

## COURSE AND CONTACT INFORMATION

- Course: STAT-4198-11 Network Data
- Semester: Spring 2024
- Time: Monday/Wednesday, 11:10AM - 12:25PM
- Location: 1957 E, #315

## INSTRUCTOR

- Name: Yinglei Lai, Ph.D.
- Campus Address: Rome Hall (801 22nd Street) / Room 752
- Phone: 202-994-6664
- E-mail: ylai@gwu.edu (preferred)
- Office hours: Monday, 3:00PM - 5:00PM, or by appointment

## COURSE DESCRIPTION

An introduction to network data at a fundamental level. Topics include: data structure, network graphics, network properties, network models, simulations and analysis.

## COURSE PREREQUISITES

- Fundamentals in probability and statistics
- Skills in computer/statistical programming

## LEARNING OUTCOMES

As a result of completing this course, students will be able to:

- Explore network data
- Create network graphics
- Perform network analysis

**(at a fundamental level. More course work studies and/or practical experience of advanced network data, graphics and analysis are needed for more sophisticated tasks.)**

## TEXTS

- Required: None
- Recommended
  - Luke, D.A. (2015) A User's Guide to Network Analysis in R
    - <http://www.springer.com/us/book/9783319238821>
  - Kolaczyk, E.D. (2009) Statistical Analysis of Network Data: Methods and Models
    - <http://www.springer.com/us/book/9780387881454>
  - Kolaczyk, E.D. and Csárdi, G. (2014) Statistical Analysis of Network Data with R
    - <http://www.springer.com/us/book/9781493909827>
- Additional course material will be provided by the instructor

## Average amount of direct instruction and average minimum amount of independent (out-of-class)

**learning expected per week:** For each credit, students are expected to spend a minimum of 100 minutes in independent learning for every 50 minutes of direct instruction for a minimum total of 2.5 hours per week or 37.5 hours for the semester. A 3-credit course, for example, would include 2.5 hours of direct instruction and a minimum of 5 hours of independent learning per week for a combined minimum total of 7.5 hours per week or

112.5 hours per semester. See Assignment of Credit Hour Policy (<http://provost.gwu.edu/policies-procedures-and-guidelines>) for more information.

## **WEEK-BY-WEEK (TENTATIVE) SCHEDULE OF TOPICS TO BE PRESENTED**

- Course Description, Overview and Preliminaries
  - Summary and Data Management
  - Network Graph Basics
  - Network Description and Analysis (I)
  - Network Description and Analysis (II)
  - Random Network Models
  - Statistical Network Models (I)
  - Dynamic Network Models (I)
  - Dynamic Network Models (II)
  - Network Flow Data Analysis
  - Statistical Network Models (II)
  - Network Topology Inference (I)
  - Network Topology Inference (II)
  - Modeling and Prediction for Processes on Network Graphs
- NOTE: For the final exam, please see Administration of Final Examinations during the Examination Period (<http://provost.gwu.edu/administration-final-examinations-during-examination-period>).

## **ASSIGNMENTS**

Homework/exercise assignments will be given according to the course progress.

## **GRADING**

- Homework: 30%; the lowest grade will be discarded.
  - Midterm exam/presentation/project (to be announced): 35%
  - Final exam/presentation/project (to be announced): 35%
- The Blackboard System (<http://blackboard.gwu.edu>) will be used for this course.

## **CLASS POLICIES**

- Regular class attendance
- No early or make-up homework, quiz, exam, presentation or project
  - Except under highly extraordinary circumstances, in which a written request and related documentation must be submitted as early as possible

## **UNIVERSITY POLICIES**

### **ACADEMIC INTEGRITY CODE**

Academic integrity is an essential part of the educational process, and all members of the GW community take these matters very seriously. As the instructor of record for this course, my role is to provide clear expectations and uphold them in all assessments. Violations of academic integrity occur when students fail to cite research sources properly, engage in unauthorized collaboration, falsify data, and otherwise violate the Code of Academic Integrity. If you have any questions about whether or not particular academic practices or resources are permitted, you should ask me for clarification. If you are reported for an academic integrity violation, you

should contact Student Rights and Responsibilities (SRR) to learn more about your rights and options in the process. Consequences can range from failure of assignment to expulsion from the University and may include a transcript notation. For more information, please refer to the SRR website at [studentconduct.gwu.edu/academic-integrity](http://studentconduct.gwu.edu/academic-integrity), email [rights@gwu.edu](mailto:rights@gwu.edu), or call 202-994-6757.

### **UNIVERSITY POLICY ON OBSERVANCE OF RELIGIOUS HOLIDAYS**

Students must notify faculty during the first week of the semester in which they are enrolled in the course, or as early as possible, but no later than three weeks prior to the absence, of their intention to be absent from class on their day(s) of religious observance. If the holiday falls within the first three weeks of class, the student must inform faculty in the first week of the semester. For details and policy, see “Religious Holidays” at [provost.gwu.edu/policies-procedures-and-guidelines](http://provost.gwu.edu/policies-procedures-and-guidelines).

### **USE OF ELECTRONIC COURSE MATERIALS AND CLASS RECORDINGS**

Students are encouraged to use electronic course materials, including recorded class sessions, for private personal use in connection with their academic program of study. Electronic course materials and recorded class sessions should not be shared or used for non-course related purposes unless express permission has been granted by the instructor. Students who impermissibly share any electronic course materials are subject to discipline under the Student Code of Conduct. Please contact the instructor if you have questions regarding what constitutes permissible or impermissible use of electronic course materials and/or recorded class sessions. Please contact Disability Support Services at [disabilitysupport.gwu.edu](http://disabilitysupport.gwu.edu) if you have questions or need assistance in accessing electronic course materials.

### **ACADEMIC SUPPORT**

#### **Writing Center**

GW’s Writing Center cultivates confident writers in the University community by facilitating collaborative, critical, and inclusive conversations at all stages of the writing process. Working alongside peer mentors, writers develop strategies to write independently in academic and public settings. Appointments can be booked online at [gwu.mywconline](http://gwu.mywconline).

#### **Academic Commons**

Academic Commons provides tutoring and other academic support resources to students in many courses. Students can schedule virtual one-on-one appointments or attend virtual drop-in sessions. Students may schedule an appointment, review the tutoring schedule, access other academic support resources, or obtain assistance at [academiccommons.gwu.edu](http://academiccommons.gwu.edu).

### **SUPPORT FOR STUDENTS OUTSIDE THE CLASSROOM**

#### **Disability Support Services (DSS) 202-994-8250**

Any student who may need an accommodation based on the potential impact of a disability should contact Disability Support Services at [disabilitysupport.gwu.edu](http://disabilitysupport.gwu.edu) to establish eligibility and to coordinate reasonable accommodations.

#### **Counseling and Psychological Services 202-994-5300**

GW’s Colonial Health Center offers counseling and psychological services, supporting mental health and personal development by collaborating directly with students to overcome challenges and difficulties that may interfere with academic, emotional, and personal success. [healthcenter.gwu.edu/counseling-and-psychological-services](http://healthcenter.gwu.edu/counseling-and-psychological-services).

#### **Safety and Security**

- Monitor GW Alerts and Campus Advisories to Stay Informed before and during an emergency event or situation

- In an emergency: call GWPD/EMeRG 202-994-6111 or 911
- For situation-specific actions: refer to GW's Emergency Response Handbook and Emergency Operations Plan
- In the event of an armed Intruder: Run. Hide. Fight.