MET6752 SPATIAL ANALYSIS OF ATMOSPHERIC DATA USING GIS (HYBRID/FLIPPED COURSE)

3 CREDIT HOURS FALL 2025

INSTRUCTOR: *Dr. Corene Matyas* matyas@ufl.edu *(Please ONLY email via Canvas) 3119 Turlington*

SYNCHRONOUS COURSE MEETING: *Turlington B109 (computer lab) Thursdays Period 6 (12:50 – 1:40 pm)*

VIRTUAL OFFICE HOURS: *Monday 10:30-11:30 pm, Wednesday 9:30-10:30 am); and by advance appointment (24 hours notice minimum) (business hours only - no evenings/ weekends)* ***Zoom meeting room: 672 215 8470***

COURSE WEBSITE: *http://lss.at.ufl.edu*

Computer Lab Policies:

Food and beverages must not be consumed in the area where technology is set up, except for water. When consuming water, please do not lean over the keyboards. If you need to eat or consume other beverages, please sit away from computers until finished.

Use your gatorlink to log into the terminals and save all work to your R drive. Please set up your R drive folder using the instructions on Canvas.

Course Communications:

This is a flipped course with lectures and quizzes online and a first discussion post and due before we meet, and we will be using Canvas and the R drive on UF Apps for all course materials. Our main purpose for the in-person meeting in the computer lab is to hold live Q and A, troubleshoot problems, and share analysis results. The assignments cannot be completed in the limited time we will meet in the lab – you must budget time to complete assignments outside of class. I highly recommend starting assignments before we meet.

I will log into my zoom meeting room during office hours – please join me. If you need to speak to me privately about your grade, or a personal matter outside of office hours, please email me via Canvas with a time(s) when we can connect on zoom and I will confirm. Please include the course-related topic that you need to discuss so that I can prepare for our meeting. I reserve the right to limit the number of hours I spend responding to student inquiries each week. I have tendonitis and can't type long responses to messages. Dr. Matyas reserves the right to record the in-person class meetings for personal use. Should they choose to do so, these will not be available to students.

The KEYS to your success are 1) good time management and communication skills, 2) familiarity with prerequisite concepts, 3) good attitude about overcoming challenges, and 4) regular ACTIVE participation. Download the assignment and skim it over before watching the lectures each week to identify concepts with which you are unfamiliar and to set aside enough time to seek help if needed. Please do not wait until 11:50 pm to start a task due at 11:59 pm. No one is available to help if you have questions! Please take the time to read feedback on assignments that I've made using the tools in Canvas.

REQUIRED VIEWINGS: Lecture slides posted to Canvas as downloadable PowerPoint files as well as links to recordings of these lectures via Mediasite.

ADDITIONAL RESOURCES: microphone on computer to record presentations, ability to use software through UF Apps, such as ArcGIS, for course assignments, making data tables and using formulas in MS Excel, making presentations in MS PowerPoint, establishing an organized workspace in your directory on the R drive.

COURSE DESCRIPTION: *Credits: 3;*

How atmospheric data are collected and analyzed both for meteorologic and climatologic-scale research. Learn where to obtain various types of data and how to analyze data to answer specific research questions.

This is not an introductory course. We will NOT cover basic fundamentals of atmospheric science such as the difference between high- and low-pressure systems, the type of weather associated with each, and how a cloud forms. You should already know these processes along with how to interpret time series and maps of geopotential heights and surface conditions.

PURPOSE OF COURSE: This course will cover how atmospheric data are collected and analyzed both for meteorologic and climatologic-scale research and we will focus on the use of GIS as a tool for data processing and spatial analysis. You should have a basic understanding of how data are collected both directly (e.g., instrumentation/sensors) and remotely (e.g., radar, satellite) from your previous coursework or research experience, or be willing to obtain this knowledge on your own as needed. We will explore where to obtain various types of data, and the spatial analysis techniques that may be used to answer research questions using these data. A previous course in GIS is not required, but you should have basic computer skills. We will be utilizing a GIS in our lab activities and an introductory assignment will help familiarize you with ArcGIS if you have not used it before.

COURSE GOALS AND/OR OBJECTIVES: *By the end of this course, students will:*

- Use common terminology for analysis of atmospheric data
- Map atmospheric data using a GIS
- Distinguish among different atmospheric datasets and explain their limitations and delimitations
- Discuss the spatial patterns of data present in their analyses
- Differentiate between the advantages and disadvantages of datasets
- Design/complete a data analysis project

HOW THIS COURSE RELATES TO THE STUDENT LEARNING OUTCOMES FOR THE CERTIFICATE IN APPLIED ATMOSPHERIC SCIENCE (GRADUATE-LEVEL)

Knowledge: Students identify, describe, and define the subject matter related to their discipline.

INSTRUCTIONAL METHODS:

All course materials are available on Canvas and/or the R Drive in UF Apps.

- Lectures have been recorded and links to them are available as well as PowerPoint files of the slides that you can download to follow along and click on links.
- Each lecture has a 10 -question quiz that you will take (20 minute time limit). You may not discuss with other students or use the internet/AI, but you may use your notes. Due dates are Wednesdays so that you begin the module early in the week.
- Posting to the discussion board (DB) is mandatory – you must post one question/comment and respond to at least 1 other post to receive full credit each week. Assignments may incorporate separate DBs. I have set the due date for Wednesdays to remind you of your first post each week and have placed the DB again at the end of the module (next buttons) to remind you to make your second post before moving on to the next module. The final post is due Friday although you can continue posting if you work on the assignment over the weekend.
- We will also have assignments – you are encouraged to work with others. You must turn in your own work. All your work must be saved within folders labelled for each module on the R drive. I will use rubrics to grade assignments and will use the tools in SpeedGrader to make comments on the document(s) that are uploaded.
- There will be a final project due at semester's end. Progress reports will be due along the way. Please plan to incorporate time to work on the project into your schedule to avoid rushing it at the last minute and losing points for not making progress at the check-up time.
- I have embedded surveys at the end of some modules to gauge how the course progresses. I appreciate your feedback and will work with you to improve the course experience.

COURSE POLICIES:

ATTENDANCE POLICY: *you must log into Canvas regularly. Logging in once per week will NOT be sufficient. No specific points towards the grade are reserved solely for your virtual attendance. Attendance and active participation are required at the one synchronous weekly meeting. There, we cover questions/troubleshooting and everyone shares their preliminary results. Students who withdraw from the course must do so according to the UF deadlines. No students will be automatically dropped from the course.*

QUIZ POLICY: Lecture *quizzes feature a mix of question types. These are open book/open note but you should NOT work with anyone else or use the internet/AI. Please allow a minimum of 3 business days after the due date for grades to become available. You have one calendar week after grades are released to arrange a time discuss results with the instructor. If you request a regrade, your score may go up or down. Regrades must be requested within one week of the grades being available.*

MAKE-UP POLICY: The general policy is that no late quiz submissions or assignments will be accepted. Please budget your time well. Quizzes open and close at scheduled times and automatically submit at the deadline. Once closed, they will not be reopened so please plan your schedule accordingly. Do not wait until the last hour before it is due! However, official documentation of prolonged absence can be presented (police report, doctor's note) and I will work with you. If you have an internet problem or Canvas malfunctions, report it to the help desk ASAP and send me the ticket number.

ASSIGNMENT POLICY: Due *dates for assignments are listed on Canvas. Late assignments will generally NOT be accepted – please submit before the due date each week. If you fall behind due to an excused extended absence, please let the instructor know so that we can work out a plan to get you back on track. Late assignments may not be graded in a timely manner. Rubrics for applicable assignments are available on the assignment's page in Canvas. Even if you collaborate with others, you must ALWAYS turn in your own work to avoid an honor code violation. Please allow a minimum of 3 business days after the due date for grades to become available. You have one calendar week after grades are released to arrange a time discuss results with the instructor. If you request a regrade, your score may go up or down. Regrades must be requested within one week of the grades being available. If arrangements are made due to excused absence for late work, ALL late work must be submitted by the last day of classes. No late work is accepted after 11:59 pm on that day.*

COURSE TECHNOLOGY: You *will be watching lecture videos and should have your own copy of the slides available on which to take notes. Links are provided on lecture slides to animations and datasets for you to explore. You will also need to download assignments and datasets, use software available through UF Apps or programs freely available on the internet to complete assignments, and upload to Canvas for me to grade. I am not a technology specialist and I cannot help you troubleshoot problems on your computer.*

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

GETTING HELP:

For issues with technical difficulties for E-learning in Canvas, or problems with UF Apps, please contact the UF Help Desk at:

- Learning-support@ufl.edu
- (352) 392-HELP - select option 2
- http://helpdesk.ufl.edu

Any requests for make-ups due to technical issues MUST be accompanied by the ticket number received from LSS 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 a make-up.

This course complies with all UF academic policies. For information on those polices and for resources for students, please see this link." (The direct link is https://syllabus.ufl.edu/syllabus-policy/uf-syllabus-policy-links/.)

GRADING POLICIES:

Assignment	Percentage
Assignments	40
Lecture Quizzes	20
Final Project (ideation, progress report(s), project and its presentation/evaluation)	30
Discussion Board Q and A	10

One lowest score will be dropped from quizzes and weekly required DB postings

GRADING SCALE:

A: 93% +
A-: <93% to 90%
B+: <90% to 87%
B: <87% to 83 %
B-: <83% to 80%
C+: <80% to 77%
C: <77% - 73%
C- : <73% to 70%
D+: <70% to 67%
D: <67% to 63%
D- : <63% to 60%
E: < 60%

COURSE SCHEDULE:

For each module, students watch lecture(s), take lecture quiz(s), make 2 discussion board posts, complete an assignment

Introductions: Syllabus Quiz, Setting up R drive/UF Apps
Module 1: Common Variables, Acronyms and Facts, Who Uses GIS Analysis, Variables 1
Module 2: Upper Atmosphere, Who Uses GIS Analysis, Variables 2
Module 3: Surface Data; Practice GIS Analysis
Module 4: GIS Data Models; TC Tracks Analysis
Module 5: Global Reanalysis; NCEP Reanalysis Analysis
Module 6: NetCDF and Map Projections; NetCDF Analysis and 3 minute video
Module 7: Regional Reanalysis; NARR Analysis, Peer Reviews of 3 minute videos
Final Project Brainstorming and Organization

Module 8: NASA Products; Rainfall Analysis
Module 9: Spatial Metrics; Spatial Analysis
Final Project Progress Reports
Module 10: AI/ML in Meteorology; AI Research Profile
Final Project submission

All due dates are available under the syllabus link in Canvas

INFORMATION ON CERTIFICATE:

So long as you receive a grade of B- or higher, this course counts as 33% of the credits needed for the graduate certificate: Applied Atmospheric Science. If you are interested in pursuing the certificate, you can apply by going to http://admissions.ufl.edu/start.html and scrolling down to the section for CERTIFICATE. There is no charge to apply if you are already a UF student. If you have applied but don't see that you are enrolled in the certificate, please email me as the Certificate Coordinator so I can check into the problem. I have uploaded fliers to Canvas that list all certificate courses.

Disclaimer: This syllabus represents my current plans and objectives. As we go through the semester, those plans may need to change to enhance the class learning opportunity. Such changes, communicated clearly, are not unusual and should be expected.