

University of Cincinnati  
Geography 785: Seminar on Location Analysis  
Winter, 2005, Thursday 2:00 - 5:00pm, Braunstein Hall 402

**Professor:**

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**Required Materials:**

*Course Packet*, available on Blackboard.

**Optional Materials:**

Taafe, Edward J., Howard L. Gauthier and Morton O'Kelly. 1996. *Geography of Transportation*. Prentice Hall.  
Chan, Yupo. 2001. *Location Theory and Decision Analysis*. South-Western College Publishing.  
Daskin, Mark S. 1995. *Network and Discrete Location*. John Wiley and Sons, Inc.

**Course Description:**

This course starts with a review of classic location theories, location of service centers (Christaller's central place theory), including agriculture land use model (the Von Thunen model), and industrial location (Weber's model). After that, more contemporary location models will be discussed, such as spatial interaction models, trade area analyses, spatial diffusion models, cellular automata models, network analyses. If time permits, covering problems, P-Center problems and P-Median problems will be introduced as well. Linear programming, as a common technique used in location analysis, will also be introduced in this seminar. The focus of this course on how each of the above models works. By completing this course, students are expected to be able to apply the models to their own research.

Students will also have an opportunity to work with the network functions in ArcView and ArcGIS to gain hands-on experience on implementing some of the above models in GIS.

**Pre-requirement:**

Knowledge of location theory, statistics (including regression analysis), algebra, and GIS is desirable.

**Course Evaluation:**

There are assigned readings for each class. Students are expected to read the assigned articles/chapters before each class.

Each student is required to deliver two presentations (one in each of the following two areas):

- 1) classical location theories
- 2) spatial interaction, trade area analysis, spatial diffusion, and network analysis

The presentations are based on the articles of students' choice. The articles can be selected from any refereed publications. And the papers included in the List of Reading in this syllabus cannot be used for the presentations. It is important that each student make a copy of the selected article for instructor and other students in the class three days before the date of presentation, so that they can read it beforehand. All presentations are to be delivered in Powerpoint.

In addition, each student is required to write a term paper that is due by the ninth week and is to be presented in Powerpoint format in the ninth or tenth week. The focus of the paper can be either an application of a model to a real-world problem, or a systematic review of recent development on a chosen model.

For application oriented term projects, the proposal must include a problem statement, data availability, methodology, and expected results. The term paper should follow the format used in refereed journals such as *Geographical Analysis*.

For review oriented term papers, the proposal must include a central theme that ties together all reviewed articles, the structure of the term paper, and a list of articles to be reviewed. The term paper should follow the format of review articles published in refereed journals such as *Geographical Analysis*.

Class attendance and participation (10%), presentations (30%) and the quality of the term paper (60%) determine the final grade. A letter grade will be assigned by the end of week ten. There will be no "I", "IP" or "N" grades in this class.

### **Important Dates:**

<u>Tasks</u>	<u>Due</u>
Initial ideas of the term paper	third week (1/20)
First presentation	fourth week (1/27)
Outline of the term paper	fifth week (2/3)
Refined outline of the term paper	seventh week (2/17)
Second presentation	eighth week (2/24)
Presentation of term paper	tenth week (3/10)

Articles for presentations are due on Monday of the week of presentation.

### **Tentative Course Schedule:**

<u>Week</u>	<u>Topic</u>
1	Christaller's central place theory
2	Von Thunen model
3	Weber's model

4	Spatial interaction model
5	Trade area analysis
6	Diffusion models
7	CA models
8	Network analysis
9	Linear programming, Location Models: Covering problems, P-Center problems, P-Median problems
10	Presentation of the term paper

## A List of Readings:

Topic	Reading
Location of service centers	<p>Dicken, P. &amp; Lloyd, P.E. 1990. <i>Location in Space</i>. Harper &amp; Row</p> <p>Von Boventer, E. 1969. "Walter Christaller's central places and peripheral areas: the central place theory in retrospect", <i>Journal of Regional Science</i>. 9(1): 117-124.</p> <p>Valavanis, S. 1955. "Losch on Location", <i>American Economic Review</i>, Vol. 45, pp. 637-644.</p> <p>Smith, T.E. 1967. "Location Games: with application to classic location problems", <i>Papers of the Regional Science Association</i>. Vol. 19. pp. 45-80.</p> <p>Wyckoff, W. 1989. "Central place theory and location of services in Colorado in 1899", <i>The Social Science Journal</i>. 26(4): 383-398.</p> <p>Stobart, J. 1996. "The spatial organization of a regional economy: central places in North-west England in the early-eighteenth century", <i>Journal of Historical Geography</i>. 22(2): 147-159.</p> <p>Esparza, X.E. and A.J. Krmenc. 1996. "The Spatial Markets of Cities Organized in a Hierarchical System", <i>Professional Geographer</i>. 48(4): 367-378.</p> <p>Berkoz, L. 2000. "Location of financial, insurance, and real estate firms in Istanbul", <i>Journal of Urban Planning and Development</i>. 126(2): 75-88.</p> <p>Hardie, I, P. Parks, P. Gottlieb, and D. Wear. 2000. "Responsiveness of rural and urban land uses to land rent determinants in the U.S. South", <i>Land Economics</i>. 76(4): 659-673.</p> <p>Berry, B. 1960. "The impact of expanding metropolitan communities upon the central place hierarchy," <i>Annals of AAG</i>. 50(2): 112-116.</p> <p>Ishikawa, T. and M. Toda. 2000. "Some economic extensions of central-place theory involving profit maximization," <i>Urban Studies</i>. 37(3): 481-495.</p> <p>Dyer, C. 1996. "Market towns and the countryside in late medieval England," <i>Canadian Journal of History</i>. April 1996. pp. 17-35.</p> <p>Griffin, E. 1973. "Testing the von Thunen Theory in Uruguay," <i>The Geographical Review</i>. Pp: 500-516.</p> <p>Dennis, C., D. Marsland, T. Cockett. 2002. "Central place practice: shopping center attractiveness measures, hinterland boundaries and the UK retail hierarchy", <i>Journal of Retailing and Consumer Services</i>. 9: 185-199.</p> <p>Parr, J.B., L. Budd. 2000. "Financial Services and the Urban System: An Exploration", <i>Urban Studies</i>. 37(3): 593-610.</p> <p>Miron, J.R. 2002. "Loschian spatial competition in an emerging retail industry", <i>Geographical Analysis</i>. 34(1): 34-61.</p>
Agricultural land use	<p>Dicken and Lloyd</p> <p>Walker, R. 2001. "Urban sprawl and natural areas encroachment: linking land cover change and economic development in the Florida Everglades," <i>Ecological Economics</i>. 37: 357-369.</p> <p>Chisholm, M. 1962. "Johann H. Von. Thunen", <i>Rural Settlement and Land</i></p>

	<p><i>Use</i>. London: Hutchinson University Libraray, pp. 21-35.</p> <p>Sinclair, R. 1996. "Von Thunen and Urban Sprawl".</p> <p>Dunn, E. S. Jr. 1955. "The equilibrium of land use patterns in agriculture", <i>Southern Economic Journal</i>. 21(2):173-187.</p> <p>Alonso, W. 1960. "A theory of the urban land market", <i>Papers and proceedings of the regional science association</i>. Vol. 6. pp. 149-157.</p> <p>Liu, L. 2000. "Labor location and agricultural land use in Jilin, China", <i>Professional Geographer</i>. 52(1): 74-83.</p> <p>Egan, D.J., K. Nield. 2000. "Towards a theory of intraurban hotel location", <i>Urban Studies</i>. 37(3): 611-621.</p>
Industrial location	<p>Dicken and Lloyd</p> <p>Daggett, S. 1955. "The system of Alfred Webber", <i>Principles of Inland Transportation</i>. Harper &amp; Row, pp. 434-441, 449-51.</p> <p>Kilkenny, M. and J. Thisse. 1999. "Economics of location: a selective survey," <i>Computers &amp; Operations Research</i>. 26: 1369-1394.</p> <p>Smith, B. 1973. "Analysis of the location of coal-fired power plants in the eastern United States," <i>Economic Geography</i>. 49(3): 243-250.</p>
Spatial interaction	<p>Taafee, Gouthier &amp; O'Kelly, chapters 7 &amp; 11</p> <p>Howrey, E.P. 1969. "On the choice of forecasting models for air travel", <i>Journal of Regional Science</i>. 9(2)</p> <p>Abler, Admas &amp; Gould. 1971. <i>Spatial Organization</i>. Prentice-Hall. Chapter 7, "The Bases for Spatial Interaction".</p> <p>Fotheringham, A.S. 1983. "A New Set of Spatial-Interaction Models: the theory of competing destinations", <i>Environment and Planning A</i>. Vol. 15. pp 15-36.</p> <p>Pooler, James. 1993. "Structural Spatial Interaction", <i>Professional Geographer</i>. 45(3): 297-305.</p> <p>Lowe, J.M. and A. Sen. 1996. Gravity Model Applications in Health Planning: Analysis of an Urban Hospital Market", <i>Journal of Regional Science</i>. 36(3): 437-461.</p> <p>Fotheringham, A. Stewart and Chris Brundson. 1999. "Locals Forms of Spatial Analysis", <i>Geographical Analysis</i>. 31(4): 340-355.</p> <p>Black, W. R. 1995. "Spatial interaction modeling using artificial neural networks", <i>Journal of Transportation Geography</i>. 3(3): 159-166.</p> <p>Murnion, S. and R. G. Healey. 1998. "Modeling distance decay effects in web server information flows", <i>Geographical Analysis</i>. 30(4): 285-303.</p> <p>Boyle, P. J. and R. Flowerdew. 1997. "Improving distance estimates between areal units in migration models", <i>Geographical Analysis</i>. 29(2): 94-107.</p> <p>Garrido, R. A. 2000. "Spatial interaction between the truck flows through the Mexico-Texas border", <i>Transportation Research Part A</i>. Vol. 34. pp. 23-33.</p>
Trade area analysis & Site selection	<p>Huff, D. L. 1963. "A probabilistic analysis of shopping center trade areas", <i>Land Economics</i>, 39, pp. 81-90.</p> <p>Carter, C. 1993. "Assumptions underlying the retail gravity model," <i>The Appraisal Journal</i>. October 1993. pp: 509-518.</p> <p>Wagner, W.B. 1974. "A longitudinal study of retail gravitation between Columbus and Springfield, Ohio", <i>Bulletin of Business Research</i>, The</p>

	<p>Ohio State University. Vol. XLIX, No. 2.</p> <p>Wrigley, Neil. 1999. "Market Rules and Spatial Outcomes: Insights from the Corporate Restructuring of U.S. Food Retailing", <i>Geographical Analysis</i>. 31(3): 288-307.</p> <p>Clarkson, R. M., C. M. Clarke-Hill, and T. Robinson. 1996. "UK supermarket location assessment", <i>International Journal of Retail &amp; Distribution Management</i>. 24(6): 22-33.</p> <p>Kohsaka, H. 1997. "Monitoring and analysis of a retail trading area by a card information/GIS approach", <i>Journal of Retailing and Consumer Services</i>. 4(2): 109-115.</p> <p>Perry, B., W. Gesler. 2000. "Physical access to primary health care in Andean Bolivia," <i>Social Science &amp; Medicine</i>. 50: 1177-1188.</p>
Spatial diffusion	<p>Morrill, R. Gaile, G. L., Thrall, G. I. 1988. <i>Spatial Diffusion</i>. Sage Publications.</p> <p>Graff, Thomas O. and Dub Ashton. 1993. "Spatial Diffusion of Wal-Mart: Contagious and Reverse Hierarchical Elements", <i>Professional Geographer</i>. 46(1): 19-29.</p> <p>Moore, D. A. 1999. "Spatial diffusion of raccoon rabies in Pennsylvania, USA", <i>Preventive Veterinary Medicine</i>. Vol. 40. pp. 19-32.</p> <p>Mottomley, P. A. and R. Fildes. 1998. "The role of prices in models of innovation diffusion", <i>Journal of Forecasting</i>. Vol. 17. pp. 539-559.</p> <p>Sugiura, Y. 1993. "Spatial diffusion of Japanese electric power companies, 1887-1906: a discrete choice modeling", <i>Annals of Association of American Geographer</i>. 83(4): 641-655.</p> <p>Gardner, L. I, J.F. Brundage, D.S.Burke, J.G.McNeil, R.Visintine, R.N.Miller. 1989. "Spatial disffusion of the human immunodeficiency virus infection epidemic in the United States, 1985-87", <i>Annals of Association of American Geographer</i>. 79(1): 25-43.</p>
Network analysis	<p>Taaffe, Gouthier &amp; O'Kelly, chapters 9 &amp; 13</p> <p>Wheeler, D. C. and M. E. O'Kelly. "Network topology and city accessibility of the commercial internet", <i>Professional Geographer</i>. 51(3): 327-339.</p>
Linear programming	<p>Daskin, chapter 2</p> <p>O'Kelly, Song &amp; Shen. New estimates of gravitational attraction by linear programming. <i>Geographical Analysis</i>. 27(4): 271-285</p>
Covering problem P-Center problem P-Median problem	<p>Daskin, chapters 4, 5, 6</p> <p>Daskin, M. S. and S. H. Owen. 1999. "Two New Location Covering Problems: The Partial P-Center Problem and the Partial Set Covering Problem", <i>Geographical Analysis</i>. 31(3): 217-235</p>