**Course Information and Syllabus**

**MATH-517-30:** Social Network Analysis

**Summer 2022**

**Time & Location:** Mondays & Wednesdays 6:00pm-8:45pm

St. Marys 111

**Instructor:** Dr. Alla Webb

**Office:** TBD

**Email:**  aw1277@georgetown.edu

**Office Hours:** Virtual; By appointment only.

Mondays and Wednesdays after 8:45pm

*Appointments should be requested at least 24 hours in advance*

**Email Policy: -**Emails received *after 5pm* **or** on *holidays and weekends* will be responded on the next school day, at the earliest.

-You are expected to notify the instructor through email in case you will be missing class

**Course Overview**

This course will cover the mathematical concepts used in Social Network Analysis (SNA),

in particular those drawn from graph theory and linear algebra. The primary focus of the applications of these methods is the analysis of relational data measured on groups of social agents or graph nodes. Topics to be discussed include graph theory, link analysis, centrality measures, estimation, sampling, large-scale analysis, functional granulation, visualization of network data including issues of validity and representation, and diffusions on networks. After identifying an area of interest, students will prepare a Research Paper and Final Project that uses tools from network theory to quantify the structure of their system and provide a meaningful interpretation of their findings.

**Credits:** 3

**Course Objectives**

By the end of the course, students are expected to:

* demonstrate conceptual understanding of experimental studies of social networks
* demonstrate working with computer methods for studying networks
* demonstrate understanding of graph theory, link analysis, centrality measures, functional granulation for networking
* perform estimation, sampling, large-scale analysis for networking
* select and apply methods and computer algorithms for the analysis and interpretation of network data
* perform visualization of network data including issues of validity and representation

**Textbook**

There will be required textbooks for this course:

* Barabasi, Albert-Laszlo. Network science. Cambridge University Press, 2016.

<http://networksciencebook.com/>

* Newman, Mark. Networks: an introduction. Oxford University Press, 2018.

ISBN-10: 0199206651, ISBN-13: 978-0199206650.

* Complex Network Analysis in Python, The Pragmatic Bookshelf, 2018, ISBN-13:978-1-68050-269-5. Online Book available via GTU library.
* Edward L. Platt. Network Science with Python and NetworkX Quick Start Guide. Pact Publishing Ltd. ISBN 978-1-78995-531-6. Online Book available via GTU library.

**Course Website**

We will use the Canvas site for the course for all the lecture notes, assignments, and communications. Announcements will usually only appear on the web page.

**Calculator**

Calculators are optional. You will need a calculator for exams/assignments. The instructor will not provide support and instructions on using calculators.

**Prerequisites**

MATH-503 Mathematical Statistics or equivalent.

* Comfortable with the Linux command line
* Familiarity with SQL, R, and/or Python: students must be able to write a script to read in, write, and manipulate data
* Familiarity with data mining techniques
* Math skills: probability, statistics, matrices, linear algebra, Graphs

**Homework Assignments**

There will be weekly homework assignments. **Late homework submissions will receive a score of zero!**

**Computer Software**

Python 3.4 or greater

iGraph [(http://igraph.org/)](http://igraph.org/)

NetworkX2.3 or greater

Gephi [(https://gephi.org/)]((https://gephi.org/)%20)

**Evaluations**

There will be homework assignments, Midterm Exam, Midterm Research paper, and a Final project (Presentation & Report). Midterm Exam will be “take-home” and online.

Details regarding the projects will be provided later in the semester.

**Exam Schedule and Projects Due Dates**

*Exact dates will be announced ahead of time for each activity.*

**Grading**

Homework Assignments 40%

Midterm Exam/ Research Paper 25%

Final Project (Presentation & Report) 35%

Total 100%

**Honor Code**

Remember that your work **MUST BE YOUR OWN**. Plagiarism and cheating will be swiftly dealt with to the full extent allowed under Georgetown policies (see details [here](http://gervaseprograms.georgetown.edu/honor/system/53519.html)).

***Title IX/Sexual Misconduct***

*Georgetown University and its faculty are committed to supporting survivors and those impacted by sexual misconduct, which includes sexual assault, sexual harassment, relationship violence, and stalking. Georgetown requires faculty members, unless otherwise designated as confidential, to report all disclosures of sexual misconduct to the University Title IX Coordinator or a Deputy Title IX Coordinator. If you disclose an incident of sexual misconduct to a professor in or outside of the classroom (with the exception of disclosures in papers), that faculty member must report the incident to the Title IX Coordinator, or Deputy Title IX Coordinator. The coordinator will, in turn, reach out to the student to provide support, resources, and the option to meet. [Please note that the student is not required to meet with the Title IX coordinator.]. More information about reporting options and resources can be found on the Sexual Misconduct Website:*[*https://sexualassault.georgetown.edu/resourcecenter*](https://sexualassault.georgetown.edu/resourcecenter)*.  
  
If you would prefer to speak to someone confidentially, Georgetown has a number of fully confidential professional resources that can provide support and assistance. These resources include:*

*Health Education Services for Sexual Assault Response and Prevention: confidential email*[*sarp@georgetown.edu*](mailto:sarp@georgetown.edu)

*Counseling and Psychiatric Services (CAPS): 202.687.6985 or after hours, call (833) 960-3006 to reach Fonemed, a telehealth service; individuals may ask for the on-call CAPS clinician*

*More information about reporting options and resources can be found on the*[*Sexual Misconduct Website*](https://sexualassault.georgetown.edu/get-help/resourcecenter/)*.*