Please complete this form and attach a copy of the syllabus for new courses. Forward it as an email attachment to the Secretary of the Graduate Council. A printed copy of the form with signatures should be brought to the Graduate Council Meeting. Complete the Coordinator Form on page 2, if changes in this course will affect other units.

Please indicate:  __X___ NEW  ____ MODIFY  ____ DELETE

Local Unit:  CAS Dept of Geography  Graduate Council Approval Date:

Course Abbreviation:  GEOG/EVPP (631) CSS (645) Course Number: 631 / 645

Full Course Title:  Spatial agent-based models of human-environment interactions

Abbreviated Course Title (24 characters max.):  ABM hum-env interact

Credit hours:  3  Program of Record:  Computational Social Science

Repeatable for Credit?  
  ___ D=Yes, not within same term  Up to hours
  ___ T=Yes, within the same term  Up to hours
  ___ X N=Cannot be repeated for credit

Activity Code (please indicate):  _x__ Lecture (LEC) ___ Lab (LAB) ___ Recitation (RCT)
  ___ Studio (STU) ___ Internship (INT) ___ Independent Study (IND) ____ Seminar (SEM)

Catalog Credit Format  3: 0 : 3  Course Level:  GF(500-600) __x__ GA(700+)

Maximum Enrollment:  24  For NEW courses, first term to be offered:  The class is planned for fall 2004.

Prerequisites or corequisites:  GEOG531 or CSS600, or permission of the instructor

Catalog Description (35 words or less)  Please use catalog format and attach a copy of the syllabus for new courses.  Discuss key challenges in spatial modeling of human-environment interactions. Review agent-based modeling applications in urban/rural interactions, agriculture, forestry, and other areas. Hands-on development of simple ABM models and investigation of linkages between GIS and ABM.

For MODIFIED or DELETED courses as appropriate:

Last term offered:  ___ Previous Course Abbreviation:  Previous number:

Description of modification:

APPROVAL SIGNATURES:

Submitted by:  ________________________________ email: _dparker3@gmu.edu

Department/Program:  ________________________________ Date: __________________

College Committee:  ________________________________ Date: __________________

Graduate Council Representative:  ________________________________ Date: __________________
GEORGE MASON UNIVERSITY
Course Coordination Form

**Approval from other units:**

Please list those units outside of your own who may be affected by this new, modified, or deleted course. Each of these units must approve this change prior to its being submitted to the Graduate Council for approval.

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<th>Unit: Environmental Science and Policy</th>
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Graduate Council approval: _______________________________ Date: __________

Graduate Council representative: _________________________ Date: __________

Provost Office representative: __________________________ Date: __________
Preliminary Syllabus, “Spatial agent-based models of human-environment interactions”

Proposed for cross-listing in Geography, Environmental Science and Policy, and the Computational Social Science Program by Dawn Parker

**Description:** This course will introduce graduate students in the spatial, environmental, and computational social sciences to the use of agent-based techniques as a means of modeling human-environmental interactions. Emphasis will be placed on spatial processes, the use of spatial identifiers to link socioeconomic and biophysical models, and, where possible, links to geographic information and technology. We will cover applications in areas such as agriculture, forestry, biodiversity, water resource management, habitat degradation, and interactions between human populations and non-human species.

The course will combine literature review with hands-on modeling. When code is available, we will compile and run models as we review articles based on those models. In addition, using user-friendly agent-based packages such as CORMAS and SIMILE, students will complete a class project where they develop their own models in their areas of interest. Students with advanced programming abilities will be encouraged to develop more sophisticated models using packages such as RePast or MASON.

**Prerequisites:** Students should have a familiarity with spatial structures and concepts, some background in a social science, and a high level of computing competence. Students should have some familiarity with agent-based modeling and complexity theory, such as would be provided by Introduction to Computational Social Science (CSS 600) or Land-Use Modeling Techniques and Applications (Geog 590/EVPP 741). Knowledge of a programming language is helpful but not required. Additional readings will be suggested for students lacking background in any of these areas.

**Course requirements:** Students will each be required to give an in-depth review of 2-3 articles over the course of the semester. Students will also complete hands-on modeling exercises and will write short reports of their results. As well, each student will complete a term project in their area of interest and will present the results to the class. There will be a take-home final based on the course readings and modeling concepts.

**Grading:** Student’s grades will be based on the following:

- 25%: Article reviews and class participation
- 25%: Lab exercises
- 25%: Term project
- 25%: Final exam

**Weekly schedule of topics:**

1. Introduction to agent-based land use models (Parker et al, 2003; Schelling 1978)
2. Challenges in spatial models of human/environment interactions (Berger and Parker 2002 (In Parker, Berger, Mason 2002))
4. Agent decision models (Parker, Berger, Mason 2002; Parker et al, 2003)
6. Rural amenities (Rand et. al 2002; Alexandridis and Pijanowski, 2002; Alberti and Waddell 2000)
7. Water use and management (Berger 2001; Lansing 1993; Rajan and Shibasaki 2000)
8. Pedestrian models (Batty 2003; Gimblett, Richards, and Itami, in Gimblett 2002)
11. Human and non-human species interactions (Trame 1997; Westervelt 1997)
12. Fisheries models (Pending forthcoming publications)
14. Student project presentations, Week 1
15. Student project presentations, Week 2

Preliminary reading list:


Verburg, P., and A. Veldkamp, eds. Forthcoming. Special land-use modeling issue of the International Journal of GIS