



## Syllabus

Course Information	<p>GG309: Introduction to Weather and Climate (Hybrid)</p>
Instructor	<p>Professor John J. Qu, In person 10:30AM-11:45AM Tuesdays, Jan 21, 2025 - May 14, 2025 &amp; online synchronous (10:30-11:40AM, Thursdays, vs Zoom).</p> <p>Class material and quizzes: Canvas</p> <p>Office hours: 11:45-12:30 (in person), Tuesdays, or make appointment (vs zoom) Please refer to your online course: <a href="https://mymasonportal.gmu.edu/">https://mymasonportal.gmu.edu/</a> &amp; <a href="https://gmu.zoom.us/">https://gmu.zoom.us/</a></p>
Course Description	<p>This course introduces students to the fundamental principles of atmospheric and climate sciences, providing a quantitative description and interpretation of a wide range of atmospheric observations and phenomena, with an emphasis on sub-synoptic scales (e.g., weather and regional-scale climate). Students will engage with real-world examples and a compelling narrative throughout the course. A key goal is not only to build foundational knowledge of the physical principles underlying weather and climate but also to prepare students for further study in atmospheric and climate sciences. The course is designed for both science majors and non-majors taking their first steps into the field.</p> <p>For Spring 2025, the course will focus on extreme weather and climate events.</p> <p>Goals of the course include:</p> <ol style="list-style-type: none"> <li>1. providing basic knowledge of physical fundamentals of weather and climate.</li> <li>2. preparing learners for the science of atmospheric modeling and simulations</li> </ol>
Course Objectives	<p>Upon completion of the course, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Describe the difference between weather and climate</li> <li>2. Define basic concepts of atmosphere and climate sciences</li> <li>3. Assess how weather and climate impact assessments</li> <li>4. Utilize textbook and references to learn why we have extreme weather and climate events</li> <li>5. Describe climate change and future challenges</li> </ol>
Course Methodology	<p>The class format will combine reading, lectures, presentations, and other learning tools. The class will be interactive and require every student to be engaged in the classroom discussion and assignments. In addition to the lectures, screencasts and timely completion of assignments, every student will be expected to be an active participant and a dedicated individual applying what you learn to every element of the course work.</p>
Required textbook(s) and/or materials	<p><b>Required Textbook:</b> Understanding Weather and Climate, Seventh Edition, (2015), by Edward Aguado and James E. Burt, Pearson, ISBN-13: 978-0321987303 and ISBN-10: 0321987306, ISBN-13: 9780133943641 (eText), 570 pages.</p> <p><b>Suggested Reference Books</b></p> <ol style="list-style-type: none"> <li>1. Atmospheric Science: An Introductory Survey, Second Edition, (2006), Wallace, J. M., and P. V. Hobbs, Academic Press.</li> </ol>

	<ol style="list-style-type: none"> <li>2. Climatology, 2011, By Robert V. Rohli, Anthony J. Vega, Jones &amp; Bartlett Learning, Paperback - 432 pages - ISBN 0763791016</li> <li>3. What We Know about Climate Change, Updated Edition, (2018) by Kerry Emanuel, MIT Press, ISBN: 9780262535915</li> <li>4. Climate Change and a Sustainable Earth, 2022, J. J. Qu and R. P. Motha, Cambridge Scholars Publishing, (<a href="https://www.cambridgescholars.com/product/978-1-5275-8044-2">https://www.cambridgescholars.com/product/978-1-5275-8044-2</a>)</li> </ol> <p>Throughout the course you should also be prepared to refer to the following websites:</p> <ul style="list-style-type: none"> <li>• <a href="#">World Meteorological Organization</a></li> <li>• <a href="#">The Intergovernmental Panel on Climate Change (IPCC)</a></li> <li>• <a href="#">National Oceanic and Atmospheric Administration (NOAA)</a></li> <li>• <a href="#">Local Weather on The Weather Channel</a></li> </ul>
<p>Computer Requirements</p>	<p><b>Hardware:</b> You will need access to a Windows or Macintosh computer with at least 2 GB of RAM and access to a fast and reliable broadband internet connection (e.g., cable, DSL). A larger screen is recommended for better visibility of course material. You will need speakers or headphones to hear recorded content. A headset with a microphone is recommended for the best experience. For the amount of Hard Disk Space required taking a distance education course, consider and allow for:</p> <ol style="list-style-type: none"> <li>1. the storage amount needed to install any additional software and</li> <li>2. space to store work that you will do for the course.</li> </ol> <p>If you consider purchasing a new computer, please go to <a href="#">Patriot Tech</a> to see recommendations.</p> <p><b>Software:</b> Many courses use Blackboard as the learning management system. You will need a browser and operating system that are listed as compatible or certified with the Blackboard version available on the <a href="#">myMason Portal</a>. See <a href="#">supported browsers and operating systems</a>. Log in to <a href="#">myMason</a> to access your registered courses. Some courses may use other learning management systems. Check the syllabus or contact the instructor for details. Online courses typically use <a href="#">Acrobat Reader</a>, <a href="#">Flash</a>, <a href="#">Java</a>, and <a href="#">Windows Media Player</a>, <a href="#">QuickTime</a> and/or <a href="#">Real Media Player</a>. Your computer should be capable of running current versions of these applications. Also, make sure your computer is protected from viruses by downloading the latest version of Symantec Endpoint Protection/Anti-Virus software for free <a href="#">here</a>.</p> <p>Students owning Macs or Linux should be aware that some courses may use software that only runs on Windows. You can set up a Mac computer with Boot Camp or virtualization software so Windows will also run . Watch <a href="#">this video</a> about using Windows on a Mac. Computers running Linux can also be configured with virtualization software or configured to dual boot with Windows.</p> <p>Note: If you are using an employer-provided computer or corporate office for class attendance, please verify with your systems administrators that you will be able to install the necessary applications and that system or corporate firewalls do not block access to any sites or media types.</p> <p><b>Course-specific Hardware/Software</b></p> <p>Check the syllabus for your course or contact the instructor prior to the start of the course to find out about specific technical requirements for your class. Hardware or software required for your course or program may be available for purchase at <a href="#">Patriot Computers</a> (the University’s computer store that offers educational discounts and special deals).</p>
<p>Course Website</p>	<p>Blackboard 9.1 will be used for this course. You can access the site at <a href="http://mymasonportal.gmu.edu">http://mymasonportal.gmu.edu</a>. Login and click on the “Courses” tab. You will see GGS309 course NOTE: Username and passwords are the same as your Mason email account. You</p>

	<p>must have consistent access to an internet connection in order to complete the assignments in this course through Blackboard (<a href="http://mymason.gmu.edu">http://mymason.gmu.edu</a>). Note the technology requirements for the college of Education and Human Development in your Blackboard course menu—it contains details of minimum technology requirements.</p>
Participation	<p>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.</p> <p>Although an active role can look differently for various individuals, it is expected in this class that you will work to explore issues and ideas under the guidance of the professor and your peers. You can do this by reflecting on the content and activities of this course, asking questions, striving for answers, interpreting observations, and discussing issues with your peers.</p>
Rules and Expectations	<p>In correspondence/communication students will be expected to:</p> <ol style="list-style-type: none"> <li>Be professional and respectful in correspondence</li> <li>Make reasonable requests of the instructor. We will be happy to clarify course material and answer legitimate questions; however, please exhaust other information sources (e.g., syllabus, Blackboard) for answering your question before contacting me and remember, "Poor planning on your part does not constitute an emergency on my part"</li> </ol> <p>In regard to honesty in work students will be expected to:</p> <ol style="list-style-type: none"> <li>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.</li> <li>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.</li> </ol>
Mason Honor Code	<p><b>The complete Honor Code is as follows:</b>  <i>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: <b>Student members of the George Mason University community pledge not to cheat, plagiarize, steal, or lie in matters related to academic work.</b></i></p> <p><i>(From the Catalog – <a href="http://catalog.gmu.edu">catalog.gmu.edu</a>)</i></p>
Cheating Policy	<p>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.</p> <p>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.</p>
Plagiarism and the Internet	<p>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.</p> <p>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.</p>

	<p>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. <a href="#">Review the Honor Code here.</a></p>
Individuals with Disabilities	<p>Students with documented disabilities should contact the <a href="#">Office of Disability Services</a> (703) 993-2474) to learn more about accommodations that may be available to them. <i>(From the 2019-2020 Catalog – catalog.gmu.edu)</i></p>
Academic Integrity and Inclusivity	<p>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. <a href="http://oai.gmu.edu/">http://oai.gmu.edu/</a></p>
Student Privacy Policy	<p>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.</p> <p>Please see George Mason University's student privacy policy <a href="https://registrar.gmu.edu/students/privacy/">https://registrar.gmu.edu/students/privacy/</a></p>
E-Mail Policy	<p>Web: <a href="http://masonlive.gmu.edu">masonlive.gmu.edu</a></p> <p>Mason uses electronic mail 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.</p> <p>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.</p> <p>Students are also expected to maintain an active and accurate mailing address in order to receive communications sent through the United States Postal Service. <i>(From the 2017-18 Catalog – catalog.gmu.edu)</i></p>
Course Grading & Evaluation	<p>Grades will be assigned as follows:</p> <p>A=90-100%  B=80-89%  C=70-79%  D=60-69%  F=&lt;60%</p>
Discussions	<p>The discussion board will be used for conversations surrounding current weather and climate events. Regular participation, through dialogue with your peers and instructor, is encouraged though you will not be graded. The "Ask the Instructor" section may be used for general questions and comments.</p> <p>Your challenge is to immerse yourself in the topics and perspectives presented in the course. You will want to be able to comment on the discussion 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 posts should be to the point and include sufficient technical detail for others to respond. You should present your opinions, but justify them with facts and proper sources. What did you disagree with and why, or not understand?</p> <p><b>Initial/Original Post</b>  Please post what you view as the appropriate responses to the above prompts. Your initial post should be 150-300 words. Please provide response with a clear, well-formulated thesis; sentence structure, grammar, punctuation, and spelling count. Support all posts with appropriate rationale and citations from readings; appropriately document sources.</p> <p><b>Responding to Others</b>  Responses to at least two classmates' postings should be approximately 200 words and should be thoughtful, substantial, polite and more extensive than a simple "well done"</p>

	phrase or "I agree." Consider points of agreement, disagreement, assumptions, and value judgments.
Quizzes – 20%	Students will complete 2 quizzes (close book) throughout the semester.
Homework – 20%	Students will complete four homework assignments that are required to be uploaded to Blackboard. Homework assignment questions and due dates will be posted on Blackboard. Refer to the course schedule and weekly overviews for details.
Midterm Exam – 25%	Midterm Exam (take home and open book) is scheduled during Week 7.
Final Exam– 35%	Final project term presentations are scheduled for Weeks 13–14, and the final project term paper is due on May 8, 2025.
<b>Need Help?</b> Utilize the "Course Q&A" discussion forum or email your instructor directly.	

Expect to work 7-8 hours per week on assignments for this course.

Unless otherwise stated, all homework(s) are due by the end of the week in which they are assigned. For the purposes of this course, a week is defined as beginning at 12:01 am each Monday ET, and ending at 11:59 pm on the following Sunday ET. All quizzes and mid-term are due by the end of day (11:59PM) which are assigned.

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.

<b>Weeks</b>	<b>Lessons</b>	<b>Assignments</b>
<b>Week 1</b>	<b>Lesson 1:</b> An Introduction & Atmospheric Composition and Structure	<ul style="list-style-type: none"> <li>• Participate in in person course kick-off session</li> <li>• Review the Lesson 1 lecture</li> <li>• Read Chapter 1</li> <li>• Review the Lesson 1 supplemental lecture materials</li> </ul>
<b>Week 2</b>	<b>Lesson 2:</b> Solar Energy and the Seasons	<ul style="list-style-type: none"> <li>• Attend in person Session</li> <li>• Review the Lesson 2 lecture</li> <li>• Read Chapter 2</li> <li>• Review the Lesson 2 supplemental lecture materials</li> </ul>
<b>Week 3</b>	<b>Lesson 3:</b> Energy Balance & Temperature	<ul style="list-style-type: none"> <li>• Attend in person Session</li> <li>• Review the Lesson 3 lecture</li> <li>• Read Chapter 3</li> <li>• Review the Lesson 3 supplemental lecture materials</li> <li>• Complete the Lesson 3 knowledge checks</li> </ul>
<b>Week 4</b>	<b>Lesson 4:</b> Atmospheric Pressure and Wind	<ul style="list-style-type: none"> <li>• Attend in person Session</li> <li>• Review the Lesson 4 lecture</li> <li>• Read Chapter 4</li> <li>• Review the Lesson 4 supplemental lecture materials</li> <li>• Complete the Lesson 4 knowledge checks</li> <li>• Complete Quiz 1</li> </ul>
<b>Week 5</b>	<b>Lesson 5:</b> Atmospheric Moisture & Cloud and Precipitation	<ul style="list-style-type: none"> <li>• Attend in person Session</li> <li>• Review the Lesson 5 lecture</li> <li>• Read Chapter 5 and 6</li> <li>• Review the Lesson 5 supplemental lecture materials</li> <li>• Complete the Lesson 5 knowledge checks</li> </ul>

<b>Week 6</b>	<b>Lesson 6:</b> Atmospheric Circulation and Pressure Distributions	<ul style="list-style-type: none"> <li>• Attend in person Session</li> <li>• Review the Lesson 7-8 lecture</li> <li>• Read Chapters 7-8</li> <li>• Review the Lesson 7-8 supplemental lecture materials</li> <li>• Complete the Lesson 8 knowledge checks</li> </ul>
<b>Week 7</b>	<b>Lesson 7:</b> Air Masses, Fronts, & Midlatitude Cyclones	<ul style="list-style-type: none"> <li>• Attend in person Session</li> <li>• Review the Chapter 9 and 10 lecture</li> <li>• Read Chapters 9 and 10</li> <li>• Review the Lesson 8 supplemental lecture materials</li> <li>• Participate in the Weather Events discussion</li> <li>• Complete the Lesson 9 knowledge checks</li> </ul>
<b>Week 8</b>	<b>Midterm Exam</b>	<ul style="list-style-type: none"> <li>• <b>Complete the Midterm Exam (Chapter 1-10)</b></li> </ul>
<b>Week 9</b>	<b>Lesson 9:</b> Lightning, Thunders, and Tornadoes	<ul style="list-style-type: none"> <li>• Attend in person session</li> <li>• Review the Chapter 10 and 11 lecture</li> <li>• Read Chapter 10 and 11</li> <li>• Review the Lesson 11 supplemental lecture materials</li> <li>• Complete the Lesson 10 knowledge checks</li> </ul>
<b>Week 10</b>	<b>Lesson 10:</b> Tropical Storms and Hurricanes	<ul style="list-style-type: none"> <li>• Attend in person session</li> <li>• Review the Chapter 12 and 13 lecture</li> <li>• Read Chapter 12 and 13</li> <li>• Review the Lesson 10 supplemental lecture materials</li> <li>• Complete the Lesson 10 knowledge checks</li> </ul>
<b>Week 11</b>	<b>Lesson 11:</b> Weather Forecasting and Analysis	<ul style="list-style-type: none"> <li>• Attend in person session</li> <li>• Review the Chapter 13-14 lecture</li> <li>• Read Chapter 13 and 14</li> <li>• Review the Lesson 11 supplemental lecture materials</li> <li>• Complete the Lesson 11 knowledge checks</li> </ul>
<b>Week 12</b>	<b>Lesson 12:</b> Human Effects on the Atmosphere and Earth Climate	<ul style="list-style-type: none"> <li>• Attend in person session</li> <li>• Review the Chapter 15 and 16 lecture</li> <li>• Read Chapter 15 and 16</li> <li>• Review the Lesson 12 supplemental lecture materials</li> <li>• Complete the Lesson 12 knowledge checks</li> <li>• <b>Complete Quiz 2</b></li> </ul>
<b>Week 13</b>	<b>Lesson 13:</b> <b>Student Presentation (1)</b> Current and Future Climate	<ul style="list-style-type: none"> <li>• Attend in person session</li> <li>• Student Presentations (1)</li> <li>• Review the IPCC Reports</li> <li>• Review the Lesson 13 supplemental lecture materials</li> <li>• Complete the Lesson 13 knowledge checks</li> </ul>
<b>Week 14</b>	<b>Lesson 14:</b> <b>Student Presentations (2)</b>	<ul style="list-style-type: none"> <li>• Student Final Project Presentations (2)</li> <li>• Class summary</li> <li>• Course evaluations</li> </ul>
<b>Week 15</b>	<b>Lesson 15:</b>	<ul style="list-style-type: none"> <li>• Final term paper (due date: May 8<sup>th</sup>, 2025)</li> </ul>