde        |
| Email      | scottsha@gatech.edu      | Email             | jolinde@gatech.edu |
| Office     | Skiles 252               | Office            |                    |
| Hours      | TBA<br>or by appointment | Hours             | TBA                |

Welcome to Applied Combinatorics! Please attend all lectures. Come prepared with your Piazza enabled device and participate. If you haven't interrupted me with a question, you're doing it wrong.

**Textbook:** Applied Combinatorics by Keller and Trotter. [Applied Combinatorics](#). Open source 2017 edition. Available online from [Prof. Trotter's website](#).

**Resources:**

- [T-square](#) will host grades and assignments.
- [Piazza](#) will host online class Q&A and some written assignments.
- [Prof. Trotter's web page](#) has an archive of past course exams and lecture notes and videos.
- [Mathlab](#) in Culc 280 offers free tutoring from recitation instructors. Check the link for summer hours.
- The Internet. [Youtube](#) and sites like [Patrick Just Math](#) have many helpful tutorials. Forums like [Stack Exchange](#) are great for asking questions when you are stuck and want help.

**Course Objectives:** We will look at a variety of discrete structures common to applications and build up basic techniques of counting, recursion, algorithms, and graph theory. Our emphasis will be on problem solving and communicating solutions.

**Course Outline:**

|   |            |
|---|------------|
| §A/1: Motivations and Preliminaries .....           | 2 lectures |
| §2 : Strings, Sets, and Binomial Coefficients ..... | 2 lectures |
| §3: Induction .....                                 | 2 lectures |
| §4: Pigeon Hole and Complexity .....                | 2 lectures |

|   |                                    |
|---|------------------------------------|
| Exam–Chapters 2-4 .....                               | 1 Feb                              |
| §5: Graph Theory .....                                | 3 lectures                         |
| §6: Posets .....                                      | 1 lecture                          |
| §7: Inclusion-Exclusion and the Twelve-fold Way ..... | 2 lectures                         |
| §8: Generating Functions .....                        | 2 lectures                         |
| Exam– Chapters 4-7 .....                              | 6 March                            |
| §9: Recurrence .....                                  | 2 lectures                         |
| §15: Polya Counting .....                             | 2 lectures                         |
| §10: Probability .....                                | 2 lectures                         |
| §12: Graph Algorithms .....                           | 2 lectures                         |
| Exam– Chapters 9,15,10,12 .....                       | 5 April                            |
| §13-14: Network Flows .....                           | 4 lectures                         |
| Final Exam–Comprehensive .....                        | Thursday, April 26 2:50 PM-5:40 PM |

**Grade Policy:** Weekly homework or quizzes will be posted to the course website. No late submissions will be considered. There will be two topic midterms and a cumulative final. Grades will be computed with the following weights

- (a) Homework, Quizzes, Participation, Projects  $\frac{1}{10}$
- (b) Three Midterms  $\frac{1}{5}$  each
- (c) Final Exam  $\frac{3}{10}$

Cutoff grades will be F=[0,60), D=[60,70), C=[70,80), B=[80,90), A=[90,100]. Any curving will occur on a per-assignment basis. Make-up examinations will be given only in the event of a valid, documented excuse. Request regrades within one week of return by e-mailing a picture of the disputed portion of the exam to Shane.

**Final:** Thursday, April 26 2:50 PM-5:40 PM. The final exam will be cumulative and will count for 30% of the final grade. An exceptionally strong final exam score may offset to a small degree a weaker score on one of the three hour tests.

**Pizza Participation:** Piazza polls will be posted during lecture to gauge student understanding. Participation will count as optional credit to homework scores.

**Honor Code:** All students are expected to comply with the Georgia Tech Honor Code. Any evidence of cheating or other violations of the Georgia Tech Honor Code will be submitted directly to the Office of Student Integrity. The institute honor code is available at <http://www.honor.gatech.edu>.

**Important Dates:**

|                               |                                    |
|-------------------------------|------------------------------------|
| First Class .....             | 9 Jan                              |
| Add/Drop Deadline .....       | 12 Jan                             |
| Exam .....                    | 1 Feb                              |
| Exam .....                    | 6 March                            |
| Withdraw Deadline .....       | 14 March                           |
| Memorial Day (No Class) ..... | 25 May                             |
| Spring Break .....            | 19-23 March                        |
| Exam .....                    | 5 April                            |
| Last Class .....              | 24 April                           |
| Course Final .....            | Thursday, April 26 2:50 PM-5:40 PM |