

SIE 510 GIS Applications Spring 2011

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 Tues and Thur 9:30-10:45 Room 326

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 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	
11 Jan 13	Course introduction Conceptual Modeling	P. Longley et al. Laurini & Thompson pp. 351-374, Bedard	
18 Jan 20	Relational Databases and Beyond Normalization	M. Worboys McFadden & Hoffer pp. 221-240	
25 Jan 27	GIS model review Terrain and hydrological models	J. Berry R. Weibel and M. Heller, Band, L.	
1 Feb 3 Feb	Network based models Time in GIS	H. Miller & S. Shaw D. Peuquet	
8 Feb 10	Natural resource applications Vehicle navigation, transportation	A. Robinette, M. White, Li et al	Student presentation Student presentation
15 Feb 17	Location based services Business applications	Schiller and Voisard Birkin, Clarke and Clarke	Student presentation Student presentation
22 Feb 24	Utility applications Cadastral applications	J. Meyers P. Dale and R. McLaren	Student presentation Student presentation
1-14 Mar	Spring Break		
15 Mar 17	Requirements Analysis Overview of data sources	McFadden & Hoffer pp. 212-220 P. Bolstad	Midterm Exam
22 Mar 24	Metadata Uncertainty and Data Quality	S. Guptill P. Longley et al.	

29Mar	Interacting with GIS	M. Egenhofer & W. Kuhn
31 Mar	Geoprocessing	
5 Apr	Customization with VB	
7	Project development	
12	Project development	
14	Project development	
19	Project development	
21	Project development	
26	Project development	
28	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. We will be using ArcGIS

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

Bedard, Y. 1999. Principles of Spatial Database Analysis and Design. In **Geographic Information Systems**. Longley, P, M. Goodchild, D. Maguire, and D. Rhind (Eds). New York: John Wiley and Sons. Vol 1. pp. 413

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.

Bolstad, P. 2008. GIS Fundamentals. Chapter 7. Digital Data. Eider Press. MN. pp 233-261.

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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- Li, J. G. Taylor, C. Brunson, A. Olden, D. Steup and M. Winter. A test Bed Simulator for GPS and GIS integrated navigation and Positioning research – Bus Positioning using GPS observations, odometer readings and map matching. Proceedings 12th International Conference on Geoinformatics 2004. Gavle, Sweden. pp. 31-38.
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- Peuquet, DJ. 1999. Time in GIS and Geographical Databases. In **Geographic Information Systems**. Longley, P, M. Goodchild, D. Maguire, and D. Rhind (Eds). New York: John Wiley and Sons. Volume 1. Pp. 91-103.
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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.
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- 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.