

Office of Undergraduate Education

**TCORE 112C - Introduction to Science**

**Global Climate Change**

**Winter 2014**

CLASS MEETS: TTH 8:00-10:05 SCI 105

PROFESSOR: Cheryl Greengrove

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PEER ADVISORS (Cohort 3): Ray Luu [luur2010@uw.edu](mailto:luur2010@uw.edu); Phanat Ny [phanatny@uw.edu](mailto:phanatny@uw.edu);

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LIBRARIAN (Science): Carole Svensson, [svensson@uw.edu](mailto:svensson@uw.edu), 692-4447

REQUIRED MATERIALS:

Textbooks:

* Anderson, B.T. and A. Strahler. 2008. Visualizing Weather and Climate. Hoboken, NJ: Wiley & Sons.
* Henson, R. 2011. The Rough Guide to Climate Change – 3rd Edition. London: Penguin.
* Craven, G. 2009. What’s the Worst That Could Happen? A Rational Response to Climate Change. New York: Perigee

Other:

* Scientific Calculator
* UW email & computer account & access to Canvas course website.
* Listserve: Sign up on our Environmental Science listserve to get information on jobs, internships, volunteer opportunities, and social hours for Project Earth. https://mailman1.u.washington.edu/mailman/listinfo/environmental\_science

COURSE DESCRIPTION:

What is climate and why do we care? The main goal of this course is to help us understand the processes that govern climate, what causes it to change, and why it matters. We will engage in the climate debate from a scientific perspective by reading texts that focus on various aspects of climate change-past, present, and future. This course will use hands-on activities, research, lectures, movies, reading, writing, and peer review to advance our understanding of global climate change.

In this course, we will operate as a research team to investigate weather and climate from around the world. We will DO science and engage in scientific disciplinary discourse through participating in hands-on activities, data collection, research, lectures, reading, writing, and presentations to advance our knowledge and understanding of global climate change.

WHAT IS THE CORE?

The Core program consists of a coordinated series of courses that represent the various disciplines in the university. This course, along with the others in your cohort, fulfills one of the university’s general education requirements in each of the areas of knowledge plus composition. The courses are designed to both support and challenge you to develop the critical thinking, writing, research, and analytical skills you’ll need at UWT while introducing you to relevant topics in the social sciences, humanities, and sciences.

CORE LEARNING OBJECTIVES

In this course, you will learn to:

*Communication/Self Expression*

* **argumentation**: formulate an original thesis-driven argument and sustain it in both written and verbal communication
* **analysis**: identify, analyze, and summarize/represent the key elements of a text.
* **disciplinary awareness**: enter/place themselves into an existing dialogue (intellectual, political, etc.).
* **expression of ideas**: express ideas clearly in writing and speaking in order to synthesize and evaluate information before presenting it.

*Global Perspective- Diversity-Civic Engagement*

* **disciplinary perspective**: understand events and processes as ‘disciplinarily’ situated.
* **global perspective**: interact with concepts, ideas, and processes related to the interdependences between personal, local, and global relationships.
* **diversity**: think outside of cultural norms and values, including their own perspectives, to critically engage the larger world.
* **civic engagement**: interact with concepts, ideas, and processes related to civic engagement.

*Inquiry and Critical Thinking*

* **inquiry & problem solving**: collect, evaluate, and analyze information and resources to solve problems or answer questions.
* **research methods & application**: approach complex issues by taking a large question and breaking it down into manageable pieces.
* **synthesis & context**: make meaningful connections among assignments and readings in order to develop a sense of the ‘big picture.’

*Quantitative Literacy*

* Use quantitative evidence (including statistics, graphs, etc.) in support of an argument.
* Analyze and evaluate a chart or graph and interpret it (through discussion, a written assignment, etc.)
* Find quantitative data to support an argument.

SPECIFIC GOALS OF THIS COURSE:

At the conclusion of this course you should be able to meet these introductory science and writing learning outcome goals:

1) Reading, interpreting, and evaluating scientific material

* Understanding sources of scientific information
* How to read a paper
* Knowing the parts of a scientific paper
* Construction of abstracts

2) Research, finding & filtering information

* Using information databases—learning to critically evaluate sources, differentiate and filter information
* Using library and web resources
* Knowing how and where to search for reliable scientific information

3) Data manipulation and analysis—quantitative data collection (using graphs)

* Data collection
* Unit conversions
* Construction and interpretation of graphs and maps
* Using Excel to manipulate, analyze, and present data

4) Writing and presenting scientific material

* Correct use of citations when providing evidence
* Presenting scientific data for publication
* Writing a scientific paper
* Presenting scientific research orally in a poster session as a research team

5) Synthesizing information

* Interpreting data in the context of previous research
* Discussing the significance and contribution of a research study

CLASS REQUIREMENTS AND EXPECTATIONS:

* ATTENDANCE: We will be doing lots of in class assignments that will serve as part of your participation grade. You are expected to attend all classes as indicated on the schedule. Please inform me via email if you are unable to attend class.
* CLASSROOM COMMUNITY:Consider this class as scientific research community where everyone’s ideas and opinions are worthy of attention and consideration, regardless of whether you agree with them. I encourage you to use inclusive language and non-sexist language whenever possible. Respect for diversity of all kinds—in terms of race, ethnicity, age, sex and gender, sexual orientation, ability/disability, political and ideological belief, and so on -- is vital to creating a respectful, safe, and STIMULATING intellectual environment. These diversities and differences can be our most valuable asset as a class. Please respect the other members of this class so we can all be open and honest about who we are and what we think and believe. Sleeping in class, side-conversations, arriving late and leaving early distracts others. **Please be courteous of others.**
* TECHNOLOGY IN THE CLASSROOM: Electronic devices (including, but not limited to, cell phones, pagers, laptops, and personal digital assistants) may only be used in the classroom with the permission of the instructor. Activities that are non-relevant to the course, such as checking/sending email, playing games, and surfing the web, are considered disruptive activities when class is in session. **Laptops down and cell phones off unless they are being used for class work.**
* UWT EMAIL POLICY <http://www.tacoma.washington.edu/policies_procedures/E-mail_Policy.pdf>
* ASSIGNMENTS: If you turn in an assignment late you will be deducted 10% for each 24 hours that it is late. Late hand-ins will only be accepted for full credit under exceptional circumstances such as illness (with doctor’s note).
* REQUIRED READINGS: Readings from the text are assigned for each class and are listed the schedule of this syllabus. It is your responsibility to study readings prior to class and to ensure that you will be fully prepared to participate in class.

* DISTRIBUTION OF STUDENT TESTS AND PAPERS: I will return tests and papers individually in class whenever I can. However, this is not always possible, especially at the end of the quarter. Papers will only be held until the end of next quarter, so please make an appointment to pick them up before then. Papers and grades cannot be emailed to students or given to any other representative due to privacy laws. If you would like your work to be sent to you after the end of the quarter you must provide us with a stamped, addressed envelope (10” x 13”). Be sure to provide enough postage for mailing your work.

* HONOR CODE/ACADEMIC STANDARDS/PLAGIARISM: All student work must be free of plagiarism. Plagiarism is defined in the University catalog and in the Student Handbook. Consult your professor if you have any questions. **Students found to be cheating, copying or plagiarizing will be subject to the University of Washington disciplinary code.** A major part of your experience in the class will be reading, synthesizing, and using the knowledge and ideas of others. It is the responsibility of the faculty to help you in this process and to be certain you learn to credit the work of others upon which you draw. To plagiarize is to appropriate and to pass off, as one's own ideas, writing or works of another. Plagiarism is no less of a misconduct violation than vandalism or assault. Ignorance of proper documentation procedures is the usual cause of plagiarism. This ignorance does not excuse the act. Students are responsible for learning how and when to document and attribute resources used in preparing a written or oral presentation. For more information, please refer to the “Student Academic Responsibility” document prepared by the Committee on Academic Conduct in the College of Arts and Sciences, UW Seattle: <http://depts.washington.edu/grading/pdf/AcademicResponsibility.pdf>

ASSIGNMENTS:

1. The **exercises** are meant to provide exposure to the tools necessary to better understand and apply the information and concepts developed in the lecture and reading. See schedule for when these are due.
2. **In class mini-assignments/participation** is crucial to our work as a research team in developing our understanding of Global Climate Change.
3. Each person will be responsible for investigating one city/place’s weather and climate for their **scientific paper**. Details of this assignment are attached. Due dates are on the class schedule.
4. **Group presentation –** small groups of about 2-3 students each will orally present the weather and climate results for their region to the class. Times of these presentations are included in the class schedule.
5. **Group Poster –** the same regional weather and climate teams will assemble and present a poster to the campus community at the end of quarter student showcase. See class schedule for date and time.
6. The **mid-term** will cover material in lectures, guest lectures, assigned readings, exercises, activities, videos and field trips up to that point in the course. The exam will consist of a combination of short answer, exercise and essay questions. See schedule for date of exam. No makeup exams will be given without a written doctor’s excuse.
7. **Comprehensive final exam** covering material from the entire course. The exam will consist of a combination of short answer, exercise and essay questions. See schedule for date of final exam. No makeup exams will be given without a written doctor’s excuse.

GRADES:

Your final grade for the course will be calculated according to the breakdown listed below. A UWT grade schedule is attached for your reference. Details for all assignments will be posted on the course website and will be dealt with in detail during class time. UWT grading policies apply <http://www.tacoma.uw.edu/enrollment-services/grading-policies>

Paper 25%

Group Oral Presentation 10%

Group Poster 15%

Exams 25%

Exercises 15%

In class mini-assignments/participation 10%

100%

CAMPUS RESOURCES & SUPPORT SERVICES:

*Teaching and Learning Center*  
The TLC provides a wide variety of instructional resources and support for teaching and learning at UW Tacoma. Teaching and learning are ongoing processes that take practice, commitment, and time. We are here to assist you in achieving your goals and provide math/quantitative, writing, science, and other tutoring services. <http://www.tacoma.washington.edu/tlc/>

*Library*

The UWT Library provides resources and services to support students at all levels of expertise. We guide students through the research process, helping them learn how to develop effective research strategies and find and evaluate appropriate resources. For more information about the Library and its services, see: <http://www.tacoma.washington.edu/library/>

*Academic Technologies & Computer Services*If you lack technology skills or access to computers and technology, you can find support and equipment in the computer labs in CP 005 and WG 108. <http://www.tacoma.uw.edu/it>

*Academic Advising*

Academic advising is located in GWP 102. Phone: 253-692-4857 <http://www.tacoma.uw.edu/advising>

*Disability Support Services*

The University of Washington Tacoma is committed to making physical facilities and instructional programs more accessible to students with disabilities. Disability Support Services (DSS) functions as the focal point for coordination of services for students with disabilities. In compliance with Title II or the Americans with Disabilities Act, any enrolled student at UW Tacoma who has an appropriately documented physical, emotional, or mental disability that substantially limits one or more major life activities [including walking, seeing, hearing, speaking, breathing, learning and working], is eligible for services from DSS. To schedule an appointment with a counselor, please call (253) 692-4522. Consult the web page below for a complete description of services. <http://www.tacoma.washington.edu/studentaffairs/SHW/dss_about.cfm>

*Counseling Center*

The Counseling Center offers short-term, problem-focused counseling to UW Tacoma students who may feel overwhelmed by the responsibilities of college, work, family, and relationships. Counselors are available to help students cope with stresses and personal issues that may interfere with their ability to perform in school. The service is provided confidentially and without additional charge to currently enrolled undergraduate and graduate students. To schedule an appointment, please call 692-4522 or stop by the Student Counseling Center (SCC), located in MAT 354. <http://www.tacoma.washington.edu/studentaffairs/SHW/scc_about.cfm/>

*Student Health Services*

Student Health Services (SHS) is committed to providing compassionate, convenient, and affordable health care for University of Washington Tacoma students, from care for illness and minor injury to women’s health and preventative medicine, including vaccination services. Insurance is not required. Funded by UW Tacoma student fees, office visits are provided free of charge. Treatment plans may incur costs, such as medications, labs, or vaccines, most of which are offered at discounted rates. For more information, please visit www.tacoma.uw.edu/shs or email at uwtshs@uw.edu. If you have questions or would like to schedule an appointment, please call (253) 692-5811 or stop by SHS at the Laborer’s Hall on Market Street.

*Safety Escort Service*

For your safety, UW Tacoma encourages students, faculty, staff and visitors to use the Safety Escort Program. Campus Safety Officers are available to walk you to your car or other campus destinations during the following hours: Monday - Thursday — 6 a.m. to 11 p.m.; Friday — 6 a.m. to 10 p.m. The service is free of charge. During busy periods, the Campus Safety Officer may ask you to meet in a common location as to facilitate escorting multiple people. Dial 253-692-4416 to request a Safety Escort.

*Campus Safety Information*

<http://www.tacoma.uw.edu/administrative-services/campus-safety>

*In case of a fire alarm*

Take your valuables and leave the building. Plan to return to class once the alarm has stopped. Do not return until you have received an all clear from somebody "official," the web or email.

*In case of an earthquake*

DROP, COVER, and HOLD. Once the shaking stops, take your valuables and leave the building. Do not plan to return for the rest of the day. Do not return to the building until you have received an all clear from somebody "official," the web‚ or email.

*Inclement Weather*

In the event of inclement weather please note the following steps for determining whether the campus is open, if your class will be held as scheduled, and/or the handling of assignments:

1. Call (253) 383-INFO. This number will inform you whether the campus has been closed.

2. Call your professor's office number. This number will inform you on whether the class will be held or not, and/or the status of pending assignments. Individual Professors will determine how final exams, papers, etc. will be submitted. Visit the IAS Faculty Directory to find your professor's contact information.

3. Call the IAS Program Office: (253) 692-4450. This number is to be used only after trying the first two numbers, if you are unable to ascertain the status of whether your class(es) will be held, and/or have a part-time instructor who does not have an office phone or other contact number.

NOTE: It is important to remember that safety should always be considered when deciding whether it is advisable to attend classes during periods of inclement weather.

**TENTATIVE SCHEDULE – See regularly updated separate document**

This schedule provides you with a general sense of what we will be doing in this course. Because this class is a living and changing organism, all schedules and the syllabus are subject to change. You must attend class regularly in order to stay informed.

Viz = Visualizing Weather & Climate

Ruf = Rough Guide to Climate Change

WWH = What’s the Worst that can Happen

OLR = Online Reading

**City Climate Scientific Research Paper in your Region** –

The purpose of this paper is to look at the current weather (2013) in your city and compare it with the 30 year climatic average to see if there are any discernable changes in atmospheric parameters or patterns between the two timeseries (2013 and climate average). In order to evaluate these data and put them in context you need to describe the conditions that affect weather and climate in your city/region (such as geography, latitude, elevation, proximity to mountains, proximity to water). We are specifically looking at temperature and precipitation data, but you may have found other papers that elude to weather and climate changes in your region over recent time. The reason we are doing this is to see if there is evidence of global climate change occurring in your city/region. As a class (through presentations and posters), we can then combine all these results and see if there is evidence across the globe that indicates global climate change is occurring and if so where.

You will do an analysis of weather, climate and possible impacts of global climate change at a city/place of your choice. You will be paired with another student to present, compare and contrast your meteorological and climatological data between your two locations. Each team will present their data orally during the quarter and as a poster at the end of quarter showcase. Formats for each of these presentations will be discussed by the instructor and provided on the course webpage.

1. Find the maximum, minimum and average temperature (Degrees C) and total precipitation (cm) for each month of 2013 at this location and plot the results on two separate graphs in a format specified by the instructor with the aid of an excel or comparable spreadsheet program.

1. Plot the same type of graphs as 1) for the climatic average of temperature and precipitation monthly over the course of a year at this site. Make sure you define what period of time this climatological data covers.

Your paper should follow the format below, be stapled together with no fancy covers, and typed double-spaced unless otherwise specified. Make sure to carefully document your paper as to what reference your information is taken from. Use the author date type scientific reference format (see website for citation format - CSE). The text of your paper should be about 5 pages in length. (This does not include your tables, figures, and references.) The style should be clear, organized and well structured so that the reader can follow your logic. Please check your spelling and grammar. Presentation and content both count.

**Scientific Paper Format (additional guidelines are given on the class webpage)**

TITLE, AUTHOR, DATE SUBMITTED

ABSTRACT - short single spaced summary at the head of the paper. This is designed so that readers can quickly determine if they are interested in the topic and should read further.

INTRODUCTION - What is this paper about? Give the reader a game plan for what will be covered where in your paper. This particular paper should include a description of the site, including physical conditions/geography that may affect the weather/climate and set the stage for possible global climate change impacts at this location. What previous studies on weather and climate have been done in this area that would provide context for your study?

METHODS - A brief description of the methods (how, where, etc...) you used to collect your data.

RESULTS - An analysis of the data you collected, which in this case should address temperature and precipitation averages over the year 2013 and compare 2013 with the long-term climatic averages. You will have to go back through the historical climatological records for this location to determine if the meteorological conditions in 2013 were the same or different than the average climatology at this site. FIGURES - Your four graphs should be included in this section along with figure captions. Refer to figures in text.

DISCUSSION - Discuss how the physical setting and configuration of this city location determines the weather and climate in this area. Discuss how 2013 meteorological conditions are similar or different from climatological conditions at this location. Is there any evidence from previous studies of weather and climate in this area that indicate that the climate is changing in this location/region. What changes, if any, are occurring? Hypothesize what might be causing these changes.

CONCLUSION – Summarize the main results, outcomes and points of your paper.

ACKNOWLEDGMENTS - anyone or thing you would like to thank for helping with this paper. It is not necessary to include this section if you don’t want to specifically thank anyone.

LITERATURE CITED – only cite those papers mentioned in the text of your paper. Should use scientific format (author date). See class website for citation format - CSE.

UW GRADE SCHEDULE

All grades except papers will be given in %, or in points which can easily be converted to %.

See below for paper grade conversions.

**Letter % UW decimal grade**

|  |  |  |
| --- | --- | --- |
| **A** | **97-100** | **4.0** |
|  | **94-96** | **3.9** |
| **A-** | **93** | **3.8** |
|  | **92** | **3.7** |
|  | **91** | **3.6** |
|  | **90** | **3.5** |
| **B+** | **89** | **3.4** |
|  | **88** | **3.3** |
|  | **87** | **3.2** |
| **B** | **86** | **3.1** |
|  | **85** | **3.0** |
|  | **84** | **2.9** |
| **B-** | **83** | **2.8** |
|  | **82** | **2.7** |
|  | **81** | **2.6** |
|  | **80** | **2.5** |
| **C+** | **79** | **2.4** |
|  | **78** | **2.3** |
|  | **77** | **2.2** |
| **C** | **76** | **2.1** |
|  | **75** | **2.0** |
|  | **74** | **1.9** |
| **C-** | **73** | **1.8** |
|  | **72** | **1.7** |
|  | **71** | **1.6** |
|  | **70** | **1.5** |
| **D+** | **69** | **1.4** |
|  | **68** | **1.3** |
|  | **67** | **1.2** |
| **D** | **66** | **1.1** |
|  | **65** | **1.0** |
|  | **64** | **0.9** |
| **D-** | **63-62** | **0.8** |
|  | **61-60** | **0.7** |
| **E** | **59-0** | **0.0** |

**Paper grade conversions:**

**Letter % Letter % Letter %**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **A+** | **100** | **B-** | **82** | **D** | **65** |
| **A** | **95** | **C+** | **78** | **D-** | **62** |
| **A-** | **92** | **C** | **75** | **E** | **0** |
| **B+** | **88** | **C-** | **72** | **(not turned in)** |  |
| **B** | **85** | **D+** | **68** |  |  |

**TENTATIVE SCHEDULE** (updated 1/9/14)

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Topic** | **Reading** | **Assignments due** |
| **Week 1**  1/7 (T) | Introduction to course, Notetakers  Pick Cities & Form Teams;  What is Weather and Climate?  Review Climate Articles |  | Make sure can get on Canvas course website |
| 1/9 (TH) | Introduction to Scientific Method & Ways of doing science – How is Science different;  Video - Gore | Craven 0-5 |  |
| **1/10 (F)** | **Catalyst survey** | **Completed online by midnight 1/10** | **Reading and Writing Science – Library Use Survey** |
| **Week 2**  1/14 (T) | Library research: finding and evaluating information – Carole Librarian; Where to find climate data; **Assign Ex. 1** |  |  |
| 1/16 (TH) | Putting together a source evaluation system; Sci. papers | Craven 6-10;  Ruf Part 4 – pp 269-297;  Online articles |  |
| **Week 3**  1/21 (T) | Lecture – Introduction to Atmosphere, Origin, Composition, Structure, Greenhouse Effect, PVT | Viz Ch. 1 & 2  Ruf Ch. 1 |  |
| 1/23 (TH) | **Ex. 2 Meteorology Field Sampling**  In class |  | **Ex. 1 – Reading and Writing Science – Library Use** |
| **Week 4**  1/28 (T) | Discussed **Ex. 2** Data – Ave, Min/Max & errors; Precision & Accuracy;  Lecture – Sci. Notation, Unit Conversions & Graphs  **Assign Ex. 3** – start in class | Viz pp. 21-23; App. A |  |
| 1/30 (TH) | Lecture – Heat, Global Circulation, Why the Wind Blows | Viz Ch. 3, 4, 6 & 7 | **Ex. 2 – turn in Ave, Min, Max, sources of error, Precision & Accuracy calculations** |
| **Week 5**  2/4 (T) | Lecture – Water in the Atmosphere – What makes it rain? | Viz Ch. 5 | **Ex. 3 Sci. Not., Units & Graphs** |
| 2/6 (TH) | Midterm Exam Review |  |  |
| **Week 6**  2/11 (T) | Midterm Exam |  |  |
| 2/13 (TH) | **Excel Workshop; Assign Ex. 4** |  | **Bring data for your City Paper** |
| **Week 7**  2/18 (T) | Lecture – Current Climate around the World; Past Climates | Viz Ch. 11-13  Ruf Part 3 | **Ex. 4 Graphs for City Paper** |
| 2/20 (TH) | Lecture – Future Climate | Viz Ch. 14-16  RUF Part 4 – pp 362 & Part 5; IPCC,PNW |  |
| **Week 8**  2/25 (T)  CG –conf. | Video – Chasing Ice |  |  |
| 2/27 (TH)  CG –conf. | Workshop day to work on:  Papers, presentations & posters |  | **Ex. 5 Brief video review due online** |
| **Week 9**  3/4 (T) | **City Teams #1,2,3,4;**  Peer Review of draft paper |  | **Draft Paper for Peer Review** |
| 3/6 (TH) | **City Teams #5,6,7,8,9 & 10** |  |  |
| **Week 10**  3/11 (T) | Putting it all together;  Peer Review of posters & poster editing |  | **Color Page-size Draft Posters for Review** |
| 3/12 (W) |  |  | **Final Posters – Print** |
| 3/13 (TH) | Final Exam Review |  | **Final Paper** |
| **3/14 (F)** |  |  | **Showcase Poster Presentations**  **Phillip Hall 9 am-noon** |
| **Week 11**  3/18 (T) | **Comprehensive Final Exam** |  |  |

**Tentative Schedule**

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Online = Online Reading