

**CPD 625 Community Planning Analysis: Land Use Modeling and Visualization 3 Cr.**  
**Community Planning & Development Program, Muskie School of Public Service**  
**Instructor: Jack D. Kartez (780-5389; jackk@usm.maine.edu)**

This course introduces concepts, methods, and tools that local and regional planners use to inventory, analyze needs for, forecast, and portray and report on patterns of land use at a planning scale (i.e., community-wide, regional or district-scale, not site planning scale). Guiding questions for the concepts, problems and tools we will explore include the following:

How do we define and evaluate existing land use patterns in a planning area? What data, assumptions, and calculations are necessary to make projections or forecasts about future land use needs and likely patterns of land use conversion and development? The focus here is on familiarization with basic land use planning data and space calculations.

How do we portray future alternatives for land use (the heart of land use planning) that contrast the likely outcome of the status quo of policies and regulations versus a change in policies or conditions? The focus here is on scenario planning.

While not primarily a GIS training course, the Land Use Modeling offering of CPD 625 is for advanced CPD students all of whom must have working knowledge of basic GIS software. The course utilizes GIS data management and modeling software and basic ArcMap operations. The course is as much about planning as it is about the computer-based tools

This course is intended to both introduce participants to the basic concepts of land use analysis and visualization and to provide an overview of the types of land use and urban modeling tools that are becoming newly available for general use. In fact, the tools highlighted in this course have changed due to such developments almost every time it has been taught.

The focus of the course this year is on using the Placeways “CommunityViz” software add-on to ESRI’s ArcGIS system as well as continuing to introduce some of the NOAA Coastal Services Center’s land use planning –related tools such as Habitat Priority Planner and Impervious Surface Analysis Tool.

This year we will be using data for the Portland Metropolitan Region that has not been available in usable form for areawide modeling until now. Projects we will explore will contribute to continuing work started under the recently-concluded HUD Sustainable Communities grant to the Greater Portland Council of Governments and partners.

Course Methods: Lectures, review/discussion of readings, workshop sessions and training tutorials in lab on software tools, joint development and presentation of analytical/visualization projects with instructor.

**Course Requirements: Satisfactory completion of assigned exercises, attendance, demonstrated understanding of basic modeling concepts, participation in joint analysis projects. One or possibly two class modeling projects (with a choice if there are two) will be discussed in March—these are data-based modeling/visualization projects, not field work, to be based on the Portland metropolitan region.**

Readings/Course Materials: A number of readings or examples are either placed on the course Blackboard site, on electronic reserve with USM Libraries or handed out. This year, I am asking you to purchase two background references which are full of examples to help develop our own project(s) as well as to understand alternative futures and scenario planning:

Hopkins, L. and Zapata, M. Eds. 2007. Engaging the Future: Forecasts, scenarios, plans, and projects. Cambridge, MA: Lincoln Institute of Land Policy.

Walker, D. and Daniels, T. 2011. The Planners Guide to CommunityViz: The essential tool for a new generation of planning. Chicago/Washington, DC: APA Planners Press for Orton Family Foundation Books.

**OTHER RESOURCE BOOKS FYI:**

Brail, R., Ed. 2008. Planning Support Systems for Cities and Regions. Cambridge, MA: Lincoln Institute of Land Policy.

Legates, R. 2005. Think Globally, Act Regionally: GIS and data visualization for social science and public policy research. Redlands, CA: ESRI Press.

Kwartler, Michael and Gianni Longo. 2008. Visioning and Visualization: people, pixels, and plans. Cambridge, MA: Lincoln Institute of Land Policy.

*Adaptations (Disclosure): The Americans with Disabilities Act of 1992 (ADA) is a federal law mandating the elimination of discrimination against persons with disabilities. If you need course adaptations or accommodations, please make an appointment to see me as soon as possible. Only students who are registered with the Office of Academic Support for Students with Disabilities (237 Luther Bonney, 780-4706) are eligible for accommodation. Students experience difficulty in courses for a variety of reasons. For problems in writing skills and time management, you can make an appointment to see a student tutor at the Academic Support Center, 242 Luther Bonney (780-4470). Help is also available through the Counseling Center, 106 Payson Smith (780-4050). In addition, the Learning Centers in Portland, 253 Luther Bonney Hall (780-4228) and Gorham, Costello Sports Complex (228-8224) offer a series of academic workshops.*

Jan. 16 **ORIENTATIONS (video, slides/digital images, demos, paper maps, handouts):**

- Visualizing Alternative Land Use Futures
- Technical Land Use Planning Today
- Review of Basics (e.g., zoning principles)

Jan. 23 Planning Support Systems, Models vs. Tools

- The CommunityViz Tool Environment
- Digital Coast Tools from NOAA
- Land Use & Cadastral Data Structures/Sources/Issues

READ:

Walker, Doug and Daniels, Tom. 2011. The Planners Guide to CommunitiyViz. Preface and Chapters 1,2,3. Chicago, IL: APA Planners Press.

Klosterman, Richard. 2001. Planning Support Systems: A New Perspective on Computer-aided Planning. Chapter 1 In Richard Brail and Richard Klosterman, Planning Support Systems. Redlands, CA: ESRI Press, Inc. (pp. 1—23). (ER—on electronic reserves for CPD 625)

Clawson, Marion and Charles Stewart.1965. Land Location and Parcel Identification. Chap. III in Land Use Information: A critical survey of U.S. Statistics including possibilities for greater uniformity. Washington, DC: Resources for the Future, Inc. (HANDOUT)

Avin, Uri. 2012. “Tools for Building Scenarios: sorting out what to sue and when. Planning (December 2012): pp. 40-43. (HANDOUT)

SKIM/REVIEW: Klosterman et. al. 2001. “Using An Operational Planning Support System to Evaluate Farmland Preservation Policies”. manuscript (ER).

Jan. 30 Land Classification Approaches to Land Use Planning and Allocative Future Land Use Modeling

Introduce Hypo City Data Exercise—Develop Constraints/Buildable Land Model, Base Map Design

READ: Frederick Steiner. 2001. “Identifying Environmental Constraints and Opportunities for Development,” In Gerrit J. Knaap, Ed., Land Market Monitoring for Smart Urban Growth. Cambridge, MA: Lincoln Institute of Land Policy. (ER).

READ: Klosterman et. al. 2001. “Using An Operational Planning Support System to Evaluate Farmland Preservation Policies.”. manuscript (ER).

Handouts on Hypo City

Feb. 13 Projection/Forecast Modeling Concepts and Approaches Through the Lens of Population Methods

READ: Isserman, Andrew. 1984. Projection, Forecast and Plan: On the Future of Population Forecasting. Journal of the American Planning Association (Spring 1984): 208—221. (ER)

READ: Hopkins & Zapata text, Chapter 9 (Isserman).

READ: Klosterman et. al. 2001. “Using An Operational Planning Support System to Evaluate Farmland Preservation Policies.”. manuscript (ER).

SKIM ONLY: Research and Evaluation Specialists of Vermont, Inc. et al. 1995. “Estimating Land Area Needs for Growth Centers: A Technical Report and Handbook.” Prepared for The Vermont Agency of Development and Community Affairs. Montpelier, VT: The Vermont Agency of Development and Community Affairs, State of Vermont. **SKIM pp. 4-26. (Example of very mediocre consultant work, but interesting as background).**

Feb. 20 Winter Break—No Meeting

Feb. 27 Data Structures in Land Use Planning, Cadastral Data, Vacant Lands and Holding Capacity Analysis

READ: Kaiser, Edward, David Godschalk and F. Stuart Chapin. 1995. “Land Use” Chapter 8, in Urban Land Use Planning (4<sup>th</sup> Edition). Chicago: University of Illinois Press. (ER).

READ: Kaiser, Godschalk and Chapin. 1995. “Residential Areas,” Chapter 14 in Urban Land Use Planning (4<sup>th</sup> Edition). (pp. 341—367). (ER)

READ: Hubner, Michael and Anne Moudon. 2000. Elements of a General Framework for Land Supply and Capacity Monitoring. Chapter 2 in A. Moudon and M. Hubner (Eds.) Monitoring Land Supply with Geographic Information Systems. New York: John Wiley and Sons, Inc.

Handouts on Locational Modeling, Data Structures and Efficiency Assumptions

Begin Tutorials on Community Viz: Create a Build-out Calculator

March 6 **Locational Modeling Concepts: Gravity Models, Market-Based and Interaction-Based Models**

Continue CommunityViz Tutorials; Introduce Allocation Modeling Tools

Hypo City Data Exercise Assigned for Two Weeks —Develop Future Land Demand Model-Residential

READ: Lee, Douglas. 1973. Requiem for Large-Scale Models. Journal of the American Institute of Planners Vol. 39: 163—178. (HANDOUT)

READ: Waddell, Paul. 2002. UrbanSim: Modeling urban development for land use, transportation, and environmental planning. Journal of the American Planning Association 68, 3: 297-314. (ER)  
(Note: Also skim Hopkins text Chapter 2, Moore on modeling supply-demand in the housing case)

READ: Robert Kent and Richard Klosterman. 2000. GIS and Mapping: Pitfalls for Planners. Journal of the American Planning Association. Vol. 86, No. 2 (Spring): 189-198. (ER).

READ: Handouts on simple (**and inventive**) applications of gravity modeling

March 13 Transportation Modeling and Related Interaction/Location Modeling Concepts (Dr. Kim)

READINGS TBA

March 20 Environmental Modeling Tools and Remote Sensing Data, Effective User Tools Interface/Experience Design

Introduce Tutorials on NOAA-Habitat Priority Planner (HPP)

Watershed Impervious Surface Impact Analysis

READ: Arnold, Chester and James Gibbons. 1996. Impervious Surface Coverage: The Emergence of a Key Environmental Indicator. Journal of the American Planning Association Vol. 62, No. 2 (Spring): 243—258. (ER).

Habitat Inventory and Analysis

READ: Handouts on NOAA-CSC “Habitat Priority Planner” Software

March 27 Planning for Portland Metropolitan Locational and Build-Out Modeling

April 3 Spring Break—No Class

April 10 Housing Demand Analysis Methods, Use of Census Data

April 17, April 24, May 1: TBA based on Course Project Needs