

## ***ESM 237 Climate Change Impacts on Hydrology and Ecology***

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**Class Schedule:** Spring  
Monday and Wednesday, 11:00-12:15  
Rm 1424 Bren Hall

### **Overview**

Global climate change may dramatically alter water resources and the ecosystems that depend upon them. Through a series of selected readings, this course will provide an overview of science-based research directed towards understanding and quantifying current and projected future hydro-ecological impacts of a changing climate. A key practical focus of this course will be synthesizing and summarizing science based information to support environmental management. Assignments and discussion will center on developing the skills needed to extract and communicate information from complex science-based research to environmental managers.

The first half of the course will focus on hydrology. We will look at how current climate trends impact the hydrologic cycle; and consider which hydrologic processes are most sensitive and why. We will also examine the techniques that scientists used to quantify these impacts and to disentangle the multiple causes of variability in surface and subsurface water resources. We will consider how vulnerability changes across scale and in different locations around the globe and address some of the key issues in making predictions and ultimately planning for continuing climate change impacts on water resources. In the second half of the course we will begin to examine ecosystem responses to climate change and in particular ecosystem responses that are linked with hydrology. We will examine how drought and other climate-related stresses alter both ecosystem structure and function. Again our analysis will look at multiple scales and locations and survey the techniques that are used to understand how ecosystems are changing. Through this course students will learn some basic concepts in science-based climate change impact analysis, the uncertainties involved and how to synthesize this information so that it supports environmental management. These concepts are also applicable in other types of environmental impact analysis where eco-hydrologic responses to other disturbances and human induced environmental change are assessed.

## Grading

Written commentary on readings (6)	50
Data analysis assignment	25
Class presentation of related climate change impact paper	15
Class participation	10

Readings will be assigned for each class and will be available on Gaucho Space. You should come prepared to discuss the reading – details on how class participation will be assessed are provided (Class Participation Expectations on Gaucho Space). In addition, for most weeks, I will ask you to write a one page commentary on an issue or question related to one of the assigned readings for the following week. I will provide specific details on the issue or question each week. The written commentary will be due 24hrs prior to the class in which we are scheduled to discuss the reading (usually this will be Tuesday at 10am). Submission of the commentaries at this time will allow me to review them prior to class and we will use the commentaries as a basis for discussion – consequently late commentaries will not be accepted. A hardcopy version of the commentary should be placed in my mail box (2<sup>nd</sup> floor Bren) AND a digital version uploaded on GauchoSpace.

The data analysis assignment will give you an opportunity to apply some of the techniques for estimation/examining climate change impacts that we will be discussing. Details on the data analysis assignment will be provided later in the course. You will also prepare short presentation on published peer-reviewed research paper related to one of the topics that we will discuss in the course. You will work in groups of two or three for this assignment. Each group will summarize the selected research paper and relate the conclusions, issues and techniques in the paper to those discussed in the course. The analysis of the paper will also consider implications for water resource or ecosystem management. I will provide additional details on this assignment later in class.

