

## MET4750 SPATIAL ANALYSIS OF ATMOSPHERIC DATA USING GIS

3 CREDIT HOURS

FALL 2020

**INSTRUCTOR:** Dr. Corene Matyas [matyas@ufl.edu](mailto:matyas@ufl.edu) (Please *ONLY* email via Canvas)

*Zoom personal meeting room: 672 215 8470 (no in-person visits this term)*

**OFFICE HOURS:** *Tuesday 9:30-10:30 am, Thursday 1:30-2:30 pm; by advance appointment (24 hours notice minimum) (business hours only - no evenings or weekends)*

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

### Course Communications:

This course will be 100% online, asynchronous (save for zoom sessions and project report meetings if you work in a group), and we will be using Canvas for all course materials. 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 a list of topics 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.

To answer questions, go over answers for assignments, and provide additional clarification and examples, I will send out invites to the Canvas Zoom tool. These 15-30 minute sessions will be recorded in case you cannot join live. If no one joins after I've delivered my intended information, I will wait a few minutes but will then end the session so that it might not last the entire scheduled time. This way, the recording won't include silence if no one joins.

Note on using zoom: **you are not required to turn on your camera.** Scheduled sessions that you access through the Zoom link on Canvas will be recorded and available to the entire class.

Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate verbally are agreeing to have their voices recorded.

If you are not willing to consent to have your voice recorded during class, 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. Dr. Matyas had tendonitis and can't use the chat - she will verbally answer questions posted to the chat.

As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

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 via

discussion boards and zoom conferences. 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 11:00 pm to start an assignment due at 11:59 pm. No one is available to help if you have questions! Please take the time to join or review the Zoom recordings and also 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 (containing the voice/video incase the MS stream links fail) as well as links to recordings of these lectures via MS Stream.

**ADDITIONAL RESOURCES:** microphone on computer to communicate with instructor, ability to use software through UF Apps, such as ArcMap, 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 and save all work related to the course in appropriate directories.

**COURSE DESCRIPTION:** *Credits: 3; Prereq: MET 3503 or GEO 3250 with a minimum B- grade.*

How atmospheric data are collected and analyzed for meteorologic and climatologic-scale research. Where various types of data are obtained and how to analyze data to answer specific research questions.

**PREREQUISITE KNOWLEDGE AND SKILLS:** Material from prerequisite courses.

**This is an upper-level course**, 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 must already know these processes along with how to interpret time series and maps of geopotential heights and surface conditions. Please do not expect me to tutor you in the prerequisite knowledge.

**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. 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 highly recommended, or basic computer programming skills. We will be utilizing a GIS in our lab activities.

**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 a data analysis project and critique the projects of peers

### **HOW THIS COURSE RELATES TO THE STUDENT LEARNING OUTCOMES FOR THE CERTIFICATE IN METEOROLOGY AND CLIMATOLOGY (UNDERGRAD)**

Content: Students will know the atmosphere from a geographic perspective on climatological time scales.

Critical Thinking: Students will analyze information relevant to climatology and apply interpretation of data toward problem solving.

Communication: Students will interpret and effectively communicate information relevant to climatology.

### **INSTRUCTIONAL METHODS:**

All course materials are available on Canvas. I have set tasks up in modules that follow our course topics. Some activities span multiple modules.

- 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 or use to take notes.
- Each lecture has a 10 -question quiz that you will take (20 minute time limit). You may not discuss with other students, 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 Fridays.
- We will also have assignments – you are encouraged to work with others. You must turn in your own work. All of 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 and you will perform peer reviews of the projects submitted by other students. There will also be a team meeting to discuss progress.
- I have embedded surveys at the end of some modules to gauge how the course is progressing. I appreciate your feedback and will work with you to improve the course experience.

### **COURSE POLICIES:**

**ATTENDANCE POLICY:** *You must log into Canvas regularly to participate in this course. Logging in once per week will NOT be sufficient. No specific points towards the grade are reserved solely for your virtual attendance. 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. There are no exams in this course. 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 an absence can be presented (police report, ticket number from IT, doctor's note) and I can adjust due dates accordingly. 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 illness, 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, else you are guilty of 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.*

**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 will use the Zoom tool in Canvas to answer questions posted to the discussion boards. 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>.

#### UF POLICIES:

**UNIVERSITY POLICY ON ACCOMMODATING STUDENTS WITH DISABILITIES:** Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center. [Click here to get started with the Disability Resource Center](#). It is important for

students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester. A minimum of one week is needed for the instructor to find ways to provide the accommodation. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

**UNIVERSITY POLICY ON ACADEMIC MISCONDUCT:** Academic honesty and integrity are fundamental values of the University community. Students should be sure that they understand the UF Student Honor Code at <http://www.dso.ufl.edu/students.php>. Each suspected honor code violation will be reported to the Dean of Students Office.

**NETIQUETTE: COMMUNICATION COURTESY:** All members of the class are expected to follow rules of common courtesy in all email messages, discussion posts and chats. First instance of improper behavior will receive a warning. Subsequent instances may result in a lowering of the course grade. [See Sample Netiquette Document](#)

**COURSE EVALUATIONS:** Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. [Click here for guidance on how to give feedback in a professional and respectful manner](#). 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 [ufl.bluera.com/ufl/](http://ufl.bluera.com/ufl/). [Summaries of course evaluation results are available to students here](#).

#### 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](mailto: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.

Other resources are available at <http://www.distance.ufl.edu/getting-help> for:

- Counseling and Wellness resources
- Disability resources
- Resources for handling student concerns and complaints
- Library Help Desk support

Should you have any complaints with your experience in this course please visit <http://www.distance.ufl.edu/student-complaints> to submit a complaint.

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

#### GRADING POLICIES:

Assignment	Percentage
Assignments	40
Lecture Quizzes	25
Final Project (progress report, peer evaluation, project write-up/answers)	25
Discussion Board Q and A	10

One lowest score will be dropped from assignments, 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%

[link to the university grades and grading policies](#)

## COURSE SCHEDULE:

Each module features lecture(s), lecture quiz (s), discussion board, assignment (denoted with “analysis”)

Introductions: Syllabus Quiz, Getting to know everyone (first half of week 1)

Module 1: Introduction: Acronyms and Facts (second half of week 1)

Module 2: Upper Atmosphere; Common Variables, Who Uses GIS Analysis

Module 3: Surface Data; Practice GIS, Who Uses GIS Analysis

Module 4: GIS Data Models; Final comments for Who Uses GIS Analysis, TC Tracks Analysis

Module 5: Global Reanalysis; NCEP Reanalysis Analysis

Module 6: NetCDF and Map Projections; NetCDF Analysis

Module 7: Regional Reanalysis; NARR Analysis

Module 8: Final Project Brainstorming and Organization

Module 9: NASA Products; Rainfall Analysis

Module 10: Spatial Metrics; Spatial Analysis

Module 11: Final Project Progress Reports

Module 12: Ground-Based Radar; Radar Analysis

Module 13: Final Project submission and peer reviews

**Specific assignment 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 25% of the credits needed for the undergraduate certificate: Meteorology and Climatology. 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.