Simon Fraser University **GEOG 651-4**
Department of Geography **Fall 2013**
Instructor: Dr. Suzana Dragicevic *Office:* RCBH-6233
E-mail: suzanad@sfu.ca *Phone:* 778-781-4621

GEOG 651

ADVANCED SPATIAL ANALYSIS AND MODELING

Course Outline

Prerequisites:
GEOG 251 and one of GEOG 351, 352, 353, 355 or 356; or permission of the instructor

Course Description:
Spatial models allow us to make the best use of our data to represent real world dynamic spatial phenomena. In this course, we will focus on *why* and *how* models are applied to mimic physical, human and environmental processes by using a variety of spatial modeling approaches within a GIS framework. Students will learn how to build spatial models and to use models as tools for representing, analyzing, and predicting spatio-temporal geographic phenomena. The topics will cover the principles of *complex systems theory*, *cellular automata*, *multi-agent systems*, *fuzzy sets*, *multi-criteria evaluation* and *spatial decision support systems*. These concepts will be applied to the modeling of land-use and land cover changes, urban growth, climate change, transportation problems, disease propagation, forest fires, landscape ecology, epidemiology and/or criminology among others. In addition, fundamental questions about time representation in GIS, model calibration, validation, errors, sensitivity and uncertainty analysis will be explored.

The lectures will be an integration of instructor-led presentations on theoretical concepts and issues related to spatial modeling, student-led discussions, and short student presentations. A required list of readings of scientific journal papers covering selected course topics will provided. Computer labs will support the design and implementation of the course projects. Students will undertake the laboratory component of the course and choose a dynamic spatial problem and conceptualize a modeling strategy to resolve it. GIS software will be used to implement the solutions. The final projects will be presented in class and each student will submit a final written report in the format of a scientific journal paper.

Grading:
The final grade for the course will be determined from: class participation and discussions (5%), seminar paper presentation (10%), project proposal (10%), project presentation (10%), written project report (35%), and late midterm examination (30%). There is no final exam.

Labs will begin in the week of September 3rd, 2013.

The content is subject to minor changes depending on the number of students, class progress, and available resources