

GEOGRAPHIC INFORMATION SYSTEMS PROJECT WINTER 2023

GEOG 481 / PLAN 481

Published Jan 07, 2023

CLASS SCHEDULE

Section	Location	Time	Instructor(s)
GEOG 481 001 [SEM]	QNC 1506	Wednesdays 8:30 a.m. - 11:30 a.m.	Renan Cai renan.cai@uwaterloo.ca
PLAN 481 001 [SEM]		Wednesdays 8:30 a.m. - 11:30 a.m.	
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INSTRUCTOR / TA INFORMATION

INSTRUCTOR:

Mr. Renan Cai

E-mail: renan.cai@uwaterloo.ca (mailto:renan.cai@uwaterloo.ca)

Office Location & Hours:

Environment 1 (EV1), Room 235

Thursday, 10:00 a.m. to 12:00 p.m.

COURSE AUTHOR:

Dr. Su-Yin Tan

E-mail: su-yin.tan@uwaterloo.ca (mailto:su-yin.tan@uwaterloo.ca)

MAD SUPPORT - GEOSPATIAL APPLICATIONS SPECIALIST

James McCarthy
MAD Helpdesk

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COURSE DESCRIPTION

Calendar Description for GEOG 481

The development, implementation, and presentation of a response to a set of GIS related project requirements is the focus of this course. Students work in small teams to enhance and develop their abilities to work with GIS and related spatial technologies and analytical methods in an advanced project setting. The nature of the project requirements and themes varies with faculty and student strengths and interests. Projects may emphasize development of software applications, use of programming, or advanced GIS analysis methods, and draw from theme areas such as environment studies and management, human and physical geography, or planning.

Prereq: GEOG/PLAN 387, GEOG/PLAN 381 and ENVS 278

Calendar Description for PLAN 481

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Prereq: GEOG/PLAN 387, GEOG/PLAN 381 and ENVS 278

OVERVIEW

In this course, students will learn how to design, manage, and complete a research project that emphasizes the use of a geographic information system (GIS). By working in small groups, students will learn how to work in a team environment and develop negotiating and project management skills. Groups will agree with the instructor on a suitable project topic or research problem and solve it by acquiring, organizing, and analyzing data using a GIS. Projects must include a substantive research component, where GIS is the main method used.

COURSE DESCRIPTION

This course focuses on developing geographic information systems (GIS) project skills. Students will gain experience in the definition, planning, execution, and completion of a GIS project.

Although real issues in geographical analysis are addressed, the focus of the course evaluation is on:

1. The project's methodological and organizational design.
2. Application of appropriate GIS techniques.
3. Presentation of the final results in both oral and written form.

Extensive independent lab work is required. It is assumed that students have already acquired a foundation of concepts and functions required for GIS analysis or are capable of learning them, and are proficient in the use of at least one GIS package.

This course is meant to simulate a team-oriented workplace environment. Students must be highly motivated, able to make progress without constant supervision, and meet strict deadlines, as though they have been hired for a geomatics-related job position.

Each group has the freedom to select their own project topic. The instructor may suggest some project ideas. If you have an idea for a group project, you are encouraged to discuss it with the instructor as soon as possible, to assess its feasibility, and to start acquiring data sources, which can be a time-consuming process. Project ideas may originate

from a variety of sources, such as a current or previous employer, work completed as a volunteer, or a previous course or field trip. Keep in mind that the project topic should appeal to other members of your group. If you intend to work with an outside organization, you are encouraged to contact them as early as possible, especially when requesting for secondary data.

Some workshops and lectures will be scheduled during the term (some may be online), but many classes will be used for informal progress reports from each group, class discussion, and questions. Students are expected to participate in discussions and contribute equally to the group project.

PREREQUISITES

GEOG/PLAN 381 and 387 or consent of the instructor.

Students taking this course should have experience in performing basic and advanced spatial analysis using GIS. It is expected/desirable that students have either basic programming/scripting experience (e.g., Python, R, etc.) or will devote sufficient time to developing such skills independently or with assistance of suggested tutorials. It is not an objective of the course to teach students programming. Knowledge of basic statistics is highly recommended.

Students are expected to complete a group project. Due to the workload in this course, students are not permitted to complete a project on their own or individually.

LEARNING OUTCOMES

By the end of this course students should be able to:

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| 1. Select a suitable research topic or problem that emphasizes the use of a geographic information system (GIS). |
| 2. Develop negotiation and project management skills by working in small groups. |
| 3. Solve a research problem by acquiring, organizing, and analyzing data using a GIS. |
| 4. Discuss research project analysis results in both written and oral formats. |

TENTATIVE COURSE SCHEDULE

The following course schedule outlines a timetable of milestones of which assigned coursework should be completed during the term and deadlines for deliverables. All times are in the Eastern Time Zone. The instructor reserves the right to make changes to the course schedule when necessary and in accordance with University of Waterloo policy. Any changes will be conveyed to students as early as possible and both electronically and in class.

Week	Class Date	Topic	Deadlines
Week 1 (Jan 9-13)	Jan 11	Course introduction, project topic selection and group formation (brainstorming exercise)	Personal biography
Week 2 (Jan 16-20)	Jan 18	GIS project topic definition & research design Workshop: Proposal Writing & Requirements	List of group members Project title, mission statement (in-class)

Week	Class Date	Topic	Deadlines
Week 3 (Jan 23-27)	Jan 25	Workshop: Geospatial Data Sources & Acquisition (UW Geospatial Centre Orientation – Eva Dodsworth)	
Week 4 (Jan 30-Feb 3)	Feb 1	Workshop: Writing an Annotated Bibliography Project meetings	
Week 5 (Feb 6-10)	Feb 8	PROPOSAL ORAL PRESENTATIONS	Proposal oral presentation
Week 6 (Feb 13-17)	Feb 15	<i>Proposal work period</i>	Proposal paper (due Wed, Feb. 15, 11 p.m.)
Week 7 (Feb 20-24)	Feb 22	READING WEEK	
Week 8 (Feb 27-Mar 3)	Mar 1	Workshop: Introduction to WebGIS & the GeoWeb (Mapping, Analysis & Design – MAD)	Progress reports
Week 9 (Mar 6-10)	Mar 8	Workshop: GIS Project Management	Annotated bibliography (due Tue, Mar. 7, 11 p.m.) Progress reports
Week 10 (Mar 13-17)	Mar 15	Workshop: Spatial Statistics & Reporting Results Project meetings	Progress reports
Week 11 (Mar 20-24)	Mar 22	Workshop: Presentation Skills & Requirements Project meetings	Progress reports
Week 12 (Mar 27-31)	Mar 29	Project meetings	Progress reports
Week 13 (Apr 3-7)	Apr 5	FINAL REPORT PRESENTATIONS <i>(Note: Additional time slot may be scheduled to accommodate all group presentations – TBD)</i>	Final presentation Final report

TEXTS / MATERIALS

No materials required.

TEXTBOOKS

There are no required textbooks. You are expected to identify relevant material for your particular group project. Students are encouraged to read widely and to refer to peer-reviewed journals.

RESOURCES

ArcGIS Pro software is generally used for project work in this course, although you may draw from additional software or applications as required. ArcGIS Pro manuals are available as on-line help files. Students are expected to use the on-line help and other resources that will also be posted on the LEARN webpage or discussed in workshops.

REQUIRED COURSE SUPPLIES

- A portable hard drive, USB thumb drive, or cloud storage for backing up work is required.
- In case pivoting to a remote teaching environment is required, access to a computer that is able to run ArcGIS Pro software either locally installed on a Windows operating system or via remote lab access using a stable internet connection.

LEARN COURSE ENVIRONMENT

LEARN is a web-based course management system that enables instructors to manage course materials (posting of lecture notes, etc.), interact with their students (drop boxes for assignment submissions, discussion boards, course e-mail, etc.), and to provide feedback (grades, assignment comments, etc.). Data files for all course modules will be found on LEARN. Log onto LEARN using your Quest/UW userid and password here: <https://learn.uwaterloo.ca> (<https://learn.uwaterloo.ca>)

STUDENT ASSESSMENT

Component	Value
INDIVIDUAL EVALUATION (Subtotal = 40%):	
Personal biography	2%
Annotated bibliography	15%
Proposal oral presentation	5%
Final oral presentation	8%
Progress report(s)	5%
Attendance/participation	5%
Peer evaluation for group work (optional)	+2% bonus

Component	Value
GROUP EVALUATION (Subtotal = 60%):	
Project title & mission statement	3%
Written proposal	20%
Final written report	37%

KEY DELIVERABLES

The primary deliverable of the course is a final group project presented in both oral and written format near the end of term. Other components in the course are meant to serve as ‘building blocks’ and to contribute towards completion of the final group project. These deliverables include a project proposal (oral and written form), annotated bibliography, and weekly progress reports. Some components will be individually assessed, while others will be marked as a group evaluation.

PROJECT PROGRESS REPORTS

Several classes over the term will be devoted to project updates from each group. Meetings with either the TA or instructor may be scheduled from time to time. A different group member will be assigned to provide a written progress report briefly summarizing the group’s weekly progress (e.g., completed tasks, challenges, project management, work plan). Each student must be responsible for at least one progress report during the term, which will be marked by the TA or instructor. Progress reports and meetings provide an opportunity to describe challenges you and your group may be facing and to obtain feedback/guidance from the instructor and/or TA. Completion of peer evaluation forms for group work will be optional near the end of term and account for 2% bonus marks added to the final course grade (in accordance with guidelines set by the instructor).

ORAL PRESENTATIONS

Oral presentations will be delivered on dates specified in the course schedule. Each student is required to contribute to both proposal and final presentations, and will be evaluated individually based on presentation skills and content. Groups are expected to use the digital projector in conjunction with presentation software. The audience for the final presentations may include people from outside the course. Final reports will be submitted shortly after final oral presentations (deadline specified by the instructor) to allow for an opportunity to incorporate feedback and comments.

ATTENDANCE/PARTICIPATION

Class attendance and participation will be monitored throughout the term and account for 5% of the total course grade. This grade will be assigned at the instructor’s discretion and evaluated holistically based on class attendance, completion of assignments/deliverables, and participation in project group work, class discussions, and activities. The instructor reserves the right to adjust final marks up or down, based on the performance, contribution, and participation of each student to their group.

PROJECT PROGRESS UPDATES

Group progress meetings will potentially be scheduled during some weeks of the term with either the instructor or TA (scheduled during or else outside class time). One student from each group will submit a written progress

update/report and assessment of their team, which will be evaluated by the instructor or TA. Each student must be responsible for at least one progress update/report during the term.

ASSIGNMENT SCREENING

Text matching software (Turnitin) will be used to screen assignments in this course. This is being done to verify that use of all material and sources in assignments is documented. In the first week of the term, details will be provided about the arrangements for the use of Turnitin and alternatives in this course. See Administrative Policy below for more information and links.

ADMINISTRATIVE POLICY

Late Penalty: If for some reason you are unable to submit coursework before specified deadlines, please contact the instructor as soon as possible. Due to critical contributions to group work and the cumulative nature of the course, any late deliverables will automatically receive a zero grade. No provisions will be made for late submissions of assignments without medical documentation.

Alternate Arrangements for Cancelled In-Person Classes: Lectures may be cancelled (as indicated in the course schedule) and a make-up class may be rescheduled, if required. If a make-up class is rescheduled, a date/time will be selected based on a class poll of availability and with majority agreement. Maximum effort will be made to select a schedule conflict-free time.

If a make-up class is not rescheduled or if there is a need to pivot to a remote teaching environment during the term (for a short-term or longer-term duration), classes will move to a synchronous format with relevant links and details/instructions posted on LEARN. Synchronous sessions may be recorded. Oral presentations will be submitted in digital format with instructions provided on LEARN.

Should there be a need to pivot to a remote teaching environment during the term (for a short-term or longer-term duration), instructions for ArcGIS Pro software access will also be provided on LEARN with two options for, (a) installing the software onto your own Windows computer, or (b) via remote lab access, which requires a stable internet connection.

Course Correspondence: During term time, the instructor and support staff will make every effort to answer e-mails within 48 hours, although busy periods may result in delays. E-mails sent on the weekend will normally be answered on the following Monday or Tuesday. Students are encouraged to consult LEARN discussion forums, which will be updated with frequently asked questions (FAQs) and to attend class and office hours to consult with the instructor and TA about lab and software-related questions.

Intellectual Property: For further information on IP related to teaching, please see https://uwaterloo.ca/legal-and-immigration-services/sites/ca.legal-and-immigration-services/files/uploads/files/volume_1_issue_3_winter_2018.pdf (https://uwaterloo.ca/legal-and-immigration-services/sites/ca.legal-and-immigration-services/files/uploads/files/volume_1_issue_3_winter_2018.pdf) and the Guidelines for Faculty, Staff and Students Entering Relationships with External Organizations Offering Access to Course Materials, <https://uwaterloo.ca/secretariat/faculty-staff-and-students-entering-relationships-external> (<https://uwaterloo.ca/secretariat/faculty-staff-and-students-entering-relationships-external>) . The following text is recommended:

Students should be aware that this course contains the intellectual property of their instructor, TA, and/or the University of Waterloo. Intellectual property includes items such as:

- Lecture content, spoken and written (and any audio/video recording thereof);
- Lecture handouts, presentations, and other materials prepared for the course (e.g., PowerPoint slides);
- Questions or solution sets from various types of assessments (e.g., assignments, quizzes, tests, final exams); and
- Work protected by copyright (e.g., any work authored by the instructor or TA or used by the instructor or TA with permission of the copyright owner).

Course materials and the intellectual property contained therein, are used to enhance a student's educational experience. However, sharing this intellectual property without the intellectual property owner's permission is a violation of intellectual property rights. For this reason, it is necessary to ask the instructor, TA and/or the University of Waterloo for permission before uploading and sharing the intellectual property of others online (e.g., to an online repository).

Permission from an instructor, TA or the University is also necessary before sharing the intellectual property of others from completed courses with students taking the same/similar courses in subsequent terms/years. In many cases, instructors might be happy to allow distribution of certain materials. However, doing so without expressed permission is considered a violation of intellectual property rights.

Please alert the instructor if you become aware of intellectual property belonging to others (past or present) circulating, either through the student body or online. The intellectual property rights owner deserves to know (and may have already given their consent).

Co-op interviews and class attendance: Co-op students are encouraged to try and choose interview time slots that result in the least amount of disruption to class schedules. When this is challenging, or not possible, a student may miss a portion of a class meeting for an interview. Instructors are asked for leniency in these situations; but, a co-op interview does not relieve the student of any requirements associated with that class meeting.

When a co-op interview conflicts with an in-class evaluation mechanism (e.g., test, quiz, presentation, critique), class attendance takes precedence and the onus is on the student to reschedule the interview. CEE provides an interview conflict procedure to manage these situations.

Students will be required to provide copies of their interview schedules (they may be printed from WaterlooWorks) should there be a need to verify class absence due to co-op interviews.

Research Ethics: The University of Waterloo requires all research conducted by its students, staff, and faculty which involves humans as participants to undergo prior ethics review and clearance through the Director, Office of Human Research and Animal Care (Office). The ethics review and clearance processes are intended to ensure that projects comply with the Office's Guidelines for Research with Human Participants (Guidelines) as well as those of provincial and federal agencies, and that the safety, rights and welfare of participants are adequately protected. The Guidelines inform researchers about ethical issues and procedures which are of concern when conducting research with humans (e.g. confidentiality, risks and benefits, informed consent process, etc.). If the development of your research proposal consists of research that involves humans as participants, the please contact the course instructor for guidance and see: <https://uwaterloo.ca/research/office-research-ethics> (<https://uwaterloo.ca/research/office-research-ethics>)

Mental Health: The University of Waterloo, the Faculty of Environment and our Departments/Schools consider students' well-being to be extremely important. We recognize that throughout the term students may face health challenges - physical and / or emotional. **Please note that help is available.** Mental health is a serious issue for everyone and can affect your ability to do your best work. Counselling Services <https://uwaterloo.ca/campus-wellness/> (<https://uwaterloo.ca/campus-wellness/>) is an inclusive, non-judgmental, and confidential space for anyone to seek support. They offer confidential counselling for a variety of areas including anxiety, stress management, depression, grief, substance use, sexuality, relationship issues, and much more.

All students are encouraged to download the WatSAFE app which is available free through the google and iOS app

stores. The WatSAFE app provides on- and off-campus contacts for students in distress, including international students, and other information related to campus safety and security.

Religious Observances: Students need to inform the instructor at the beginning of term if special accommodation needs to be made for religious observances that are not otherwise accounted for in the scheduling of classes and assignments.

Communications with Instructor and Teaching Assistants: All communication with students must be through either the student's University of Waterloo email account or via LEARN. If a student emails the instructor or TA from a personal account they will be requested to resend the email using their personal University of Waterloo email account.

Recording lecture: Use of recording devices during lectures is only allowed with explicit permission of the instructor of the course. If allowed, video recordings may only include images of the instructor and not fellow classmates. Posting of videos or links to the video to any website, including but not limited to social media sites such as: facebook, twitter, etc., is strictly prohibited.

UNIVERSITY POLICY

Academic integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check [the Office of Academic Integrity](https://uwaterloo.ca/academic-integrity/) (<https://uwaterloo.ca/academic-integrity/>) for more information.]

Grievance: A student who believes that a decision affecting some aspect of their university life has been unfair or unreasonable may have grounds for initiating a grievance. Read [Policy 70, Student Petitions and Grievances, Section 4](https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-70) (<https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-70>) . When in doubt, please be certain to contact the department's administrative assistant who will provide further assistance.

Discipline: A student is expected to know what constitutes academic integrity to avoid committing an academic offence, and to take responsibility for their actions. [Check [the Office of Academic Integrity](https://uwaterloo.ca/academic-integrity/) (<https://uwaterloo.ca/academic-integrity/>) for more information.] A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate associate dean. For information on categories of offences and types of penalties, students should refer to [Policy 71, Student Discipline](https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-71) (<https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-71>) . For typical penalties, check [Guidelines for the Assessment of Penalties](https://uwaterloo.ca/secretariat/guidelines/guidelines-assessment-penalties) (<https://uwaterloo.ca/secretariat/guidelines/guidelines-assessment-penalties>) .

Appeals: A decision made or penalty imposed under [Policy 70, Student Petitions and Grievances](https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-70) (<https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-70>) (other than a petition) or [Policy 71, Student Discipline](https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-71) (<https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-71>) may be appealed if there is a ground. A student who believes they have a ground for an appeal should refer to [Policy 72, Student Appeals](https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-72) (<https://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-72>) .

Note for students with disabilities: [AccessAbility Services](https://uwaterloo.ca/disability-services/) (<https://uwaterloo.ca/disability-services/>) , located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term.

Turnitin.com: Text matching software (Turnitin®) may be used to screen assignments in this course. Turnitin® is used to verify that all materials and sources in assignments are documented. Students' submissions are stored on a U.S. server, therefore students must be given an alternative (e.g., scaffolded assignment or annotated bibliography), if

they are concerned about their privacy and/or security. Students will be given due notice, in the first week of the term and/or at the time assignment details are provided, about arrangements and alternatives for the use of Turnitin in this course.

It is the responsibility of the student to notify the instructor if they, in the first week of term or at the time assignment details are provided, wish to submit alternate assignment.