

Networks (MAD 4934/MAD 5932)

Syllabus, Fall 2018

M,W,F 2:30–3:20 107 Love Bldg.

Professor: Prof. Richard Bertram
Office Hours: M,W,F 1:30–2:30, or by appointment
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Prerequisite: MAS3105 (Applied Linear Algebra) or some linear algebra course.

Textbook: “Networks: An Introduction” by M.E.J. Newman. (I have the first edition, but a second edition just came out. Either one should be fine.)

Course Topics: Examples of networks in science and technology, mathematical principles of network theory, network centrality, and the large-scale structure of networks.

Course Objective: This introductory course examines the properties of networks from a mathematical perspective. The main objective is to demonstrate how this is done. A second objective is to present examples of large-scale networks that we rely on every day (e.g., transportation networks, the internet and world wide web) or are part of our bodies (e.g., gene transcription and neural networks). A third objective is to familiarize students with computer software that is useful in the analysis of networks.

Computer Software: Much of what is done in this class involves operations with matrices. Matlab is the perfect software package for handling matrices, but it is not free. Scilab is a free variation of Matlab, and it can be downloaded onto any computer. You will need to have either one of these operational on your computer.

Expectations: You are expected to attend class, complete assignments, and take all exams.

Assignments: I will periodically assign homework problems. By doing these, you will get a better feel for the concepts discussed in class. On the due date of each assignment I will

randomly select students from the class to present their solutions to the problems. You must attend these problem presentation classes, or face a grade penalty (see below).

Student Lectures: Each graduate student is expected to present a lecture during the last couple of weeks of the semester. This will be on a topic of his/her choice, and should be based on a research article(s) (not the textbook) that I have approved.

Exams: There will be two 50-min midterm exams and a 2-hr cumulative final exam. There will be no make-up exams. If you miss a midterm exam, then your final exam grade will be used for the midterm exam grade. The final exam is currently scheduled for Monday of finals week at 7:30–9:30 AM. I will poll the class to come up with a more humane time and day for the exam.

Grading: Each midterm exam counts 25% of the final grade. The final exam counts 50%. With rare exceptions, your final numerical grade will be reduced by 2 points for each problem presentation day that you miss. The final letter grade is determined according to the following scale:

90.1–100% = A ,	88–90% = A⁻	
84.1–87.9% = B⁺ ,	80.1–84% = B ,	78–80% = B⁻
74.1–77.9% = C⁺ ,	68.1–74% = C ,	66.1–68% = C⁻
58–66% = D ,	0–57.9% = F	

Honor Code: A copy of the University Academic Honor Code can be found in the current Student Handbook. You are bound by this in all of your academic work. It is based on the premise that each student has the responsibility 1) to uphold the highest standards of academic integrity in the student's own work, 2) to refuse to tolerate violations of academic integrity in the University community, and 3) to foster a high sense of integrity and social responsibility on the part of the University community. You may discuss homework assignments with other students in the class, but the work you turn in must be your own. Plagiarizing the work of others is academically dishonest and will result in a grade of 0.

American Disabilities Act: Students with disabilities needing academic accommodations should: 1) register with and provide documentation to the Student Disability Resource Center (SDRC); 2) bring a letter to the instructor from SDRC indicating you need academic accommodations. This should be done within the first week of class.