

GGR373: Advanced GIS

Course Description



In this course, students learn how to use a global positioning system, perform network analysis, create and analyze three-dimensional surfaces, visualize geospatial data, and perform advanced spatial analysis. This course builds on GGR272 and GGR273 and continues the examination of the major theoretical and analytical components of a geographic information system and spatial analysis.

Hybrid course format: This is a hybrid course, meaning that there is a mix of online and in-person activities, and is meant to give you the “best of both worlds”. The course is flexible, so that you can learn when it works best for you, and you can connect your own interests to the concepts and methods covered. The lectures and software demonstrations are provided as videos that you can watch on your own schedule but should be viewed before the class meetings. The class meets every second week but instead of lecturing, the instructor will briefly summarize key concepts, answer questions about the video material and readings, and provide advice on the assignments and software. You can attend these meetings in person or online. The class meetings may be recorded when appropriate, but the recordings alone will be of limited value, as the meetings will be interactive discussions, sometimes with individuals or small groups, as opposed to presentations that can be watched later. You are welcome to attend the meetings even if you don’t have any questions, but just want to listen.

Communication: In this course, you have the option to gain experience with a variety of communication tools including webinars, videoconferencing, screen sharing, discussion boards, and chat windows. Think of this as another aspect of your learning and take the opportunity to learn how to use them effectively.

Please keep in mind: Many of the concepts and skills learned in this course are cumulative. This course provides great flexibility as to when you work on it, but it is essential that you manage your time well. If you find you are falling behind, ask for help from your TA or instructor as soon as possible. You may find this link helpful in deciding if this course is a good fit for you: [Is taking an online course right for me?](#) (this isn’t strictly an online course, but most of the information still applies).

Online discussion: There is a lot to learn in this course, and you will find that interacting with other students, the TAs, and the instructor will make your learning experience more efficient and enjoyable. You are strongly encouraged to ask and answer questions on Piazza, a separate discussion board website. You can subscribe to the discussion board so that you are notified when there is a new post, to save you having to check it all the time. You will not be evaluated based on your level of participation, but it will likely help you with the other aspects of the course in which you *are* being evaluated.

Textbook: There is no required textbook. Links to online readings will be provided by the instructor.

Prerequisite: GGR272 and GGR273.

Software: The course uses ArcGIS software from [Esri Inc.](#), the most popular GIS software and an industry standard in many fields.

Course website: <http://portal.utoronto.ca>.

Evaluation

Practical assignments: 35%

The practical assignments are designed to help you see connections between the theory discussed in the lectures, how those theoretical concepts are used in the software, and how both relate to your own interests. By the end of the course, you should be able to make informed decisions about finding, evaluating, managing, and analyzing geospatial data to answer geographic questions. You should also be able to communicate your results as maps, and interpret and discuss their meaning. You will have opportunities to find and explore map data on topics of your choosing, and these may be used to develop work that can be integrated into your final story map project (see below).



The time required to complete the assignments varies, depending on the person. You will be learning practical skills in mapping and problem solving using complex software, which will require a substantial amount of time each week. Assignments (including maps and figures) are completed in Quercus. Printed or e-mailed submissions are not accepted.

Marking: You will be assigned to a teaching assistant based on your last name, and that TA will be marking all of your work. Please check the Contacts page on Quercus for a list of TAs and which names they are marking.

GIS application term paper: 15%

This assignment is designed to get you acquainted with the published research literature concerning the use of geographic information systems in your particular field of interest. Much of this course, and your previous GIS courses, are geared towards introducing you to the fundamental concepts and techniques of GIS. However, it is not possible to address how GIS is actually used in all of the fields of inquiry represented by the variety of students in the class. Therefore, this assignment gives you the opportunity to explore how GIS is related to your own area of interest through the completion of a literature review that is no more than 1,250 words in length.

Final exam: 50%

Students will be responsible for all course material for the entire term. The exam format will be multiple choice and short answer questions. The questions asked in the lectures, quizzes, and assignments are all useful examples of the types of questions you may see on the exam.

Note: The final exam must be written in person during the regular exam period.

Instructor



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Website: <http://portal.utoronto.ca> (Quercus, requires UTorID & password)

Office hours

In person: open-door policy; drop by or make an appointment. Sidney Smith Hall room 5011.

Online: please [e-mail me](#) to set up a time. We use the Blackboard Collaborate web conferencing software built into Quercus.

Class Meetings (with Simultaneous Webinar)

Tuesday 1:10-3:00, Sidney Smith Hall, room 1084. See schedule on last page for meeting dates.

Class meetings are your opportunity to meet with the instructor to get answers to any questions you may have about the lecture and software videos, the assignments, or your term project. You will get the most out of these meetings if you have watched all the relevant videos, taken notes, and started your assignment before we meet. The instructor will first cover any common questions relevant to everyone present before breaking into an informal question and answer session.

You have the option of attending class meetings in person, online, or both. The meetings will be streamed live on the internet as a webinar and you will be able to ask questions in real time using a chat window. I will do my best to monitor this during class, and answer questions just as I would if someone were in the room and had raised their hand. The webinar sessions will not be recorded.

Disclaimer: please remember that live streaming the class meetings is something I offer for your convenience, and do not guarantee availability if there are technical difficulties.

Lecture slides: The PowerPoint slides used in the lecture videos will be made available as PDF files. Please keep in mind that these files are designed to be part of a presentation, and are definitely not a substitute for taking your own notes.

Webinar FAQ:

What will I see online? You will see whatever is shown using the projector in class. There may be video of the instructor as well. You may want to use earbuds/headphones. No audio or video of students will be intentionally captured or recorded (although sometimes students asking questions are inadvertently recorded by my microphone). Any questions asked by students in the lecture hall will be repeated by the instructor for the benefit of those watching online.

How do I access the live webinar? At any time during the class, go to the Bb Collaborate link provided in Quercus, select "Join session" and you will enter the webinar "room". Use Google Chrome or Firefox for the best experience. For more information on using Collaborate in Quercus, go to this [link](#).

How do I ask a question in the webinar? Just type your question into the chat window and press the Enter key on your keyboard. You don't need to use the "raise hand" option. Audio and video questions are not available during the class meetings but may be possible during office hours, depending on attendance.

Will the class meetings always be recorded? As a hybrid course, the class meetings are not lectures but instead are interactive discussions that can't be easily time-shifted by watching a recording of them later. These meetings will be informal and the format will vary based on attendance and what questions students have. General discussions that include the whole class may be recorded, as that might be useful to someone not able to attend, but discussions with small groups or individuals (either online or in person) will not be recorded.

Lab Sessions

Lab sessions: Tuesday, 4:10-6:00 in Ramsay Wright, room 107
Wednesday, 1:10-3:00 in Ramsay Wright, room 107

Unlike GGR272 and GGR273, there are lab sessions in this course. You are expected to attend the session times that you signed up for on ACORN (attendance is not mandatory). If you wish to drop in on the other lab session, please ask the TA if there is room – if there is, you are welcome to sit in.

Options for Using the GIS Software

There are several options for accessing ArcGIS for Desktop (Advanced version) made by [Esri Inc.](#), which you will need to complete the course work. The "default" option is to use the computers in one of the Arts and Science computer labs. For your convenience, you can install ArcGIS on your own computer or run it virtually through a web browser. Please note that you are responsible for ensuring that you have access to ArcGIS using one of these methods. **Encountering a technical problem using any option other than a computer lab is not a valid reason for an assignment deadline extension.** If you run into problems, check the GIS Software FAQ page and, if needed, post a question on the discussion board so that we can resolve the problem as quickly as possible.



Use ArcGIS in the Arts and Science IIT Labs

You can login to the Information and Instructional Technology (IIT) lab computers using your UtorID and password.

Install ArcGIS on your own computer

PC: You can download a free, one-year student edition of ArcGIS from the Map and Data Library [here](#). Since all of the assignments and data are available on Quercus, many students find this to be a convenient option. If you need installation assistance, contact gis.maps@utoronto.ca. ArcGIS only runs on Windows. An internet connection is not required once ArcGIS is installed.

Mac: ArcGIS is Windows-only but can be installed on a Mac using [Boot Camp](#), a free utility that comes with OS X and later (but you will need a valid copy of Windows).

Run ArcGIS over the Internet

PC or Mac: You can run ArcGIS over the internet without installing anything on your Mac or PC except a small app called Citrix Receiver. Instructions are available on the GIS Software page in Quercus.

Warning: Using Citrix may become slow if there is heavy demand on the server, such as the night before an assignment deadline. This is not grounds for an extension, so please plan accordingly.

Use ArcGIS in Robarts Library

The Map and Data Library (fifth floor, Robarts Library) has 20 workstations with ArcGIS and there are another 40 computers on the fourth floor. The staff there are available to help with any problems or technical questions you may have with ArcGIS but are not able to provide specific help with assignments.

Getting Help

Course material: Learning new GIS concepts, and how they are implemented in the software to complete various tasks, can sometimes be challenging. The ability to work independently is a valuable skill for all GIS users, and it is important that you take advantage of all the course material available on Quercus, including lecture and software videos, readings and other resources.

Discussion board: If you've gone through all of the course material and are still stuck, then post a question to the discussion board. Chances are that another student, a TA, or the instructor has encountered a similar problem and will be able to offer advice. Students can sometimes feel isolated and that they have no one to talk to about the course. Don't let this happen! If you participate in conversations online, you'll have a much easier time understanding the material, keeping up, and you will likely find the course more enjoyable. Using the discussion board also allows other students to benefit from the discussion and dramatically improves efficiency in communication. E-mail to your TA or the instructor should only be used for personal questions, such as requests for deadline extensions due to illness.

Lab sessions: There are scheduled lab sessions held each week where a teaching assistant will be available to assist you. You are expected to attend the session times that you signed up for on ACORN (attendance is not mandatory). If you wish to drop in on the other lab session, please ask the TA if there is room – if there is, you are welcome to sit in.

Please note that the teaching assistant's role is to guide you and make suggestions but in order to learn the concepts and software, you must be prepared to try things on your own. The TAs will not give you the answers to assignment questions, as this would deny you the chance to learn for yourself. Make sure you monitor the discussion board, as this is often where you will get valuable tips and other help.

Class meetings: You are welcome to ask about any aspect of the course during the class meetings. However, since there are other ways to ask straightforward questions about things like accounts or software tools or glitches, the best use of class time is probably to focus on more complex questions related to lecture concepts or getting advice on your assignments.

ArcGIS Help: Esri provides extensive documentation for its software that provides technical information, but there also many sections with explanations similar to what you would find in a textbook. Numerous links to these help pages are available on Quercus, but you are encouraged to consult this [website](#) yourself as well.

GeoNet: This is a group of ArcGIS forums run by Esri. You are not required to consult GeoNet for this course, but it can be a useful place to look if you're getting an error message, or want to participate in technical discussions. You can access it here: <https://geonet.esri.com>.

Learner support available at the University of Toronto: The University provides a range of student support related to student life and academic success, including services related to university life, library and academic skills support, IT support and more. See [Learner Support Available at the University of Toronto](#).

Course Policies

Late penalty: A penalty of 10% of the total mark for the assignment will be applied per day, up to 7 days (including weekends and holidays), after which assignments will not be marked. Penalties are calculated for each 24-hour period after the deadline. If an assignment has been handed back, no other assignments will be accepted, even if it has not been 7 days.

Technical problems: This course requires the use of computers, and many things can go wrong when using them. You are responsible for ensuring that you maintain regular backup copies of your files, use antivirus software (if using your own computer), and schedule enough time to allow for delays due to technical difficulties. Computer viruses, crashed hard drives, lost or corrupted files, incompatible file formats, etc. are common issues when using technology, and are not acceptable grounds for a deadline extension.

In case of illness: Requests for deadline extensions must be made to the instructor within five business days after the deadline and must be accompanied by an original copy of the official university medical form. Medical forms are accepted at the discretion of the instructor, and must clearly indicate that you were incapacitated for the date of a test or for several days in the case of an assignment (being ill right before the deadline for a two-week assignment is not sufficient grounds for a deadline extension).

Inquiries about graded term work: Any inquiries about marking must be made within two weeks of the return date of the work. This is in accordance with Arts and Science rules as stated in the calendar. Please contact the person that did the marking first. If, after discussing the issue with the marker, you are still not satisfied with the explanation for your mark, you should then contact the instructor. You will be assigned to a teaching assistant based on your last name, and that TA will be marking all of your work. Please check the Contacts page on Quercus for a list of TAs and which names they are marking.

Accessibility needs: The University of Toronto and the course instructor are committed to accessibility. If you require accommodations or have any accessibility concerns, please visit the [Accessibility Services website](#).

Academic offences: Plagiarism and other academic offences including impersonating another student or providing false or altered medical forms, death certificates, or similar documents will not be tolerated. For more information, please refer to the [Code of Behaviour on Academic Matters](#).

Use of class materials and copyright notice: The materials used in this class including, but not limited to lecture notes, video recordings, exams, quizzes, and assignments are copyright protected works. If a student wishes to photograph, record audio and/or video, or otherwise reproduce lecture presentations, course notes or other similar materials provided by the instructor, he or she must obtain the instructor's written consent beforehand. Otherwise, all such reproduction is an infringement of copyright and is absolutely prohibited. In the case of private use by students with disabilities, the instructor's consent will not be unreasonably withheld.

Course Schedule

WEEK	DAY	DATE	MODE	TOPIC OR ACTIVITY	STARTS	DUE ¹
1	Tuesday	Sept. 10	Class	Class meeting: Course introduction	Term paper	
	Friday	Sept. 13	Online	GLOBAL NAVIGATION SATELLITE SYSTEMS	LAB 1	
2	Tuesday	Sept. 17		No class		
3	Tuesday	Sept. 24	Class	Class meeting: Q&A, discussion		
	Friday	Sept. 27	Online	RASTER ANALYSIS: ADVANCED METHODS	LAB 2	LAB 1 (5%)
4	Tuesday	Oct. 1		No class		
5	Tuesday	Oct. 8	Class	Class meeting: Q&A, discussion		
	Friday	Oct. 11	Online	TERRAIN MAPPING AND ANALYSIS	LAB 3	LAB 2 (10%)
6	Tuesday	Oct. 15		No class		
7	Tuesday	Oct. 22	Class	Class meeting: Q&A, discussion		
	Friday	Oct. 25	Online	INTERPOLATION AND SURFACE CREATION	LAB 4	LAB 3 (10%)
8	Tuesday	Oct. 29		No class		
*	Tuesday	Nov. 5		Reading week (no class or help desk sessions)		
9	Tuesday	Nov. 12	Class	Class meeting: Q&A, discussion		
	Friday	Nov. 15	Online	GIS PLANNING AND IMPLEMENTATION		LAB 4 (10%)
10	Tuesday	Nov. 19		No class		
11	Tuesday	Nov. 26	Class	Class meeting: Q&A for term paper		
	Friday	Nov. 29	Online	COURSE REVIEW		Term paper (15%)
12	Tuesday	Dec. 3	No class	(online office hours will be held during the exam period)		

¹ Assignments are due at 5:00 pm on the dates indicated. Quizzes are due at 9:00 am on the dates indicated

Please keep in mind that the instructor keeps regular business hours. Emails/posts received outside of these hours will usually be replied to the next business day. The instructor reserves the right to modify the topics and schedule during the term.