# CMSC/MATH 420: Graph Theory

*20th of January, 2016*

| | |
|---|---|
| Lecture: | MWF 11:00-11:50am, Ruffner 356 |
| Website: | http://cs.longwood.edu/courses/cmsc420/s16/ |
| Professor: | Julian Dymacek |
| Office: | Ruffner 342 |
| Phone: | x2192 |
| Email: | dymacekjm@longwood.edu |
| Office hours: | M: 9am–10am<br>T: 12:30pm–1:30pm<br>W: 9am–10am, 3pm–4pm |

## Course Description

An introduction to topics in graph theory, focusing on analysis of specific applications and proofs of important theorems in the discipline. Topics include graphs, paths, and cycles; directed graphs, trees, and applications of graph theory in real world contexts.

### Prerequisites

CMSC 160 and either MATH 300 or CMSC 208.

## Course Objectives

1. introduction to fundamental graph theory topics
2. identify applications of graph theory concepts
3. application of mathematical proof and basic algorithm analysis

## Textbook and Resources

There is no set textbook for this course. Online resources will be linked on the class website.

You will be given an account on the department's computer systems.

# Course Requirements

## Tentative Course Schedule

| Week | Date | |
|---|---|---|
| 1 | Jan. 20-22 | Introduction & Definitions |
| 2 | Jan. 25-29 | Definitions |
| 3 | Feb. 1-5 | Trees |
| 4 | Feb. 8-12 | Connectivity & Eulerian |
| 5 | Feb. 15-19 | Tree Algorithms |
| 6 | Feb. 22-26 | Spanning Trees |
| | | Project 1 |
| 7 | Feb. 29-Mar. 4 | Shortest Paths |
| 8 | Mar. 7-11 | *Spring break: no classes* |
| 9 | Mar. 14-18 | Hamiltonian |
| 10 | Mar. 21-25 | Colorable |
| 11 | Mar. 28-Apr. 1 | NP-Complete Algorithms |
| 12 | Apr. 4-8 | NP-Hard Algorithms |
| 13 | Apr. 11-15 | Steinhaus Graphs |
| | | Project 2 |
| 14 | Apr. 18-22 | Additional topics |
| 15 | Apr. 25-29 | Review |
| | May. 3 | **Final Exam** Tuesday 8-10:30am |

## Important university dates

| | |
|---|---|
| Jan. 26 | Last day of Add/Drop (5pm) |
| Feb. 26 | Last day for Pass/Fail (5pm) |
| Mar. 14 | Deadline to withdraw with "W" |
| Apr. 29 | Last day of classes |

## Grading Scale

| | | | | | |
|---|---|---|---|---|---|
| | | A | 100–91 | A– | 90 |
| B+ | 89 | B | 88–81 | B– | 80 |
| C+ | 79 | C | 78–71 | C– | 70 |
| D+ | 69 | D | 68–61 | D– | 60 |

59 and lower is an F

## Graded work

This course should take about 10–12 hours of time per week. This time includes reading, assignments, class, and homework. If you are stuck on something talk to me sooner rather than later. The entire course is cumulative so you cannot afford to get behind.

**Participation & Quizzes:** You are expected to be an active participant in the class. You should be present and engaged. Pop quizzes will be given in class and cannot be made up.

**Homework:** Homework will cover problems related to the in class material. Homework assignments will be done in groups.

**Projects:** There will be two projects assigned in the class. Projects will be larger assignments and require outside research. Projects are to be your work alone.

**Exams:** There will be a final exam. The final exam will, by the nature of the course, be cumulative. Exams are to be your work alone and not discussed with anyone.

### Breakdown

| | |
|---|---|
| Projects: | 30% |
| Final Exam: | 20% |
| Homework: | 40% |
| Quizzes & Participation: | 10% |

## Policies

### Honor Code

We will follow the Longwood Honor Code in this class. When completing work please do not lie, cheat, or steal.

1. Do not lie and claim someone else's ideas as your own: you must give proper attribution
2. Do not cheat and copy work from another student or the Internet
3. Do not steal someone else's work and submit it: your files are to be written by you
4. YOU are responsible for securing YOUR code/work: do not let someone else have access to your work/files

If you are unsure if your action will violate the honor policy: DON'T DO IT. Feel free to talk with me if you have questions.

Infractions of these policies will be dealt with harshly under the Longwood Honor Code with cases turned in to the Honor Board. Any student convicted of an honor offense involving this class will automatically receive a lowered *final course grade*, potentially severe as an **F**. You should consider all work in this class to be pledged work, whether or not the pledge appears on the assignment.

### Support

Programming (and mathematical proof) is a different way of thinking about problem solving. A solution is not necessarily easy or obvious. I strongly encourage you to follow along with the class in readings and activities. When you have questions, ask. In addition to my regular office hours, you can always email to schedule a time to meet. If my office door is open feel free to stop by, if my door is closed I'm not available.

### Attendance and late work

You are expected to attend and participate in class. Attendance will be recorded in every class. In accordance with campus policy, missing more than 10% of scheduled class time to unexcused absences may, at my discretion, result in the loss of one letter grade. Missing 25% of class or more, whether excused or not, may result in an automatic failing grade.

Late work will not be accepted outside of exceptional circumstances such as serious medical or family emergencies. Most extensions will require a note from a Longwood administrator.

### Inclement weather policy

I don't plan to cancel class for weather unless the entire college shuts down. If extenuating circumstances cause me to cancel class, you will be notified by e-mail.

## Accommodations

If you have a documented disability, you should contact Longwood's Office of Disability Resources (Graham Hall, x2391) to discuss some of the support the college can offer you. All such conversations are confidential. Please speak to me early in the term to set up any special accommodations.