School of Forest Resources and Conservation
Gulf Coast Research and Education Center
Plant City Education center

GIS Fundamentals – SUR 6934

1 Overview

This course introduces geographic information systems to Geomatics and natural resources students. The course aims to provide both theoretical background and diversified practical skills needed in many applications. Students learn basic GIS data modeling and management concepts, spatial references, and analysis tools. Real world case studies involving data modeling, overlay analysis, and surface modeling are presented.

- 3 Credits - Fall Semester
- Format: blended (Zoom* live teaching with recording)
- http://elearning.ufl.edu/

Course Prerequisites: none

Instructor: Dr. Amr Abd-Elrahman (Phone: 813.757.2283, Email: **aamr@ufl.edu**)

- Please use gator link email (aamr@ufl.edu) for fastest response.
- Zoom Online Meeting* – Lecture (optional): MW period 6 (12:50–1:40p) & Lab (optional): F period 3 (9:35-10:25a) – Classes are recorded and recording links will be posted in canvas within 24hrs of class offering.

Textbook(s) and/or readings:

Required Textbook (lab exercises):

Gorr, Wilpen L. and Kristen S. Kurland, "GIS Tutorial 1 for ArcGIS Pro", ESRI Press, ISBN: 978-1589484665.

Recommended Textbook

Paul Bolstad (2016). GIS Fundamentals (5th edition). Eider Press. ISBN: 978-1506695877. Note: The fourth edition version of the book will work too.

Additional Materials:

- Reading and multimedia material will be provided throughout the semester. Web links to GIS topics and data source material will be provided.

2 Learning Outcomes

At the end of this course, each student will be able to:

- Identify the concept of geographic information systems and data sources
- Utilize different national and international spatial reference systems and perform spatial reference transformation
- Model spatial and non-spatial data in relational and object-relational databases.

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*Zoom is a software program used to conduct virtual meetings. Link will be provided to the class earlier in the semester. See "**Using Zoom Software**" section in this syllabus.

- Apply vector and raster data analysis and solve spatial problems using vector analysis tools
- Implement ArcGIS software in analyzing GIS data
- Develop problem solving skills in a spatial context

3 Course Logistics

The lectures and labs in this course will be delivered using the Zoom virtual classroom software (please see 'Using Zoom Connect Software' section.). Students can log on to the system from any computer by clicking on the Zoom link posted in the course website (Canvas). All lectures and labs are recorded. Recording links will be posted after each class. Students registered in the distance sections are recommended to watch the recordings and take notes promptly while watching.

Learning modules consisting of a lecture, readings, supporting material, and occasional quizzes are provided online for each topic. Learning modules build on previous modules so you should complete the learning modules in the order presented.

If you will be using the ArcGIS Pro software installed on UFAPPS, we already provided a copy of the data in UFAPPS drive (Please See the ArcGIS Software Access Section for more details).

Technology Requirements:

- A computer or mobile device with high-speed internet connection.
- A headset and/or microphone and speakers; a web cam is suggested.
- Latest version of web browser. Canvas supports only the two most recent versions of any given browser. What browser am I using?
- Zoom Virtual Meetings: See "**Using Zoom Software**" section below)

ArcGIS Software Access

The primary and recommended method of accessing the ArcGIS Pro software for most students is through **downloading the software and installing it locally on their computers**. Students whose computers are running operating systems other than Windows (e.g. Apple Mac OS), or don't want to install the software locally on their machines, will be using the software through UF APPS (https://apps.ufl.edu/vpn/index.html). Information will posted in canvas during the first week of the semester with instructions on how to download/install the software locally and how to access the software through UFAPPS. When using UFAPPS, please copy the GIST1Pro folder from the R:(C)\Courses\2019-Fall-GIS3072c_xxx\Data\GIST1Pro_Data folder to your M(StudentFileStorage):\ folder. Detailed instructions on how to access the UFAPPS folder will be provided early in the semester.

Using Zoom Software

Lecture and office hour meetings (per request) will be conducted using the Zoom software. The software is accessed by clicking a link posted by the instructor through e-Learning. The instructor will schedule the sessions and post the link to you earlier in the semester. You should click on the link each time you need to join the office hour sessions.

Please check https://support.zoom.us/hc/en-us/articles/201362023-System-Requirements-for-PC-Mac-and-Linux for more information about Zoom software use requirement. Zoom supports almost any operating system including Windows, Macintosh, and Linux, as well as the most widely used browsers including Internet Explorer, Firefox, Safari, and Chrome. A microphone is also needed to communicate with the instructor and the students attending the session.

3.1 Assignments & Deliverables

Laboratory Report Assignments

The ArcGIS Tutorials 1 for ArcGIS Pro book is used in this class. The book is divided into chapters. Each chapter has a specific set of objectives and is divided into tutorials. You are required to do 8 of these chapters throughout the semester according to the assignments released in the course website. **A summary lab report on each chapter that includes a list of chapter objectives, tutorial methods, snapshots of last screen in each tutorial, and snapshots of the 'Your Turn' parts in the tutorials should be submitted according to the due date specified in canvas. Collaboration on software issues is allowed. However the tutorials should be performed by each student independently.**

PLEASE MAKE SURE THAT YOUR SCREEN CAPTURES INCLUDE THE **COMPUTER DATE AND TIME** AT THE LOWER RIGHT CORNER OF THE SCREEN. The screen snapshots can be taken using any of the online freeware available for this purpose or using the ctrl-PrintScr (or Fun-PrintScr) to capture and ctrl-v to past the snapshot. You may choose to enrich the reports with other items such as alternative methods to achieve tutorial objectives. This report should be considered as your notes for future referencing of the tutorials.

Assignment feedback will be communicated through the canvas course website. Comments will be provided mainly using the grading portal of each assignment. Students are encouraged to review and digest the comments promptly to avoid recurring errors.

Participation

Virtual (online) discussion topics will be created in the course website (Canvas). You are strongly encouraged to read, post and interact in these discussions. Please contribute positively to the discussions by providing useful/tested technical tips as well as innovative and critical thoughts. You are also encouraged to introduce new discussion items and enrich course resources with online material. A five point participation grade will be issued based on the quantity and quality of your participation in the course online discussion

Semester Projects

At least 2 projects will be announced during the semester. The time frame for each project is 1-2 weeks. Project description, data source, time frame, and deliverables will be posted at the course e-learning website (Canvas) and discussed in the labs/lectures. Please feel free to suggest changes to the original project to accommodate certain ideas you have or you may suggest your own project. Since the projects are designed to assess and emphasize the skills you learnt in the tutorials in addition to test your critical thinking skills, **you should expect to have less step-by-step instructions than are included in the tutorials.** The basic delivery for each project will be a Microsoft word report illustrating, at least, project

objectives, methodology, data and data preparation steps, analysis, results/discussions, and conclusions. Some projects may be chosen for in-class presentation and discussion.

Project feedback will be communicated through the canvas course website. Comments will be provided mainly using the grading portal of each assignment. Students are encouraged to review and digest the comments promptly to avoid recurring errors. Similar to the tutorials, collaboration on software issues is allowed. However projects should be performed by each student independently.

Exams

Two midterm exams will be conducted online using the course e-learning (canvas) website. The first midterm exam will occur approximately in Week 8 and the second midterm approximately during the last week of the class. Midterm exam reviews will be conducted on an individual basis using special Zoom sessions when requested. **Exams are an individual assessment and collaboration is strictly prohibited.**

Final Project

A final project is required. Preparation for the project should start as early as possible and should be discussed thoroughly with **Dr. Abd-Elrahman.** The basic delivery for each project is a word document and power point presentation illustrating, at least, project objectives, methodology, data preparation steps, analysis, results, and conclusion. Some projects may be chosen for in-class presentation and discussion. **Collaboration on software issues is allowed. However final project should be performed by each student independently.**

3.2 Grades & Grading Scale

Grading Item	Grade Percentage	Description
Lab Activities	**20%**	This includes lab participation, performing assigned tutorials from 'GIS Tutorial 1 for ArcGIS Pro' book and submitting lab reports. Please see the 'Laboratory Attendance and Tutorials' section for more details.
Class Participation	**5%**	Class participation includes class attendance and participation in online discussions. Please see the 'Class Participation' section for more details.
Midterms	**40%**	Two midterms will be delivered tentatively after the second and fourth modules. Exact midterm dates will be posted on the course website (Canvas) at least one week before the exam offering date. Please check the course calendar frequently.
Projects	**25%**	Three projects will be distributed through the semester. Each project headline, time frame and deliverables will be posted at the course Canvas system website. Please see the 'projects' section for more details.
Final Project	**10%**	A final project is required. Topic and details to be discussed with instructor

Please note that we are using the + and - grading scale encouraged by UF. For more information about the new grading system, please visit http://www.isis.ufl.edu/minusgrades.html

Grade Scale

Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E
Corresponding Course Score	95-100	90-94	85-89	80-84	75-79	70-74	65-69	60-64	55-59	50-54	45-49	0-44
Grade Points	4	3.67	3.33	3	2.67	2.33	2	1.67	1.33	1	0.67	0

For information on current UF policies for assigning grade points, see https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

4 Course Content

Learning Modules and Lecture Schedule#

Week 0f	Module_	Lecture Topic/Readings	Reading (GIS Fundamentals Book – based on 5th Edition)
Aug. 19	1. Introduction to GIS and Data Sources	Course outlines – GIS Introduction – GIS data formats	Ch1 pp. 1-21; Ch 2 pp. 25-52
Aug. 26		Introduction to ArcGIS software Digital Data	Ch 7 pp. 299-327
Sept. 02		Data Sources: Global Positioning system	Ch 5 pp.203-220
Sept. 09		Aerial and Satellite Images	Ch 6 pp. 249 – 290
Sept. 16		Data Sources…continue	
Sept. 23	2. Spatial References	Horizontal datum and map projections	Ch 3 pp. 85-115
Sept. 30		Datum & projections…cont/ Vertical datums <<Module 3 Discussions>>	Ch3 pp. 116 - 137
Oct. 07	3. Data Modeling and Management	<<Module 1 Discussions>> Introduction to spatial data modeling and Management (conceptual)	Ch 8 pp. 331 – 349
Oct. 14		Data modeling and management (cont.) (Logical modeling)	TENTATIVE WEEK FOR MIDTERM EXAM 1
Oct. 21		Data modeling and management (cont.) (Physical modeling) <<Module 2 Discussions>>	Ch 8 pp. 350 –364
Oct 28	4. GIS Vector Analysis	Introduction to vector data analysis. Buffering, proximity analysis, and geo-processing tools	Ch 9 pp. 373 - 419
Nov. 04		Vector Analysis ...cont.	
Nov. 11		Using ArcGIS model builder	Ch 9 pp. 420 - 428
Nov. 18	5. Surface Modeling and Raster Analysis	<<Module 4 Discussions>> - Surface modeling	
Nov. 25		Surface modeling – Geo-statistical analysis – Introduction to raster Analysis	Ch 12 pp. 519-533 Ch 10 pp.443 – 473
Dec. 02		<<Module 4 and 5 Discussion>>	TENTATIVE WEEK FOR MIDTERM EXAM 2

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Friday Lab Schedule[#]:

Date	Lab Topic
Aug. 23	Lab Instructions and Equipment Settings using Zoom software Introduction to ArcGIS Software
Aug. 30	GIS Tutorials For ArcGIS Pro: Chapter 1 Introduction
Sep. 06	GIS Tutorial: Chapter 2 Map Design
Sep. 13	GIS Tutorials For ArcGIS Pro: Chapter 3 GIS Output
Sep. 20	Introduction to Geodatabases GIS Tutorials For ArcGIS Pro: Chapter 4 Geodatabases
Sep. 27	Project 1 (Data Handling and Preparation)
Oct. 04	**NO LAB – HOMECOMING
Oct. 11	GIS Tutorials For ArcGIS Pro: Chapter 5 Importing Spatial and Attribute Data
Oct. 18	GIS Tutorials For ArcGIS Pro: Chapter 7 Digitizing
Oct. 25	Project 2 (Developing GIS)
Nov. 01	GIS Tutorials For ArcGIS Pro: Chapter 6 Spatial Data Processing Project 3 (Urban Forest Plot Analysis)
Nov. 08	GIS Tutorials For ArcGIS Pro: Chapter 9 Spatial Analysis
Nov. 15	*Discussion of project 3*
Nov. 22	*Final Project Representation (Graduate Students)*
Nov. 29	**NO LAB – THANKSGIVING**

[#]Schedule is tentative and subject to change due to actual course delivery circumstances

5 Policies and Requirements

This syllabus represents current plans and objectives for this course. As the semester progresses, changes may need to be made to accommodate timing, logistics, or to enhance learning. Such changes, communicated clearly, are not unusual and should be expected.

5.1 Late Submissions & Make-up Requests

It is the responsibility of the student to access on-line lectures, readings, quizzes, and exams and to maintain satisfactory progress in the course.

Tutorial and project reports turned in after the due date will be deducted points. To receive points for a late assignment, the report must be turned in no later than two weeks past the due date. One week late will result in a 25% reduction in points. Two weeks late will result in a 50% reduction. Lab reports will not be accepted after two weeks from the deadline.

Examples for the reasons justifying missing class activities can be found in **https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx**. Please contact me if you have any unusual circumstances as soon as possible to arrange for make-up plans.

Computer or other hardware failures, except failure of the UF e-Learning system, will not excuse students for missing assignments. Any late submissions due to technical issues MUST be accompanied by the ticket number received from the Helpdesk when the problem was reported to them. The ticket number will document the time and date of the problem. You MUST e-mail your instructor within 24 hours of the technical difficulty if you wish to request consideration.

For computer, software compatibility, or access problems call the HELP DESK phone number—352-392-HELP = 352- 392-4357 (option 2).

Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

5.2 Semester Evaluation Process

Student assessment of instruction is an important part of efforts to improve teaching and learning.

At approximately the mid-point of the semester, the School of Forest Resources & Conservation will request anonymous feedback on student satisfaction on various aspects of this course. These surveys will be sent out through Canvas and are not required, but encouraged. This is not the UF Faculty Evaluation!

At the end of the semester, students are expected to provide UF with feedback on the quality of instruction in this course using a standard set of university and college criteria (UF Faculty Evaluations). 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.

5.3 Netiquette: Communication Courtesy

All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats. Failure to do so may result in loss of participation points and/or referral to the Dean of Students' Office. http://teach.ufl.edu/docs/NetiquetteGuideforOnlineCourses.pdf

5.4 Academic Honesty Policy

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 or 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.

5.5 University Policy on Accommodating Students with Disabilities:

Students requesting accommodation for disabilities must first register with the Dean of Students Office (http://www.dso.ufl.edu/drc/). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

5.6 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.

6 Getting Help

For issues with technical difficulties for e-learning in Canvas, please post your question to the Technical Help Discussion in your course, or contact the UF Help Desk at:

- Learning-support@ufl.edu | (352) 392-HELP - select option 2 | http://elearning.ufl.edu
- Library Help Desk support http://cms.uflib.ufl.edu/ask
- SFRC Academic Hub https://ufl.instructure.com/courses/303721

6.1 Student Life, Wellness, and Counseling Help

- Counseling and Wellness resources http://www.counseling.ufl.edu/cwc/
- U Matter, We Care http://www.umatter.ufl.edu/
- Career Resource Center http://www.crc.ufl.edu/
- Other resources are available at http://www.distance.ufl.edu/getting-help for online students.

6.2 Student Complaint Process

The School of Forest Resources & Conservation cares about your experience and we will make every effort to address course concerns. We request that all of our online students complete a course satisfaction survey each semester, which is a time for you to voice your thoughts on how your course is being delivered.

If you have a more urgent concern, your first point of contact should be the SFRC Academic Coordinator or the Graduate/Undergraduate Coordinator for the program offering the course. You may also submit a complaint directly to UF administration:

- Students in online courses: http://www.distance.ufl.edu/student-complaint-process
- Students in face-to-face courses: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf