

**GIS IN LAND RESOURCE MANAGEMENT
SWS 5721C
On-Campus Section**

[GIS: Geographic Information System]

INSTRUCTOR:

Dr. Sabine Grunwald, Professor, Soil and Water Science Department, University of Florida, 2171 McCarty Hall, PO Box 110290, Gainesville, FL 32611-0290.

CONTACT:

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TIMES: Fall, even and odd years

CREDIT HOURS: 3

ENROLLMENT CAP: 10

FORMAT: Lecture, discussion and Q&A (Tuesday 2nd period) and Q&A and labs (Wednesday 4-5th period), course web site, and virtual computer lab

Instructor Office Hours: Tuesday 9:30 to 10:30 am (office: McCarty Hall A Room 2171) or by appointment

DELIVERY MODE:

- Course material is provided at: <https://lss.at.ufl.edu/> (select Canvas) (incl. annotated Power Point slides with audio recording, reading material, library of GIS video clips, and GIS resources)
- Email and discussion board are used for asynchronous communication
- A virtual computer lab is used for GIS assignments and project. Students are not required to purchase GIS software. The virtual computer lab provides 24/7 access to the ArcGIS software package and spatial datasets that are used in the assignments. The project will be also conducted within the virtual computer lab.

PREREQUISITES:

Basic knowledge in Windows operating system and in geography, statistics, and soil science/land resources are expected.

COURSE OBJECTIVES:

To provide students with the basic concepts of, and experience in using, the ArcGIS geographic information system (GIS) and geospatial methods as applied to land resource management issues.

GOOD TO KNOW:

In this course you will gain ample hands-on experience in using ArcGIS and geospatial analysis using real-world spatial data. Learning about GIS is fun and a creative process that all of you will enjoy. Being good at the practical aspects of GIS also requires to build-up a theoretical foundation, which will also be provided in this introductory GIS course. After you complete this course you will be able to independently conduct your own GIS projects and find solutions to geospatial problems.

OTHER INFORMATION:

The course counts towards the ICGIS certificate (<http://web.uflib.ufl.edu/icgis>).

SOFTWARE:

In this course the ArcGIS (Environmental Systems Research Institute, Redlands, CA) software is used including ArcCatalog, ArcMap, and ArcToolbox.

REQUIRED TEXTBOOK:

Law M. and Collins A. (2013, 2014 or 2015 editions). Getting to Know ArcGIS. ESRI Press.

RECOMMENDED TEXTBOOK:

Bolstad P. 2012. GIS Fundamentals. Eider Press, White Bear Lake, Minnesota. ISBN 0-9717647-0-0. Also available as ebook: <http://www.paulbolstad.net/gisbook.html>.

GRADING:

Assignments: 40% (8 assignments)

Exam: 20%

GIS Project: 30%

Overall course participation: 10%

GRADING SCHEME:

Passing Letter Grade	Course Points	Grade Points
A	95-100	4.0
A-	90-95	3.67
B+	80-85	3.33
B	85-80	3.0
B-	80-75	2.67

C+	75-70	2.33
C	70-65	2.0
C-	65-60	1.67
D+	60-55	1.33
D	55-50	1.0
D-	50-45	0.67
S	45-below	0

Failing Grades	Course Points	Grade Points
E	0	0
WF	0	0
I	0	0
NG	0	0

Definitions

E = Failure

H = Deferred grade assigned only in approved sequential courses or flexible learning

I* / I = Incomplete

N* / NG = No grade reported

S = Satisfactory

U = Unsatisfactory

W = Withdrew

WF = Withdrew failing

The grading policy of UF will be followed in this course as outlined at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx#repeat>

EXPECTATIONS AND GRADING POLICY IN THIS COURSE:

It is expected that students attend class (including labs) and study the learning material provided on the course web site and textbooks. The participation grade is based on active participation in class discussions and activities and postings on the discussion board.

All hands-on assignment, the exam, and the GIS project have to be conducted within the virtual computer lab where output files are written to individual private student user folders (identified by their Gatorlink username). These files can be viewed by the instructor and TA and serve as proof that an assignment, exam, or project was conducted by a student enrolled in this course. During the labs a Teaching Assistant (TA) will be available for questions. The instructor and TA are available for additional questions outside the classroom as they arise. Students are discouraged to send individual emails to the instructor or TA in regard to assignments and learning material. These should be placed on the discussion board of the course web site to be shared and viewable to everybody in class.

Students are expected to work independently on their hands-on GIS assignments and produce their own assignment reports with responses to questions. Copying of results (reports) from other students will be considered as plagiarism.

The instructor and TA are not responsible to fix/resolve technical problems that may arise as part of this GIS course. The IT staff of the University of Florida provides the service to assist with technical problems (e.g., GIS software and virtual computer lab).

Late submissions of assignments, exam and project report will result in 15% reduction of points within 24 hours late submission and 30% reduction of points between 24-48 hours late submission. After more than 48 hours late submission zero points will be assigned to the assignment, exam, or project. All assignment, exam and project reports need to be submitted through the course website. Submissions via email attachments will not be accepted.

COURSE MODULES:

Module 1: Principles of Geographic Information Systems (GIS)

Introduction to the basic components and structure of GIS. Geographic concepts, geographical entities and spatial data formats will be introduced.

Module 2: Introduction to ArcGIS

Introduction to the ArcGIS software and its components (ArcMap, ArcCatalog and ArcToolbox). You will learn how to navigate, manage spatial data, manipulate layers, and document spatial data.

Module 3: Spatial Data Formats

In this module you will learn about data types, the differences between raster and vector formats, non-native data formats and metadata. Data analyses and functions are highly dependent on these spatial data formats.

Module 4: Map Projections

This module provides an overview of geographic coordinate systems and map projections. These are essential to georeference spatial data and superimpose spatial datasets. You will be introduced to a variety of commonly used map projections.

Module 5: Spatial Data Analysis

An overview of multiple vector-based and raster-based (local, focal, zonal and global) spatial operations will be provided. Queries, the field calculator, raster calculator and model maker provide operational tools to conduct spatial analyses within the ArcGIS environment. You will learn how to create new spatial datasets and how to edit existing spatial datasets.

Module 6: Database Concepts and Soil Information Systems

In this module you will learn about database management of spatial data. You will be introduced to multiple Soil Information Systems which use the relational database concept to store land resource data.

Module 7: Interpolations

You will learn how to interpolate point (site-specific) data using a variety of different methods (local, global, and geostatistical). These methods generate continuous maps that show gradual changes in soils and other environmental properties. Cross-validation, validation and error metrics are important to document the prediction quality of properties.

Module 8: Standards, Data Quality and Errors

In this module you will learn about standards for spatial data and transfer of data, data quality such as precision, accuracy, bias and errors associated with GIS datasets.

Other resources:

- GIS data Resources
- GIS project implementation
- Google Earth and ArcGIS
- ArcGIS video clips

ATTENDANCE AND MAKE-UP WORK

Absences

Students are responsible for satisfying all academic objectives as defined by the instructor. Absences count from the first class meeting.

In general, acceptable reasons for absence from or failure to participate in class include illness, serious family emergencies, special curricular requirements (e.g., judging trips, field trips, professional conferences), military obligation, severe weather conditions, religious holidays and participation in official university activities such as music performances, athletic competition or debate. Absences from class for court-imposed legal obligations (e.g., jury duty or subpoena) must be excused. Other reasons also may be approved.

You cannot participate in classes unless you are registered officially or approved to audit with evidence of having paid audit fees. The Office of the University Registrar provides official class rolls to instructors.

If you do not participate in at least one of the first two class meetings of a course or laboratory in which you are registered, and you have not contacted the department to indicate your intent, you can be dropped from the course. You must not assume that you will be dropped, however. The department will notify you if you have been dropped from a course or laboratory. You can request reinstatement on a space-available basis if you present documented evidence.

The university recognizes the right of the individual professor to make attendance mandatory. After due warning, professors can prohibit further attendance and subsequently assign a failing grade for excessive absences.

Religious Holidays

The Florida Board of Education and state law govern university policy regarding observance of religious holidays. The following guidelines apply:

- Students, upon prior notification to their instructors, shall be excused from class or other scheduled academic activity to observe a religious holy day of their faith.
- Students shall be permitted a reasonable amount of time to make up the material or activities covered in their absence.
- Students shall not be penalized due to absence from class or other scheduled academic activity because of religious observances.

If a faculty member is informed of or is aware that a significant number of students are likely to be absent from class because of a religious observance, the faculty member should not schedule a major exam or other academic event at that time.

A student who is to be excused from class for a religious observance is not required to provide a second party certification of the reason for the absence. Furthermore, a student who believes that he or she has been unreasonably denied an education benefit due to religious beliefs or practices may seek redress through the student grievance procedure.

Illness Policy

If you are absent from classes or examinations because of illness you should contact your instructors. You should contact your college by the deadline to drop a course for medical reasons. You can petition the Dean of Students Office to drop a course for medical reasons. The university's policy regarding medical excuse from classes is maintained by the Student Health Care Center.

Twelve-Day Rule

Students who participate in athletic or extracurricular activities are permitted to be absent 12 scholastic days per semester without penalty. (A scholastic day is any day on which regular class work is scheduled.) Instructors must be flexible when scheduling exams or other class assignments.

The 12-day rule applies to individual students participating on athletic or scholastic teams. Consequently, a group's schedule that requires absence of more than 12 days should be adjusted so that no student is absent from campus more than 12 scholastic days.

If you previously have been warned about absences or unsatisfactory work you should not incur additional absences, even if you have not been absent 12 scholastic days. It is your responsibility to maintain satisfactory academic performance and attendance.

ONLINE COURSE EVALUATION PROCESS

Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. These

evaluations are conducted online at <https://evaluations.ufl.edu>. Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results>.

ACADEMIC HONESTY

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: *"We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity."* You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: *"On my honor, I have neither given nor received unauthorized aid in doing this assignment."*

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>.

SOFTWARE USE:

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

SERVICES FOR STUDENTS WITH DISABILITIES:

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation

0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/

CAMPUS HELPING RESOURCES:

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students.

Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- *University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, www.counseling.ufl.edu/cwc/*
 - Counseling Services
 - Groups and Workshops
 - Outreach and Consultation
 - Self-Help Library
 - Wellness Coaching
- *Career Resource Center, First Floor JWRU, 392-1601, www.crc.ufl.edu/*