**GEORGE MASON UNIVERSITY**
**COLLEGE OF SCIENCE**

# GGS 312 – Physical Climatology
**Spring - 2016**

**Syllabus**

## Contents

## Instructor:

**Name**: Dr. Paul R. Houser

**Email**: phouser@gmu.edu (preferred method of communication)

**Phone**: (301) 613-3782

**Office Hours:** **In Person**: Exploratory 2209; by appointment

**Virtual:** Email, Phone, Skype (prhouser), Google Hangouts; by appointment

I am generally available Monday at 9 am to Friday at 5 pm for student inquiries. During this 5 day period, I will respond to student inquiries within 24 hours.

## Course Description:

This course is designed as an introduction to the physical climate system for earth, environmental and geographic scientists. Students will learn about the 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.

## Course Prerequisites:

30 hours; and GGS 121, MATH 113, PHYS 243-244, or permission of instructor.

## Course Expectations:

1. Working online requires dedication and organization. Proper preparation is expected every week. You are expected to log in to the course on a **daily** basis and complete the assignments and activities on or before the due dates.
2. Students must check their GMU email messages on a **daily** basis for course announcements, which may include reminders, revisions, and updates.
3. It is expected that you will familiarize yourself with and adhere to the Honor Code. Student members of the George Mason University community pledge not to cheat**,** plagiarize**,** steal**,** and/or lie in matters related to academic work.
4. It is essential to communicate any questions or problems to me promptly.

## Online Learning Community:

This online course is taught via Blackboard Courses (Log into http://mymason.gmu.edu, select the Courses Tab, and the course can be found in the Course List).

This course is offered completely online, and is asynchronous (meaning there are no live sessions). Each week begins on Monday and ends on Friday. The group class project is a major part of this

course, requiring two presentations and peer evaluations. You will need to record your presentation and upload it for your peers and the instructor to evaluate.

In our online learning community, we must be respectful of one another. Please be aware that innocent remarks can be easily misconstrued. Sarcasm and humor can be easily taken out of context. When communicating, please be positive and diplomatic. I encourage you to learn more about Netiquette.

## Technology Requirements:

**The technology requirements for this online course are listed below:**

**Hardware:**

You will need access to a Windows or Macintosh computer with at least 2 GB of RAM and to a fast, reliable broadband Internet connection (e.g., cable, DSL, 4G). For optimum visibility of course material, the recommended computer monitor and laptop screen size is 13-inches or larger. You will need computer speakers or headphones to listen to recorded content. A headset microphone is recommended for recording your project presentations. For the amount of computer hard disk space required to take an online course, consider and allow for the space needed to: 1) install the required and recommended software and, 2) save your course assignments.

For hardware and software purchases, visit Patriot Computers.

**Software:**

Web browser (See Blackboard Support for supported web browsers)

Blackboard Courses (Log into http://mymason.gmu.edu, select the Courses Tab)

Blackboard Collaborate (select from the course menu)

Adobe Acrobat Reader (free download)

Flash Player (free download)

Microsoft Office (purchase)

We will use Screencast-o-matic to record our presentations. See the Computer System Check section on Blackboard in Getting Started.

**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.

## Learning Outcomes:

At the end of this course, students will be able to:

1. Recognize the extent and limitations the satellite and in-situ global climate observation network.
2. Enumerate and recognize the different areas of study within climatology.
3. Demonstrate a broad knowledge base on the fundamentals, theory and basic physical processes that control climate.
4. Differentiate nature versus human impact on climate and vice versa.
5. Apply the concept of climate variability and theories for climate change.
6. Articulate and communicate the concepts and differences between climatology and weather.
7. Recommend, design, and construct how climatic data can be used to improve life on earth.

## Required Text:

1. Global Physical Climatology (Dennis L. Hartmann, Academic Press, pp. 411) San Diego : Academic Press, c1994. (Kindle edition is available).

## Additional Readings:

1. Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007
2. Fifth Assessment Report of the Intergovernmental Panel on Climate Change, 2014

## Performance-based Assessments:

1. **On-line Discussions:**
   There are two on-line class discussions. Discussions will open on Blackboard on Sunday at the beginning of the session. Submit your initial posts no later than two days into the session. Read your classmates' posts and reply to two of them between the third and fifth day of the session. See the Discussion Rubric.

2. **Session Quizzes:**
   Session quizzes will assess student progress toward learning objectives. At the end of each Session students will be presented with random questions (selected from a larger database of questions) on Blackboard, and will have 10min to present their answers..

3. **Biweekly Homework:**
   Homework will be assigned on a bi-weekly basis to hone student skills. Assignments will be submitted in Microsoft Word or Adobe PDF format via Blackboard.

4. **Group Project Proposal**:
   Students will formulate, design, and document their climate indicator project idea in a video proposal presentation. The proposal will be presented to the class for instructor and peer review via an on-line video, via Blackboard.

5. **Project Demonstration**:
   Students will develop a prototype of a climate indicator, and present it via a recorded presentation for peer and instructor review.

## Grading:

Students will be evaluated in the following areas:

- **Discussions** (15%)
  - Discussion 1 – 5 points (1 point for each thoughtful/useful post)
  - Discussion 2 – 5 points (1 point for each thoughtful/useful post)
  - Knowledge Café – 5 points (1 point for each thoughtful/useful post)
- **Homework** (25%)
  - 5 homework assignments at 5 points each
- **Quizzes** (20%)
  - 10 quizzes at 2 points each
- **Group Project** (40%)
  - Proposal Video – 10 points
  - Peer Review Discussions – 5 points (1 point for each thoughtful/useful post)
  - Proposal revisions – 5 points
  - Project Video – 15 points
  - Peer Review Discussions – 5 points (1 point for each thoughtful/useful post)

Grades are assigned using a ten point scale:
A= 90 – 100 B = 80 – 89.9 C= 70 – 79.9 D= 60 – 69.9 F= 0 – 59.94

+/- grades are determined on the highest and lowest part of the range at the discretion of the instructor.

| Learning Module | Readings | Videos | Assessments (due date, midnight ET) |
|---|---|---|---|
| **Session1:** Week1: Jan 25-29<br>• **Course Welcome**<br>• **Climate System Intro** | • **Course Welcome in Blackboard**<br>About the Instructor and Getting Started<br>• **Hartmann**: Ch 1 | • **Orientation**<br>• **Session 1** | • *Contact instructor immediately if you are experiencing any difficulties in accessing course content*<br>• **Student Introductions:** Submit Blog Post (Jan 22)<br>• **Quiz** (Jan 29) |
| **Session2:** Week 2: Feb 1-5<br>• **Global Energy Balance** | • **Hartmann**: Ch 2 | • **Session 2** | • **Quiz** (Feb 5) |
| **Session3:** Week3: Feb 8-12<br>• **Radiation, Clouds & Climate** | • **Hartmann**: Ch 3 | • **Session 3** | • **Homework** (Feb 12)<br>• **Quiz** (Feb 12) |
| **Session4:** Week4: Feb 15-19<br>• **Surface Energy Balance** | • **Hartmann**:Ch 4 | • **Session 4**<br>• **Climate Indicators** | • **Quiz** (Feb 19)<br>• **Discussion–Climate Indicators** (Feb 19) |
| **Session 5:** Week5: Feb 22-26<br>• **Hydrologic Cycle** | • **Hartmann**:Ch 5 | • **Session 5** | • **Homework** (Feb 26)<br>• **Quiz** (Feb 26) |
| **Session6:** Week6: Feb 29-Mar 4<br>• **Project Proposal** | | • **Project videos** | • **Group Project Proposal** (recorded presentation – Mar 4)<br>• **Online peer/instructor review** (Mar 16)<br>• **Revised project proposal** (ppt – Mar 18) |
| **Session7:** Week7: Mar 14-18<br>• **Atmospheric Circulation** | • **Hartmann**: Ch 6 | • **Session 7** | • **Quiz** (Mar 18) |
| **Session8:** Week8: Mar 21-25<br>• **Ocean Circulation** | • **Hartmann**: Ch 7 | • **Session 8** | • **Homework** (Mar 25)<br>• **Quiz** (Mar 25) |
| **Session9:** Week9: Mar 28-Apr 1<br>• **Paleoclimate** | • **Hartmann**: Ch 8 | • **Session 9** | • **Quiz** (Apr 1)<br>• **Discussion–Climate Feedback** (Apr 1) |
| **Session10:** Week10: Apr 4-8<br>• **Sensitivity & Feedback** | • **Hartmann**: Ch 9 | • **Session 10** | • **Homework** (Apr 8)<br>• **Quiz** (Apr 8) |
| **Session11:** -Week 11:Apr 11-15<br>• **Climate Modeling** | • **Hartmann**: Ch 10 | • **Session 11** | • **Quiz** (Apr 15) |
| **Session12:** Week 12: Apr 18-22<br>• **Natural Climate Change** | • **Hartmann**: Ch 11 | • **Session 12** | • **Quiz** (Apr 22) |
| **Session13:** Week13: Apr 25-29<br>• **Anthropogenic Change** | • **Hartmann**: Ch 12 | • **Session 13** | • **Homework** (Apr 29)<br>• **Quiz** (Apr 29) |
| **Session14:** Week14: May 2-6<br>• **Climate Policy & Politics** | | • **Session 14** | • **Quiz** (May 6)<br>• **Project Demonstration** (Recorded Presentation – May 2)<br>• **Online peer/instructor review** (May 11) |

**Student Expectations:**

**Academic Integrity**
Students must be responsible for their own work, and students and faculty must take on the responsibility of dealing explicitly with violations. The tenet must be a foundation of our university culture. [See http://academicintegrity.gmu.edu/distance].

**Honor Code**
Students must adhere to the guidelines of the George Mason University Honor Code [See http://oai.gmu.edu/honor-code/masons-honor-code/].

**MasonLive/Email (GMU Email)**
Students are responsible for the content of university communications sent to their George Mason University email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students solely through their Mason email account. [See https://thanatos.gmu.edu/masonlive/login].

**Patriot Pass**
Once you sign up for your Patriot Pass, your passwords will be synchronized, and you will use your Patriot Pass username and password to log in to the following systems: Blackboard, University Libraries, MasonLive, myMason, Patriot Web, Virtual Computing Lab, and WEMS. [See https://thanatos.gmu.edu/passwordchange/index.jsp].

**University Policies**
Students must follow the university policies. [See http://universitypolicy.gmu.edu].

**Responsible Use of Computing**
Students must follow the university policy for Responsible Use of Computing. [See http://universitypolicy.gmu.edu/1301gen.html].

**University Calendar**
Students must follow the university policies. [See http://catalog.gmu.edu].

**Students with Disabilities**
Students with disabilities who seek accommodations in a course must be registered with the George Mason University Office of Disability Services (ODS) and inform their instructor, in writing, at the beginning of the semester [See http://ods.gmu.edu].

**Religious Holidays**
A list of religious holidays is available on the University Life Calendar page (http://ulife.gmu.edu/calendar/religious-holiday-calendar/ ). Any student whose religious observance

conflicts with a scheduled course activity must contact the Instructor at least 2 weeks in advance of the conflict date in order to make alternative arrangements.

**Students are expected to follow courteous Internet etiquette.**

## Student Services:

**University Libraries**
University Libraries provides resources for distance students. [See http://library.gmu.edu/distance].

**Writing Center**
The George Mason University Writing Center staff provides a variety of resources and services (e.g., tutoring, workshops, writing guides, handbooks) intended to support students as they work to construct and share knowledge through writing. [See http://writingcenter.gmu.edu]. You can now sign up for an Online Writing Lab (OWL) session just like you sign up for a face-to-face session in the Writing Center, which means YOU set the date and time of the appointment! Learn more about the Online Writing Lab (OWL) (found under Online Tutoring).

**Counseling and Psychological Services**
The George Mason University Counseling and Psychological Services (CAPS) staff consists of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling, workshops and outreach programs) to enhance students' personal experience and academic performance [See http://caps.gmu.edu].

**Family Educational Rights and Privacy Act (FERPA)**
The Family Educational Rights and Privacy Act of 1974 (FERPA), also known as the "Buckley Amendment," is a federal law that gives protection to student educational records and provides students with certain rights. [See http://registrar.gmu.edu/privacy].