

Complex Networks (PHY 320)

Spring 2014

Lecture: MWF 12:00 noon to 12:50 pm in SEB 143
Instructor: Dr. Nick Hollingshad
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Office Hours: MW 1:00 to 3:00 or by appt.

Required Text: R. Cohen and S. Havlin, Complex Networks: Structure, Robustness and Function, Cambridge University Press, 2010.

What's in it for you: The principles of nonlinear statistical physics are finding wide applicability to networks that describe the fundamental structure of many complex systems. These systems are found in fields as diverse as computer science, neurophysiology, telecommunications, economics and sociology. This course is designed provide an introduction to the theories of complexity and network science as applied to real world applications. You will receive an overview of the primary theories in complexity and network science, while concurrently working on a more in-depth project in an area of your own choosing under the guidance of the instructor.

What to expect (overview): The lecture part of this course is designed to give you a broad introduction to network science and complexity, and consequently will cover a wide array of topics. Concurrently, you will select, on consultation with the instructor, a semester-long project that will allow more in-depth exploration of a topic related to your own field of academic (or personal) interest. You will develop a definition (proposal) of your problem for presentation to the class. Over the course of the semester, you will work the problem, culminating in a paper and in-class presentation of your results. This work will include one or more graded project status meetings (outside of the scheduled lecture times) with me over the course of the semester. There will also be homework assignments, two midterm exams, and a comprehensive final exam.

Homework: Homework assignments will consist of problems in which you will apply the theories explored during lecture (as you would expect for any physics class). There will also be outside reading assignments, short essay-type assignments requiring research beyond the textbook, and other activities consistent with the material being covered.

Project: At the beginning of the semester, I will solicit areas of interest from the students and will work with you individually to select a topic in that field for your project. You will survey what is already known as a means of refining the problem definition for your project. You will then present your problem to the class; this will be your project proposal. You will work the problem over the course of the semester, with periodic (graded) progress meetings with me, culminating in a presentation during class near the end of the semester. This approach is designed to mimic (in a condensed form) the scientific research process.

Midterm and Final Exams: There will be two midterm exams. As in most physics courses, the material is cumulative, meaning that you should expect that the second exam will require you to use information covered prior to the first exam, although the focus will be on material covered *since* the first exam. The final exam will be comprehensive. The schedule for the midterm exams

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will be determined based on the progress in the class, but the first will be scheduled so that you will have results prior to the withdrawal date. The second is tentatively scheduled for early April.

Missed assignments: You will receive a grade of zero for any missed work unless you provide sufficient justification for missing the work. I will always accept an absence officially excused by the university as “sufficient justification.” Otherwise, you must provide something in writing and I will be the sole judge of what is sufficient (for example, I have in the past accepted doctor’s notes and copies of obituaries).

In the event you provide sufficient justification, the missed work will be handled as follows. In the case of homework, I will grant extensions so that you may complete the work. Progress reviews and exams must be made up no later than one week after your return.

Grading and Grading Scale

Homework	10%
Proposal	10%
Exam 1	15%
Progress Review(s)	5%
Exam 2	15%
Final Paper	25%
Final Exam	20%

90-100%	A
85-89%	B+
80-84%	B
75-79%	C+
70-74%	C
60-69%	D
0-59%	F

Class Policies:

Attendance: Attendance at lectures is not required but is strongly encouraged. However, students are solely responsible for learning the materials covered and the announcements made in the missed classes.

Electronic devices: In order to maximize student engagement and to minimize sources of distraction, neither laptop computers nor cell phones may be used when class is in session. During exams, no electronic devices of any kind may be used without my prior approval.

Honor code: You are bound by the Mercer honor code. The College’s academic misconduct policy will be followed. All work for which a grade is received must be the original work of the student without aid or assistance of another party, or any printed and or electronic data/information. Academic misconduct cases will be referred to the honor council and the student will automatically receive a grade of incomplete (IC) pending a ruling by the honor council.

Student Disabilities: Students requiring accommodations or modifications for a disability should inform the instructor at the close of the first class meeting or as soon as possible. The instructor will refer you to the ACCESS and Accommodation Office to document your disability, determine eligibility for accommodations under the ADA/Section 504 and to request a Faculty Accommodation Form. Disability accommodations or status will not be indicated on

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academic transcripts. In order to receive accommodations in a class, students with sensory, learning, psychological, physical or medical disabilities must provide their instructor with a Faculty Accommodation Form to sign. Students must return the signed form to the ACCESS Coordinator. A new form must be requested each semester. Students with a history of a disability perceived as having a disability or with a current disability who does not wish to use academic accommodations are also strongly encouraged to register with the ACCESS and Accommodation Office and request a Faculty Accommodation Form each semester. For further information, please contact Carole Burrowbridge, Director and ADA/504 Coordinator, at 301-2778 or visit the ACCESS and Accommodation Office website at <http://www.mercer.edu/disabilityservices>.

Key Dates:

January 6	First Lecture
January 20	MLK Holiday – Lecture CANCELLED
Week of March 3 (tentative)	MIDTERM EXAM 1
March 10 - 14	Spring Break – Lecture CANCELLED
March 20	Last Day for Course Withdrawal
Week of April 7 (tentative)	MIDTERM EXAM 2
April 11	Bear Day – Lecture CANCELLED
April 18	Good Friday – Lecture CANCELLED
April 28	FINAL EXAM 2:00 pm to 5:00 pm