Geospatial Modeling
GEO4938/GEO6938
Class Periods: T | Period 10 - E1 (5:10 PM - 8:10 PM)
Location: TUR 3006
Academic Term: Spring 2020

I. Instructor
Dr. Reza Khatami
Email: seyedghkhatami@ufl.edu.
Office Hours: TBD. Email me for an appointment.
Office: TUR 3018B

II. Course Description
Introduction to implementation of geospatial research projects. Geographical, temporal, environmental modeling concepts using geospatial data, programming languages, and tools. Topics include: introduction to geospatial data; reading/writing, visualizing, and analyzing geospatial data; programming for analysis of geospatial data; and statistical analysis. Students will learn about working with the MATLAB, Google Earth Engine (GEE), and ArcGIS.

Note: This is a time-consuming course, which requires significant amounts of programming. You are expected to spend a lot of time to complete the assignments and the term project. You are expected to bring your own term project idea and data, preferably approved by your adviser. You must substantially use the platforms taught during the semester in your project. Basics of MATLAB and GEE will be covered and no previous experience in working with those platforms is expected. However, based on your research project, you might need to do self-study, outside class, to learn specific functionalities. ArcGIS will be shortly introduced in one session (this is not a step-by-step ArcGIS course) and will be used frequently during the semester.

III. Course Pre-Requisites
While the basics of the software/platforms are covered during the course, students require some understanding of geospatial science and scientific programming. Assignments could be challenging and time-consuming for student with no prior programming experience. Please note that this is NOT a geospatial theory course. The geospatial theories and concepts will be kept at a simple level, so students could focus on implementation aspect. You should have a good understanding of your research ideas. During the semester, you will learn how to implement those ideas.

IV. Course Objectives
The aim of the course is to familiarize you with:
- Working with geospatial data (vector and raster)
- Automation of geospatial data processing
- Implementation of spatial analysis tasks using programming
- Time-series analysis of remote sensing images
- Remote sensing image classification and change detection
- Scientific computation basics
- MATLAB, Google Earth Engine, and ArcGIS platforms

V. Course Schedule

Week	Date	Topic and important dates
1	1/7/2020	Introduction to geospatial data and coordinate systems Basics of ArcGIS
2	1/14/2020	Basics of MATLAB (1)
3	1/21/2020	Basics of MATLAB (2)
4	1/28/2020	Spatial Analysis using MATLAB Project proposal due (12 PM on 2/3/2020) GEE account creation due (12 PM on 2/3/2020)
5	2/4/2020	Processing raster data using MATLAB
6	2/11/2020	Google Earth Engine (1) • JavaScript basics • Displaying imagery and cloud masking • Mathematical image operations • Working with image collections
7	2/18/2020	Google Earth Engine (2) • Working with image collections (*continued*) • Iterating functions over image collections • Charting • Importing and exporting data Term project data submission due (12 PM on 2/24/2020)
8	2/25/2020	Google Earth Engine (3) • Working with reducers • Compositing and mosaicking • Time-series regression Research plan presentation
-	3/3/2020	Spring Break
9	3/10/2020	Google Earth Engine (4) • Single-date image classification • Classification of time-series images Term project progress report 1 due (12 PM on 3/16/2020)
10	3/17/2020	Google Earth Engine (5) • Multi-date/Multi-sensor classification • Post-classification change detection
11	3/24/2020	Google Earth Engine (6) • Arrays and Matrices • Time Series Analysis • Phenology modeling
12	3/31/2020	Working on term project Term project progress report 2 due (12 PM on 4/6/2020)
13	4/7/2020	Working on term project
14	4/14/2020	Working on term project
15	4/21/2020	Term project presentation
-	4/28/2020	Term project report due (12 PM on 4/28/2020)

VI. Attendance Policy, Class Expectations, and Make-Up Policy

You are expected to actively participate in the class and the discussions. Participation includes asking questions, answering questions, agreeing or disagreeing with points made by the instructor or your peers, sharing examples from your own research, and so forth. You will not simply receive credits for sitting in the class. Excused absences must be consistent with university policies in the Graduate Catalog (http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#attendance) and require appropriate documentation. Additional information can be found here: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Every homework is due at 11 AM before the next session. You will lose three points per day for late submissions.

This is a graduate level course. Expectations for term project and report are high.

VII. Grading Policy

Assignment	Total Points	Percentage of Final Grade
Assignments (10)	400 (40 points each)	40%
Participation	50	5%
Project proposal	40	4%
Term project data submission	40	4%
Research plan presentation	40	4%
Term project progress report 1	40	4%
Term project progress report 2	40	4%
Term project presentation	75	7.5%
Term project report	75	7.5%
Term project submission	200	20%

Letter grades will be assigned based on the scale shown below:

Percent	Grade	Grade Points
93.0 - 100.0	A	4.00
90.0 - 92.9	A-	3.67
87.0 - 89.9	B+	3.33
83.0 - 86.9	B	3.00
80.0 - 82.9	B-	2.67
77.0 - 79.9	C+	2.33
73.0 - 76.9	C	2.00
70.0 - 72.9	C-	1.67
67.0 - 69.9	D+	1.33
63.0 - 66.9	D	1.00
60.0 - 62.9	D-	0.67
0 - 59.9	E	0.00

More information on UF grading policy may be found at:
http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#grades
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Disclaimer: The syllabus represent the current plans and objectives. We might need to make some changes depending on the students' background, progress, and project requirements.

VIII. Students Requiring Accommodations
Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, https://www.dso.ufl.edu/drc) by providing appropriate documentation. Once registered, students will receive an accommodation letter, which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

IX. Course Evaluation
Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu/evals. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.

X. University Honesty Policy
UF students are bound by The Honor Pledge, which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students 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." The Honor Code (https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor in this class.

XI. 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. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

XII. Student Privacy
There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see:
http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html

XIII. Campus Resources
Health and Wellness

U Matter, We Care:
If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.

Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS)
Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/.

Academic Resources

E-learning technical suppor*t*, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. https://www.crc.ufl.edu/.

Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/.

Writing Studio, 302 Tigert Hall*, 846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/.

Student Complaints Campus*:* https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

On-Line Students Complaints*:* http://www.distance.ufl.edu/student-complaint-process.