# Geography / Planning 487

## Management Issues in Geographic Information Systems

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## Calendar description

Built around a set of key issues in the management of Geographic Information Systems. Focuses on middle management concerns and covers topics including GIS needs assessment, benchmarking, the law and spatial data, spatial data warehousing, multi-user GIS modelling and GIS application development. Uses of GIS in both public and private sector organizations are covered.

**Prerequisites:**   Successful completion of Geog/Plan 381 or Geog/Plan 387.

## Recommended

Notwithstanding the prerequisites listed above, **it is highly recommended that students complete both Geog/Plan 381 and 387 before taking this course**.  If you have not completed both courses, you will be expected to have a solid knowledge base in both spatial analysis and spatial database management.

## Overview

An important aspect of the Geographic Information Systems (GIS) industry, which is often overlooked in university education, concerns practical aspects of the management of this technology in the workplace. In this course, the term "management" encompasses technology, the GI (Geog. Info.) industry, and their interfaces between society and organisations.  Some topics that fall within this definition include: setting up an enterprise level spatial database, conducting GIS needs assessment, writing and responding to requests for a proposal (RFP), data and metadata standards, multi-user data modelling, data sharing and data warehousing, legal aspects of spatial data use, end user education and staffing, and the changing socio-technological context in which GIS are situated.

This course provides an overview of these and some other aspects of GIS management.  The course is built around a sequence of seminar topics, some of which involve a presentation from a guest speaker, who is expert on the topic they speak to. The course seeks to convey to students the issues that must be addressed in GIS implementation and management within the workplace.  The issues addressed in GIS management are essentially the same in the public and private sectors, although typically the private sector comprises the "vendor" market and the public sector the "client" market. We consider both sectors in this course and consider the supply of GIS technology and services  to the GIS user community and how needs are best articulated from the user community.

It will be evident from the course that successful GIS implementation and management in the workplace is far from straightforward.  However, with the knowledge gained from the course, you should be at least able to begin to approach the challenges of managing a GIS installation with some forethought and basic knowledge.

**Objectives:**

The course is intended to provide senior undergraduate students with a thorough overview of the various aspects of managing the installation and operation of a workplace GIS. The topics covered include considerations relevant to smaller operations and to complex, multi-user, client-server systems that run in large organisations. The topics complement the technical knowledge of spatial data, spatial databases and GIS applications that you will have acquired from GP381, GP387 and GP481. In addition to covering all of the procedural issues involved in GIS management, there will also be some attention given to research issues (for example, open source software, Web 2.0 and public participation GIS).

By the end of the course, you should be knowledgeable of the key issues involved in GIS management and should understand how to plan for, initiate, and manage the implementation of a GIS from software selection, through database development, end-user training, and applications deployment.

**Class schedule and learning modes**

Our classes will be held in **HH1108** on **Wednesdays** from **11.30am - 2.20pm**. The class is structured as much as possible in a seminar format, given the limitations of the class size. Typically, each class will be divided into two sessions of roughly equal length. The first session will be lecture and discussion format and address a specific topic listed on the course schedule. On some weeks, the latter part of the class will centre on a guest presentation by a practitioner prominent in the GIS industry who has experience relevant to that week's topics. If we do not have a guest speaker on a given week, the last section of the class will be used for lectures and/or discussion of assignments as required.

<u>Note:</u>  **This is an advanced level class that requires your attendance every week to build your understanding of the issues and to be respectful to the guest speakers who freely donate their time and expertise.  If you cannot commit to this standard, do not take this course.**

**Readings:**

You are not required to purchase a text book, however we will make use of selected chapters from the texts listed below as well as selected journal articles, published reports and web page references that will be posted on the course Learn site.

Tomlinson, R. (2013) "Thinking about GIS: Geographic Information System planning for managers". 5th ed. (hard copy on reserve - Dana Porter Library)

Yeung, A. and G.B. Hall (2007) "*Spatial Database Systems: design, implementation and project management*", Springer: Dordecht, The Netherlands.  (hard copy - Dana Porter Library reserve, e-book link on Learn)

Obermeyer, N. and J. Pinto (2008) Managing Geographic Information Systems, 2nd Ed., Guilford: New York. (hard copy on reserve - Dana Porter Library)

## Course Learn site

The course web site on Learn is a key resource for GP487 students and a mechanism for our communication. This site must be consulted regularly by students as it provides a summary of each week's topic and offers resources (e.g. pdf files, web links, etc.) for you to explore.

## Email and personal consultation

I am happy to meet with you during my office hours (EV2-1002 Spatial Decision Lab) and accept email concerning any aspect of the course.

To help identify course-related messages, **all course-related emails will need to use the uwaterloo system and include "GP487" as part of the email subject line.** Note that I will only reply to messages that originate from the UW system (e.g. [StudentName@uwaterloo.ca](mailto:StudentName@uwaterloo.ca)).

Except in emergencies, emails sent during the weekend will not be responded to until the following Monday. Emails sent between 5:00 PM and 9:00 AM will not be responded to until the following day. Also, remember that email is not a good medium to discuss complicated issues or concerns. In these instances, use email to set up an appointment to meet me as appropriate.

## Evaluation:

Evaluation in this course is based on a combination of individual and group work.

| Assignment | Type | Date out | Date due | Value |
|---|---|---|---|---|
| | | | | |
| Web-mapping assignment | Teams of 3 or 4 | Jan. 11 | Feb. 1 | 25% |
| Group project | Teams of 3 or 4 | Feb. 1 | March 15 | 35% |
| Group project presentation | Teams of 3 or 4 | | March 22 | 5% |
| End of term test | individual | | March 29 | 25% |
| Class participation | individual | | | 10% |

**Web mapping assignment I:**

The range of choices in web-GIS and web mapping software has grown substantially and ranges from light weight javascript mapping APIs to more complex APIs and toolkits that use online services to enable some forms of spatial analysis and geoprocessing. In this assignment, students will use and critically evaluate a selected set of web mapping software options in light of different end-user requirements.

**Group project:**

Very often in the geospatial information industry, you will work in a team environment to propose ideas, identify solutions, and complete the assigned task. In this assginment, student GIS groups comprised of 3 or 4 students will propose and implement a GIS project for a Request For Proposal (RFP). Your group will be assessed primarily based on your project. However, given the importance of communicating the merits of projects effectively in a short time period, a further 5% of your grade will be based on a succinct presentation.

**Participation:**

Your participation and attendance in class is important for you to build your understanding of the topics that are discussed and to be respectful of guest speakers who give their time freely to come and speak.  It is expected that you will come to class prepared and will contribute to class discussions.  Attending class is not equivalent to participating in class. However, attendance will be factored into your participation grade based on a loss of 1% per class, up to the maximum participation grade of 5%, unless a doctor's note or some other acceptable reason is produced.

**End of Term test:**

All students are required to be in class on March 29<sup>th</sup> for the end-of-term test.  The test will be 2 hours in length and will cover materials from all classes, readings and speakers.  **A grade of 0 will be assigned for a missed test unless a doctor's note indicating illness is submitted.**  In that case, alternative arrangements for the test will be made.

**Important notes:**

1. **Group assignments:**  The web mapping assignment and the RFP assignment (proposal and presentation) will be completed in groups of 3 or 4 students (i.e. not 2, not 5 …).  Working with a variety of colleagues is workplace reality.  For this reason, **you will need to work with different classmates for these assignments**.

2. **Peer evaluations:** Each team member is expected to contribute equally to all aspects of the two group assignments (e.g. research, data management, coding, writing, budgeting, team meeting, presentation, etc.) and to complete an evaluation of their partners' contributions.  If there is evidence of highly inequitable contributions to the final product, individuals' marks will be adjusted accordingly.  In all other cases, all group members will receive the same grade.

3. **Each assignment is due at the beginning of class on the assigned dates (hard copy and soft copy in Learn dropbox).**  Assignments submitted later than the dates advertised above will be subject to a late penalty of 10% per day.  Assignments submitted more than 4 days late will not be accepted and will be graded as zero unless they are accompanied by a note from a physician.

4. Unclaimed assignments will be retained until two months after term grades become official in Quest. After that time, they will be destroyed in compliance with UW's confidential shredding procedures.

5. To obtain a passing grade in the course, students are expected to achieve a pass in each graded course component.  The professor will examine the record of each individual student's achievement and may adjust their final grade to take into account the component passing requirement, extenuating and compassionate circumstances and the student's general pattern of achievement in the course.

6. **Readability and Clarity**: Students are expected to present well organized, and properly written work. Penalties of up to 25% may be applied in cases where readability and/or clarity are inadequate.

7. **Students with disabilities:** The AccessAbility Office 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 the AccessAbility Office at the beginning of each academic term.

8. **Mental Health:** The University of Waterloo, the Faculty of Environment and our Departments 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

http://www.uwaterloo.ca/counselling-services 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.

9. **Religious Observances:** Please 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.

10. **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. www.uwaterloo.ca/academicintegrity/

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**Consequences of Academic Offences:**

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> *A student is expected to know what constitutes academic integrity, to avoid committing academic offenses, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offense, or who needs help in learning how to avoid offenses (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offenses and types of penalties, students should refer to Policy 71 - Student Discipline, http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm*
>
> *Within ENV, those committing academic offences (e.g. cheating, plagiarism) will be placed on disciplinary probation and will be subject to penalties which may include a grade of 0 on affected course elements, 0 on the course, suspension, and expulsion. Students who believe that they have been wrongfully or unjustly penalized have the right to grieve; refer to Policy #70, Student Grievance, http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm*

Students who are unsure what constitutes an academic offence are requested to visit the on-line tutorial at **http://www.lib.uwaterloo.ca/ait/**

**Research Ethics:** Please also note that 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

**Class Schedule**

| Week | Date | Weekly Topic | Assignments |
|---|---|---|---|
| 1 | Jan. 4 | Course introduction | |
| 2 | Jan. 11 | End-user education, training and professionalising the GIS workforce | Web mapping teams due<br>Web mapping assignment out |
| 3 | Jan. 18 | Standards and spatial data infrastructures (SDIs) | |
| 4 | Jan. 25 | GIS Needs Assessment | Group project teams due |
| 5 | Feb. 1 | Project management | Web mapping assignment due<br>Group project assignment out |
| 6 | Feb. 8 | Writing and Responding to a Request for Proposal (RFP) | |
| 7 | Feb. 15 | Legal and ethical issues | Group project proposal and work plan due |
| | *Reading week: Feb. 20 - 24* | | |
| 8 | Mar. 1 | Local government GIS - challenges and opportunities | |
| 9 | Mar. 8 | Web services and spatial data deployment<br>VGI workshop | |
| 10 | Mar. 15 | Open data and Open government | Group project assignment due |
| 11 | Mar. 22 | Group project presentations | Group project presentation due |
| 12 | Mar. 29 | In-class test (2 hours) | |

**Notes:**
    1. **Changes to the schedule of class topics are not anticipated but may be required to accommodate the availability of guest speakers**
    2. **Consult the course Learn site for a complete list of readings that include textbook chapters, journal articles, industry publications and web pages.**