



## Department of Geography and Geoinformation Science

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# GG5 681 Social Media Analysis Spring 2022

## 1. General Information

- **Instructor:** Dr. Ziheng Sun (Jensen)
- **Where:** online via Zoom
- **When:** a learning module will be released each week on **Tuesday** and should be completed by the following **Monday (11:59pm Eastern time)**. Due dates of other course activities will be specified separately in the instructions of the activity (see Section 5).
- **Course website:** Blackboard
- **Credits:** 3.0
- **Instructor's Office Hours:**
  - **Online:** TBD
- **TA's office hours:** TBD
- **Contact method:** message board via Blackboard. Messages will typically be answered within 24-36 hours Monday to Friday; messages sent during the weekend will be answered on the following Monday. If

## 2. Course Objectives

Over the last few years, social media (e.g. Twitter, TikTok, Instagram, YouTube, etc.) have become an integral part of the modern information and communication landscape. Through social media, individuals, groups, organizations, and even nations can now acquire, probe, and deliver information, as well as shape and reshape public opinion. At the same time, social media content is increasingly related to physical geographical locations. Fueled by advances in of cloud computing, smartphone technology, web services, and spatially-aware technologies (i.e. GPS enabled devices), social media can provide a unique opportunity to observe and study the flow of information in both cyber and physical spaces. Employing a geographically-driven analysis approach enables to track how information flows, as well as to derive information about real-world events and processes. We call this approach Geosocial media analysis. In view of these developments and opportunities this course has the following objectives:

1. Provide an understanding of the fundamentals and theory upon which Social media analysis builds.
2. Introduce key analytical techniques and tools that are used in Social media analysis.
3. Explore how Social media analysis is applied in various scenarios and real-world applications (e.g., emergency response, political movements, etc.).
4. Identify and explore some of the emerging trends in Social media analysis.

### 3. Learning Outcomes

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By the end of the course each student will be able to:

1. Describe the fundamentals, theory and techniques of Social media analysis and its relation to geographic information.
2. Appropriately apply the tools, algorithms and concepts covered in the course for various hypothetical and real-world data processing tasks.
3. Given a problem or task, be capable to effectively analyze it, identify key elements and potential difficulties, and define a strategy for successfully addressing it.
4. Effectively articulate and communicate concepts and ideas related to Social media analysis through written reports and visualization products, as well as oral presentations.

### 4. Course Schedule (tentative)

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Please note that this schedule is **tentative** – The course instructor may change this schedule depending on the course needs and the instructor's evaluation of the overall class progress. For up-to-date information on the course schedule please refer to the course website on Blackboard.

Module Release Date	Learning Module	Exam	Project Activity	Assignment	
				Release*	Due*
1/25	Introduction and overview				
2/1	Sensing our environment				
2/8	What is social media?			Lab 1	
2/15	Social media data harvesting			Lab 2	Lab 1
2/22	Graphs and networks				Lab 2
3/1	Node level measures			Lab 3	
3/8	Midterm	Midterm			
3/15	Eigenvector-based centrality		Project Assigned	Lab 4	Lab 3
3/22	Transitivity, reciprocity, and similarity				
3/29	Community detection				Lab 4
4/4	Network visualization		Proposal Abstract	Lab 5	
4/11	Geosocial media clustering				Lab 5
4/18	Content analysis (1)		Progress Report		
4/25	Content analysis (2)				
5/3	Summary and project presentations		Final Report		

\*For information on the exact release and due dates of learning modules and assignments, please see Section 5 of the syllabus.

### 5. Course Format

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The course will be delivered as a distance-learning course that combines individual review and study of course materials, as well as online synchronous and asynchronous discussions and other interactions. The key building blocks of this course are **learning modules**, which are built around a specific topic in the course. Throughout the semester course activities will be following this schedule:

- Each week a learning module will be released on **Wednesday**. Each module should be completed within one week (unless stated otherwise in the course schedule, see Section 9). If a learning module includes an assignment it will be released with the module.
- Assignments will be due by **Monday** by 11:59pm (Eastern Time). Typically, one **or** two weeks will be given to complete the assignment, depending on its scope. The exact due date of each assignment will be indicated in the assignment instructions.
- In each week a Zoom session (time TBD) will be held to discuss any questions or issues.
- The course discussion board will be monitored every day during regular business hours (except for weekends and university holidays).

## 6. Reading materials and video resources

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The learning modules in the course will typically include both reading materials (e.g. scientific papers, book chapters, written tutorials, etc.) and short videos that review, explain, or demonstrate various topics. **You are required to review all these materials.**

As the theme of this course is part of an emerging research field, there is no single textbook or resource that will cover all the course materials. Accordingly, the course reading materials will include a selected collection of academic papers, reports and white papers, book chapters, and other online resources. Links to (or instructions on how to obtain) all materials will be made available on the course website per the course schedule.

## 7. Technology Requirements

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**Please note:** for your convenience, the GGS computer lab that is in Exploratory Hall 2202 is available to you for your work in this course. This lab is equipped with high-end PCs and have the software components you will need to participate in this course.

### 7.1 Hardware

In order to participate in the course you **must** have access to:

- A Windows or Macintosh (Intel based) computer with **at least 4 GB of RAM** (8 GB of ram is highly recommended) and a dual core (or better) processor is highly recommended.
- A reliable broadband Internet connection.
- A computer headset with a microphone (a headset with a separate microphone can also be used).
- A microphone. Please note that if you wish to use your computer “built-in” microphone you **must** use a headset.
- A web camera is highly recommended but not required.

### 7.2 Instructional Software

To deliver the course and support its activities the following software tools are required:

- A supported web browser (See [Blackboard Support](#) for supported web browsers)
- Access to the course’s Blackboard website (Log into <http://mymason.gmu.edu>, select the Courses Tab)
- Zoom (need download and install client)
- Respondus lock-down browser (available through Blackboard)
- VirtualBox ([free download](#), please select the proper operating system)

- Adobe Acrobat Reader ([free download](#))
- PDF Creator (optional) - An open source PDF printer ([free download](#))
- Microsoft Office ([freely available to Mason students](#))

### 7.3 Other software

Throughout this course we will use several software tools, with a particular emphasis on open source software. The main work environment will be Python (version 2.7) as well as several python libraries. In addition, we will use open source and freely available software packages.

**Note:** If you are using an employer-provided computer or corporate office for class attendance, it is your responsibility to verify with the computer owner that you will be able to install the necessary applications and that any firewalls installed on such a computer will allow you to gain access to all the electronic course content that is posted on Blackboard.

## 8. Course Expectations

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### 8.1 General requirements

1. This is a graduate-level course in the College of Science that involves some use of mathematical and statistical concepts.
2. The course involves the use of algorithms and computer-based processing tools. During the course, you will be required to develop and demonstrate your understanding of these tools. Some course activities will require you to write scripts in a computer environment (i.e. Python).
3. Your work should show attention to detail, with the expectation that the experience will provide the basis for potential employers to consider your skills.
4. I expect that you will **review all the assigned materials** in every learning model, including any assigned readings, videos, and other resources. This is essential to **your** success of this course.
5. You are expected to **actively participate** in the scheduled office hours Collaborate sessions as well as in the course discussions.

### 8.2 Electronic Communication

All course related correspondence should be made through the discussion board on course Blackboard website. Please refrain from emailing the instructor or the TA through their @gmu.edu address regarding non-sensitive (or non-personal) matters, as it is very likely that other students would benefit from your questions. If you wish to email the course teaching team directly please include “GG5681Sp22” at the beginning of the email subject line.

### 8.3 Being a Distance Learning Student

Being a distance-learning student is different in some ways from being a face-to-face student. In online learning **self-discipline, time management, and organization** is even more important since the learning tasks are not set for a specific class hours – instead the material is formed as a set of learning modules, which students may complete at their own pace. While each one of us may have a different learning style, there are several key activities that you should consider and incorporate as you develop your approach to taking a distance-learning course. Such activities include, for example:

- Review this syllabus as well as the course website and make sure you have a good understanding of the course expectations.

- Ensure uninterrupted access to the required hardware and software before the semester begins (see the Technical Requirements section). Not having the necessary hardware and software tools will impact your ability to participate in the course.
- Build a schedule for your learning activities and follow it. Note that while distance-learning course often do not include extensive face-to-face time, you are required to spend time reading materials, completing assignments, and taking exams.
- Take the time to review all the assigned course materials (videos, written instructions, book chapters, etc.), and keep notes and comments on what you reviewed. Try to identify key themes and strive to develop a thorough understanding of them.
- Complete assignments on time and submit all assignments. While this is true for both face-to-face and online courses, in a distance learning course it is sometimes more difficult to notice that you are missing work. Keeping in touch with the course instructor and your peers can help with this.
- Keep track of all the important dates of the course (assignment due dates, exam dates, etc.), as well as the completion time of each learning module.
- Participate in face-to-face or synchronous online sessions as much as possible, and attend face-to-face office hours as necessary. While the course is offered online, you should seek opportunity to interact with the teaching team and other students as much as possible. Such interactions could make a big difference in your learning experience.

A key factor in your success as a distance-learning student is being proactive and self-aware. Like any other learning experience, distance learning requires you to be responsible for your own learning experience. As most of the learning is done individually, it is often easy to overlook important details or even miss key ideas in the material. Therefore, it is essential that you keep in touch with the class and with the instructor, and seek feedback on your progress and work. Throughout the course you will have several ways accomplish this:

- **The Discussion Board:** the course discussion board on blackboard contains several discussion themes. Post any questions or feedback in the board.
- **Online Virtual Class Meeting:** during the semester we will hold virtual class meetings via Zoom. This is a great opportunity to ask any questions you might have, learn from the questions of others, and interact with both the instructors and students.
- **Face-to-face office Hours:** we hold weekly office hours, as indicated above. You are welcome to drop in during these office hours. If these times are not convenient for you, please contact me to schedule a spate appointment.

The benefit you will gain from any of these options, however, depends on how **proactive** you are with respect to seeking interaction, feedback, or help. Your success in the course, especially if this is your first distance learning experience, depends on how proactive you are in identifying any issues you have and seeking feedback.

In addition, the course instructor will send students **announcements and updates** via the blackboard announcements tool. Often you will receive these messages as emails to your Mason email account. **Please do not ignore these messages** – it is your responsibility to check your Mason email account and the course website several times during the week.

Another important resource that could contribute significantly to your success is the **class community**. If you have questions about a course topic, it's likely that some students in your class could help, and sometimes simply discussing the topic with a fellow student will help you understand it better. Therefore, it is important that you establish from early on some connections with other students, participate in discussions in one of the class forums, and form study groups.

When communicating with your peers (and your instructor) it is important to **be respectful** of one another. Please be aware that innocent remarks can be easily misconstrued, and that sarcasm and humor can be easily taken out of context. When communicating, please try to be positive and offer **constructive feedback**.

## 9. Assessment

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Your assessment in this course includes several interrelated components as described below.

### 9.1 Assignments

The course will include several mandatory assignments on selected topics from the material covered in class and in the assigned reading. Assignments may include tasks such as (but are not limited to) code implementation, data analyses, analysis of processing results, and discussion/review of theoretical concepts and test cases. Generally, each assignment will have a different weight in the overall assignments component of the course grade, and the weight of each assignment will be provided in the assignment instructions. Typically, one to two weeks will be allocated for every assignment. Submission of assignments should be done only through the Blackboard course website. Unless noted otherwise, we will only grade assignments that are submitted through the "Assignments" section of the Blackboard system. Please DO NOT email assignments directly to the instructor's Mason email or through their Blackboard email.

**Late submission Policy:** assignments submitted between 1 to 3 calendar days past the due date would result in a late penalty of 3 points per day. As a general rule, labs submitted after more than 3 days will not be accepted and incomplete lab work may not be completed after the due date. Exceptions to this policy may be made on a case-by-case basis at the discretion of the Instructor. Deferral of course work is a privilege and not a right; there is no guarantee that a deferral will be granted. Please make sure you notify the instructor as soon as you know you would like to request a deferral.

### 9.2 Exams

The course will include one exam ("midterm"), which will be delivered through Blackboard. The material covered in the exam will be announced in advance. A student who cannot take a course examination because of an incapacitating illness, severe domestic affliction or other compelling reasons can apply for extension of time to complete an assignment. Generally, exceptions to the exam date will not be made.

### 9.3 Project

The goal of the course project is to bridge theory and practice by providing you the opportunity to gain hands-on experience with implementing geosocial analysis methods on real-world data. In order to accomplish this course projects will include and integrate several key elements:

1. A clear research question related to the theory, methods, or application of social media analysis and its relation to geographic space.
2. Real-world data harvested from at least one social media source.
3. Integration of geosocial analysis methods, including data collection, data analysis (in particular content, social and spatial networks, and clustering), and visualization.
4. Show relevance to at least one real-world application, and demonstrate it through real-world data.

Course projects will be individual, and will include a written report and a video presentation of the project. Specific instructions on the format of the project components and timeline for submitting it will be provided separately.

### 9.4 Course grades

Each grade component will be given a numerical grade on a 0-100 scale. Some assignments may include bonus tasks. At the end of the term all the marks will be totaled as a **weighted average** per the following weights:

- **Assignments:** 35%
- **Midterm exam:** 25%
- **Course project:** 40%

Please note that, in general, assignments will not have the same weight. The weight of each individual assignment will be indicated on the assignment form. Final grades at the end of the course will be assigned using a combination of absolute achievements and relative standing in the class.

## 10. Other Important Dates

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In addition to the course schedule outlined in this syllabus, please refer to Mason's academic calendar for information on important dates and follow Mason's announcements on any calendar changes during the semester. The Mason calendar is available at <http://registrar.gmu.edu/calendars/>. In case of any discrepancy between the Mason calendar and the course schedule in the syllabus the Mason calendar shall prevail.

## 11. Student Expectations

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### 11.1 Academic Integrity

Students must be responsible for their own work, and students and faculty must take on the responsibility of dealing explicitly with violations. The tenet must be a foundation of our university culture. [See <http://oai.gmu.edu/>].

### 11.2 Honor Code

Students must adhere to the guidelines of the George Mason University Honor Code [see <http://oai.gmu.edu/the-mason-honor-code-2/>].

### 11.3 MasonLive/Email (GMU Email)

Students are responsible for the content of university communications sent to their George Mason University email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students solely through their Mason email account. [See <https://masonlivelogin.gmu.edu/login> ].

### 11. 4 Patriot Pass

Access to Mason's online system is done through a personal username and password known as the Patriot Pass. Once you sign up for your Patriot Pass, your passwords will be synchronized, and you will use your Patriot Pass username and password to log in to the following systems: Blackboard, University Libraries, MasonLive, myMason, Patriot Web, Virtual Computing Lab, and WEMS. [See <https://password.gmu.edu/index.jsp> , this link also enables you to reset your password].

### 11.5 Responsible Use of Computing

Students must follow the university policy for Responsible Use of Computing. [See <http://universitypolicy.gmu.edu/policies/responsible-use-of-computing/>].

### 11.6 Students with special needs

Students with disabilities who seek accommodations in a course must be registered with the George Mason University Office of Disability Services (ODS) and inform their instructor, in writing, at the beginning of the semester [See <http://ods.gmu.edu> or call 993-2474]. Please be proactive and let me know how I can help you with any disability issue.

## 12. Student Services

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### 12.1 University Libraries

University Libraries provides resources for distance students. [See <http://library.gmu.edu>].

### 12.2 Writing Center

The George Mason University Writing Center staff provides a variety of resources and services (e.g., tutoring, workshops, writing guides, handbooks) intended to support students as they work to construct and share knowledge through writing. [See <http://writingcenter.gmu.edu>]. You can now sign up for an Online Writing Lab (OWL) session as well as face-to-face session in the Writing Center (see the Tutoring section in the link above).

### 12.3 Counseling and Psychological Services

The George Mason University Counseling and Psychological Services (CAPS) staff consists of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling, workshops and outreach programs) to enhance students' personal experience and academic performance [See <http://caps.gmu.edu>].

### 12.4 Family Educational Rights and Privacy Act (FERPA)

The Family Educational Rights and Privacy Act of 1974 (FERPA), also known as the "Buckley Amendment," is a federal law that gives protection to student educational records and provides students with certain rights. [See <http://registrar.gmu.edu/privacy>].

**Disclaimer:** Any typographical errors in this Course Outline are subject to change and will be announced in class. If the course includes a final exam the date of the final examination is set by the Registrar and takes precedence over the final examination date reported by the instructor.

**Notice:** Recording of any kind (audio, video), reuse or remix of course materials, and further dissemination of the course content is not permitted unless prior written consent of the professor and George Mason University has been given or if recording is part of an approved accommodation plan.