

GEOGRAPHY 331/531: ANALYTICAL AND COMPUTER CARTOGRAPHY

**DEPARTMENT OF GEOGRAPHY
COLLEGE OF ECOSYSTEM SCIENCE & MANAGEMENT
SPRING 2003**

Instructor: Dr. Lee Dexter

Time/day: 4:10-5:00 p.m. MWF + 3 hrs lab

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Dexter's Office: F&G 205

Office hours: 10:00-11:00 AM & 1:30-3:00 PM. M & W or by appointment

TA: Mr. Paul (Zeke) Lauck

Classroom: Building 82, F&G room 35

Web: <http://www.geog.nau.edu/~lrd>

Phone: 523-6535

PREREQUISITES AND RECOMMENDED COURSES:

GGR 230 - Map and Image Interpretation or equivalent or instructor's consent (required)

Students will have a higher sense of achievement if they have any of the following:

GGR 330 - Cartography

Any math, especially algebra, geometry, trigonometry and intro statistics

Any computer related courses, especially applications or programming

Note: I assume a mapping background but do not necessarily assume any computer skills. This class can be completed with little or no computer background *but will be considerably more difficult without a modest amount of previous computer experience!!*

COURSE DESCRIPTION:

Computer assisted cartography extends the concepts, theory and techniques developed in map interpretation or cartography to an automated level where computers will be used to handle the mechanics of map compilation. This course will provide an overview of computer operation (with an emphasis on microcomputers) and the application of computers to input, manipulation, analysis and cartographic output of spatial data. The course will be divided between lecture, demonstrations and hands-on exercises as demanded by the specific topics. Several themes will be woven into the course material. These themes include:

- An "inside - out" organization to computer mapping topics
- The use of cartographic objects (points, lines, areas)
- The "eleven types" of cartographic software
- The theoretical basis for computer cartography

This is a co-convened class. That means both graduate and undergraduate students attend the same class. The graduate students will complete the same material as the undergraduates but will have some additional responsibilities and requirements including completion of an original project and serving in a mentoring role to undergraduates. This is the first time this class has been offered in a co-convened format although we have had graduate students take the course in the past. This will be a learning experience for us all and your cooperation is doubly appreciated this term.

COURSE OBJECTIVES:

- To provide a working overview of computing systems
- To become conversant with the theory behind automated cartography
- To be able to construct maps with a variety of cartographic software
- To be able to analyze spatial data with a variety of cartographic software
- To provide a foundation for further study of geographic information systems

TEXT AND MATERIALS:

No textbook is used this year

An exercise workbook is required:

Dexter, L. R., 2003, *Analytical and Computer Cartography: Exercise Manual* Scholargy Publishing (about \$20).

A collection of lecture related material is required:

Dexter, L. R. (ed.), 2003, *Analytical and Computer Cartography: Course Resource Supplement*. Scholargy Publishing (about \$30).

In addition, each student must provide media such as CDs or ZIP disks for data backup.

COURSE REQUIREMENTS FOR GGR 331:

- Assigned readings from articles and lecture supplement as per the tentative schedule.
- This is a lecture/demo/exercise course. Class meetings will consist of lectures and/or software demonstrations followed by hands-on exercise work on the part of the student. This portion of your grade will depend upon your performance on approximately 12-13 such exercises.
- 2-3 written examinations and 1 quiz
- Participation in peer evaluation of two cartographic projects.

COURSE REQUIREMENTS FOR GGR 531:

- All of the above plus the following:
- An original project of your own design and execution
- Organization and supervision of the peer evaluations
- Organization and supervision of the class users group

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:

My main focus, among all of my professorial roles, 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 you with 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:

Each of the 12-13 exercises will be worth a maximum of 50 points and will be graded using a weighting scale as follows

- .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 assignment is due 1 week after it is assigned. Work turned in beyond the due date will be penalized by 10 points per week. In addition, checked out materials kept beyond the check-out time limit may result in a 5 point loss.

Preliminary quiz is worth 50 points

Each exam will be worth 200 points

The final project will be worth 70 points (graduate only)

Organization of the users group 30 point (graduate only)

Organization of the undergraduate peer evaluation process 20 points (graduate only)

Cooperation, courtesy, attendance, peer review and promptness will be worth 50 points.

1100-1350 undergraduate points and 1220-1470 graduate points total possible with a guaranteed scale of:

A>=90%, B>=80%, C>=70%, D>=60%, F<60% .

TENTATIVE SCHEDULE:

DATE:	LECTURE TOPIC:	DEMO/EXERCISE TOPIC:
Jan 13	Introduction to the course	
Jan 15	Overview	<i>Operating systems (ex 1)</i>
Jan 17	Cartographic principles	
Jan 20	MLK Day, no class	
Jan 22	Cartographic principles	<i>Cartographic layout (ex 2)</i>
Jan 24	Computing hardware	
Jan 27	Computing hardware	
Jan 29	Computing hardware	
Jan 31	Computing software	
Feb 03	Quiz	
Feb 05	Input of planar spatial data	<i>Keyboard data input (ex 3)</i>
Feb 07	Cartography show (peer review)	
Feb 10	Input of planar spatial data	
Feb 12	Global positioning systems	<i>Digitizing tablets (ex 4)</i>
Feb 14	Global positioning systems	
	<i>DEXTER AT SILVERTON THIS WEEK</i>	
Feb 17	Computer cartographic data structures	
Feb 19	Computer cartographic data structures	<i>GPS / downloading digital data (ex 5)</i>
Feb 21	GPS data reduction demo	
Feb 24	Spatial data transforms	
Feb 26	Spatial data transforms	<i>Affine Transforms (ex 6)</i>
Feb 28	Open day	
DATE:	LECTURE TOPIC:	DEMO/EXERCISE TOPIC:
	<i>DEXTER AT AAG THIS WEEK</i>	
Mar 03	Review	
Mar 05	Exam #1	
Mar 07	Open day	

Mar 10	Projections	
Mar 12	Projections	<i>Projection transforms (ex 7)</i>
Mar 14	Open day	
Mar 17-21	Spring break	
Mar 24	Cartometrics	
Mar 26	Cartometrics	<i>Computer Cartometrics (ex 8)</i>
Mar 28	Open day	
Mar 31	Mapping point data	
Apr 02	Mapping line data	<i>Thematic mapping with points (ex 9)</i>
Apr 04	Open day	
Apr 07	Points and lines as surfaces	
Apr 09	Surface models	<i>Thematic mapping with lines and surfaces (ex 10)</i>
Apr 11	Surface models/Open day	
Apr 14	Mapping area data	
Apr 16	Review	<i>Thematic mapping with areas (ex 11)</i>
Apr 18	Open day	
Apr 21	Imaging in cartography	
Apr 23	Remote sensing	<i>Image analysis (ex 12)</i>
Apr 25	Open day	
Apr 28	Introduction to GIS	<i>Geographic information systems (ex 13)</i>
Apr 30	Review and Wrap-up	
May 02	Cartography show #2 (peer review)	
May ??	Final Exam	

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 331/531, Analytical and Computer Cartography. 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 331/531 carries a prerequisite of GGR 230, Map and Image Interpretation. 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 needed to complete the requirements of this course, GGR 33/531.

Signature _____

Printed name _____

SSN _____

Semester GGR 230 taken: _____

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