GEOGRAPHY 433/533: ***SURVEY OF G.I.S.***

DEPARTMENT OF GEOGRAPHY, PLANNING & RECREATION
COLLEGE OF SOCIAL & BEHAVIORAL SCIENCES
SPRING, 2005

Instructor: Dr. Lee Dexter | **TA: Mr. Tim Harrington**
Time/day 9:10-10:00 MWF + 3 hrs lab | Classroom: Building 82, F&G room 35
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Office hours: 10:15-12:15 M & W or by 24 hour notice appointment
Credits: 3 hours lecture, 1 hour lab

COURSE PREREQUISITES AND RECOMMENDED COURSES:

- Map and image interpretation, GGR 230 (required).
- Analytic and computer cartography, GGR 331/531 (required).
- Participants will have a higher sense of achievement if they have had any of the following courses prior to or concurrent with enrollment in this course:
  - Any of the CIS or CSE 100 level courses (or equivalent computer skills)
  - Any intro level statistics course.

COURSE DESCRIPTION :

The union of computer cartography with database management and analytical/ statistical techniques has resulted in an extremely useful set of tools for maintaining and analyzing spatial data. These tools are usually termed "geographic information systems" or "GIS". The concepts presented in this course will extend the theory and techniques developed in analytic and computer cartography (GGR 331/531) to multi-layer, database-linked geographic information systems. The course will begin by developing general concepts applicable to all types of GIS. Next the characteristics of vector based GIS will be explored and finally the characteristics of raster based GIS will be presented.

COURSE OBJECTIVES:

- To be able to transfer geographic concepts into digital representations .
- To be able to describe and discuss the 5 basic elements of GIS.
- To be able to describe and discuss the operating principles of both vector and raster -based GIS.
- To demonstrate hands-on technical expertise with several different GIS products.
- To complete all phases of a full GIS project (U.S.F.S. habitat study).
- To be able to assess the accuracy and limitations of GIS.
- To improve computer-related problem solving skills.
- To provide a foundation for further study of more powerful GIS packages.

TEXT AND MATERIALS:

The required books and manuals are:

Concepts and Techniques of Geographic Information Systems by Lo and Yeung, 2002, Prentice Hall. Upper Saddle River, NJ

Survey of Geographic Information Systems: Lecture Supplement 2005 ed., edited by L. R. Dexter, Scholargy Publishing.

Survey of Geographic Information Systems: Exercise Manual 2005 ed., written by L. R. Dexter, Scholargy Publishing.

In addition, each student is encouraged to provide sufficient RW storage media for secure data backup in a format compatible with the lab machines (may be a R/W CD or USB flash drive).

COURSE REQUIREMENTS:

- Assigned readings (text and outside articles).
- Attendance of lectures and software demonstrations (clinics are optional).
- Completion of approximately 11 exercises.
- Three written examinations.
- Submission of a project log and a final report.
- A critical review of a GIS based article of your choosing (grads only).
- Proposal to conduct an original GIS based study (grads only)

COURSE POLICY:

Students are expected to attend each class meeting and tardiness is discouraged. While a certain amount of collaboration among students is encouraged, each student is expected to complete his or her own assignments. Anyone found plagiarizing assignments or cheating on exams will fail the course. A summary of standard university policies is attached.

PROFESSOR'S PHILOSOPHY:

Across the spectrum of all of my professorial roles, my principal focus is teaching. I consider myself to be a dedicated and enthusiastic instructor. I am considered to be demanding in expectations but fair in grading and evaluation by most of my past students. My classes tend to be rich in content and I present a lot of material from which to learn. For a specific list of materials and learning approaches used in this class, see the teaching style attachment later in the syllabus. In return for the amount of work I put into resource and class preparation, I expect you to be willing to work hard in absorbing as much of the material as you can. I would much rather work with an interested and enthusiastic C or D student than a bored and uncooperative A or B student. If you work from this attitude, you and I will get along just fine. If, on the other hand, you view your university experience as simply paid admission to a diploma, you and I may have conflicting objectives and attitudes. To this end, some of the points awarded in this class reflect how seriously you approach the learning process as a cooperative endeavor. Items included in this group of points are attendance, punctuality, enthusiasm and cooperation. Some of these points will be objectively tracked (e.g. attendance) and some are my subjective opinion. You will all start out with the maximum number of points pre-awarded in this area. As the end the class approaches, a demerit system will be used if you have been deficient in these areas.

GRADING:

Exercise #1 and #2 are worth 25 possible points. Exercise 3 products are graded as part of exercise 4 for a total of 50. The remaining 7 exercises will be worth 50 possible points for 450 points total. Each exercise has a "stepped" list of products. To be eligible for each grade step (A, B, etc.), you need to turn in all of the listed products from the lower grade step before being considered for the next higher step.

Each project will receive a weighted score based on:

- .9-1.0 * possible points (exceptional work, extra effort demonstrated)
- .7-.9 * possible points (meets basic requirements as described in the products)
- .5-.7 * possible points (incomplete or deficient in content)
- 0-.5 * possible points (unsatisfactory, very incomplete or very deficient in content)

Each project is normally due 1 week after it is assigned.
Work turned in beyond the due date will be penalized by 10 points per week. Loan materials kept beyond the check-out time limit may incur a 5 point deduction.
Each exam will be worth 100 points (300 points total),
The project log is worth 40 points.
The final report is worth 60 points.
Annotated and critiqued GIS article 40 points (grads only)
The proposal is worth 60 points (grads only)
Cooperation, responsibility, participation, attendance etc. 100 points.
Undergrad = 950 points total with a guaranteed scale of A>=850, B>=750, C>=650, D>=550, F<550
Graduate = 1050 points total with a guaranteed scale of A>=950, B>=850, C>=750, D>=650, F<650

TENTATIVE SCHEDULE:

DATE	TOPIC	READING
M, Jan 17	MLK holiday – no class	
W, Jan 19	*Introduction* & Exercise #1	Ch. 1 , R. & E.
F, Jan 21	*Project organization / error*	
M, Jan 24	*Project organization / error*	
W, Jan 26	*Spatial* ***data acquisition (1)***	Ch. 2
F, Jan 28	*Spatial* ***data acquisition (2)***	
M, Jan 31	***Preprocessing*** & Exercise #2	R. & E.
W, Feb 2	***Preprocessing*** & Cartalinx demo	Ch. 5 & 6
F, Feb 4	Exercise #3 & #4	R. & E
M, Feb 7	Clinic	
W, Feb 9	Meniscus Project Staff Meeting #1	
F, Feb 11	Open work day	
M, Feb 14	*Spatial data structures for G.I.S.(1)*	Ch. 3 & 5
W, Feb 16	*Spatial data structures for G.I.S.(2)*	
F, Feb 18	Erdas Intro and demo, Exercise #5	
M, Feb 21	Dexter & Harrison in Silverton, Colorado	
W, Feb 23	Exam #1	
F, Feb 25	Meniscus Project Staff Meeting #2	

TENTATIVE SCHEDULE (cont.):

DATE	TOPIC	READING
M, Feb 28	Arc/Info and ArcView concepts	
W, Mar 2	ArcView 3.2 Demo Exercise #6	
F, Mar 04	Clinic / open work day	
M, Mar 07	ArcGIS 8 demo and Exercise #7	Work day
W, Mar 09	***Data management***	R. & E
F, Mar 11	Clinic / open work day	
M, Mar 14	Data Conversion & DEMs Exercise #8	R. & E
W, Mar 16	*Attribute* ***data acquisition*** *& data structures*	Ch. 4
F, Mar 18	Clinic / Open work day	
M, Mar 21- 25	Spring break – no class	
M, Mar 28	***Data manipulation & analysis #1***	Ch. 4 & 5
W, Mar 30	***Data manipulation & analysis #2***	Ch. 9 & 10
F, Apr 01	Idrisi concepts, demo and Exercise #9	R. & E.
M, Apr 04	Open work day – Dexter at AAG	
W, Apr 06	Exam #2	.
F, Apr 08	Open work day	
M, Apr 11	***Data manipulation & analysis #3***	
W, Apr 13	Exercise #10	R. & E.
F, Apr 15	Open work day	
Sat, Apr 16	Meniscus Project Staff Ground truth field trip	
M, Apr 18	*Remote sensing & GIS*	Ch. 8
W, Apr 20	Exercise #11	R. & E.
F, Apr 22	Meniscus Project Staff Meeting #3	
M, Apr 25	***Product generation***	Ch. 7
W, Apr 27	Open work day	
F, Apr 29	Thanksgiving Holiday, no class	
M, May 02	Meniscus Project Staff Meeting #4	
W, May 04	Wrap-up & review	Ch 12
F, May 06	Open work day (final report and log due)	
W, May 11	Exam #3, 7:30-9:30 am	

Ch. # denotes Lo & Yeung text, R & E. denotes class manuals

NORTHERN ARIZONA UNIVERSITY POLICY STATEMENTS:

SAFE ENVIRONMENT POLICY

NAU's Safe Working and Learning Environment Policy seeks to prohibit discrimination and promote the safety of all individuals within the university. The goal of this policy is to prevent the occurrence of discrimination on the basis of sex, race, color, age, national origin, religion, sexual orientation, disability, or veteran status and to prevent sexual harassment, sexual assault, or retaliation by anyone at this university. You may obtain a copy of this policy from the college dean's office. If you have concerns about this policy, it is important that you contact the departmental chair, dean's office, the Office of Student Life (523-5181), the academic ombudsperson (523-9368), or NAU's Office of Affirmative Action (523-3312).

STUDENTS WITH DISABILITIES

If you have a learning and/or physical disability, you are encouraged to make arrangements for class assignments/exams so your academic performance will not suffer because of the disability or handicap. If you have questions about special provisions for students with disabilities, contact the Counseling and Testing Center (523-2261).

It is your responsibility to register with the Counseling and Testing Center. Application for services should be made at least eight weeks before the start of the semester. If the Counseling and Testing Center verifies your eligibility for special services, you should consult with your instructor during the first week in the semester so appropriate arrangements can be made. Concerns related to noncompliance with appropriate provisions should be directed to the Disability Support Services coordinator in the Counseling and Testing Center.

INSTITUTIONAL REVIEW BOARD

Any study involving observation of or interaction with human subjects that originates at NAU-including a course project, report, or research paper-must be reviewed and approved by the Institutional Review Board (IRB) for the protection of human subjects in research and research-related activities. The IRB meets once each month. Proposals must be submitted for review at least fifteen working days before the monthly meeting. You should consult with your course instructor early in the course to ascertain if your project needs to be reviewed by the IRB and/or to secure information or appropriate forms and procedures for the IRB review. Your instructor and department chair or college dean must sign the application for approval by the IRB. The IRB categorizes projects into three levels depending on the nature of the project: exempt from further review, expedited review, or full board review. If the IRB certifies that a project is exempt from further review, you need not resubmit the project for continuing IRB review as long as there are no modifications in the exempted procedures. A copy of the IRB Policy and Procedures Manual is available in each department's administrative office and each college dean's office. If you have questions, contact Carey Conover, Office of Grant and Contract Services, at 523-4889.

ACADEMIC INTEGRITY

The university takes an extremely serious view of violations of academic integrity. As members of the academic community, NAU's administration, faculty, staff, and students are dedicated to promoting an atmosphere of honesty and are committed to maintaining the academic integrity essential to the educational process. Inherent in this commitment is the belief that academic dishonesty in all forms violates the basic principles of integrity and impedes learning. Students are therefore responsible for conducting themselves in an academically honest manner. Individual students and faculty members are responsible for identifying instances of academic dishonesty. Faculty members then recommend penalties to the department chair or college dean in keeping with the severity of the violation. The complete policy on academic integrity is in Appendix F of NAU's Student Handbook.

AGREEMENT OF UNDERSTANDING:

I have read the course syllabus for GGR 433/533, Survey of Geographic Information Systems. I have had the opportunity to ask questions about the syllabus and course. I understand the content of the syllabus and agree to be responsible for the requirements and course policies.

I further understand that GGR 433/533 carries a prerequisite of GGR 230, Map and Image Interpretation and GGR 331/531, Analytical and Computer Cartography. My signature indicates that I have completed these courses or, in consideration for the instructors waiver of this requirement (if offered by the instructor), I agree to be responsible for any necessary background information and or knowledge equivalent to the content of GGR 230 and GGR 331/531 needed to complete the requirements of this course, GGR 433/533.

Signature _____

Printed name _____

SSN _____

Detach and turn in before the end of the second week of class to avoid administrative drop.