SYLLABUS	
Course Information	**CLIM312/GGS312: Physical Climatology (3 credits)** Modality: 100% Face-to-Face Location: Fairfax Campus (Tuesdays and Thursdays 4:30 pm – 05:45 pm in EXPL 3301)
Instructors	Dr. Silvia R. Santos da Silva Postdoctoral Research Associate in COS/AOES and Adjunct Instructor in AOES. Mason e-mail address: ssantosd@gmu.edu Office Hours: Tuesdays and Thursdays 3:00 pm – 04:00 pm in EXPL 3417 or by appointment.
Course Description	Catalog Description: Quantitative description of nature and theory of the climate system, dynamics of atmosphere-ocean-land surface, internal interactions and response to external forcing, description of the climate record and simple climate models. Expanded Description: The course focuses on exploring the relationships between the atmosphere, the oceans, water, land, vegetation, energy, and human systems through an interwoven understanding of the physical, biogeochemical and socioeconomic relationships and constraints that influence (and are influenced by) climate. The course introduces a holistic framework to formalize these relationships and explore their implications.
Course Objectives	Upon completion of the course, students will enhance their knowledge of climate science by: 1. Explore the fundamentals of the interaction between the atmosphere, the oceans, water, climate, land, vegetation, energy, and human systems at the regional and global scales; 2. Apply quantitative approaches to provide estimates of earth system stocks and fluxes under the influence of changing forcings (e.g., population, socioeconomics); 3. Understand the role of water-climate-land-energy-economy interactions in the context of adaptation processes, policy-making and development.
Course Methodology	The class format will combine lectures, readings (textbook material and scientific papers), and other learning tools. The class will be interactive and require every student to be engaged in the classroom discussion and assignments. Note that lectures will be recorded and made available in Blackboard as an additional learning resource.
Required textbook(s) and/or materials	There is no required textbook for this class. Readings will be assigned from the following online textbook: Goosse H., 2015, Introduction to climate dynamics and climate modeling, Cambridge University Press, online textbook available at http://www.climate.be/textbook/ In addition, various other reading sources will be utilized. All required course readings and materials will be made available electronically.

Computer Requirements	**Hardware:** You will need access to a computer and access to a fast and reliable broadband internet connection. A larger screen is recommended for better visibility of course material. Given that lectures will be recorded and made available in Blackboard, you will also need speakers or headphones to hear recorded content. If you consider the purchase of a new computer, please go to Patriot Tech to see recommendations. **Software:** This course uses Blackboard as the learning management system. You will need a browser and operating system that are listed compatible or certified with the Blackboard version available on the myMason Portal. Please visit Browser Checker to check if your browser supports the most recent release of Blackboard. Log in to myMason to access your registered courses.
Course Website	Blackboard will be used for this course. You can access the site at http://mymasonportal.gmu.edu. Login and click on the "Courses" tab. You will see our CLIM312/GGS312 course. NOTE: Username and passwords are the same as your Mason email account. You must have consistent access to an internet connection in order to complete the assignments in this course through Blackboard. You can also visit Blackboard ITS Support for Students for additional training materials and resources about Blackboard.
Participation	Learning can only happen when you are playing an active role. It is important to place more emphasis on developing your insights and skills, rather than transmitting information. Knowledge is more important than facts and definitions. It is a way of looking at the world, an ability to interpret and organize future information. An active learning approach will more likely result in long-term retention and better understanding because you make the content of what you are learning concrete and real in your mind.
Rules and Expectations	In correspondence/communication students will be expected to be professional and respectful. In regard to honesty in work students will be expected to: a. Review the University integrity and honesty policies in the student handbook for guidelines regarding plagiarism and cheating (summarized below). I will gladly clarify my stance on any questionable or "grey area" issues you may have. b. Refrain from dishonest work as it will receive a minimum penalty of zero on the assignment and a maximum penalty of a zero for the course with a report to the Honor committee. The GMU Honor Code requires that faculty submit any suspected Honor Code violations to the Honor Committee. Therefore, any suspected offense will be submitted for adjudication.
Mason Honor Code	**The complete Honor Code is as follows:** To promote a stronger sense of mutual responsibility, respect, trust, and fairness among all members of the George Mason University community and with the desire for greater academic and personal achievement, we, the student members of the university community, have set forth this honor code: **Student members of the George Mason University community pledge not to cheat, plagiarize, steal, or lie in matters related to academic work.** (From the Catalog – catalog.gmu.edu)
Cheating Policy	Any form of cheating on an activity, project, or exam will result in zero points earned. "Cheating" includes, but is not limited to, the following: reviewing others' exam papers, having ANY resources utilized when not allowed, collaborating with another student during an individual assignment.

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<tr><td></td><td>If you have questions about when the contributions of others to your work must be acknowledged and appropriate ways to cite those contributions, please talk with the professor or utilize the GMU writing center.</td></tr>
<tr><td>Plagiarism and the Internet</td><td>Copyright rules also apply to users of the Internet who cite from Internet sources. Information and graphics accessed electronically must also be cited, giving credit to the sources.

This material includes but is not limited to e-mail (don't cite or forward someone else's e-mail without permission), newsgroup material, information from Web sites, including graphics. Even if you give credit, you must get permission from the original source to put any graphic that you did not create on your web page. Shareware graphics are not free. Freeware clipart is available for you to freely use. If the material does not say "free," assume it is not.

Putting someone else's Internet material on your web page is stealing intellectual property. Making links to a site is, at this time, okay, but getting permission is strongly advised, since many Web sites have their own requirements for linking to their material. Review the Honor Code here</td></tr>
<tr><td>Individuals with Disabilities</td><td>Students with documented disabilities should contact the Office of Disability Services (703) 993-2474) to learn more about accommodations that may be available to them. (From the Catalog – catalog.gmu.edu)</td></tr>
<tr><td>Academic Integrity and Inclusivity</td><td>This course embodies the perspective that we all have differing perspectives and ideas, and we each deserve the opportunity to share our thoughts. Therefore, we will conduct our discussions with respect for those differences. That means, we each have the freedom to express our ideas, but we should also do so keeping in mind that our colleagues deserve to hear differing thoughts in a respectful manner, i.e. we may disagree without being disagreeable. http://oai.gmu.edu/</td></tr>
<tr><td>Student Privacy Policy</td><td>George Mason University strives to fully comply with FERPA by protecting the privacy of student records and judiciously evaluating requests for release of information from those records. Please see George Mason University’s student privacy policy

https://registrar.gmu.edu/students/privacy/</td></tr>
<tr><td>E-Mail Policy</td><td>Mason uses email to provide official information to students. Examples include notices from the library, notices about academic standing, financial aid information, class materials, assignments, questions, and instructor feedback.

Students are responsible for the content of university communication sent to their Mason e-mail account and are required to activate that account and check it regularly.</td></tr>
<tr><td>Course Evaluation and Grading</td><td>Grading of all writing assignments is based on students’ incorporation of the material covered in class. Assignments will generally be submitted through Blackboard, unless otherwise noted by the course instructor.
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<tr><td>Homework Assignments</td><td>35%</td></tr>
<tr><td>Research Paper Review and Presentation</td><td>30%</td></tr>
<tr><td>Final Examination</td><td>35%</td></tr>
<tr><td>Total</td><td>100%</td></tr>
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<tr><td></td><td>It is important to budget enough study time into your schedule. College students are generally expected to work independently for an additional 2-3 hours outside of class for every credit hour/hour in the standard (non-lab) classroom. For this course, you should budget a total of 6-9 hours per week. Unless otherwise stated, all assignments are due by the end of the week in which they are assigned. There is a one day overlap between the end of one course week and the beginning of the next. For the purposes of this course, a week is defined as beginning at 12:01 am each Monday EST, and ending at 11:59 pm on the following Monday EST.

To help you manage your schedule and time to complete the assignments in this course, please follow the recommended timeline below. If you have a question or concern or encounter a problem about an assignment, please contact me immediately so we can discuss and work out a resolution.

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<tr><td colspan="2">Grades will be assigned as follows:</td></tr>
<tr><td>A</td><td>93.00-100%</td></tr>
<tr><td>A-</td><td>89.50-92.99%</td></tr>
<tr><td>B+</td><td>87.00-89.49%</td></tr>
<tr><td>B</td><td>83.00-86.99%</td></tr>
<tr><td>B-</td><td>80.00-82.99%</td></tr>
<tr><td>C+</td><td>77.00-79.99%</td></tr>
<tr><td>C</td><td>73.00-76.99%</td></tr>
<tr><td>C-</td><td>70.00-72.99%</td></tr>
<tr><td>D</td><td>60.00-69.99%</td></tr>
<tr><td>F</td><td>0-59.99%</td></tr>
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<tr><td>Assignments</td><td>All assignments are due on the designated date, and are required to be uploaded to Blackboard. Assignments are due by Monday, 11:59 PM, ET unless otherwise stated. Refer to the course schedule and weekly overviews for details. Late work will have a deduction of 5% of the total possible points for every day the assignment is late. (So, for example, on a 100-point scale, a student who would have earned a 94 on a timely assignment will earn 89 if the same assignment is turned in one day late, 84 if turned in 2 days late, etc.).</td></tr>
<tr><td>Reading Reflections</td><td>Your challenge is to immerse yourself in the readings assigned in the course. You will want to be able to comment on the paper topics with authority. You are encouraged to make notes on your own thoughts about the various concepts and issues, and consider possible issues/outcomes. Your reflections should be to the point and include sufficient technical detail. You should present your opinions, but justify them with facts and proper sources. What did you disagree with and why, or not understand?

Your reading reflections should be about 100-150 words. Please provide a clear, well-formulated thesis, sentence structure, grammar, punctuation. Support all reflections with appropriate rationale and citations from readings; appropriately document sources, if appropriate.</td></tr>
<tr><td>Term Project</td><td>Instructions and deadlines will be provided separately.</td></tr>
<tr><td colspan="2">Need Help with this course, or anything else? If you encounter any difficulties in this course, or with your ability to access Mason classes due to academic, personal, or work issues, please let me know. You may utilize the Ask Your Instructor discussion forum, or email your instructor immediately! Do not wait until the end of the semester to ask for help in understanding the material in order to improve your grade - by then, it may be too late. Do not be afraid</td></tr>
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to ask for help! In addition to your instructor, the Counseling Center is committed to improving academic and personal skills, and offers many workshops and counseling groups throughout the semester. Make use of the many rich academic and personal opportunities available at Mason!

Course Schedule: Fall 2023		
Date	**Topic**	**Assignments**
Lecture 1: (Aug 22)	**What is this class about?**	• Review class syllabus • Reading: Goosse (Chapter 1)
Lecture 2: (Aug 24, Aug 29)	**Definition of the Climate System and its Components**	• Reading: Goosse (Chapter 2) • Homework Assignment 01
Lecture 3: (Aug 31, Sep 5)	**Energy, Hydrological and Carbon Cycles**	• Reading: Goosse (Chapter 4) • Homework Assignment 02
Lecture 4: (Sep 7, Sep 12)	**Climate Perturbations and Responses: Forcings and Feedbacks**	• Reading: Goosse (Chapter 5) • Homework Assignment 03
Lecture 5: (Sep 14, Sep 19, Sep 21, Sep 26)	**Climate Variability and Change: Timescales, Dynamics and History**	• Reading: Goosse (Chapter 6) • Homework Assignment 04
Lecture 6: (Sep 28, Oct 3)	**Modeling of the Climate System: Introduction and History**	• Reading: Goosse (Chapter 3) • Homework Assignment 05 • Reading: Paper Assignments
Lecture 7: (Oct 5, Oct 12)	**Climate Models and Applications**	• Reading: Goosse (Chapter 6) • Homework Assignment 06 • Reading: Paper Assignment
Lecture 8: (Oct 17, Oct 19)	**Human and Socioeconomics Considerations in Climate Science**	• Reading: Paper Assignments • Homework Assignment 07
Lecture 9: (Oct 24, Oct 26, Oct 31, Nov 2)	**Climate, Energy, Land Water, and Biodiversity**	• Reading: Paper Assignments • Homework Assignment 08
Lecture 10: (Nov 7, Nov 9, Nov 14, Nov 16, Nov 21)	**Case Study Applications and Introduction to AR6**	• Reading: Paper Assignments • Reading: excerpts from AR6 • Homework Assignment 09

Research Paper Reviews (Nov 28, Nov 30)	**Student Presentations**	N/A
Reading Day (no class) (Dec 05)	**Reading Day**	N/A (Note: reading days provide students with additional study time for final examinations.)
Final Exam (Dec 12)	**Final Examination**	N/A (Note: see the official University's final exam period here (GMU Final Exam Schedule - Fall 2023).