GEOGRAPHY 960, Spring 2012 (01/23 – 05/10)

Geographic Techniques
Lectures: R 5:00PM-7:40 PM @ NWQ 6587

Instructor: Zengwang Xu
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Office Hours: TBA
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E-Mail: xuz@uwm.edu

COURSE DESCRIPTION
This course is an applied graduate seminar on concepts, techniques, and implementation of modeling using GIS and related techniques. Students should have basic knowledge of GIS and be familiar with ArcGIS™, ArcGIS™ 10, R, Python, and GeoDa will be used. Prior experience on R, Python, and GeoDa is not required. I will introduce the basics and provide tutorials. Confidence to overcome the initial learning curve is very necessary. Specific modeling and analytical techniques include areal interpolation, basic clustering techniques, spatial probability, interaction, and allocation models, multi-level model, and individual-based model. Reading materials including book chapters or journal articles will be distributed prior to the class (1-2 weeks). Students will be asked to lead the discussions on assigned papers in the second half of classes, and students will work on a final project of their own interest.

REQUIRED TEXTS
Reading materials will be assigned in classes or distributed through D2l. It is students’ responsibility to check D2l regularly.

COURSE REQUIREMENTS
1. ATTENDANCE AND PARTICIPATION:
Class attendance and participation in leading discussion are required. Each student will be assigned reading(s) of his/her choice to lead discussion in class. Discussion leader should prepare a PowerPoint™ presentation (figures and tables from the reading and its Supplementary Material should be included), make the presentation and lead the discussion on why, what, and how was the work done. All need to think and discuss what you like, or don’t like about the reading(s), and what’s the reading(s)’ contributions. All are expected to actively participate in the discussions.

2. LABS/ASSIGNMENTS: No lab meeting, tutorials and assignment will be handed out.

3. FINAL PROJECT: A final project of students’ interest is required.

GRADING AND EVALUATION
1) Attendance 30%
2) Labs/Assignments 30%
2) Final Project 40%

The final letter grades will be assigned as follows: A (90-100%); A- (87-89.99%); B+ (83-86.99%); B(80-82.99%); B-(77-
TENTATIVE SYLLABUS - GEOGRAPHY 960 - UW-Milwaukee

79.99%; C+ (73-76.99%); C(70-72.99%); C-(67-69.99%); D+ (63-66.99%); D(60-62.99%); D-(57-59.99%) and F (below 56.99%). The “Incomplete” grade will not be considered except verified emergences.

**D2L**

Reading assignments will be distributed through D2L. It is students’ responsibility to check D2l regularly.

**SOFTWARE**

The R, Python, GeoDa, and the ArcGIS™ (version 10) software will be used in classes and labs. I assume you have basic knowledge of GIS and you are familiar with the basics of ArcGIS™. Prior experience of the R, Python, and GeoDa, is not required. Basics of the software will be introduced.

**COMPUTING HELP**

If you have a computer or computing problem, you can always consider the UWM Help Desk (https://www4.uwm.edu/uits/help/help_desk/index.cfm) a potential consultant.

*Telephone: (414) 229-4040*
*Email: GetTechHelp@uwm.edu*
*Location: Bolton 225*

This may include (but not limited to) problems in D2l, managing folders and files using Windows Explorer, transferring files using an FTP server, or installing software on your own personal computer.

**POLICIES**

Please be advised that Geography 960 abides by all the University of Wisconsin – Milwaukee’s official policies on disabilities, religious observances, active military duty, incomPLETES, discriminatory conduct, academic misconduct, complaint procedures, and grade appeal procedures.

For more information, please see the following link, http://www.uwm.edu/Dept/SecU/SyllabusLinks.pdf. Some of them are specified as follows,

**Students with disabilities.** If you need special accommodations due to disability reason, please see me and submit your VISA from the Student Accessibility Center within the first two weeks of the semester. I’ll be happy to make due arrangements for you. For more information, see the following link, http://www4.uwm.edu/sac/SACltr.pdf

**Religious observances.** If you require accommodations for absences due to religious observance, I’ll be happy to make due arrangements. Please note you’re required to notify me within the first three weeks of the beginning of classes (within the first week of summer session and short courses), of the specific days or dates on which you will request relief from an examination or academic requirement. I will schedule a make-up examination or other academic requirement before or after the regularly scheduled examination or other academic requirement. For more information, please see the following, http://www4.uwm.edu/secu/docs/other/S1.5.htm

**Students called to active military duty.** If you need accommodations for absences due to call-up of reserves to active military duty, I’ll be happy to make due arrangements. Please see the following links for details, Students: http://www4.uwm.edu/current_students/military_call_up.cfm

Employees: http://www4.uwm.edu/secu/docs/other/S40.htm
### Tentative Schedule and Topics (GEOG 960), Spring 2012 (01/23-05/10)

**This schedule is subject to change as the class proceeds.**

<table>
<thead>
<tr>
<th>WEEK</th>
<th>LECTURE TOPICS</th>
<th>DESCRIPTION</th>
<th>LAB/ASSIGEMENTS</th>
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<tbody>
<tr>
<td>Week 1 (Jan 23–29)</td>
<td>Concepts of GIS modeling</td>
<td></td>
<td>Reading</td>
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<tr>
<td>Week 2 (Jan.30-Feb.5)</td>
<td>Basics of R</td>
<td></td>
<td>Lab#1</td>
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<tr>
<td>Week 3 (Feb.6-12)</td>
<td>Basics of Python</td>
<td></td>
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<tr>
<td>Week 4 (Feb.13-19)</td>
<td>ArcGIS™ Geoprocessing</td>
<td>Using Python and ModelBuilder to automate ArcGIS™ Geoprocessing</td>
<td>Lab#2</td>
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<tr>
<td>Week 5 (Feb.20-26)</td>
<td>Areal Interpolation</td>
<td>Areal interpolation and its development in social science application</td>
<td>reading</td>
</tr>
<tr>
<td>Week 6 (Feb.27-Mar.4)</td>
<td>Statistic basics and clustering</td>
<td>Basic statistics concepts and clustering methods, k-means and hierarchical clustering</td>
<td>Lab#3</td>
</tr>
<tr>
<td>Week 7 (Mar.5-11)</td>
<td>Spatial Probability Models</td>
<td>Using GeoDa in spatial probability model.</td>
<td>Reading</td>
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<td>Week 8 (Mar.12-18)</td>
<td>Spatial Probability Models</td>
<td></td>
<td>Lab#4</td>
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<tr>
<td>Week 9 (Mar.19-25)</td>
<td>Spatial Interaction Models</td>
<td>Concepts and development of spatial interaction models</td>
<td>Reading</td>
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<td>Week 10 (Mar.26-Apr.1)</td>
<td>Spatial Interaction Models</td>
<td></td>
<td>Lab#5</td>
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<tr>
<td>Week 11 (Apr.2-8)</td>
<td>Spatial Allocation Models</td>
<td>Concepts and development of spatial allocation model</td>
<td>Reading</td>
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<td>Week 12 (Apr.9-15)</td>
<td>Spatial Allocation Models</td>
<td></td>
<td>Lab#6</td>
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<tr>
<td>Week 13 (Apr.16-22)</td>
<td>Multi-level modeling</td>
<td>Concepts and development of multi-level model</td>
<td>Reading</td>
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<tr>
<td>Week 14 (Apr.23-29)</td>
<td>Multi-level modeling</td>
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Final project due is to be decided later in the semester.