Syllabus – Spring 2019

Course and Instructor Information

Course Title: Location Analysis [GEOG 5100]
Credits: 3 credits
Format: online
Prerequisites: none
Instructor: George C. Bentley, Ph.D.

Email: george.bentley@uconn.edu
Office Hours: After the first day of classes, you should send all messages to the instructor at the above email address with questions.

Course Materials

Recommended text: Mastering ArcGIS 8th Edition
   Author: Maribeth Price
   Publisher: McGraw-Hill Higher Education
   ISBN: 978-1-259-92965-6

This course was developed by Dr. Robert Cromley, Professor Emeritus in the Geography Department at the University of Connecticut. All images, charts, graphs were created by Dr. Robert G. Cromley unless otherwise cited.

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Excluding materials for purchase, syllabus information may be subject to change. The most up-to-date syllabus is located within the course in HuskyCT.

Course Description

Geography 5100 is a course covering 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.
At the completion of this course, you will 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.

Your course will be conducted online in a series of sessions. It is assumed that it may take up to two weeks to complete the session by submitting the assignment in the end. The final session of the semester is only one week in length.

Your grade will be based on your performance on laboratory assignments, a midterm exam, and a final exam.

<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>Total</td>
<td>100 %</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>Total Points</td>
<td>160</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.

**Grading Scale:**

<table>
<thead>
<tr>
<th></th>
<th>Graduate</th>
<th></th>
<th></th>
<th>Undergraduate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>Letter Grade</td>
<td>GPA</td>
<td>Grade</td>
<td>Letter Grade</td>
</tr>
<tr>
<td>97-100</td>
<td>A+</td>
<td>4.3</td>
<td>93-100</td>
<td>A</td>
</tr>
<tr>
<td>93-96</td>
<td>A</td>
<td>4.0</td>
<td>90-92</td>
<td>A-</td>
</tr>
<tr>
<td>87-89</td>
<td>B+</td>
<td>3.3</td>
<td>87-89</td>
<td>B+</td>
</tr>
<tr>
<td>83-86</td>
<td>B</td>
<td>3.0</td>
<td>83-86</td>
<td>B</td>
</tr>
<tr>
<td>80-82</td>
<td>B-</td>
<td>2.7</td>
<td>80-82</td>
<td>B-</td>
</tr>
<tr>
<td>77-79</td>
<td>C+</td>
<td>2.3</td>
<td>77-79</td>
<td>C+</td>
</tr>
<tr>
<td>73-76</td>
<td>C</td>
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<td>73-76</td>
<td>C</td>
</tr>
<tr>
<td>70-72</td>
<td>C-</td>
<td>1.7</td>
<td>70-72</td>
<td>C-</td>
</tr>
<tr>
<td>67-69</td>
<td>D+</td>
<td>1.3</td>
<td>67-69</td>
<td>D+</td>
</tr>
<tr>
<td>63-66</td>
<td>D</td>
<td>1.0</td>
<td>63-66</td>
<td>D</td>
</tr>
<tr>
<td>60-62</td>
<td>D-</td>
<td>0.7</td>
<td>60-62</td>
<td>D-</td>
</tr>
<tr>
<td>&lt;60</td>
<td>F</td>
<td>0.0</td>
<td>&lt;60</td>
<td>F</td>
</tr>
</tbody>
</table>

**Due dates and Late policy:**
All course due dates are identified in the Course Schedule. 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 per day up to three days past the due date, unless you have contacted the instructor and made special arrangements. No assignments will be accepted for credit after three days past the due date. Exceptions to this rule require instructor approval and must be made prior to the assignment’s due date.

Make-up exams are only scheduled only in the event of personal illness or extraordinary circumstances. If you know you will miss an exam due to a scheduled conflict (e.g., conference, University event), you must contact the instructor no later than two weeks prior to the scheduled exam date to schedule a make-up exam.

**Feedback and Grades:**
I will make every effort to provide feedback and grades in a timely manner. All assignments will be graded within one week of their due date. Exams will be graded within one week of the due date. Use the MyGrades tool in HuskyCT to keep track of your performance in the course.

**Email Communication:**
Please identify yourself in the heading of your email by topic, name, and class. The heading should read along the lines of: A question from John Doe, GEOG 5100. I will make every attempt to answer emails received between Monday through Friday, within 24 - 48 hours. All emails should be well-written and professional.
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
## Course Calendar

<table>
<thead>
<tr>
<th>Dates</th>
<th>Topic</th>
<th>Activity</th>
<th>Due Date and Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Session 1</strong></td>
<td>Jan 22 – Feb. 3</td>
<td>Modeling Demand and Market Areas</td>
<td>Assignment 1</td>
</tr>
<tr>
<td><strong>Session 2</strong></td>
<td>Feb. 4 – Feb. 17</td>
<td>From Entropy Maximizing to Distance Minimizing</td>
<td>Assignment 2</td>
</tr>
<tr>
<td><strong>Session 3</strong></td>
<td>Feb. 18 – Mar. 3</td>
<td>Solving the Weber Model as a Suitability Problem</td>
<td>Assignment 3</td>
</tr>
<tr>
<td><strong>Session 4</strong></td>
<td>Mar. 4 – Mar. 17</td>
<td>Solving the Location set Covering Problem</td>
<td>Assignment 4</td>
</tr>
<tr>
<td>Mar. 18 – Mar. 22</td>
<td><strong>Spring Break</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>EXAM</strong></td>
<td>Mar. 25 – Mar. 31</td>
<td>Midterm Exam</td>
<td>Mar. 31, 11:59pm</td>
</tr>
<tr>
<td><strong>Session 5</strong></td>
<td>Apr. 1 – Apr. 14</td>
<td>Solving the LSCP using the LCCUs</td>
<td>Assignment 5</td>
</tr>
<tr>
<td><strong>Session 6</strong></td>
<td>Apr. 15 – Apr. 28</td>
<td>Solving the maximal capture problem</td>
<td>Assignment 6</td>
</tr>
<tr>
<td><strong>Session 7</strong></td>
<td>Apr. 29 – May 5</td>
<td>Solving a Goal Programming Model</td>
<td>Assignment 7</td>
</tr>
<tr>
<td><strong>EXAM</strong></td>
<td>May 6 – May 11</td>
<td><strong>Final Exam</strong></td>
<td>May 11, 11:59pm</td>
</tr>
</tbody>
</table>

## Software Requirements

The technical requirements for this course include:

- Reliable, high-speed internet access
- ArcGIS Desktop 10.x
  - ArcGIS is available to enrolled students via UConn SkyBox or UConn AnyWare, or you can request a download code from the instructor to install the software on your PC. ArcGIS is a MS Windows based program, therefore student computers must have a Windows OS if they want to install ArcGIS Desktop on their PC.
- Microsoft Excel 2000 or later version
- Word processing software
- Adobe Acrobat Reader

## Minimum Technical Skills

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

- Use email with attachments.
- Use a basic spreadsheet program, such as Excel.
- Use ArcGIS 10.x.
- Save files in commonly used word processing program formats.
University students are expected to demonstrate competency in Computer Technology. Explore the [Computer Technology Competencies](#) page for more information.

**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 of these important standards, policies and resources.

**Student Code:**

You are responsible for acting in accordance with the [University of Connecticut's Student Code](#). 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 about the subject of plagiarism, use the following resources:

- [Plagiarism: How to Recognize it and How to Avoid It](#)
- [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 proofread 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 the [Student Administration System](#).
- Non-degree students should refer to [Non-Degree Add/Drop Information](#) located on the registrar’s website.

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:
The University's Academic Calendar contains important semester dates.

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: 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.
The UConn eCampus FAQ page provides a guide to technical and academic assistance. This course is completely facilitated online using the learning management platform, HuskyCT.

If you have difficulty accessing HuskyCT, you have access to the in person/live person support options available during regular business hours through HuskyTech. You also have 24x7 Course Support including access to live chat, phone, and support documents.