Syllabus
DATA 890: Special Topics in Data Science for
Graduate Students
Section 03: Topics in Graphs and Hypergraphs

Course Description:
This is a graduate-level course open to a wide range of students interested in applied mathematics, network science, and machine learning. Upper-level undergraduate students are also encouraged to enroll. Graphs and hypergraphs are fundamental mathematical structures with wide-ranging applications in various fields, including computer science, mathematics, biology, social sciences, and engineering. The goal of this course is to provide a comprehensive introduction to the theory, learning techniques, and applications associated with graphs and hypergraphs.

Prerequisites:
Familiarity with calculus, linear algebra, standard machine learning concepts, and at least one programming language such as Python, MATLAB, R, C++, etc.

Lead Faculty:
Can Chen, PhD
Assistant Professor
School of Data Science and Society

Office Hours:
The instructor will hold office hours each week. The day and time will be posted on the course wall no later than Week 1. Students can attend Office Hours by logging into the live classroom.

Course Website:
Canvas (Learning Management Site)

Course Overview:
The course goal is to expose graduate students in any UNC department to a broad range of topics in the theory and applications of network science. Students will learn about classical and current methods to advance individual research efforts and facilitate interdisciplinary collaboration. Guest lectures on current research from experts in the field may also be incorporated, depending on the interests of the students, as availability allows.

Course Format/Sessions
This course is in person (ITS Manning 5106) and meets twice a week (TTH 09:30 – 10:45am) for a 16-week semester.

Course Schedule
The instructor reserves the right to change the syllabus, including topics, readings, assignments, and due dates. Any changes will be announced as early as possible. For week-by-week course details, please see the Canvas course site. Readings not freely accessible via the direct link will be in (LMS section). All assignments and readings should be completed BEFORE the course.

Course Assignments and Assessments
This course will be graded (H/P/L/F) based on attendance and participation (20%) and the completion of a final group project (80%). Each group will propose and give a ~10-minute presentation of a topic for their project midway through the term. At the conclusion of the semester, students will submit a written report and give a ~30-minute presentation on their work. The aim of the project is hands-on experience with mathematical modeling and machine learning in the student's area of interest, with feedback and guidance from the instructor. High-quality reports may be considered for submission to conferences or journals for publication.