UNIVERSITY OF NEVADA, Department of Geography

Climate Change and Its Environmental Impacts

(GEOG / ATMS 121, 4 credits)

FALL 2015 Syllabus

Instructor: Prof. Franco Biondi, PhD

Lecture Hours and Location: Mon and Wed, 4:00-5:15 pm in SLH 1.

Catalog Description: Past, present and likely future climate. Impacts on the landscape, especially water resources, species distributions, and wildfires. Laboratory experiences on climate data and models. (Core Natural Sciences course)

Prerequisites: Completion of Core Math requirement OR SAT of 610 OR ACT of 27 OR corequisite. Corequisites: MATH 127 R or higher.

Course Objectives

Core Objective 04: Physical and Natural Phenomena

Students will be able to explain the processes by which the natural and physical worlds are investigated, articulate basic principles used to explain natural phenomena, and apply the scientific process to real problems using observational and/or experimental methods.

Student Learning Outcomes

1) Students will be able to identify key factors of the climate system, its patterns, and its processes.
2) Students will be able to understand and summarize the environmental impacts of regional and global climate.
3) Students will be able to analyze data and read scientific papers as part of their laboratory exercises.

Course Description

Climate change is becoming increasingly important in people’s lives. Understanding the scientific basis of climate change and its environmental impacts should be part of every student’s educational experience. We will review and discuss the mechanisms behind past, present, and likely future climate change, together with its influences on the landscape, with emphasis on water resources, species distributions, and wildfire regime. Information relevant to Nevada, and to ongoing research in the Great Basin region, will be highlighted. The textbook is an excellent source of background information, and additional class material will be presented during lectures and made available through the WebCampus online site.

Students will be encouraged to develop a strong conceptual understanding of the climate system, with emphasis on the following topics:

1. History and development of climate science (Week 1)
2. Greenhouse gases over time and space (Week 2-3)
3. Energy and radiation budgets  (Week 4)
4. Atmospheric and oceanic circulation  (Week 5-6)
5. Climate data and models  (Week 7)
6. Forcing factors: greenhouse gases, aerosols, solar variability, and volcanic eruptions  (Week 8-9)
7. ENSO and other decadal modes of climate  (Week 10)
8. Proxy records of climate spanning the Holocene  (Week 11-12)
9. Interactions between drought, water resources, and wildfires  (Week 13)
10. Climate impacts on ecosystems: biodiversity and species distributions.  (Week 14-15)

Laboratory experiences will focus on CO₂ fluxes and sinks, climate data analysis, and global circulation modeling. Besides hands-on activities and exercises, there will be discussion sessions on peer-reviewed scientific articles. While this course is part of the core natural sciences curriculum (group A) at UNR, it is also part of an existing climate curriculum in Geography, which includes GEOG 221 (Strange and Dangerous Weather), GEOG 321 (Understanding Climate), GEOG 421/621 (Climatology), and GEOG 721 (Advanced Climatology).

Course Materials
- Additional material during the semester will be posted on the class WebCampus site (see details at the end of this syllabus).

Office Hours: Fri, 11-noon in MS 225 or by appointment.
Office: 225 Mackay Science Hall  Phone: 784-6921  Email: fbiondi@unr.edu

Grading
By enrolling in this class, a student agrees to become familiar with the contents of the syllabus and requirements of the course, including the laboratory requirements, the grading system, dates for tests, frequency of quizzes, due dates, and consequences of missing tests or being late for an assignment.

Students will be graded according to their score on two Exams, five Quizzes, four Laboratory exercises, and class Participation. All tests count, so make sure you take all of them. Both quizzes and exams will be open-book, open-notes, since they are intended as a check of your understanding, but keep in mind that advance knowledge of the class materials is usually needed to complete tests within the required time limit.

- **Exams** are a combination of multiple-choice, fill-in, true/false, and short essay/exercise questions. There is one midterm and one final exam, which will cover class materials presented after the midterm exam.
- **Quizzes** include 5 questions, and should take no longer than 5-10 minutes. Each Quiz covers material presented since the previous test (either midterm Exam or Quiz). If you miss a Quiz without a valid justification, you will receive a 0, which will count towards your final grade.
- **Laboratory** grades will be based on written assignments, plus attendance and participation. Missing a lab session without a valid justification (see Rules of Conduct below) means losing all points for that lab. Save all laboratory materials to document your attendance.
• Participation: this involves attending lectures and labs in a professional way. Points will be taken out for breaking the Rules of Conduct (see below).
• There is no extra credit work. There is ample opportunity to demonstrate your desire for a good grade through the regular assignments.

**Grading breakdown**

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<tr>
<td>Exams (2 x 50)</td>
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<td>Quizzes (5 x 5)</td>
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<td>Laboratory experiences (4 x 25)</td>
<td>100</td>
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<tr>
<td>Participation (25)</td>
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<td><strong>TOTAL</strong></td>
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A mid-semester grade summary will be provided to each student. Final letter grades may have a plus or minus according to the following scheme:
A = 93% or higher;  A- = 90-92.9%;  B+ = 87-89.9%;  B = 83-86.9%;  B- = 80-82.9%;  C+ = 77-79.9%;  C = 73-76.9%;  C- = 70-72.9%;  D+ = 67-69.9%;  D = 63-66.9%;  D- = 60-62.9%;  F = < 60 %.

While this grading scale cannot be changed, the instructor reserves the right to increase letter grades based on class performance.

**How to succeed in this class:**
- ✔️ Read the assigned sections of the textbook both before and after class
- ✔️ Ask questions
- ✔️ Be aware of test dates, and prepare in advance
- ✔️ Keep up with the material
- ✔️ Maintain a professional demeanor and attitude
- ✔️ COME TO LECTURES AND LABS!

**Rules of Conduct (the tough stuff):**
- **Attendance.** Attendance is required to both lectures and labs. Keep in mind that your grade will improve if you come to class and take notes. Each lecture builds on the previous one, therefore it is important to keep up with the material. Also, talking with other students or reading materials not related to the course during a lecture or a lab disturbs the entire class, and will not be tolerated. If you need to know something, ask your instructor or teaching assistant.
- **Tardiness.** BE ON TIME. Coming late or leaving early is a sign of disrespect to everybody else in the classroom. If you have a schedule conflict, please come and talk to your instructor or teaching assistant – maybe we can work out a solution.
- **Digital Devices.** Digital devices are only admitted in class for very specific purposes. Therefore, you cannot (1) use a cell phone, (2) tap on your laptop (unless the instructor allows for that), (3) listen to music (remove those earpieces before entering!).
- **Exams and Quizzes.** It is YOUR responsibility to be on time for tests, and to contact your instructors well before the test if you absolutely cannot attend. In most cases, it is possible
to take a test before its scheduled date, but it is not possible to make it up afterwards. Students who arrive after the first person has completed the test will automatically receive a zero on that exam or quiz. Make-up examinations will be given only with an MD’s note requesting permission in the case of illness, or a death certificate in the case of a family death. Medical excuses are invalid if turned in after the exam/quiz has been graded.

- **Test tips.** When asked to explain or discuss in the homework, quizzes, and examinations, you should provide an answer in the form of sentences and paragraphs that detail what you are thinking. A list is not an explanation or discussion. Scientific writing needs to be very precise. Your instructors are not mind readers and cannot assume what you meant but did not express. If you are not doing well in class, contact your instructor as soon as possible. We will do everything possible to help you improve your grade, but waiting until mid-semester or later is typically too late.

- **Late Assignments.** Assignments are due when stated — late projects will be marked down at a rate of 10% of the grade per day. Unless otherwise noted, assignments are due by the beginning of class. Given the nature of the course and examination materials, there are no scheduled make-up exams.

**Class web site**
The course web site will be used to post updates to the calendar and additional class materials, and is located on UNR’s WebCampus system. In order to log onto the class web site you will need to:
1. Go to [https://wcl.unr.edu/](https://wcl.unr.edu/)
2. Enter your **Username** and **Password** ***Same as your UNR NetID and Password*** (Your UNR NetID and Password need to be activated before trying to access the class web site).

Please navigate to the course link and web page inside your WebCampus account, and remember to hit the "Reload" button of your web browser to view the most recent changes. **Also, do NOT send me e-mail or post messages on the class web site: they will not be read. If you need to get in touch with me, please use the contact information given in this syllabus.**

**Statement on Academic Dishonesty:** Cheating, plagiarism or otherwise obtaining grades under false pretenses constitute academic dishonesty according to the code of this university. Academic dishonesty will not be tolerated and penalties can include canceling a student's enrollment without a grade or giving an F for the assignment or for the course. For more details, see the University of Nevada, Reno General Catalog.

**Statement of Disability Services:** Any student with a disability needing academic adjustments or accommodations is requested to speak with me or the Disability Resource Center (Thompson Building, Suite 101) as soon as possible to arrange for appropriate accommodations.

**Statement for Academic Success Services:** Your student fees cover usage of the Math Center (784-443 or www.unr.edu/mathcenter/), Tutoring Center (784-6801 or www.unr.edu/tutoring-center), and University Writing Center (784-6030 or http://www.unr.edu/writing-center). These centers support your classroom learning; it is your responsibility to take advantage of their services. Keep in mind that seeking help outside of class is the sign of a responsible and successful student.

**Statement on Audio and Video Recording:** Surreptitious or covert video-taping of class or unauthorized audio recording of class is prohibited by law and by Board of Regents policy. This class may be videotaped or audio recorded only with the written permission of the instructor. In
order to accommodate students with disabilities, some students may have been given permission
to record class lectures and discussions. Therefore, students should understand that their
comments during class may be recorded.

Assessment Plan

*How the course satisfies CO4:*

This course explores the methods in which the climate system is investigated, including its past,
present, and future states. Students will be challenged to learn about the environmental impacts of
regional and global climate, and will apply the scientific process to real problems using
observational data on precipitation and temperature, carbon dioxide concentration in the
atmosphere, and global climate models.

*How SLOs related to CO4 will be assessed:*

CO4 will be assessed by rubrics applied to laboratory assignments completed during the semester.
A random sample of 1 out of 6 students will be chosen for evaluation. The rubrics applied to the
laboratory reports will assess whether students successfully identify, analyze, and interpret the
features of regional and global climate and of greenhouse gases in space and time. The results will
be reported to the Department Chairs, the Dean of the College, and the Core Board.