



GEOGRAPHY 3260A Environmental Modelling

fall 2013-2014

Course Outline

v1.1 - 24 Jul 2013



Course Instructor:

M. Van De Wiel
office: Room 2412, Social Sciences Centre
email: mvandew3@uwo.ca
telephone: 519 661-2111 ext.80161
office hours: Monday, 14:00 – 17:00 (SSC 2412)

Teaching Assistant:

none

Lectures:

weekly

Tuesday, 12:30 – 14:30

room 1316a, Social Sciences Centre

Practicals:

irregular

Tuesday, 14:30-16:30

room 1316a, Social Sciences Centre

Attendance:

Attendance at lectures and practicals is optional, but recommended. Students are responsible for keeping up with course material of missed lectures and practicals. Submission deadlines for assignments apply regardless of attendance.

Course Description:

Landscapes are complex dynamic systems, which change over time and space. Environmental process models are used to study, understand and predict surface and near-surface processes that drive these changes. Computational modelling is a rapidly developing field in environmental sciences, and is becoming an ever more important tool in environmental research and in environmental management decision making.

This course aims to introduce the students to the theory, applications and complexities of environmental modelling. The course lectures will introduce the student to the basic theory of environmental process models, their use, application, and possibilities, as well as their limitations. The course laboratories will allow the students to take a hands-on approach to environmental modelling. Several environmental topics will be considered, including: geomorphology, hydrology, and biogeography.

Course Prerequisites:

Geography 2210a/b

Geography 2220a/b

at least one of: Geography2310a/b, Geography2320a/b, Geography2330a/b, or Geography2340a/b

NOTE: Unless you have either the requisites for this course or written special permission from your Dean to enrol in it, you will be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Course Objectives:

At the end of the course, students will understand the complexities, functioning, potential and limitations of environmental process models. During the course the student will:

- learn to represent and visualize spatial data in a computer environment
- learn to analyse, manipulate and combine primary spatial data to derive new information
- examine different approaches in GIS and other computer modelling software to achieve this
- apply this knowledge to existing tools (GIS and stand-alone modelling software)
- enhance this knowledge by developing a new computer model (as a group project)
- generalize this knowledge to understand the abilities and limitations of computational models

The course takes a seminar-based approach, by which a different aspect of environmental modelling will be explored each week.

Lecture schedule

| | |
|--------------|---------------------------------------|
| Tue, Sep 10: | Introduction |
| Tue, Sep 17: | Types of Models |
| Tue, Sep 24: | Modelling with Static Spatial Data |
| Tue, Oct 01: | <i>[field camp]</i> |
| Tue, Oct 08: | Modelling of Spatio-Temporal Dynamics |
| Tue, Oct 15: | Theory of Modelling |
| Tue, Oct 22: | Introduction to CA Algorithms |
| Tue, Oct 29: | CA Algorithms in Practice |
| Tue, Nov 05: | Other Algorithms |
| Tue, Nov 12: | Developing a Model |
| Tue, Nov 19: | Model Calibration |
| Tue, Nov 26: | Model Validation |
| Tue, Dec 03: | Bringing It All Together |

NOTE: This scheduling of lecture topics is provisional, and may change depending on class dynamics during term.

Evaluation of the course will be based on the following components:

Assignments: 55 %

Some lab classes will consist of assignments to be completed outside of scheduled lab hours. Deadlines apply to each lab assignment and these will be strictly enforced. Detailed lab assignment instructions, including the deadlines, will be provided in the lab handouts.

Mid-term Exam: 10%

The mid-term exam is provisionally scheduled on Tuesday, October 29th 2010. The mid-term exam will be a 2-hour exam and will include both short-answer and short essay-type questions. The answer to one of the short essay-type questions (student's choice which one), must be defended in a oral interview with the course instructor.

Final exam: 35 %

The final exam will be held during the official University examination period. The final exam will be a 3-hour exam and will include both short-answer and short essay-type questions. Depending on the students' evaluation of the mid-term oral exam component, a similar oral exam component might be included in the final exam.

NOTE: Simple calculators are permitted, but no other electronic devices will be allowed during tests and examinations

NOTE: The mark awarded by an instructor in a course at UWO is only final when students receive it from the Registrar.

Late Policy:

All assignments must be handed in before 4pm on the due date. Late submissions will be penalized at a rate of 10% per day for the first seven days. A mark of 0%-mark will be recorded if work is submitted more than a week late.

Extensions:

If you have genuine extenuating circumstances and will not be able submit an assignment on time, you may submit a written request for extension, clearly outlining why you should be granted an extension. This request must be submitted to the course instructor at least seven days before the assignment is due.

Accommodation:

If you have genuine extenuating circumstances and failed to submit an assignment on time, you must submit a signed doctor's letter or other legitimate documentation explaining why you failed to meet the deadline. This documentation should be submitted directly to the Dean's Office, not the course instructor. It is the Dean's Office that will determine if accommodation is warranted.

NOTE: Also see UWO's Policy on Accommodation for Medical Illness (<https://studentservices.uwo.ca/secure/index.cfm>).

Illness:

If you have an illness during the term that affects your work or ability to write exams or to complete work on schedule, please contact me as soon as you can, so I that can help with any accommodation. Also, please refer to Western's Policy on Accommodation for Medical Illness:

http://www.uwo.ca/univsec/handbook/appeals/accommodation_medical.pdf.

You can download a Student Medical Certificate (SMC) from: <https://studentservices.uwo.ca> under the Medical Documentation heading.

There is no course textbook.

Handouts of selected lecture material will be provided electronically (via WebCT) before each lecture, but students are expected to take notes during the lectures to complement the handouts. The course material is cumulative, *i.e.* you are expected to keep up with the material week by week. If you do not keep up with the material, you may find subsequent lectures difficult.

Additional reading may be assigned during term, and will consist of selected scientific papers from academic journals to which the University subscribes (in print or online), such as *Computers and Geosciences*, *Ecological Modelling*, and *Environmental Modelling and Software*.

Academic Conduct: Students should be familiar with the University Academic Policies and Regulations, and with the Academic Rights and Responsibilities in the Academic Calendar on the Registrar's website.

<http://www.westerncalendar.uwo.ca/2012/pg37.html>

Scholastic Offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

<http://www.uwo.ca/univsec/handbook/appeals/scholoff.pdf>

Plagiarism refers to the inclusion or submission of someone else's work (published or unpublished) without giving credit to the original author. Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar).

NOTE: All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

Geography Undergraduate Assistant:

Angelica Lucaci
SSC 2322A

Registrarial Services:

<http://www3.registrar.uwo.ca/index.cfm>

Student Development Services:

<http://www.sdc.uwo.ca/>

Social Sciences Academic Counselling:

<http://counselling.ssc.uwo.ca/>
SSC 2105

Accessibility:

The University of Western Ontario is committed to achieving barrier free accessibility for persons studying, visiting and working at Western. Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x82147 for any specific question regarding an accommodation.

Mental Health:

If you or someone you know is experiencing distress, there are several resources at Western to assist you. Please visit <http://www.uwo.ca/uwocom/mentalhealth/> for more information on these resources and on mental health.