Course Information and Requirements

Course Title: GEOG5100 Location Analysis  
Credits: 3  
Prerequisites: None  
Format: Online via HuskyCT (HuskyCT Help: Digital Learning Center, 860-486-1187)

Instructor: Shuowei Zhang

E-mail: shuowei.zhang@uconn.edu (After the first day of classes, students registered in the course should use HuskyCT’s Messages tool to send correspondence to the instructor.)

Office: 417, Philip E. Austin Building (formerly CLAS)  
Office Hours: By appointment

Recommended Text: Students should have a copy of Price, Mastering ArcGIS, 7th edition. All other readings will be made available in HuskyCT.

Additional Information:

The developer of this course is Dr. Robert G. Cromley, Professor of Geography at the University of Connecticut. All images, charts, graphs were created by Dr. Robert G. Cromley unless otherwise cited.

Course Description

Issues and approaches in location analysis. Topics include location theory and models; representation issues; use of geographic information systems (GIS) for data preparation, analysis and display; evaluation of service areas; land use allocation; accessibility and locational conflict; and implications for planning and public policy.

Course Objectives

At the completion of this course, you should be able to:

- Explain location theories.
- Develop real world location/allocation models.
- Examine the impact of scale and representation on model outcomes.
- Solve real world location/allocation problems using computerized optimization techniques.
- Evaluate the impacts of locational choices, including resulting political conflicts.
- Use GIS operations to estimate model parameters, display and evaluate model results.
Course Requirements and Grading

The final course grade will be based upon the following required components:

<table>
<thead>
<tr>
<th>Course Components</th>
<th>Final Grade %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>40</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>25</td>
</tr>
<tr>
<td>Final Exam</td>
<td>35</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Assignments

You may freely communicate with other students in the course regarding any assignment. For each assignment, a discussion board has been created for this purpose. However, you must complete each assignment without copying material from another student or anyone else. The grading of assignments will be based on the proper submittal of all required deliverables described in the exercise. Each assignment has its own point value noted below.

<table>
<thead>
<tr>
<th>Assignment name</th>
<th>Number of Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment 1: Modeling Demand and Market Areas</td>
<td>20</td>
</tr>
<tr>
<td>Assignment 2: From Entropy Maximizing to Distance Minimizing</td>
<td>30</td>
</tr>
<tr>
<td>Assignment 3: Solving the Weber Model as a Suitability Problem</td>
<td>20</td>
</tr>
<tr>
<td>Assignment 4: Solving the Location set Covering Problem</td>
<td>25</td>
</tr>
<tr>
<td>Assignment 5: Solving the LSCP Using LCCUs</td>
<td>25</td>
</tr>
<tr>
<td>Assignment 6: Solving the Maximal Capture Problem</td>
<td>20</td>
</tr>
<tr>
<td>Assignment 7: Solving a Goal Programming Model</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total Points</strong></td>
<td><strong>160</strong></td>
</tr>
</tbody>
</table>

Exams

All examinations are open-book and open-notes. However, you cannot communicate with any other person or persons in any fashion whatsoever while in the process of taking the examinations.

Final Letter Grades

Final letter grades for this course will be determined based on the following scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Letter Grade</th>
<th>GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>97-100</td>
<td>A+</td>
<td>4.3</td>
</tr>
<tr>
<td>93-96</td>
<td>A</td>
<td>4.0</td>
</tr>
<tr>
<td>90-92</td>
<td>A-</td>
<td>3.7</td>
</tr>
<tr>
<td>87-89</td>
<td>B+</td>
<td>3.3</td>
</tr>
<tr>
<td>83-86</td>
<td>B</td>
<td>3.0</td>
</tr>
<tr>
<td>80-82</td>
<td>B-</td>
<td>2.7</td>
</tr>
</tbody>
</table>
Due Dates and Late Policy

All course due dates are identified in the Course Schedule in HuskyCT. Deadlines are based on Eastern Standard Time; if you are in a different time zone, please adjust your submittal times accordingly.

Assignments handed in late will be penalized by a 10% deduction, unless you have contacted the instructor and made special arrangements. One week after the due date, an assignment will not be accepted for credit, unless you have contacted the instructor and made special arrangements.

If you will miss an exam due to illness or other extraordinary circumstance, you must contact the instructor in advance of the exam time to schedule a make-up.

Feedback and Grades

I will make every effort to provide feedback and grades in a timely manner. All assignment will be graded within 3 days of their due date. The midterm and final exam will be graded within 2 days. To keep track of your performance in the course, use the MyGrades tool.

Course Outline

Session 1: Introduction to Location Theory and Optimization Methods
- History of Location Theory;
- Modeling the Landscape for Location-Allocation Analysis and Market Area Analysis;
- Solving Location-Allocation Problems: Optimization Methods

Session 2: Spatial Interaction and Spatial Allocation Models
- Market Area Analysis
- Spatial Interaction Modeling: The Gravity and Maximum Entropy Modeling
- The Transportation Problem & Its Dual Problem
- Central Place and Threshold Constraints

Session 3: Land Use Allocation and Plant Location
- The Von Thunen Model; Urban Land Use
- Land Use Suitability; Linear Programming Approaches to Land Use Suitability
- Plant Location, Market Potential, and the Least Cost Weber Model

Session 4: Public Facility Location
• Public Facility Location Theory; Measures of Central Tendency & Locational Equity versus Efficiency
• The Location Set-Covering Problem; The Maximal Covering Problem
• The p-Median Problem
• Solutional Heuristics and Interrelationships Between Facility Location Models

**Session 5: Representation and Scale Issues**

• Representation Issues
• Aggregation Effects in Location-Allocation Modeling
• Integrating GIS Operations into the Location-Allocation Process

**Session 6: Competition**

• Spatial Interdependence
• The Maximal Capture and the Preemptive Location Problem
• Risk/Return, Uncertainty and Game Theory
• Facility Interdiction Models

**Session 7: Multi-objective Location Modeling, Noxious Facilities, & SDSS**

• Goal Programming and Criterion Weighting
• Locational Conflict and Noxious Facilities
• Spatial Decision Support Systems

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**Required Software**

• **ArcGIS 10** *(This software is free to enrolled students. Instructor will email instructions on downloading software prior to the start of class.)*
• Microsoft Excel 2000 or later version

**Minimum Technical Skills**

To be successful in this course, you will need the following technical skills:

• Use electronic mail with attachments.
• Use basic spreadsheet programs, such as Excel.
• Use ArcGIS 10.
• Save files in commonly used word processing program formats.
• Copy and paste text, graphics or hyperlinks.
• Use presentation software to create and share information.
• Work within two or more browser windows simultaneously.
• Open and access PDF files.

**Student Responsibilities and Resources**

As a member of the University of Connecticut student community, you are held to certain standards and academic policies. In addition, there are numerous resources available to help you succeed in your academic work. This section provides a brief overview to important standards, policies and resources.
Student Code

You are responsible for acting in accordance with the University of Connecticut's Student Code, available at http://www.community.uconn.edu/student_code.html. Review and become familiar with these expectations. In particular, make sure you have read the section that applies to you on Academic Integrity:

- Academic Integrity in Undergraduate Education and Research
- Academic Integrity in Graduate Education and Research

Cheating and plagiarism are taken very seriously at the University of Connecticut. As a student, it is your responsibility to avoid plagiarism. If you need more information, use the following resources:

- Plagiarism: How to Recognize it and How to Avoid It
- Instructional Module about Plagiarism
- University of Connecticut Libraries’ Student Instruction (includes research, citing and writing resources)

Copyright

Copyrighted materials within the course are only for the use of students enrolled in the course for purposes associated with this course and may not be retained or further disseminated.

Netiquette and Communication

At all times, course communication with fellow students and the instructor are to be professional and courteous. It is expected that you proof read all your written communication, including discussion posts, assignment submissions, and mail messages. If you are new to online learning or need a netiquette refresher, please look at this guide titled, The Core Rules of Netiquette.

Adding or Dropping a Course

If you should decide to add or drop a course, there are official procedures to follow:

- Matriculated students should add or drop a course through Peoplesoft.
- Non-degree students should refer to the Registrar’s office Non-Degree page for more information.

You must officially drop a course to avoid receiving an "F" on your permanent transcript. Simply discontinuing class or informing the instructor you want to drop does not constitute an official drop of the course. For more information, refer to the:

- Undergraduate Catalog
- Graduate Catalog
Academic Calendar

There are important dates and deadlines for each semester and session classes are offered:
- Fall and Spring Semester
- Summer Session
- Winter Session

Academic Support Resources

Technology and Academic Help provides a guide to technical and academic assistance.

Students with Disabilities

Students needing special accommodations should work with the University's Center for Students with Disabilities (CSD). You may contact CSD by calling (860) 486-2020 or by emailing csd@uconn.edu. If your request for accommodation is approved, CSD will send an accommodation letter directly to your instructor(s) so that special arrangements can be made. (Note: Student requests for accommodation must be filed each semester.)

Blackboard measures and evaluates accessibility using two sets of standards: the WCAG 2.0 standards issued by the World Wide Web Consortium (W3C) and Section 508 of the Rehabilitation Act issued in the United States federal government." (Retrieved March 24, 2013 from Blackboard's website)

Policy against Discrimination, Harassment and Inappropriate Romantic Relationships

The University is committed to maintaining an environment free of discrimination or discriminatory harassment directed toward any person or group within its community – students, employees, or visitors. Academic and professional excellence can flourish only when each member of our community is assured an atmosphere of mutual respect. All members of the University community are responsible for the maintenance of an academic and work environment in which people are free to learn and work without fear of discrimination or discriminatory harassment. In addition, inappropriate Romantic relationships can undermine the University's mission when those in positions of authority abuse or appear to abuse their authority. To that end, and in accordance with federal and state law, the University prohibits discrimination and discriminatory harassment, as well as inappropriate Romantic relationships, and such behavior will be met with appropriate disciplinary action, up to and including dismissal from the University. Refer to the Policy against Discrimination, Harassment and Inappropriate Romantic Relationships for more information.

Sexual Assault Reporting Policy

To protect the campus community, all non-confidential University employees (including faculty) are required to report assaults they witness or are told about to the Office of Diversity & Equity under the Sexual Assault Response Policy. The University takes all reports with the utmost seriousness. Please be aware that while the information you provide will remain private, it will not be confidential and will be shared with University officials who can help. Refer to the Sexual Assault Reporting Policy for more information.
**Course Evaluation**

Students will be provided an opportunity to evaluate instruction in this course using the University's standard procedures, which are administered by the Office of Institutional Research and Effectiveness (OIRE).

Additional informal formative surveys may also be administered within the course as an optional evaluation tool.

<table>
<thead>
<tr>
<th>Dates</th>
<th>Topic</th>
<th>Activity</th>
<th>Due date</th>
<th>Due Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session 1 (Aug. 31 – Sep.13)</td>
<td>Modeling Demand and Market Areas</td>
<td>Assignment 1</td>
<td>Sep 13</td>
<td>noon</td>
</tr>
<tr>
<td>Session 2 (Sep. 14 – Sep.27)</td>
<td>From Entropy Maximizing to Distance Minimizing</td>
<td>Assignment 2</td>
<td>Sep 27</td>
<td>noon</td>
</tr>
<tr>
<td>Session 3 (Sep. 28 – Oct. 11)</td>
<td>Solving the Weber Model as a Suitability Problem</td>
<td>Assignment 3</td>
<td>Oct 11</td>
<td>noon</td>
</tr>
<tr>
<td>Session 4 (Oct.12 – Oct. 25)</td>
<td>Solving the Location set Covering Problem</td>
<td>Assignment 4</td>
<td>Oct 25</td>
<td>noon</td>
</tr>
<tr>
<td><strong>EXAM</strong> (Oct. 26 - Nov. 1)</td>
<td>Midterm exam</td>
<td></td>
<td>Nov 01</td>
<td>noon</td>
</tr>
<tr>
<td>Session 5 (Nov. 02 - Nov. 15)</td>
<td>Solving the LSCP using the LCCUs</td>
<td>Assignment 5</td>
<td>Nov 15</td>
<td>noon</td>
</tr>
<tr>
<td>Session 6 (Nov. 16 - Nov.29)</td>
<td>solving the maximal capture problem</td>
<td>Assignment 6</td>
<td>Nov 29</td>
<td>noon</td>
</tr>
<tr>
<td>Session 7 (Nov. 30 - Dec. 13)</td>
<td>Solving a Goal Programming Model</td>
<td>Assignment 7</td>
<td>Dec 13</td>
<td>noon</td>
</tr>
<tr>
<td><strong>Exam</strong> (Dec. 14 - Dec. 18)</td>
<td>Final Exam</td>
<td></td>
<td>Dec 18</td>
<td>noon</td>
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</tbody>
</table>