Geog 464/564 Learning Objective Outline
Part I. Situating GIS and Decision Support

LOO 01 Course Introduction

01.1 What is this course about and what are some of the logistics?
01.2 Define GISystems in terms of three perspectives; and what is the advantage of using those three perspectives?
01.3 What is the significance of GIS as a decision support technology?

LOQ 01.1 What is this course about and what are some of the logistics?
- Course web site - http://courses.washington.edu/geog464
- Review the overview page from course web site (handout)
  http://courses.washington.edu/geog464/464Ovr17.html
- Course lecture schedule is organized by session #
- Learning objective questions (LOQ's) focus our discussion of material
  e.g., LOQ 01.1 What is this course about and what are some of the logistics?
- Readings for LOQ's provide context for lecture material

GIS has matured sufficiently to handle complex urban, social, economic, and/or environmental problems providing further motivation for casting GIS work in terms of a decision support approach. The principal motivation for focusing on planning, improvement programming and implementation decision work within urban-regional land, transportation, and water resource settings is that decision activity in such settings is pervasive within communities around the world. The *Regional and Urban GIS: A Decision Support Approach* textbook was written to carry that message.

01.2 Define GISystems in terms of three perspectives; and what is the advantage of using those three perspectives?
RUGIS Chapter 1 Section 1.1 Perspectives on GIS – A Decision Support Approach

working definition of GIS: *a combination of hardware, software, data, people, procedures, and institutional arrangements for collecting, storing, manipulating, analyzing, and displaying information about spatially distributed phenomena for the purpose of inventory, decision making and/or problem solving within operations, management, strategic contexts as related to issues at hand.*

The three perspectives drawn out through this definition:
a) **Components** of a system
a combination of hardware, software, data, people, procedures, and institutional arrangements
b) **Processes** used in working with the system
for collecting, storing, manipulating, analyzing, and displaying information about spatially distributed phenomena
c) **Motivation** for system use (each of these is also a process)
for the purpose of inventory, decision making and/or problem solving within operations, management, strategic contexts as related to urban issues.

GIScience – the conceptual underpinning of systems development and use.

GIServices – the use of Cyberinfrastructure to host Web Services

GISociety – the influence of GIS on society and society on GIS

01.3 What is the significance of GIS as a decision support technology?
RUGIS Chapter 1 Section 1.1.4 GIS as Decision Support Systems

Two decades ago David Cowen (1988) described GIS as a decision support system involving the integration of spatially referenced data in a problem solving environment.

Basic decision aids of GIS

- data management as an aid to extending human memory,
- graphic display as an aid to enhanced visualization, and
- spatial analysis functions to extend human computing performance.

Beyond these GIS-common decision aids

- Special features include modeling, optimization, and simulation functions required to generate, evaluate, and test the sensitivity of computed solutions.
- Other functions such as statistical, spatial interaction, and location/allocation models can be found in special GIS software packages.

Instead of expanding a GIS toolbox indefinitely by adding new models and procedures,

- modelers provide application programming interfaces (APIs).
- API allows enhancing the decision support function of GIS by adding models that support various capabilities.

Examples of such decision aiding models linked with GIS include various environmental models and multiple criteria decision making (MCDM) models used for evaluation of land planning decisions.

Developers of special GIS decision support software – called spatial decision support systems (SDSS)

Strategies of linking analytical models with GIS.

- file exchange mechanisms (so called *loose coupling*),
- data exchange protocols such as dynamic data exchange (so called *tight coupling*),
- implementations of predictive/prescriptive models and decision support functions in GIS toolboxes (so called *embedded coupling*).

Linking analytical models with GIS have been recently expanded by various software technologies

open source programming languages

Python

Sun MicroSystems Enterprise Java Beans

In this textbook and course we introduce a mix of decision support capabilities from both commercially available packages and special GIS packages.