

Course Syllabus

Environmental Remote Sensing

GIS 5038c - Remote Sensing of Environment

GIS 4037 - Digital Image Processing

[Office Hours: Book on https://calendly.com/sounny/meetme](https://calendly.com/sounny/meetme)

<https://calendly.com/sounny/meetme>

Note on Office hours: I have over 20 hours a week of available office hours. They are in high demand, so if they are unavailable on the reservation system, they are booked up. If you book an office hour and are not going to use it, please cancel to make it available to other students.

Description

This course introduces the use of remotely sensed data in *environmental* applications. Remote Sensing is the science of acquiring data using the measurement of electromagnetic radiation by techniques that do not require actual contact with the object or area being observed. Most environmental applications of remote sensing use instruments carried on satellites or piloted/unpiloted aircraft. The different sensors used to collect this information and the interpretation techniques vary widely and are being developed astoundingly. In this course, we will focus on the interpretation and applications of data from **space-borne imaging** systems (e.g., Landsat MSS, Landsat TM, Landsat ETM+, Landsat OLI, Quickbird, IKONOS, MODIS, ASTER, SeaWiFS, HYPERION, SPOT, AVHRR). **Newer airborne sensors**, e.g., the National Ecological Observatory Network's (NEON) Airborne Observation Platform (AOP), the EU's Sentinel satellites, the International Space Stations such as GEDI, OCO-1 and -2, and ECOSTRESS will be described late in the course.

Prerequisites

Senior Standing (GIS4037), Graduate Standing (GIS5038c), or Permission of Instructor. Facilities with operations in MS Windows, College-level Statistics, or Quantitative Analysis in Geography and College-level Algebra are required, and basic courses in Ecology or other Environmental Sciences and Physics are recommended. A prior course in GIS would be helpful but is not required. Likewise, this course would give students an advantage in a GIS course.

Textbooks

Optional Textbook: Jensen, J.R. 2016. Introductory Digital Image Processing: A Remote Sensing Approach. Prentice-Hall, Saddle River, NJ. 544 pages. Download Jensen, J.R. 2016. Introductory Digital Image Processing: A Remote Sensing Approach. Prentice-Hall, Saddle River, NJ. 544 pages.

Optional Textbook: Jensen, J.R. 2007. Remote Sensing of the Environment: An Earth Resources Perspective. Prentice-Hall. Upper Saddle River, NJ.

ASSIGNMENTS

WEEKLY LABS = 60% of the grade. Individual exercises in the lab manual will be posted online each week. You should create a file of the labs for yourself. Labs are frequently quite complex, and much of each exercise must be completed outside laboratory periods. Thirteen lab exercises are planned, and these will take you from basic introductory tasks through intermediate and some more advanced remote sensing techniques. You are given one week to complete each lab, and all labs must be handed in with the answers printed and references given at the beginning of the next lab period (completing a previous week's lab during the lab session is not allowed - you will fall behind if you do this). Labs are critical to this class, and it is easy to stay caught up. Labs are an integral part of the learning procedure in this course and are timed to coincide with the appropriate lectures and reading materials. As such, they comprise a significant proportion of your grade and should be taken very seriously.

EXAMS = 10% of Grade

Midterm and Final - Two examinations will be given. Both exams will use short-answer, problem-solving, image interpretation, and essay questions as a format. Graduate students may have additional questions to answer. Make-up exams are only given if written proof/documentation of the emergency which caused you to miss the exam is given.

Term Paper = 30% of Grade.

Throughout the semester, you will do a term paper worth 30% of your grade. There are six parts to this assignment.

- Submission of the first draft of research questions and project objectives (1 page)
- After feedback, finalize and resubmit your research questions and project objectives for final approval.
- Submit proof of project data in hand.
- Submit completed (see guidelines) project proposal
- Submit Imagery analysis results and draft paper to peer reviewers (to be determined).
- Peer evaluations due to authors
- Final Course Project Papers due.

LECTURE SECTIONS WILL BE RECORDED

Our class sessions will be audio-visually recorded for students in the class to refer back to and for UFO-enrolled students who cannot attend live. Students who participate with their camera engaged or utilize a profile image agree to have their video or image recorded. If you are attending the course online, please log on with your camera so I can see you. You can just turn off your camera when I start to record the session if you don't mind. If you are unwilling to consent to have your profile or video image recorded, keep your camera off and do not use a profile image. Likewise, students who unmute during class and participate orally agree to have their voices recorded. Suppose you are not willing to consent to have your voice recorded during class. In that case, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to

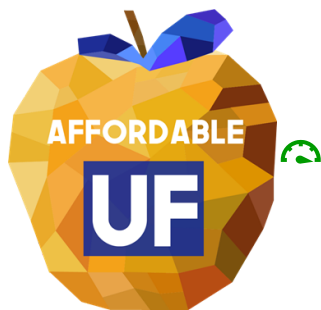
type questions and comments live. The chat will not be recorded or shared. As in all courses, recording and sharing recorded materials are prohibited.

COURSE EVALUATION BY STUDENTS

From the GatorEvals Course Evaluation System Web site: “Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback professionally and respectfully is available at <https://gatorevals.aa.ufl.edu/students/> (<https://gatorevals.aa.ufl.edu/students/>). Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/> (<https://ufl.bluera.com/ufl/>). Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/> (<https://gatorevals.aa.ufl.edu/public-results/>).”

Course Resources

This course participates in the Affordable UF Initiative. The high cost of instructional materials can be a burden. This course is working to keep your material costs at less than \$20 per-credit-hour. To accomplish this, there is no required text for this course. All course material will be provided on the eLearning Platform. The software will also be provided through the UF Apps framework as well as in TUR 3006 on campus. At the request of the student to the Instructor, license codes can be provided for the Esri GIS platforms for personal laptop use.



Class Demands

In general, concepts and theories will be presented through videos online. You are expected to commit four to six hours per week of in-lab time during the normal semester and ten-twenty hours a week during accelerated summer. The instructor will hold virtual office hours as requested to have one-on-one instruction. Please take advantage of the various digital interactions available in the course to get feedback and foster a sense of community with the class.

Peer Review

Many assignments will require peer review. This is a time to give feedback to your fellow students as well as see what others are turning in. It is fine to be harsh and give feedback, but it is not appropriate to be disparaging, rude, or plain mean. Give the peer review you hope you will get—constructive feedback to make better RS products.

Academic Honesty

You are all bound by the student academic honor code:

"We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity." "On my honor, I have neither given nor received unauthorized aid in doing this assignment."

UF Counseling Services

Resources are available on campus for students having personal problems or lacking clear career and academic goals that interfere with their academic performance. These resources are available on campus for students having personal problems or lacking clear career and academic goals that interfere with their academic performance. These resources include University Counseling Center, 301 Peabody Hall, 392-1575 (personal and career counseling); Student Mental Health, Student Health Care Center, 392-1171 (personal counseling); Center for Sexual Assault /Abuse Recovery and Education (CARE), Student Health Care Center, 392-1161 ext. 4231 (counseling related to sexual assault and abuse); Career Resource Center, Reitz Union, 392-1601 (career development assistance and counseling).

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.

Americans With Disabilities Act

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring accommodation, please contact Student Services before bringing your request to the instructor.

Grade Breakdowns

100	A
99	A
98	A
97	A
96	A
95	A
94	A
93	A
92	A
91	A
90	A

89	B+
88	B+
87	B+
86	B+
85	B+
84	B
83	B
82	B
81	B
80	B
79	C+
78	C+
77	C+
76	C+
75	C+
74	C
73	C
72	C
71	C
70	C
69	D+
68	D+
67	D+
66	D+
65	D+
64	D
63	D
62	D
61	D
60	D
59	E
58	E
57	E
56	E
55	E
54	E
53	E

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4	E
3	E
2	E
1	E
0	E

Course Summary:

Date	Details	Due
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