

## Course Change Request

### New Course Proposal

Date Submitted: 05/02/18 10:34 pm

Viewing: **CLIM 610 : Introduction to the Physical Climate System**

Last edit: 05/02/18 10:34 pm

Changes proposed by: bklinger

Are you completing this form on someone else's behalf?

No

Effective Term: Spring 2019

Subject Code: CLIM - Climate Dynamics

Course Number: 610

Bundled Courses:

Equivalent Courses:

Catalog Title: Introduction to the Physical Climate System

Banner Title: Physical Climate

Will section titles vary by semester? No

Credits: 3

Schedule Type: Lecture

Hours of Lecture or Seminar per week: 3

Repeatable: May only be taken once for credit (NR)

Default Grade Mode: Graduate Regular

Recommended Prerequisite(s): BS or MS in mathematics or a physical science, or permission of instructor.

Recommended Corequisite(s):

Required Prerequisite(s) / Corequisite(s) (Updates only):

Registrar's Office Use Only - Required Prerequisite(s)/Corequisite(s):

And/Or	(	Course/Test Code	Min Grade/Score	Academic Level	)	Concurrency?

Registration Restrictions (Updates only):

Registrar's Office Use Only - Registration Restrictions:

Field(s) of Study:

Class(es):

Level(s):

Degree(s):

School(s):

Catalog Description:

Provides modern understanding of ocean, atmosphere, and land based on fundamental physical laws. Describes current climate and physical processes by which climate is maintained. Covers theoretical models of general circulation of atmosphere, including time mean and transient behavior. Describes basics of ocean circulation and interactions between ocean and atmosphere. Reviews past climate change, stratosphere and its interactions with troposphere, and role of land processes in modulating climate.

Justification:

#### In Workflow

1. AOES Chair
2. SC Curriculum Committee
3. SC Associate Dean
4. Assoc Provost-Graduate
5. Registrar-Courses
6. Banner

#### Approval Path

1. 05/07/18 1:51 pm  
Jim Kinter (ikinter):  
Approved for AOES Chair

This course is a replacement for CLIM 710 Introduction to the Physical Climate System. The number is being changed to a 600-level course in order to facilitate future cross-list with an undergraduate class.

The original justification for CLIM 710 still applies to CLIM 610: forms one part of the core subject knowledge that Climate Dynamics PhD students must have.

**Does this course cover material which crosses into another department?** No

**Learning Outcomes:**

- (1) Acquire knowledge of the basic physics principals that govern weather and climate.
- (2) Understand the overall energy balance of the earth-atmosphere-ocean system.
- (3) Be able to articulate the reasons for global atmosphere and ocean transport of energy.
- (4) Become familiar with the atmospheric structures that transport energy and moisture.
- (5) Acquire basic skills for examining current data sets of weather and climate variables.
- (6) Develop the ability to read basic journal papers on the subject, and report the main findings.

**Attach Syllabus (PDFs only)** [clim610syllabus2.pdf](#)

**Additional Attachments (PDFs only)**

**Staffing:** All Climate Dynamics faculty in the AOES Department (about 10 faculty members) are qualified to teach the course.

**Relationship to Existing Programs:** Required course for Climate Dynamics PhD and for proposed Climate Science MS.

**Relationship to Existing Courses:** This is a renumbering of current course CLIM 610 Introduction to the Physical Climate System.

**Additional Comments:**

**Reviewer Comments**

Key: 15914

## **Course Syllabus: CLIM 610 – Introduction to the Physical Climate System**

### **Catalog Description**

Provides modern understanding of ocean, atmosphere, and land based on fundamental physical laws. Describes current climate and physical processes by which climate is maintained. Covers theoretical models of general circulation of atmosphere, including time mean and transient behavior. Describes basics of ocean circulation and interactions between ocean and atmosphere. Reviews past climate change, stratosphere and its interactions with troposphere, and role of land processes in modulating climate. *May not be repeated for credit.*

**Recommended Prerequisite:** BS or MS in mathematics or a physical science, or permission of instructor.

### **Course Topics**

Topic 1: Global Energy Balance

Topic 2: Black-Body Radiation

Topic 3: Radiation and Climate – Part I

Topic 4: Radiation and Climate – Part II

Topic 4a: Long-Wave Radiation Model

Topic 5: Thermodynamics – Part I

Topic 6: Thermodynamics – Part II

Topic 7: General Circulation – Part I

Topic 8: General Circulation – Part II

Topic 9: Baroclinic Transients and heat/moisture transport

Topic 10 The Hydrological Cycle

Topic 11: Paleoclimate: Observations, Theory and Modeling

Topic 12: Oceans and Climate

### **Course Goals and Student Learning Outcomes**

- (1) Acquire knowledge of the basic physics principals that govern weather and climate.
- (2) Understand the overall energy balance of the earth-atmosphere-ocean system.
- (3) Be able to articulate the reasons for global atmosphere and ocean transport of energy.
- (4) Become familiar with the atmospheric structures that transport energy and moisture.
- (5) Acquire basic skills for examining current data sets of weather and climate variables.
- (6) Develop the ability to read basic journal papers on the subject, and report the main findings.

### **Student Work Components**

Mid-Term Exam = 20% percent of grade

Final Exam = 20% percent of grade

Four Homework Sets = 30% percent of grade

Journal Paper Presentations = 20% of grade

Class Participation = 10% of grade

## Some Important Mason Policies

Updated Spring 2016

### **Electronic Communications**

Students must use their MasonLive email account to receive important University information, including communications related to this class.

### **Disability Accommodations**

If you have a documented learning disability or other condition that may affect academic performance you should:

- 1) make sure this documentation is on file with **Office of Disability Services** to determine the accommodations you need; and 2) talk with me to discuss your accommodation needs.

Office of Disability Services: <http://ods.gmu.edu>

### **Academic Integrity**

The integrity of the University community is affected by the individual choices made by each of us. Mason has an Honor Code with clear guidelines regarding academic integrity.

Three fundamental and rather simple principles to follow at all times are that:

1. all work submitted be your own;
2. when using the work or ideas of others, including fellow students, give full credit through accurate citations; and
3. if you are uncertain about the ground rules on a particular assignment, ask for clarification.

No grade is important enough to justify academic misconduct. Plagiarism means using the exact words, opinions, or factual information from another person without giving the person credit. Writers give credit through accepted documentation styles, such as parenthetical citation, footnotes, or endnotes. Paraphrased material must also be cited, using MLA or APA format. A simple listing of books or articles is not sufficient. Plagiarism is the equivalent of intellectual robbery and cannot be tolerated in the academic setting. If you have any doubts about what constitutes plagiarism, please see me.

Office of Academic Integrity: <http://oai.gmu.edu/>

Honor Code: <http://oai.gmu.edu/the-mason-honor-code-2/>

## **Mason Diversity Statement**

George Mason University promotes a living and learning environment for outstanding growth and productivity among its students, faculty and staff. Through its curriculum, programs, policies, procedures, services and resources, Mason strives to maintain a quality environment for work, study and personal growth.

An emphasis upon diversity and inclusion throughout the campus community is essential to achieve these goals. Diversity is broadly defined to include such characteristics as, but not limited to, race, ethnicity, gender, religion, age, disability, and sexual orientation. Diversity also entails different viewpoints, philosophies, and perspectives. Attention to these aspects of diversity will help promote a culture of inclusion and belonging, and an environment where diverse opinions, backgrounds and practices have the opportunity to be voiced, heard and respected.

The reflection of Mason's commitment to diversity and inclusion goes beyond policies and procedures to focus on behavior at the individual, group and organizational level. The implementation of this commitment to diversity and inclusion is found in all settings, including individual work units and groups, student organizations and groups, and classroom settings; it is also found with the delivery of services and activities, including, but not limited to, curriculum, teaching, events, advising, research, service, and community outreach.

Acknowledging that the attainment of diversity and inclusion are dynamic and continuous processes, and that the larger societal setting has an evolving socio-cultural understanding of diversity and inclusion, Mason seeks to continuously improve its environment. To this end, the University promotes continuous monitoring and self-assessment regarding diversity. The aim is to incorporate diversity and inclusion within the philosophies and actions of the individual, group and organization, and to make improvements as needed.