

# GEOG/PLAN 281

## INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEMS

### Course Syllabus – Winter 2017

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#### OVERVIEW

Geographic Information Systems (GIS) are used in a wide variety of planning, facilities management, resource management, business, and applied research applications. The common thread in this diverse range of applications is the need to store, manipulate and analyze spatial data. Since spatial factors are central to almost all issues related to planning and geographic inquiry, it is important to develop a sound grasp of GIS principles and the fundamental skills required to apply it in practice.

#### COURSE DESCRIPTION

This course provides an introduction to digital mapping and spatial analysis using GIS. Students learn how to create their own maps, how to use GIS software to analyse geographic problems, and learn techniques that can be applied to a wide variety of subject areas within geography and other disciplines. The lectures discuss underlying theory and how it is implemented in GIS software. The lab sessions allow students to gain hands-on experience with GIS software.

#### INSTRUCTOR

**Dr. Su-Yin Tan**

Office: EV1-227

Phone : 519-888-4567, Ext. 38772

E-mail: su-yin.tan@uwaterloo.ca (use LEARN mail system)

Office hours: Tuesday, 12:30 p.m. - 2:00 p.m. (subject to change). By appointment if necessary.

#### LECTURES

Location: Arts Lecture Hall (AL), Room 116

Time: Tuesday, 2:30-4:20 p.m.

#### TEXT AND READINGS

Students should focus on material presented in lectures and lab sessions. The mandatory text should be used to provide further explanation and examples of concepts and techniques discussed in the course:

Longley, P., Goodchild, M., Maguire, D., and Rhind, D (2015). Geographic Information Systems and Science, 4<sup>th</sup> Edition. John Wiley and Sons, Toronto.

[ Note: 3<sup>rd</sup> edition (2011) is acceptable, but chapter numbers may differ from assigned readings ]

#### PREREQUISITE

GEOG 181 or GEOG 187 or Planning Student

## EVALUATION

ArcGIS Tutorial:	5 %	Lab Assignments (6 x 7%):	42 %
GPS Exercise:	5 %	Midterm Quiz:	14 %
Lab Attendance:	4 %	Final Exam:	30 %

## SUPPORT STAFF

- Teaching Assistants:  
(Office hours: TBA – posted on LEARN      Location: General Use Lab, EV2-1001)

<b>Ryan Carlow</b>	redcarlo@uwaterloo.ca	<b>Karl Hanke</b>	khanke@uwaterloo.ca
<b>Kristen de Kroon</b>	ke2dekro@uwaterloo.ca	<b>Haydn Lawrence</b>	hlawrenc@uwaterloo.ca
<b>Liuyi Guo</b>	l29guo@uwaterloo.ca	<b>Melissa Weber</b>	m3weber@uwaterloo.ca

- Informatics Instructional Coordinator:

### **James D. McCarthy**

Office: Ask at MAD Helpdesk  
Phone : 519-888-4567 Ext. 38529  
E-mail: jmccarth@uwaterloo.ca (use LEARN mail system)

## LABS

- Location: The Galileo GIS Lab (EV1, Room 240)  
Software: ArcGIS 10.3.1 (29 computer workstations available)  
Times: Schedule listed below [Lab section number in brackets]  
*\*\* Only attend the lab session you are assigned to, otherwise assignments submitted to different lab sections will not be marked \*\**

Monday:	4:30 p.m.-6:20 p.m.	[103]
	6:30 p.m.-8:20 p.m.	[101]
Tuesday:	4:30 p.m.-6:20 p.m.	[106]
	6:30 p.m.-8:20 p.m.	[107]
Wednesday:	6:30 p.m.-8:20 p.m.	[108]
Thursday:	4:30 p.m.-6:20 p.m.	[105]
	6:30 p.m.-8:20 p.m.	[104]
Friday:	8:30 a.m.-10:20 a.m.	[109]
	1:30 p.m.-3:20 p.m.	[102]

- Note:
- Please use LEARN mail system for course-related enquiries.
  - Lab sessions are held every week and conducted by teaching assistants (TA's)
  - **Please contact your TA first for lab-related questions before contacting the lecturer or instructional coordinator**
  - The TA's are responsible for introducing new assignments and guiding you to learn concepts and software. TA's will not give you answers to assignment questions.
  - You are responsible for maintaining back-ups of your work.
  - **Switching lab sections:** In rare instances, the TA may be consulted at the beginning of the course and a switch may be granted if room is available.

## COURSE POLICIES:

### **Required Course Supplies:**

USB flash drive for backing up work. Printing credit for lab assignment submissions, if necessary.

### **Resources:**

ArcGIS software is used for all lab work in this course. Manuals are available as on-line help files. Students are expected to use the on-line help to obtain information on operations that are not fully detailed in the assignments. Other resources will also be posted on the LEARN webpage.

### **Late Penalty:**

10% of the total mark for the assignment per day, up to 7 days (including weekends and holidays), after which assignments will not be accepted. Hand in all assignments directly to your TA at the beginning of your lab session. If an assignment is submitted after the start of the lab session in which it is due, it will be penalized for that day.

Late lab assignments should be submitted to Heather Dorken in EV1, Rm 115 during normal working hours, who will time stamp assignments upon receipt. All late lab assignments should be clearly labeled with your lab section number and TA. The late penalty will be counted from and including the submission date (as indicated by time stamp). You assume all risk for lost or missing material.

### **Lab Attendance:**

4% of the total mark has been allocated for lab attendance. TA's will record lab attendance for each lab section. 1% of the total grade will be deducted for a recorded absence up to a maximum of four.

TA's will only grade lab assignments for students in their assigned lab section. Therefore, students should only attend their assigned lab section, otherwise assignments submitted to a different session will not be graded.

## UW POLICIES:

### **Unclaimed Assignments:**

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

### **Academic Integrity:**

To create and promote a culture of academic integrity, the behavior of all members of the University of Waterloo is based on honesty, trust, fairness, respect and responsibility.  
<http://www.uwaterloo.ca/academicintegrity/>

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, then please contact the course instructor for guidance and see <http://iris.uwaterloo.ca/ethics/>

**Note for Students with Disabilities:**

The AccessAbility Office, located in Needles Hall, Room 1132, 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.

**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 ([www.uwaterloo.ca/counselling-services](http://www.uwaterloo.ca/counselling-services)) is an inclusive, non-judgmental, and confidential space for anyone to seek support. They offer confidential counseling for a variety of areas including anxiety, stress management, depression, grief, substance use, sexuality, relationship issues, and much more.

**Religious Observances:**

Student needs 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.

**Grievance:**

A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70 - Student Petitions and Grievances, Section 4, <http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm>. When in doubt please contact your Undergraduate Advisor for details.

**Discipline:**

A student is expected to know what constitutes academic integrity, to avoid committing academic offence, 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 offences and types of penalties, students should refer to Policy 71 - Student Discipline <http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm>.

**Appeals:**

A student may appeal the finding and/or penalty in a decision made under Policy 70 - Student Petitions and Grievances (other than a petition) or Policy 71 – Student Discipline if a ground for an appeal can be established. Read: Policy 72 - Student Appeals, <http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm>

**LEARN:**

Users can login to LEARN via: <http://learn.uwaterloo.ca/> using your WatIAM/Quest username and password. Available documentation: [http://av.uwaterloo.ca/uwace/training\\_documentation/index.html](http://av.uwaterloo.ca/uwace/training_documentation/index.html)

## COURSE SCHEDULE

Term Week	Lectures			Labs	
	Lecture Date	Lecture Topic	Textbook Chapters	Assignment Distributed	Assignment Due
1 (Jan 3-6)	Jan. 3	Course overview - What is GIS?	1, 2	No Lab	None
2 (Jan 9-13)	Jan. 10	Spatial data models	3, 7	Tutorial	None
3 (Jan 16-20)	Jan. 17	Georeferencing I	4, 11	Lab 1	Tutorial
4 (Jan 23-27)	Jan. 24	Georeferencing II	4	Lab 2	Lab 1
5 (Jan 30-Feb 3)	Jan. 31	Vector GIS + Midterm Briefing	9, 12, 14	Lab 3	Lab 2
6 (Feb 6-10)	Feb. 7	Vector GIS Analysis	13, 14	GPS Exercise	Lab 3
7 (Feb 13-17)	Feb. 14	<b>MIDTERM QUIZ</b>		None	None
8 (Feb 20- 24)	Feb. 21	<b>READING WEEK</b>		None	None
9 (Feb 27-Mar 3)	Feb. 28	Raster GIS	3	Lab 4	GPS Exercise
10 (Mar 6-10)	Mar. 7	Raster GIS analysis	13, 14, 15	Lab 5	None
11 (Mar 13-17)	Mar. 14	Data acquisition and data quality	5, 8, 16, 17	Lab 6	Lab 4
12 (Mar 20-24)	Mar. 21	Spatial data analysis and modeling	14, 15	Required attendance	Lab 5
13 (Mar 27-31)	Mar. 28	Review Class		No Lab	Lab 6

### Notes:

- Weeks indicated in the schedule begin on Mondays
- Labs are assigned and due at the start of your registered lab session in the week indicated
- The instructor reserves the right to modify the schedule and topics during the term

### Holidays and University Closures:

- Jan. 2 (M) for New Year's Day observance
- Feb. 20 (M) for Family Day
- Feb. 20-24 (M-F) for Reading Week