COURSE SYLLABUS

Introduction to Geographic Information Systems

GGS 311-DL1

Spring 2024

Class Meetings [Online] MW: 3:00 pm – 4:15 pm

Faculty Contact Information:		Graduate Teaching Assistant
Name	Maction Komwa, PhD	Zheng Gong (PhD Student)
Office Location	Exploratory Hall, 2414	Exploratory Hall 1102-J
Office Hours	M: 1:00 pm – 2:30 pm (Online) W: 1:30 pm – 2:30 pm in-person	TBA
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Course description

This course is designed as an introduction to geographic information systems and focuses on the associated fundamental scientific principles, theories, and techniques. Students will learn how the Earth's features are modeled and stored in a computer information system. Students will learn how to use geographic information systems to answer geographic questions and how to perform simple analytical procedures using geographic data. Students will formulate a research proposal around a scientific question, adopt appropriate GIS-based methodology, collect geographic data, conduct analysis, and prepare a summary and evaluation of findings.

Course Prerequisites

There are no formal prerequisites. Some students may find GGS 110 (Maps and Mapping) useful, but it is not required

Credit Hours for this course: 3

Learning Objectives

By the end of this course, students will be able to:

- Demonstrate a broad knowledge base of the fundamental scientific theories, principals and techniques of Geographic Information System.
- Demonstrate an understanding of the societal context of GIS, and articulate important historical events, contemporary developments, and future trends that shape GIS.
- Apply and demonstrate key concepts of spatial analysis using commercial GIS software.
- Given a specific problem, identify problem parameters, characterize data needs, assemble data, and perform analysis with GIS.
- Effectively communicate results of research and analysis using maps and graphics produced with GIS software packages.

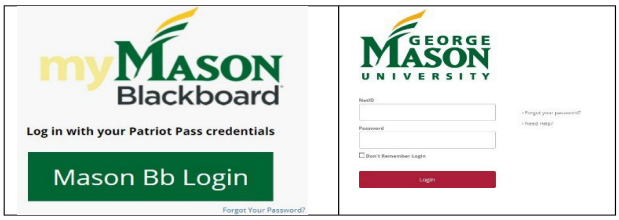
Instructional Methodology

- This is a synchronous learning course – although this is a distance learning course, our classes will occur according to the proposed schedule and time frame [MW – 1:30 pm – 2:45 pm]. We will all be online at the same time through Zoom.
- As a student participating in this Distance Learning course, or considering taking this type of course, it is expected that you have the following:
- Internet Connection
    - Access to high speed connection such as Cable, DSL, or Satellite is recommended
    - Internet Browser Support include:
        - Internet Explorer latest version | Safari version latest version
        - Google Chrome latest version | Firefox latest version

  Access to software
    - You will need to have access to the most up to date:
        - Adobe Acrobat Reader. https://get.adobe.com/reader/;
        - Windows Media Player: https://windows.microsoft.com/enus/windows/downloads/windows- media-player/
        - Apple Quick Time Player: www.apple.com/quicktime/download/
        - MS Word, Excel, etc.
- Required equipment necessary for this course thus including hardware and software (e.g. MS word, etc.), speakers, microphones, or webcams, etc. are the responsibility of the student.

Learning Management Systems

- Blackboard is our course management system which provides access to course materials, assignments, and class discussions. You will log in to Blackboard using your George Mason username and password through this link: https://mymasonportal.gmu.edu.



- If you have computer problems, please contact ITS Support Center httpp://itservices.gmu.edu; Email: support@gmu.edu; | Phone: 703-993-8870.

Technology Requirements & Expectations

To participate successfully in an online class, you should be able to:

- Use a web browser to visit websites and print web documents.
- You will need access to a Windows or Macintosh computer with at least 2 GB of RAM or more and to a fast and reliable broadband Internet connection (e.g., cable, DSL).
- A larger screen is recommended for better visibility of course material.
- You will need speakers or headphones to hear recorded content and a headset with a microphone is recommended for the best experience.
- Hard Disk Space required to take a distance education course consider and allow for the

storage amount needed to install GIS software and your GIS work.

- Data Storage: GIS work requires a lot of space storage. I recommend that you buy a portable US Drive – 5 GB drive or larger. USB Flash drives are available at Patriot Computer, Micro Center, etc.
- Finally, it is extremely important that when you work on GIS Project/Lab assignments, you should consistently back-up your work. Sometimes computer software can crash, and ArcGIS is not exceptional. If you don't save your work, you will be prone to lose your GIS 3-hour work or so!

Required Textbook:

GIS Fundamentals: A First Text on Geographic Information Systems, 7th Ed., Paul Bolstad. Eider Press 2023
Textbook website: http://www.paulbolstad.net/gisbook.htm

ArcGIS Software:

This course is completely facilitated Online using Blackboard and Zoom. For all GIS Lab Assignments, students will use ArcGIS Pro. You will get instructions on how to install ArcGIS Pro on your personal computers (if you are using windows). All instructions will be posted through the Blackboard.

Students owning Macs or owning computer running Linux should be aware that some courses may use software that only runs on Windows, including the primary software tool for this class, ArcGIS Pro v.2.8. You can set up a Mac computer with Boot Camp or virtualization software so Windows will also run on it. This following webpage https://support.apple.com/en-us/HT201468) contains information about using Windows on a Mac in bootcamp mode. It is also possible to run Windows using a virtual machine on your Mac. Search "running windows on my Mac". Computers running Linux can also be configured with virtualization software or configured to dual boot with Windows. Setting up Windows on your Mac can be a bit complicated, and will require some external technical support.

The most dependable student computing lab with ArcGIS Pro installed is **Exploratory Hall, Room 2102**, which you will have swipe/ID access to all term

Performance-Based Assessments - Grading

You will achieve the course learning outcomes outlined above through reading the textbook, preparing and writing reading summaries (reading reflections), participating in online class discussions, working through GIS tutorials, completing lab exercises, and taking online assessment exams at midterm and during finals week.

Online Class Discussions | Reading Reflection: [10%]

There will online bi-weekly discussion aligned with modules. You will share ideas and questions with your classmates. These may include current events from popular news sources, case studies and extra material from the textbook readings, or subjects chosen by the class. Each student will post an original response to the assigned discussion question initiated by the Instructor and respond to the post of another classmate. You will be assessed on your relevant facts and logical connections between text under discussion and the concepts of the module or question that is initiated by the Instructor. The Rubric for grading this assignment will be posted through the blackboard and will be assessed in these categories: **Expected** [5 points]; **Sufficient** [4 points]; **Insufficient** [3 points]; and **Not Completed** [2 points]. An initial post of 25-100 words, and at least one significant reply to a classmate's post of 25-- 100 words. Check for detailed instructions through the Blackboard.

GIS Lab Assignments [50%]

You should get ready to conquer 11 GIS Lab Assignments designed to enhance your practical geographical skills. Every Wednesday, buckle up for hands-on activities that will put your theoretical knowledge to the test. These labs will equip you with essential practical skills like:

- **Data Analysis and Visualization:** Learn how to transform raw data into compelling maps and charts.
- **Spatial Modeling:** Understand the relationships between geographical elements and predict future trends.
- **Problem Solving:** Develop critical thinking skills to tackle real-world geospatial challenges.

Examinations [40%]:

There will be 3 examinations, which must be completed in the prescribed time period. These examinations will cover the textbook, readings as well as the material in the lecture's notes. The exams will include multiple choice questions, definitions, Fill-in the Blanks, and short answer questions.

Exam 1: 10%; Exam 2: 10%; Final Exam 20%

Policy on missed Exams and Assignments

- All due dates are included in the course calendar. Take note suggested time of 11:59 pm is based on Eastern Standard Time and it is your responsibility to adjust your submittal time accordingly.
- Stick to the schedule! Due dates are listed clearly in the syllabus and Blackboard. But **"life happens,"** so you have two **flex days** to submit up to two assignments up to 2 days late (no penalty). After that, late penalties apply - 5 points per day, down to zero (no grade).
- There will be no make-ups on Discussion after due date has passed.
- Make-up exams will only be accepted in the event of personal illness or extraordinary circumstances (The Instructor has the right to ask for supporting evidence) or in the case of university-excused absences such as sports, religious holiday etc. If you know in advance that you will not be available during the time when you are supposed to take the exam, please contact me a week prior to the scheduled exam date.

Grading Scale

The following will be your Letter Grade and Percentages to determine your final grade for this course.

Grades will be assigned based on the distribution scheme below

Range	Letter Grade	Grade description	Range	Letter Grade	Grade description
93 - 100	A	Excellent	77 - 79	C+	Above satisfactory
90 - 92	A-	Very Good	70 - 76	C	Unsatisfactory
87 - 89	B+	Good with merit	60 - 69	D	Unsatisfactory
83 - 86	B	Good	<60	F	Failure
80 - 82	B-	Above satisfactory		*There is No C- grade*	

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://thanatos.gmu.edu/masonlive/login]. I will not respond to any emails sent through private account(s).

University Policies

Students must follow the university policies. [See http://universitypolicy.gmu.edu].

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]

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]

Student Responsibilities

- Stay engaged with material, discussions, and deadlines.
- Respect classmates and express opinions courteously.
- Value and learn from diverse perspectives.
- Communicate clearly and professionally in writing.
- Emails: Strictly, use Mason Email Account. Don't send email from non-Mason account.

Academic Integrity

George Mason University operates under an honor system, which is published in the University Catalog and deals specifically with cheating, attempted cheating, plagiarism, lying, and stealing. You are therefore expected to take this course in adherence to GMU and Department standards for Academic Integrity.
Please familiarize yourself with the honor code, especially the statement on plagiarism (http://www.gmu.edu/org/honorcouncil/guidelines.htm). Plagiarism will result in a failing grade of the course.

Disability Accommodations

Disability Services at George Mason University is committed to providing equitable access to learning opportunities for all students by upholding the laws that ensure equal treatment of people with disabilities. If you are seeking accommodations for this class, please first visit http://ds.gmu.edu/ for detailed information about the Disability Services registration process. Then please discuss your approved accommodations with me. Disability Services is located in Student Union Building I (SUB I), Suite 2500. Email: ods@gmu.edu | Phone: (703) 993-2474.

Diversity and Inclusion

George Mason University is committed to providing equal opportunity and an educational and work environment free from any discrimination on the basis of gender expression and identity, race, economic status, sex, sexuality, ethnicity, national origin, first language, religion, age and ability, marital status, pregnancy status, or genetic information. George Mason University shall adhere to all applicable state and federal equal opportunity/affirmative action statutes and regulations.

Sexual Harassment, Sexual Misconduct, and Interpersonal Violence

As a faculty member, I am designated as a "Responsible Employee," and must report all disclosures of sexual assault, interpersonal violence, and stalking to Mason's Title IX Coordinator per University Policy 1412. If you wish to speak with someone confidentially, please contact one of Mason's confidential resources, such as Student Support and Advocacy Center (703-380-1434) or Counseling and Psychological Services (CAPS) (703-993-2380). You may also seek assistance from Mason's Title IX Coordinator by calling 703-993-8730 or emailing cde@gmu.edu.

Student Privacy

George Mason University strives to fully comply with FERPA by protecting the privacy of student records and judiciously evaluating requests for release of information from those records. Please see George Mason University's student privacy policy https://registrar.gmu.edu/students/privacy.

Student Support Services

George Mason University has several academic support and other resources to facilitate your success. Some of these resources are presented below:

i. Counseling and Psychological Services: (See http://caps.gmu.edu/)
ii. Learning Services, University Career Services: http://careers.gmu.edu/)
iii. The Writing Center (See http://writingcenter.gmu.edu/)
iv. University Policies: (See http://universitypolicy.gmu.edu)
v. Student Support and Advocacy Center: See http://ssac.gmu.edu)
vi. The Stearns Center for Teaching and Learning Website below: https://stearnscenter.gmu.edu/knowledge-center/knowing-mason-students/student-support-resources-on-campus/

Absences & Accommodations

- **Religious Holidays:** Please refer to George Mason University's calendar of religious holidays and observations (http://ulife.gmu.edu/calendar/religious -holiday-calendar/). It is the student's responsibility to speak to the instructor in advance should their religious observances impact their participation in class activities and assignments.
- **Absence for documented illness:** Students who miss multiple virtual classes due to prolonged illness should seek medical care and provide documentation of such to the Dean's Office, which will communicate with the student's professor(s). A prolonged absence may necessitate the student's withdrawal from the course or from the University for the semester.
- **At the discretion of the professor:** There may be cases where an absence is undocumented but is, nevertheless, excused by the professor (e.g., absence due to a death in the family). Students should initiate a conversation with their professors about the nature and duration of the absence, in advance of the absence whenever possible.

When absences are excused, students remain responsible for all assigned work, and shall be provided with the opportunity to make up, without penalty, any work that they have missed.

Course Schedule/Calendar

Students are responsible for keeping up with the textbook readings, lectures, GIS tutorials/exercises, project deliverables, and assessments. Readings assigned for the week & session should be completed before the scheduled date.

*This Schedule is subject to change. Any changes will be announced over email & Blackboard

Week	Date	Monday	Wednesday	Due Dates
1	Jan. 17	NA	Course Overview /Lab Introduction	Self-Intro Jan 21
2	Jan. 22 & 24	Ch. 1 Intro to GIS	Lab 1: Intro to ArcGIS Pro | QGIS	**Lab 1**: Jan 28
3	Jan. 29 & 31	Ch. 2 Data Models	Lab 2: Projections	**Lab 2:** Feb 4
4	Feb. 5 & 7	Ch. 3 Projections	Projections Continued	Discussion 1
5	Feb. 12 & 14	Ch. 4 Maps, Data Entry,	Lab 3: Digitizing	**Lab 3** Feb 18
6	Feb. 19 & 21	Ch. 5 Global Satellite Navigation	**Exam 1 (Chapters 1-5)**	Discussion 2
7	Feb. 26 & 28	Ch. 7 Digital Data	Lab 6 Digital Data	**Lab 6:** Mar. 3
8	Mar. 4 & 6	**Spring Recess [No Classes]**		
9	Mar. 11 & 13	Ch. 8 Attribute Data & Tables	Lab 7 Tables	**Lab 7:** Mar 17
10	Mar. 18 & 20	Ch. 9 Basic Spatial Analysis	Lab 8: Spatial Selection	**Lab 8:** Mar 24 Discussion 3
11	Mar. 25 & 27	**Exam 2 (Chapters 7-9)**	Lab 9: Buffering & Overlay	**Lab 9**: Mar. 31
12	Apr. 1 & 3	Ch. 9 Raster Analyses	Lab 10: Topics in Raster Analysis	**Lab 10:** Apr. 4
13	Apr. 8 & 10	Ch. 11 Terrain Analyses	Lab 11: Terrain Analysis	**Lab 11**: Apr. 14 Discussion 4
14	Apr. 15 & 17	Ch. 12 Spatial Estimation	Lab 12: Interpolation	**Lab 12**: Apr. 21
15	Apr. 22 & 24	Ch. 13 Spatial Models & Modeling	Lab 13: Intro to Cartographic Modeling	**Lab. 13**: Apr. 28
16	Apr. 29	Ch. 14 Data Standards & Data Quality	**Exam Review**	Lab Make-up
	May 6	**Final Exam [1:30 pm – 4:15 pm]**		
11 labs total, lowest grade will be dropped				