

NR 6930

Advanced GIS for Natural Resource Applications

Fall Semester 2015

3 credits, Online Delivery

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Course Description

The course is designed for students looking to expand their GIS skill set and build proficiency in solving spatial problems with GIS analyses. Students will use Esri's ArcGIS 10 software for all course exercises. The first few labs are designed to acquaint students with the software's functionality. The rest of the course is comprised of lab work that will build proficiency in GIS problem solving, advanced tools and plugins, and increase GIS professionalism. Topics covered include troubleshooting coordinate system issues, morphometric analyses, terrain modeling, DEM construction, model building, python scripting, cluster and hotspot analyses, complex raster/vector analyses, and error analysis to demonstrate data quality limitations and quantify accuracy of results.

While there are no specific prerequisites, students should have a strong working knowledge of Esri's ArcGIS software package for desktop. Unflappable computer literacy is absolutely assumed. Interest in natural resources spatial is helpful. Students are required to have access to a computer which meets the system requirements to run the ArcGIS software and *must have reliable internet access*. Please see Esri's webpage on system requirements before registering for the course (<http://resources.arcgis.com/en/help/system-requirements/10.2/index.html#//01510000002000000>). Note that ArcGIS will not run on an Apple OS.

The course is available to MNR students, working professionals, as well as any graduate level student interested in advancing their GIS skills as applied to natural resource issues.

Course Objectives

- To further develop specific skills needed in the GIS field
- To fully utilize the wealth of web-based GIS resources
- To critically evaluate and analyze data, tools, results
- To effectively and professionally convey results of GIS analyses

Course Materials

Canvas: The course will use Canvas (<https://online.usu.edu/>) for course announcements, assignment delivery and submission, quizzes, discussions, grades, etc. It is the student's responsibility to log in to and utilize the Canvas system. Help using the Canvas system can be obtained by contacting USU Information Technologies at 797-HELP or going to <http://it.usu.edu>.

Software: The ESRI education edition software package (a one year free trial of ArcGIS 10.2) will be made available to all students enrolled in the class.

Hardware: Students will need access to a computer with the following system requirements:

Windows OS (7, Vista, XP preferred, 2008/2003 will also work)
CPU Speed 2.2 GHz minimum
Memory/RAM 2 GB *minimum* (4 GB would be better)
Disk space 5 GB minimum

Please see: <http://resources.arcgis.com/content/arcgisdesktop/10.0/arcgis-desktop-system-requirements> for more information or to test your computer for compatibility with ArcGIS.

Internet access: A reliable high-speed internet connection is required for all students enrolled in the course.

Your success in this course will be determined in large part by the effectiveness of your computer and internet connection. Over the years, the students who are dealing with computer issues after the start of the semester fall behind and have a very difficult time catching up. If you suspect you will have limited internet access, you might consider putting off this course until a time when you will have full-time reliable internet access.

Required Textbook: No required text. Periodic readings will involve relevant case studies published in peer reviewed journals and from web sources.

Suggested texts (not required):

Mastering ArcGIS 5th edition, Price. ISBN: 9780077462956
This book is a thorough 'recipe' style GIS workbook. Includes data disk.

GIS Fundamentals 4th edition, Bolstad. ISBN: 9780971764736
This is a very approachable text on the principles underlying GIS.

Course Structure

Each week is built around a central theme and lab assignment and may additionally include a reading assignment, discussion topic, or video tutorials. All course materials will be available on Canvas.

Lab exercises are designed to provide students the opportunity to learn GIS and GISc concepts through hands-on experience. Lab exercises have been written such that the first lab will help reacquaint students with the functionality of ArcMap while building professional cartographic skills. The labs will cover new topics each week and will build proficiency using fundamental tools. The pace of the class is rigorous in that students need to complete one lab assignment per week of the semester. *This is not a self-paced course.*

Reading assignments (periodic) are designed to inspire, foster discussion, and expose students to contemporary GIS applications in various natural resource fields.

Discussions and Forum Participation: Students are expected to interact with each other on the course discussion board and external forum in two ways: 1) Discussion topics related to the assigned readings will be posted and student feedback will be monitored, 2) Questions and issues encountered in the labs are expected to be posted to the external forum. Students are invited to help each other work through encountered ‘problems’ to further promote GIS problem solving.

Work load: I’m not going to lie; this course will be *a lot* of work. You should expect to spend at least 10 hours per week (or maybe substantially more) on the activities for each module.

Course assessment: Assessment of the class will occur during week 15 utilizing the IDEA course assessment tool.

Grading

Grades for the class will be assigned based on the following weighting scale:

		Percent of grade
Weekly assignments	470 pts	73%
Discussion and forum participation	50 pts	7%
Final Project	140 pts	20%
		100%

Utah State University Grading Scale:

A (93-100%)	B+ (87-89%)	C+ (77-79%)	D (60-69%)
A- (90-92%)	B (83-86%)	C (73-76%)	F (Below 60%)
	B- (80-82%)	C- (70-72%)	

Communication

The instructor will be available via email to answer any questions or to clarify issues that arise throughout the semester. The instructor will make efforts to respond to students as quickly as possible. Email is a faster mode of communication than Canvas. Students are expected to monitor Canvas messaging and email in order to receive communications about the class in a timely manner. Canvas will be utilized for class-wide announcements and addressing frequently asked questions.

The [external forum](#) will be used as a forum for students to both post, and answer, questions about the modules. Student participation and helpfulness in answering other students’ questions in the discussion forum will be evaluated as part of the grading structure.

In addition to the forum, the instructor will use screen capture demonstration videos and other technologies to ensure that adequate interaction and assistance is available.

Policies

Honor Pledge: Students will be held accountable to the Honor Pledge, which they have agreed to: “I pledge, on my honor, to conduct myself with the foremost level of academic integrity.”

Academic Dishonesty: The Instructor of this course will take appropriate actions in response to Academic Dishonesty, as defined the University’s Student Code:

Acts of academic dishonesty include but are not limited to:

1. Cheating: (1) using or attempting to use or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity, including working in a group when the instructor has designated that the quiz, test, examination, or any other academic exercise or activity be done “individually”; (2) depending on the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments; (3)

substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work; (4) acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission; (5) continuing to write after time has been called on a quiz, test, examination, or any other academic exercise or activity; (6) submitting substantially the same work for credit in more than one class, except with prior approval of the instructor; or (7) engaging in any form of research fraud.

2. Falsification: altering or fabricating any information or citation in an academic exercise or activity.

3. *Plagiarism: representing, by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgment. It also includes using materials prepared by another person or by an agency engaged in the sale of term papers or other academic materials.*

This instructor highly values the University's Academic Code of Conduct and the integrity of this course. Plagiarism will not be tolerated in this course. I recommend that you clearly cite all sources referenced in any part of the work you submit for this course. Give full credit to the original source (person or entity) for any ideas, thoughts, phrases (reworded or not), or data that you use, in part or in whole.

Full text of the Student Code available at available at available at <http://www.usu.edu/student-services/pdf/StudentCode.pdf>:

Special needs: Students with ADA-documented physical, sensory, emotional or medical impairments may be eligible for reasonable accommodations. Veterans may also be eligible for services. All accommodations are coordinated through the Disability Resource Center (DRC) in Room 101 of the University Inn, (435)797-2444 voice, (435)797-0740 TTY, (435)797-2444 VP, or toll free at 1-800-259-2966. Please contact the DRC as early in the semester as possible. Alternate format materials (Braille, large print or digital) are available with advance notice.