

Syllabus – Fall 2017

**Course Information and Requirements**

**Course Title:** GEOG 5100 – Location Analysis

**Credits:** 3

**Instructor:** Shuowei Zhang

**email:** [shuowei.zhang@uconn.edu](mailto:shuowei.zhang@uconn.edu)

(After the first day of classes, registered students should use HuskyCT's Messages tool to send correspondence to the instructor.)

**Office:** 417 Austin Building

**Office Hours:** By appointment (contact through email). We can meet face-to-face or use the HuskyCT Collaborate utility (just like Skype)

**Recommended Text:**

Students should have a copy of *Mastering ArcGIS 7<sup>th</sup> Edition* by Maribeth Price (**Publisher:** McGraw-Hill Higher Education (**ISBN:** [0-07-809514-X](#))). An eBook version of the text is available from the publisher. Visit [create.mheducation.com/shop/](http://create.mheducation.com/shop/) and search for [ISBN: 9781308621951](#) (title: Applications of GIS).

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.

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.

**Course Goals and Objectives**

Upon successful 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.

## Course Requirements and Grading

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

Course Components	Final Grade %
Assignments	40 %
Midterm Exam	25 %
Final Exam	35 %
<b>Total</b>	<b>100 %</b>

### 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.

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

### 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:

Grade	Letter Grade	GPA
97 – 100	A+	4.3
93 – 96.9	A	4.0
90 – 92.9	A-	3.7
87 – 89.9	B+	3.3
83 – 86.9	B	3.0
80 – 82.9	B-	2.7
77 – 79.9	C+	2.3
73 – 76.9	C	2
70 – 72.9	C-	1.7
67 – 69.9	D+	1.3
63 – 66.9	D	1.0
60 – 62.9	D-	0.7
< 60	F	0.0

## **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 in HuskyCT.

## **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

<b>Couse Schedule</b>			
<b>Dates</b>	<b>Topic</b>	<b>Activity</b>	<b>Due Date</b>
<b>Session 1</b> Aug 28 – Sept 10	Modeling Demand and Market Areas	Assignment 1	Sept 10
<b>Session 2</b> Sept 11 – Sept 24	From Entropy Maximizing to Distance Minimizing	Assignment 2	Sept 24
<b>Session 3</b> Sept 25 – Oct 8	Solving the Weber Model as a Suitability Problem	Assignment 3	Oct 8
<b>Session 4</b> Oct 9 – Oct 22	Solving the Location set Covering Problem	Assignment 4	Oct 22
<b>EXAM</b> Oct 23 – Oct 29	Midterm Exam		Oct 29
<b>Session 5</b> Oct 30 – Nov 12	Solving the LSCP using the LCCUs	Assignment 5	Nov 12
<b>Session 6</b> Nov 13 – Nov 26	Solving the maximal capture problem	Assignment 6	Nov 26
<b>Thanksgiving Break</b>			
<b>Session 7</b> Nov 27 – Dec 8	Solving a Goal Programming Model	Assignment 7	Dec 8
<b>EXAM</b> Dec 9 – Dec 15	Final Exam	Final Exam	Dec 15

All assignments and activities are due at noon (EST) on the specified day.

## 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.
- 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.

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. Review these important [standards, policies and resources](#), which include:

- The Student Code
- Academic Integrity
- Resources on Avoiding Cheating and Plagiarism
- Academic Support Resources
- Copyrighted Materials
- Netiquette and Communication
- Adding or Dropping a Course
- Academic Calendar
- Policy Against Discrimination, Harassment and Inappropriate Romantic Relationships
- Sexual Assault Reporting Policy

## **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](mailto: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](#))

## **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.

## **Help**

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.