SIE 510
GIS Applications
Spring 2009

Instructor: Kate Beard
Office: 348A Boardman Hall
beard@spatial.maine.edu
Phone: 581- 2147

Tues and Thur 9:30-10:45 Room 336

Course Objective
The purpose of this course is to investigate theoretical and practical aspects of GIS applications and application development. The course will review GIS models and operations, various application areas, and dependencies between models and applications. Following this overview, the course will cover the process of application development from requirements analysis to conceptual data modeling, database development, analytical steps and customization. Course grades will be based on completion of several lab exercises, presentations and class participation, a midterm exam, and satisfactory development and completion of an application project.

The application project involves working with a client(s), some level of requirements analysis to determine the client's needs, specification of requirements, and development of application prototypes to serve the client's needs. Projects require a final presentation to the class and clients and submission of a final project report at the end of the semester.

Course Outline

Date	Topic	Readings	
13 Jan	Course introduction	P. Longley et al.	
15	GIS model review	Berry	
20 Jan	Project meeting		
22	Terrain and hydrological models	R.Weibel and M. Heller, Band	
27 Jan	Network based models	H. Miller & S. Shaw	
29	Time in GIS	D. Peuquet	
3 Feb	Natural resource applications	A. Robinette,	Student presentation
5	Vehicle navigation, transportation	M. White, Li et al	Student presentation
10 Feb	Utility applications	J. Meyers	Student presentation
12	Business applications	Birkin, Clarke and Clarke	Student presentation
17	Location based services	Schiller and Voisard	Student presentation
19	Cadastral applications	P. Dale and R. McLaren	Student presentation
24 Feb	Requirements Analysis	McFadden & Hoffer pp. 212-220	
26	Relational Databases and Beyond	M. Worboys	
2-13 Mar	Spring Break		
17 Mar	Normalization	McFadden & Hoffer pp. 221-240	
19	Conceptual Modeling	Laurini & Thompson pp. 357-374	
24 Mar	Overview of data sources	P. Bolstad	Midterm Exam
26	Uncertainty and Data Quality	P. Longley et al.	
31	Metadata	S. Guptill	

2 Apr	Interacting with GIS	M. Egenhofer & W. Kuhn
7 Apr	Project development	
9	Project development	
14	Project development	
16	Project development	
21	Project development	
23	Project development	
28	Project development	
30	Project development	

Final project presentations will be during exam week.

Class Presentations: Students are responsible for researching and presenting on one of the designated application areas.

Lab Exercises: Students are responsible for completing several lab exercises. The objective of the labs is to introduce and familiarize you with GIS software.

If you require course adaptations or accommodations because of a disability, please contact the coordinator for Services for Students with Disabilities, Onward Program at 581-2319.

Grading

Class participation/presentations		10%
Lab exercises		20%
Midterm – Take home exam		25%
Final project		45%
Preliminary reports	5%	
Presentation	20%	
Written report	20%	

SIE 510 Bibliography

Band, L. E. 1999. Spatial Hydrography and Landforms, In **Geographic Information Systems**. Longley, P, M. Goodchild, D. Maguire, and D. Rhind (Eds). New York: John Wiley and Sons. 2nd Edition. Vol 1. pp. 527-542

Berry, J. 1993. Cartographic Modeling; the Analytical Capabilities of GIS. In **Environmental Modeling with GIS**. Goodchild, M. B. Parks, L. Steyart. (Eds) New York: Oxford University Press. pp.598-74.

Birkin, M, GP Clarke and M Clarke. 1999. GIS for Business and Service Planning. In **Geographic Information Systems**. Longley, P, M. Goodchild, D. Maguire, and D. Rhind (Eds). New York: John Wiley and Sons. Vol 2. pp. 709-722.

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Dale, PF and RA McLaren. 1999. GIS in Land Administration. In **Geographic Information Systems.** Longley, P, M. Goodchild, D. Maguire, and D. Rhind (Eds). New York: John Wiley and Sons. Vol. 2. pp. 859-875

Egenhofer, M and W. Kuhn. 1999.Interacting with GIS. In **Geographic Information Systems**. Longley, P, M. Goodchild, D. Maguire, and D. Rhind (Eds). New York: John Wiley and Sons. Vol. 1. pp. 401-412.

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Schiller, J. and Voisard, A. 2004. Location Based Services. Chapter 1. Elsevier: Morgan Kaufman: San Francisco . CA. pp. 9-25

Weibel, R. and Heller, M. Digital Terrain Modeling. in **Geographical Information Systems.** ed. Maguire, D., Goodchild, M. and D. Rhind. London: Longman Scientific and Technical. pp. 269-297.

White, M. 1991. Car Navigation Systems. in **Geographical Information Systems.** ed. Maguire, D., Goodchild, M. and D. Rhind. London: Longman Scientific and Technical. pp. 115-125

Worboys, MF. 1999. Relational Databases and Beyond. In **Geographic Information Systems**. Longley, P, M. Goodchild, D. Maguire, and D. Rhind (Eds). New York: John Wiley and Sons. Volume 1. pp. 373-384.