Geography 9105 - Environmental Modelling

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Class Times
Tuesday     12:30 - 14:30 (SSC 1316A) if enrolment < 4
or
Tuesday    10:30 - 12:30 (room TBA) if enrolment ≥ 4
NOTE: only one of these two options is relevant, depending on course enrolment - see ‘Course Format’ below

Short Description
This course concerns the practicalities, possibilities and limitations of numerical simulation of environmental processes. The course provides a basic understanding of numerical algorithms for environmental processes and their implementation in spatial and temporal dimensions. While directed at physical environmental processes, the concepts covered in the course are transferable to other areas as well.

Course Objectives
This course aims to introduce the students to the theory, applications and complexities of environmental modelling.

Course Outline
The environment is a complex dynamic system, which changes over time and space. Environmental models are used to study, understand and predict these changes and the processes that drive them. 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. The course aims to introduce the students to the theory, applications and complexities of environmental modelling. Particularly, the course will address the following topics: types of models, representation and analysis of spatial data, representation of temporal dynamics, theory and algorithms in modelling, model development, numerical issues, model calibration and validation, uncertainty analysis, sensitivity analysis, analysis of dynamic environmental processes.
**Course Format**
The format of the course delivery depends on course enrolment. With low enrolment (< 4) a lecture-based format will be used, tied in with an undergraduate course on environmental modelling (GEOG3260). With higher enrolments (4+), the course will consist of a series of graduate seminars, based on readings and group discussion of academic papers.

In both cases, the students will be expected to work on an independent hands-on modelling-based project throughout the course. This project is tailored to the individual research interests of each student, usually in line with their thesis research.

**Course Text and Readings**
There is no course textbook. Readings consist of selected scientific papers from academic journals to which the University subscribes (in print or online), such as *Computers and Geosciences, Ecological Modelling, Hydrological Processes, Environmental Modelling and Software*, and others. Students will be asked to identify relevant additional readings in their specific fields of interest.

**Assessment**
50% of the course mark is based on a written report based on the student’s course project. The remaining 50% of the mark is a theory mark, which depends on the course format. If a seminar format is taken (enrolment ≥ 4), the theory mark is based on the student’s participation in the seminars. If a lecture format is taken (enrolment < 4), the theory mark is based on a final exam.

**Academic Offences**
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/scholastic_discipline_grad.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).