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# GEO 488.01: Snow, Ice and Climate

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## **Snow, Ice and Climate (GEOS 488), 3 credits**

Tuesdays and Thursdays, 11:00-12:15, SC304

### **Instructor information**

Joel Harper

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### **Moodle**

*This Course has a Moodle Site. Information and assignments will be posted there with frequent updates and homework assignments, so check the site often.*

### **Emailing**

I may occasionally conduct email correspondence with class members and I will use official UM email addresses. All email sent to me must originate from your official UM email address (email originating from non-UM addresses will not be read or responded to). Sorry, but this is the law I am required to follow.

### **Motivation for this course**

Frozen water is a main component of the Earth system: glacier ice permanently covers 10% of Earth's land surface, growing to 30% during ice ages; sea ice covers about 15% of oceans during part of the year; and, seasonal snow blankets about 30% of Earth's total land surface each winter season. Snow and ice strongly govern Earth's climate, water resources, and global sea level. The processes governing changes in snow and ice are therefore critical to understanding Earth's changing climate.

### **Course objective**

The primary goal of this course is to provide students with a broad understanding of the cryosphere within the context of changing climate. Topics are organized around three societally important scientific problems: 1) glacier and ice sheet dynamics and sea level rise; 2) ice core constraints on climate change; 3) seasonal snow in a warming climate. Participants in this course will improve their ability to: comprehend evolving issues related to snow, ice and cold regions processes; make inferences based on scientific observations; and, interpret scientific data presented in graphs and figures.

### **Course text**

No formal text required. Reading assignments will be distributed as the course progresses via Moodle.

### **Prerequisites**

At least Math 121, preferably Math 150 or above: students must have the ability to solve algebraic and other pre-calculus level math problems. Familiarity and comfort with computers (i.e., Excel) will be necessary. Students must have an ability to read, comprehend, discuss, and present scientific material at a level commensurate with an upper division science course.

### **Format**

Classes will consist of lectures and discussions related to the assigned reading. A major component of this course is doing assigned reading and preparing for class discussions. Lectures will generally not cover the same material as the reading. Exams will cover material from both the lectures and assigned reading.

### **Evaluation criteria for letter grade**

- Two exams (midterm and a final, equally weighted): 35%
- One research proposal and presentation: 15%
- Reading assignments and in-class participation and: 10%
- Homework problem sets: 40%

### **Other Policies**

- >All homework assignments are due at the start of class on designated due date.
- >Because this course has a relatively large enrollment, and because we will attempt to grade and return homework assignments rapidly, late work cannot be accepted.
- >The format of this course requires class attendance. Substantial course content and information transfer will only occur in class. Because of the relatively large enrollment, we cannot accommodate individual make-ups for missed classes. This is not a good course for you if it is not possible for you to always attend class sessions.

### **Schedule**

A tentative schedule has been posted on the Moodle site. Note that this schedule is subject to change as the course progresses. The course topics and dates of homework assignments in particular may be adjusted. However the following dates will not be changed.

- Midterm Exam: *Thursday February 28*
- Final Exam: *Thursday May 2, 8:00-10:00 AM*

*All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at: [http://life.umd.edu/vpsa/student\\_conduct.php](http://life.umd.edu/vpsa/student_conduct.php)*