George Mason University
GGS 310: Introduction to Digital Cartography
Fall Semester 2019 (August 26 – December 18)

Course: GGS 310 (Online)
Website: https://mymason.gmu.edu
Section/Credits: DL1 / 3 credit hours
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Instructor office: EXPL 2413
Office hours: TR 1:30 – 3:00 PM
  W 3:00 – 4:00 PM (Online)

General Information

Catalog description: Study and creation of maps. Fundamental mapping principles (projection, scale, generalization, symbolization) and applied computer-based cartographic production.

Course overview: This course is focused in the science and art of creating maps. As a visual form of communication, it is important that geographers learn how to make "good" maps that are informative, creative, easy to understand, and aesthetically pleasing. By the end of the course, students will be able to both recognize good map design and also apply technical skills to create effective maps and graphics.

This course consists of two closely related components: lectures and labs. In lectures, students will learn cartographic theory and conventions. In labs, students will apply these principles of cartography, along with modern computer-based techniques, in 'hands-on' experience with ArcGIS and other software packages to create maps and graphics. Both lecture and lab will occur asynchronously in video recordings. Each week lectures will be offered as a set of videos broken into shorter sections, while labs will be one video that provides an overview of the assigned lab. See the schedule at the end of the syllabus for a specific schedule.

Online course: GGS 310 is presented as an asynchronous online course. "Asynchronous" means that there are no specific timed gatherings for this course (E.G.: we don't meet for lectures at specific times like in-classroom courses). Still, there will be specific due dates for graded work in the course that you are expected to meet. It is incumbent upon each student to organize their time and work through materials in a timely and efficient manner.

The course has been designed in weekly segments (see the schedule at the end of the syllabus). Segments will be released in order in a prescribed manner. Students will not have access to the entirety of the course materials from the start; you will get the materials necessary for each week as the week approaches. This is done to ease logistical problems of students being at significantly different sections of the course. Please do not ask for advanced access to materials.

Target audience: This course is required for anyone majoring in geography and geoinformation science (both BS and BA GEOG degrees). The course is also accepted as an elective for the GIS minor. This course is appropriate for any student that wants to develop cartographic skills, enhance graphic design ability, and spatial thinking.

Applicable learning outcomes: Upon completion of this course, students should be able to:
- Understand scale, projections, generalization, classification, symbolization, and other basics of cartography
- Know how to properly place map elements for a balanced layout, creating ethical cartographic products utilizing principles of graphic design
- Understand how different media (paper, digital, animation) affect map clarity
- Possess the ability to critique maps
- Understand and be able to create various thematic maps, and choose which thematic map types (or graphic types) are appropriate for certain data or situations
- Be proficient in cartographic tools of ArcGIS

Course prerequisites: No prior coursework is required, but it is strongly suggested that students have basic computer skills and at least passing familiarity with GIS.

Enrollment and repeat policy: This course follows the general Mason policy that an undergraduate course can be repeated for grade up to three times. Understand that each academic unit can have more restrictive limits on specific courses. Students that repeat the course must submit all newly completed work.

Course Materials

Required text: Tyner, J. A. 2010. *Principles of map design*. New York: Guilford Press.
ISBN 13: 978-1-462-51712-1

The course textbook is available from various outlets in various forms. It is available through the bookstore or through your online provider of choice (Amazon, the publisher, etc). The publisher sells an e-book version through their website (https://www.guilford.com/books/Principles-of-Map-Design/Judith-Tyner/9781462517121/summary) and VitalSource (https://www.vitalsource.com/products/principles-of-map-design-tyner-judith-a-v9781609180317). Presumably other e-book providers also sell the text. In addition, there may be other readings posted on Blackboard for you to complete.

The Tyner text is available freely online through the GMU library. **However, access is limited so that only one student at a time can have online access.** You will need to use your Mason email account to log in for access. Below is links to the book. Click the link (you may want to bookmark it) to bring up the library page. There is a section with the header "View Online"; click the link to "view full text" to access the book.

To access the Tyner text, use the following link: https://wrlc-gm.primo.exlibrisgroup.com/discovery/fulldisplay?docid=alma9935194163404105&context=L&vid=01WRLC_GML:01WRLC_GML&search_scope=MyInst_and_CI&isFrbr=true&tab=Everything&lang=en

GGS computer lab: The lab in EXPL 2102 is open 24 hours for you to use. Registration in a GGS class should automatically grant you access. Please contact ggsit@gmu.edu to report issues. You can also make use of the GMU Virtual Computing Lab (https://www.vcl.gmu.edu/).

Software, hardware, and data: The main software used for this class is ArcGIS; in particular, we will be using ArcMap rather than ArcGIS Pro. We may also utilize other software in the context of this course, including Adobe products. If you would like a student evaluation copy of ArcGIS, please contact your instructor. Software will be available in GGS student computer lab.

Many of the files we will use are very large! You are encouraged to have a USB flash drive or portable hard drive in order to store and access files. 16 GB of storage or more is preferable. You may also use the drive to install some of programs we use. Cloud storage is another option, either to keep all your files or to use as a common backup.

You will create a video presentation of your final project. You will need a microphone or headset to complete this assignment. Many computers, especially laptops, have built-in microphones that should be sufficient, but you should test your hardware early.

Online materials and email: This course will make extensive use of Blackboard at Mason. Course materials such as assignments will be available only in electronic version on Blackboard. Also, students will be expected to submit assignments online through Blackboard. **Only Word document (.docx or .doc) or Adobe PDF (.pdf) file formats will be accepted,** with some exceptions. Grades will be posted on Blackboard as well. Make sure you are familiar and comfortable with the Blackboard interface.

Students are required to have a MasonLive/Email account, which will allow you access to Blackboard and lab computers. Please use this university email account when contacting the professor regarding this class.

Grading

Lab Assignments (30%): Most weeks there will be a laboratory exercise. Labs are designed to apply the cartographic theories discussed in class in a hands-on environment. Work will typically be completed with ArcGIS. Each lab has a graded deliverable, typically in the form of a map. Labs will be due on Wednesday of the following week (by 11:59 PM). Labs will be submitted online through Blackboard, with potentially items due in hard copy. There will be ten (10) labs overall. Nine are one-week labs (worth 10 points each), while one is a two-week lab (worth 20 points).

Midterm Exam (10%): There will be one midterm exam for this course. The midterm will be a mix of multiple choice, fill-in-the-blank, short answer, and long answer questions covering topics from lecture and readings.

Final Exam (15%): The final will be the same format as the midterm but will cover all material learned during the course. Though cumulative, the majority of the exam will cover material since the midterm exam.

Project (25%): Each student will complete a course project. The course project requires you to make an original map product. High quality work is expected. The topic and type of map is up to you. You will be required to show at least two spatial or temporal variables in the map you produce. That is to say, it is not enough to do a simple choropleth map of one Census statistic. More specific information on the course project will be provided during the semester. There are six parts to the

course project: a proposal, a check-in meeting, presentation, final map product, project report, and a set of peer assessments.

Map Critiques (10%): On days in which labs are due (besides Lab 1), a set of students will post their maps on the Blackboard discussion board along with a brief written summary of their map. Another set of students will write a paragraph constructive critique of each map. Each student will choose two times to post maps, and two times to post critiques.

Discussions (10%): There will be five group discussions in this course. Most discussions will require two parts; a posting and commenting. Topics will be provided for each discussion. Topics will generally revolve around finding and discussing online resources.

Undergraduate grading scale:

Grades	Percentage Required	Grades	Percentage Required	Assignment	Percentage of Total Grade
A+	96 to 100	**C+**	76 to 79.9	Labs	**30%**
A	93 to 95.9	**C**	73 to 75.9	Midterm	**10%**
A-	90 to 92.9	**C-**	70 to 72.9	Final	**15%**
B+	86 to 89.9	**D**	60 to 69.9	Project	**25%**
B	83 to 85.9	**F**	<60	Map critiques	**10%**
B-	80 to 82.9			Discussions	**10%**

Make-up and late assignment policies: Due dates are explicitly stated. Assignments in this course (which are listed above as "Labs", "Map critiques", and "Discussions") will be accepted past the ascribed due date all the way to the last regular class meeting of the semester (December 8th). Late penalties are assigned in a two-tiered system. Assignments turned in **within seven (7) days will result in a 25% deduction** for the assignment. Assignments **later that seven (7) days will result in a 50% deduction** for the assignment. This penalty begins 1 minute after the due date. Technical excuses ("computer system error", "didn't submit correctly on Blackboard", etc.) will not be accepted as reasons for late work. You are expected to start the work early. **Never underestimate the time you will spend on the assignments.** If you cannot complete the assignment on time, it can sometimes be better to turn in partially completed work than nothing at all.

If you are ill or physically indisposed and cannot submit an exam on time, you must notify the instructor beforehand for you to have a chance to make up the assignment. **Make-up exams will be given only for University approved excused absences. No late quizzes are accepted.** This policy may seem strict, but it is in your best interest to turn in everything on time to avoid falling irrecoverably behind. Please contact the instructor if you are struggling and you will receive aid as best as the instructor can provide.

Administrative

Academic integrity: *The following statement is adapted from the Stearns Center for Teaching and Learning.* No grade is important enough to justify academic misconduct. The integrity of the University community is affected by the individual choices made by each of us. Mason has an Honor Code, which you can read fully at the Office for Academic Integrity (https://oai.gmu.edu/mason-honor-

code/). The Honor Code Pledge reads as follows:

> To promote a stronger sense of mutual responsibility, respect, trust, and fairness among all members of the George Mason University Community and with the desire for greater academic and personal achievement, we, the student members of the university community, have set for this Honor Code: Student Members of the George Mason University community pledge not to cheat, plagiarize, steal, or lie in matters related to academic work.

The Mason Honor Code defines cheating, plagiarism, stealing, and lying. It is expected that you understand these definitions. If you have any doubts about what constitutes cheating, plagiarism, stealing, or lying in the academic context, please see your professor. **Acts of academic dishonesty in this course may be penalized with failure of either the work in question or the entire course.**

While collaboration and group learning is encouraged in this course, each student **absolutely must** turn in their own work, from their own computer, and any discussion must be theirs alone, and not attributable to another person or group, *except where noted* (for example, quoting authors as a small portion of your scholarly work). This also applies to online sources; you cannot copy the words of anyone else for any graded part of this course. It is not enough to exchange a few synonyms within a sentence! You must write, summarize, and analyze with your own words and ideas.

Disability statement: This course is in compliance with Mason policies for students with disabilities. Students with disabilities are encouraged to register with Disability Services (DS). DS can be contacted by phone at (703) 993-2474, or in person at SUB I Suite 2500, or online by the link at the end of this section. Students who suspect that they have a disability, temporary or permanent, but do not have documentation are encouraged to contact DS for advice on how to obtain appropriate evaluation. A memo from DS authorizing your accommodation is needed before any accommodation can be made. The memo should be furnished to the professor preferably within the first two weeks of class or as soon as an accommodation is made. Please visit https://ds.gmu.edu/ for more information.

Mason diversity statement: *From https://stearnscenter.gmu.edu/professional-development/mason-diversity-statement*

> George Mason University promotes a living and learning environment for outstanding growth and productivity among its students, faculty and staff. Through its curriculum, programs, policies, procedures, services and resources, Mason strives to maintain a quality environment for work, study and personal growth.
>
> An emphasis upon diversity and inclusion throughout the campus community is essential to achieve these goals. Diversity is broadly defined to include such characteristics as, but not limited to, race, ethnicity, gender, religion, age, disability, and sexual orientation. Diversity also entails different viewpoints, philosophies, and perspectives. Attention to these aspects of diversity will help promote a culture of inclusion and belonging, and an environment where diverse opinions, backgrounds and practices have the opportunity to be voiced, heard and respected.

Mason policy on sexual harassment, sexual misconduct, and interpersonal violence: *As a faculty member and designated "Responsible Employee," I am required to 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 the <u>Student Support and Advocacy Center</u> *(703-380-1434),* <u>Counseling and Psychological Services</u> *(703-993-2380),* <u>Student Health Services,</u> *or* <u>Mason's Title IX Coordinator</u> *(703-993-8730; cde@gmu.edu).*

University-wide closures and class cancellations/delays: There may be times during the semester in which George Mason University announces university-wide closures or delays. As an asynchronous online course, in general these cancellations should not delay our course. However, there may be times in which university-wide closures or delays will affect Blackboard availability or the ability to submit coursework. In these situations, your professor will make an announcement via Blackboard and/or email. Check the Mason website and our own Blackboard site for updates. Other cancellations or delays to class will be announced via Blackboard by your professor. In the event that this course is in some way interrupted, the course schedule, assignment deadlines, and other course alterations will be decided upon and announced via Blackboard and email by the professor. You are expected to stay abreast of any changes.

Instructor availability: Please do not hesitate to contact your instructor if you have questions about course topics or assignments. Your instructor will do his best to answer all weekday emails within 24 hours, and weekend emails within 48 hours. Should you not receive a response within that time frame, you may send a gentle reminder via email. Do try to avoid last-minute emails, as your instructor may not have email accessible immediately before deadlines. It is generally a good practice to avoid sending an email at the first sign of trouble with an assignment; many times you will find the proper solution by giving yourself an hour or two to problem solve!

Please also make use of the office hours listed at the top of this document. Generally, issues can be clarified quickly in person or in a live online chat.

GGS 310 course schedule

Week	Lecture/Lab Topic	Coursework
Unit 1: Mapping basics		
Week 1: Aug 26 – Sep 1	Introduction to cartography 1.1. Course overview 1.2. Cartography and maps 1.3. Types of maps Lab 1: Critiquing maps	**Read** Chapter 1, 12 **Lab 1:** - Due Wednesday, 9-4 **Discussion 1:** - Post due Saturday, 8-31 - Comments Saturday, 9-7
Week 2: Sep 2 – Sep 8	Cartographic design 2.1. Map elements 2.2. Gestalt principles 2.3. Map outputs Lab 2: Cartography basics	**Read** Chapter 2 **Lab 2:** - Due Wednesday, 9-11
Week 3: Sep 9 – Sep 15	Projections and coordinate systems 3.1. Measuring the Earth 3.2. Projections 3.3. Coordinate systems Lab 3: Projections	**Read** Chapter 6 **Lab 3:** - Due Wednesday, 9-18 **Map critique 1:** - Post Wednesday, 9-11 - Comment Saturday, 9-14
Unit 2: Symbolization of maps		
Week 4: Sep 16 – Sep 22	Color and symbolization 4.1. Color and color models 4.2. Color schemes 4.3. Symbolization Lab 4: Color and symbols	**Read** Chapter 4, 7 **Lab 4:** - Due Wednesday, 9-25 **Map critique 2:** - Post Wednesday, 9-18 - Comment Saturday, 9-21 **Discussion 2:** - Post due Saturday, 9-21 - Comments Saturday, 9-28
Week 5: Sep 23 – Sep 29	Typography and generalization 5.1. Typography 5.2. Labeling 5.3. Scale 5.4. Generalization Lab 5: Typography	**Read** Chapter 3, 5 **Lab 5:** - Due Wednesday, 10-2 **Map critique 3:** - Post Wednesday, 9-25 - Comment Saturday, 9-28
Week 6: Sep 30 – Oct 6	Midterm exam Lab 6: General reference map	**Midterm Exam:** - Due Friday, 10-4 **Lab 6:** - Due Wednesday, 10-16 **Map critique 4:** - Post Wednesday, 10-2 - Comment Saturday, 10-5
Week 7: Oct 7 – Oct 13	Terrain visualization 7.1. Terrain file types 7.2. Vertical terrain view 7.3. Other terrain visualizations Lab 6 (continued)	**Read** Slocum Ch. 20 **Project** proposal: - Due Wednesday, 10-9 **Discussion 3:** - Post due Saturday, 10-12 - Comments Saturday, 10-19

Unit 3: Thematic mapping		

Week 8:
Oct 14
–
Oct 20
	Classification and choropleth mapping
	    8.1. Data classification
	    8.2. Choropleth maps
	    8.3. Dasymetric maps
	Lab 7: Choropleth maps
		Read Chapter 8
		Lab 7:
		- Due Wednesday, 10-23
		Map critique 5:
		- Post Wednesday, 10-16
		- Comment Saturday, 10-19

Week 9:
Oct 21
–
Oct 27
	More quantitative mapping techniques
	    9.1. Isarithmic maps
	    9.2. Proportional and graduated symbols maps
	    9.3. Dot density maps
	Lab 8: Dot density and graduated symbol maps
		Read Campbell Ch. 11
		Lab 8:
		- Due Wednesday, 10-30
		Map critique 6:
		- Post Wednesday, 10-23
		- Comment Saturday, 10-26

Week 10:
Oct 28
–
Nov 3
	Additional thematic mapping techniques
	    10.1. Cartograms
	    10.2. Flow maps
	    10.3. Multivariate maps
	Lab 9: Flow maps
		Read Chapter 9, 10
		Lab 9:
		- Due Wednesday, 11-6
		Map critique 7:
		- Post Wednesday, 10-30
		- Comment Saturday, 11-2
		Discussion 4:
		- Post due Saturday, 11-2
		- Comments Saturday, 11-9

Unit 4: Maps, technology, and the Internet		

Week 11:
Nov 4
–
Nov 10
	Technology and mapping
	    11.1. Animation
	    11.2. Multimedia
	    11.3. GIS 2.0
	    11.4. Web mapping
	    11.5. Web languages
	Lab 10: Cartograms
		Read Chapter 11
		Lab 10:
		- Due Wednesday, 11-13
		Map critique 8:
		- Post Wednesday, 11-6
		- Comment Saturday, 11-9

Week 12:
Nov 11
–
Nov 17
	Trends and other graphics
	    12.1. Linked maps
	    12.2. Using other senses
	    12.3. Information visualization and spatialization
	Work on final project
		Read Slocum Ch. 26
		Map critique 9:
		- Post Wednesday, 11-13
		- Comment Saturday, 11-16

Unit 5: The final project		
Week 13: Nov 18 – Nov 24	Work on final project	**Discussion 5:** - Post due Saturday, 11-23 - Comments Saturday, 11-30 **Project** check in meeting
Thanks- giving	*Thanksgiving break – No class*	
Week 14: Dec 2 – Dec 8	Final project presentations	**Project** presentation: - Due Wednesday, 12-4 **Project** peer assessments: - Due Saturday, 12-7
Finals Week	Final exam	**Project** map and report: - Due Wednesday, 12-11 **Final exam:** - Due Friday, 12-13

Note: The GGS 310 course schedule is tentative and is subject to revision by the instructor