

## Geography 444/544: Geo-computation for Earth and Environmental Sciences

### Course Syllabus-

Summer 2003

Instructor: Jimmy Adegoke  
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Office Hours: 10-11.30 AM TR

**Introduction:** The course objective is to assist you develop competence in the use of advanced techniques for analyzing and modeling highly complex and often non-deterministic geographical problems. The course is structured in a seminar format to provide room for in-depth instructor-student interaction. The instructor will lead class discussions to introduce concepts and demonstrate applications. You will be assigned readings for each class and class discussions will focus around those readings. Each student will be required to make several short presentations based on assigned readings, submit a short paper, and complete one individual project. The project will focus on the application of one or more geocomputation methods to investigate a substantive problem to be developed in consultation with the instructor. A course objective is to build a virtual geocomputation studio comprising various tools implemented in the individual projects.

**Class schedule:** This course will be offered for the first time over a five-week period during the 2<sup>nd</sup> summer session of 2003. Classes will be held TR from 11.30 AM – 2.00 PM.

**Exams and grading:** Course grade will be based on class participation, a seminar presentation and an individual project. Class participation will constitute 30%, seminar presentation 20% and the final project 50% of the course grade. Structured exams will not be administered.

### Additional requirement for graduate credit:

This course will be offered as Geog 444 and Geog 544. To receive graduate credit, students will be required to submit a professionally formatted 10-15 page manuscript on a topic to be selected in consultation with the course instructor. Students will have the option of submitting a paper based on original research conducted as part of the course project.

### Course Outline:

- Week 1: Origins of Geocomputation:
- The quantitative revolution in Geography in the 1970s
  - The GIS Revolution in the 1980s
- Review of conventional spatial statistics:
- Parametric and non-parametric statistics
    - The regression model
    - Spatial clustering functions
    - Maximum likelihood classifiers

Weeks 2-4: GeoComputation tools for Data Mining and Modeling:

- Neural networks
- Decision trees
- Cellular automata
- Data visualization and virtual reality paradigms

Week 5: Individual project presentations.

**Readings:** Class readings will mostly comprise journal articles from the following journals: *Artificial Intelligence*; *Computers and Geosciences*; *Photogrammetric Engineering and Remote Sensing*; and *International Journal of Geographical Information Science*. All five journals are available through the MERLIN Library Catalog on the UMKC Nichols Library website. Copies of all assigned readings will be available in a class folder in the reception area of 420 Flarsheim Hall. Sign-out sheets will also be available for the use of students who wish to make personal copies. Please note that materials can only be signed out for a maximum of 1 hour at a time.