

MATH 4315 – Graph Theory with Applications – Section 23485  
Spring 2018

## Course Information

**Instructor:** Krešimir Josić  
josic@math.uh.edu  
PGH 624

**Time and Location:** TuTh 4:00 –5:20 pm, C 104

**Office Hours:** T 3 - 4, and by appointment

**Course Website:** <http://www.math.uh.edu/~josic>

**Textbook:** *Networks, Crowds, and Markets: Reasoning About a, Highly Connected World* by David Easley and Jon Kleinberg  
<https://www.cs.cornell.edu/home/kleinber/networks-book/>  
ISBN: 9780521195331

**Prerequisites:** MATH 3330 or 3336, and three additional hours at the MATH 3000-4000 level. I will assume some understanding of probability. Some assignments will require use of Matlab.

## Course Description

### Schedule and Attendance

This is a course about how to model the interconnectedness we see around us using the tools of graph theory. We will study complex systems of interacting agents which occur in biology, physics, and the social sciences. We will ask: How should one describe the structure of social networks? How do diseases and rumors spread along different types of networks, and how does network structure affect the speed and reach of information, memes, and diseases? Using network structure only, how can one determine which Web pages are the most important ones? Course topics include basic structural features of networks, generative models of networks, centrality, random graphs, clustering, and dynamical processes on networks.

Some of the assignments will have a computational component. These problems can be solved using Matlab, although I will accept solutions using any other programming language.

A successful student will develop sound knowledge and appreciation of some of the tools, concepts, and computations used in the study of networks.

### Grading Policy

Final grades are based on quizzes, homework and exam scores weighted as follows:

- Quiz: 5%
- Homework: 35%
- Midterm : 20%
- Final Exam: 40%

Grades will be assigned according to the usual scale:  $> 92.5$  is an A, a total between 90 and 92.5 is an A-, and so on.

## Quizzes

Quizzes will be given on most days at the beginning of class. Buy a pack of index cards (3 by 5 inches) for the quizzes. I will either assign a short problem on the website, ask you to provide a definition, or ask a question from the previous lecture. You will thus have the opportunity to get a perfect grade by reviewing the material, and solving the assigned problems at home.

## Homework

Homework will be assigned every 10 days, and should be submitted **in class** on the indicated due date. Late homework will not be accepted; however, the lowest homework scores will be dropped. Homework solutions should be prepared independently and **not copied from other sources**. You are encouraged, however, to discuss with others and consult other resources to improve your understanding.

**You should prepare the homework you submit on your own!**

## Exams

There will be one midterm exams and a final exam. The exams will be given in class on the following dates:

- Midterm: Tuesday, March 20
- Final Exam: Tuesday, May 10, 5–8pm

## Make-up Policy

There will be no make-up exams offered in this course, except in the case of a documented medical emergency. **Make-ups will not be offered to accommodate personal travel plans.**

## Additional Information

**Academic Integrity:** All UH academic integrity policies apply to this course. For a review of these policies, visit:

<http://www.uh.edu/provost/academic-affairs/policy-guidelines/honesty-policy/>

**Email Notifications:** UH policy states that all required written notices shall be addressed to the student via their UH email. Notices properly addressed and so sent shall be presumed to have been received by the student. Thus, you are responsible for the content in emails sent to your UH account, regardless if your external (non-UH) email provider filters or blocks them. Emails lost to external providers shall not be used as a justification to claim faculty are unresponsive, to appeal grades, etc.

**Learning Accommodations:** Whenever possible, and in accordance with 504/ADA guidelines, we will attempt to provide reasonable academic accommodations to students who request and require them.

**Counseling and Psychological Services:** CAPS can help students who are having difficulties managing stress, adjusting to college, or feeling sad and hopeless. You can reach CAPS ([www.uh.edu/caps](http://www.uh.edu/caps)) by calling 713-743-5454 during and after business hours for routine appointments or if you or someone you know is in crisis. No appointment is necessary for the Let's Talk program, a drop-in consultation service at convenient locations and hours around campus. [http://www.uh.edu/caps/outreach/lets\\_talk.html](http://www.uh.edu/caps/outreach/lets_talk.html)