SPATIAL DATABASES WINTER 2023

GEOG 387 / PLAN 387 / GEOG 387 / PLAN 387

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CLASS SCHEDULE

Section	Location	Time	Instructor(s)
GEOG 387 102 *[LAB]*	EV2 1002A	Tuesdays 12:30 p.m. - 2:20 p.m.	Peter Deadman peter.deadman@uwaterloo.ca
PLAN 387 101 *[LAB]*		Tuesdays 10:30 a.m. - 12:20 p.m.	
PLAN 387 102 *[LAB]*		Tuesdays 12:30 p.m. - 2:20 p.m.	
GEOG 387 001 *[LEC]*	MC 4040	Mondays 11:30 a.m. - 2:20 p.m.	
PLAN 387 001 *[LEC]*		Mondays 11:30 a.m. - 2:20 p.m.	
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INSTRUCTOR / TA INFORMATION

Instructor: Peter Deadman, Associate Professor, Dept. of Geography and Environmental Management,

Office: EV1-323

Office Hours: Thursdays, 1:00 – 3:00 PM

E-mail: pjdeadma@uwaterloo.ca (mailto:pjdeadma@uwaterloo.ca)

Please Note: If you need to get in touch with me, please send an email. (email sent on a weekday will normally be answered within 24 hours. Email sent on the weekend will normally be answered on Monday)

We intend to provide fully in-person delivery of this course in the Winter 2023 term. However, these plans could change, due to the pandemic. **Updates to the course mode of delivery will be provided through the announcements on Learn. Please check the Learn announcements regularly**.

Teaching Assistant:

Pedro Valentin Serrano pvserran@uwaterloo.ca (mailto:pvserran@uwaterloo.ca)

COURSE DESCRIPTION

> *Calendar Description for GEOG 387*
>
> This course focuses on design and development of a GIS database. It addresses theoretical issues regarding data models used in GIS and data modeling techniques used in designing spatial databases. It considers the processing required to input data from a variety of sources and clean and edit a multi-theme database and introduces students to creation and use of internet map services.
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> Prereq: GEOG/PLAN 255 or GEOG/PLAN 281

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Geographic Information Systems (GIS) are being used in a wide variety of planning, facilities management, business, resource management, and applied research applications. In order to use GIS effectively, it is necessary to have a good understanding of the data structures used to store spatial data, the methods used to associate attribute data with spatial features, and the techniques used to query the spatial database and perform specialized spatial analyses.

This course focuses on the design and development of spatial databases. Particular emphasis will be placed on the use of data modeling techniques to design a GIS database for a specific application. Students undertake tasks related to the development of a conceptual design for a GIS database. They will also build a database based on a conceptual design using digital data available through a variety of sources, including digitized data. The resulting database will be used to perform some basic spatial analysis.

The objectives of this course are to:

- enable students to develop a good understanding of the principles and techniques of relational database design as they apply to spatial databases
- apply these principles and techniques in building spatial databases
- use spatial databases to perform common types of queries and spatial analyses.

LEARNING OUTCOMES

No explicit learning outcomes defined for this course.

Upon completing this course, students will be able to:

1. develop a conceptual design for a spatial database.
2. document a spatial database design
3. populate a spatial database by importing existing digital data, digitizing features from maps or imagery, and generating feature data using address locators (geocoding)
4. define and use attribute domains and topology rules in editing and maintaining a spatial database
5. use structured query language for data manipulation and spatial analysis

TENTATIVE COURSE SCHEDULE

LECTURE AND LAB SCHEDULE*

WEEK OF	LECTURE TOPIC(S)	LAB ASSIGNMENT
9 - January	Course Overview The growth of spatial databases	Tutorial,
16 - January	Spatial data representation Coordinate systems	Lab 1 begins
23 - January	Database Management Systems GIS and Databases	
30 – January	Database Design Database design tools Conceptual Design of a Database	Lab 1 Due – Feb 3rd, 4 PM Lab 2 begins
6 - February	Representing Relationships Database Normalization	

13 - February	Data Management and Analysis with SQL	
20 - February	**Study Break Week**	
27 - February	Database Management, documentation, accuracy standards	Lab 2 due – Mar 3rd, 4 PM Lab 3 begins
6 - March	3D surface representation and analysis LCP Analysis	
13 - March	Network representation and analysis	
20 - March	The Geoweb Modelling built environments	Lab 3 due – Mar 24th, 4 PM Lab 4 begins
27 - March	Spatial modelling and simulation	
3 - April	**Test (April 3rd)**	Test - in class
10 - April	Last day of classes	Lab 4 due – Apr 10th, 4 PM

* The instructor reserves the right to make alterations to the class schedule if necessary

TEXTS / MATERIALS

No materials required.

STUDENT ASSESSMENT

Evaluation

Component	Value
Lab 1	20%
Lab 2	20%
Lab 3	20%
Lab 4	20%
Term Test	20%

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

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/) 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) . 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/) 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) . For typical penalties, check Guidelines for the Assessment of 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) (other than a petition) or Policy 71, Student Discipline (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) .

Note for students with disabilities: AccessAbility 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.