GEOL4325/5308 Paleoclimate & Climate Change Fall 2015

Instructor: Prof. Arne Winguth

Instructor: Arne Winguth, Associate Professor
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Faculty Profile: https://www.uta.edu/profiles/arne-winguth
Office Hours: Tuesday & Thursday 13:30 -14:00 or after appointment

Section Information:
Lecture GEOL4325-001 undergraduate students
Lecture GEOL5308-001 graduate students

Time and Place of Class Meetings:
Lecture: Tuesday & Thursday 9:30 – 10:50 Geosciences Room 109

Description of Course Content: Climate change throughout geologic time, especially the last 100 Million years: Models of the climate system, reconstruction and modeling of past climates, abrupt climate change, warm climates, paleoclimatology, climate change and mass extinctions.

Student Learning Outcomes: After completion of this class, students will be familiar with the key terminology pertaining to the climates of the past and will have a well-rounded understanding of the major paleoclimate reconstructions and climate forcings and feedback process as well as complex interactions with the various components of the climate system. This knowledge will enable them to have a fundamental knowledge in scientific problems and a better understanding of great societal important topics, such as future climate change, mass extinction, resources, and environmental sustainability.

The student will be able to:
• Understand the feedbacks of components of the Earth’s climate system (atmosphere, terrestrial biosphere, cryosphere, and geosphere).
• Analyze the atmospheric and the oceanic circulation system.
• Describe the principles involved in the transition to hot house climates and cold house climates.
• Explain the role of weathering and erosion, and plate tectonics on the global climate.
• Explain the relationship between plants and animals in the ocean and land and how they affect the cycling of carbon among the ocean, atmosphere, land and sediments and build-up of geologic resources.
• Identify the consequences of a rise in sea level on the coastal zone and society.
• Identify major factors leading to climate change, and assess future climate projections.
• Discuss the societal relevance of paleoclimatology and climate change for global initiatives and political decisions.

This knowledge will enable the students to better understand topics of great societal importance, such as future climate change, geologic resources, and environmental sustainability.


**Descriptions of major assignments and examinations:** Major course requirements are weekly homework assignments in which students present the results, examinations, and quizzes.

**Attendance:** At The University of Texas at Arlington, taking attendance is not required. As the instructor of this course, attendance at class meetings is not required but strongly encouraged.

**Grading:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage of Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture Portion</td>
<td>75%</td>
</tr>
<tr>
<td>Signature Assignment &amp; Proposal</td>
<td>25%</td>
</tr>
<tr>
<td>Proposal of the Assignment</td>
<td>4%</td>
</tr>
<tr>
<td>Signature Assignment</td>
<td>21%</td>
</tr>
<tr>
<td>Lecture Portion:</td>
<td></td>
</tr>
<tr>
<td>Lecture Tool Quizzes</td>
<td>2.5%</td>
</tr>
<tr>
<td>Quizzes (Top 3)</td>
<td>7.5%</td>
</tr>
<tr>
<td>Exams (3)</td>
<td>45%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20%</td>
</tr>
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</table>

### Lecture Portion: 75% of course
- **Signature Assignment & Proposal:** 25% of course
  - Proposal of the Assignment: 4% of course
  - Signature Assignment: 21% of course
- **Lecture Tool Quizzes:** 2.5% of course
  - Quizzes (Top 3): 7.5% of course (2.5% each)
  - Exams (3): 45% of course (15% each)
  - Final Exam: 20% of course
Final grade calculation:
0.25 x signature project & proposal + 0.10 x quizzes + 0.45 x exams + 0.20 x final exam
Score will be translated into a grade based on class average. Maximum average grade of each category will be no more than 100%.

Grades will not be released over the phone or by email. Grades must be either obtained in person or from the UTA online database.

Exams will be multiple-choice questions and problem solving questions. There are no early exams

Students are expected to keep track of their performance throughout the semester and seek guidance from available sources (including the instructor) if their performance drops below satisfactory levels; see “Student Support Services,” below.

Make-up Exams: Make-up exams can be only taken in cases of illness or family emergency. A note from the University disciplinary officer or doctor may be required in these cases. Students who do not take an exam receive zero points as a grade on that exam. Make-up exams are scheduled and set by the instructor.

Quizzes: Quizzes consist of Lecture Tool quizzes and pop quizzes that are not announced. Lecture Tool quizzes are graded by participation. The 3 best pop quizzes out of 4 will be counted towards the total grade. There are no make-up quizzes.

Extra Credits: Extra credit opportunities will be announced during the lecture.

Signature project: A signature research assignment in the area of paleoclimatology is part of the assessment and is designed to stimulate critical thinking skills, communication skills, and empirical and quantitative skills. The project is split up into an one-page proposal (4% of the total grade) and the final term 6-page paper and presentation (21% of grade). The oral presentation counts 25% of the final signature paper grade. The total report length for each final signature paper will be 6 pages including at least 4 written pages, figures and references, letter size, 1.5-spaced, 12 pt times new roman font. Each student will present the project in a 10-minute presentation. Identical copy of a term paper from web or other sources (plagiarized papers or web pages) will result in an F or 0% (see also the UT Arlington Honor Code).

Expectations for Out-of-Class Study: A general rule of thumb is this: for every credit hour earned, a student should spend 3 hours per week working outside of class. Hence, a 3-credit course might have a minimum expectation of 9 hours of reading, study, home work, etc.
Grade Grievances: Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current University Catalog: http://catalog.uta.edu/academicregulations/grades/#undergraduatetext

Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student’s responsibility to officially withdraw if they do not plan to attend after registering. Students will not be automatically dropped for non-attendance. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/aaofao/).

Americans with Disabilities Act: UT Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including The Americans with Disabilities Act (ADA), The Americans with Disabilities Amendments Act (ADAAA), and Section 504 of the Rehabilitation Act. All instructors at UT Arlington are required by law to provide “reasonable accommodations” to students with disabilities, so as not to discriminate on the basis of disability. Students are responsible for providing the instructor with official notification in the form of a letter certified by the Office for Students with Disabilities (OSD). Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting: The Office for Students with Disabilities, (OSD) www.uta.edu/disability or calling 817-272-3364.
Counseling and Psychological Services, (CAPS) www.uta.edu/caps/ or calling 817-272-3671.

Title IX: The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit uta.edu/eos. For information regarding Title IX, visit www.uta.edu/titleIX.

Academic Integrity: Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington’s tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.
I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System Regents’ Rule 50101, §2.2, suspected violations of university’s standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student’s suspension or expulsion from the University.

Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at http://www.uta.edu/oit/cs/email/mavmail.php.

Student Feedback Survey: At the end of each term, students enrolled in classes categorized as “lecture,” “seminar,” or “laboratory” shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student’s feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington’s effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit http://www.uta.edu/sfs.

Final Review Week: A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week unless specified in the class syllabus. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.
Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.


Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at www.uta.edu/resources.

The English Writing Center (411LIBR): Hours are 9 am to 8 pm Mondays-Thursdays, 9 am to 3 pm Fridays and Noon to 5 pm Saturdays and Sundays. Walk In Quick Hits sessions during all open hours Mon-Thurs. Register and make appointments online at http://uta.mywconline.com. Classroom visits, workshops, and advanced services for graduate students and faculty are also available. Please see www.uta.edu/owl for detailed information.

Emergency Phone Numbers In case of an on-campus emergency, call the UT Arlington Police Department at 817-272-3003 (non-campus phone), 2-3003 (campus phone). You may also dial 911.

For non-emergencies, contact the UTA PD at 817-272-3381

Librarian to Contact: Antoinette Nelson (nelsona@uta.edu)

Other important library information

Library Home Page ......................... http://www.uta.edu/library
Subject Guides ......................... http://libguides.uta.edu
Subject Librarians ....................... http://www.uta.edu/library/help/subject-librarians.php
Database List .......................... http://www.uta.edu/library/databases/index.php
Course Reserves .................... http://pulse.uta.edu/vwebv/enterCourseReserve.do
Connecting from Off- Campus ..........  http://libguides.uta.edu/offcampus
Ask A Librarian ..............................  http://ask.uta.edu
GEOL 4325/5308 Paleoclimate and Climate Change - Course Schedule

As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course. —Arne Winguth

<table>
<thead>
<tr>
<th>Week</th>
<th>Days</th>
<th>Topics</th>
<th>Reading Chapter Ruddiman</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aug. 27, Sep. 1</td>
<td>Introduction to the Climate System</td>
<td>1</td>
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<tr>
<td>2</td>
<td>Sep. 3, 8</td>
<td>Present Day Climate, Climate Archives, Data, and Models</td>
<td>2</td>
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<tr>
<td></td>
<td>Sep. 10, 15</td>
<td>CO₂ and Long-Term Climate, Plate Tectonics and Long-Term Climate</td>
<td>4</td>
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<tr>
<td>3</td>
<td>Sep. 22, 24</td>
<td>Greenhouse Climate &amp; KP extinction</td>
<td>6</td>
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<tr>
<td>4</td>
<td>Sep. 29, Oct 1.</td>
<td>The Last 50 Million Years</td>
<td>7</td>
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<tr>
<td></td>
<td></td>
<td>Proposal Due Oct 1. Deadline of 1-Page Proposal</td>
<td></td>
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<tr>
<td>5</td>
<td>Oct. 6, 8</td>
<td>Astronomical Variations in Radiation</td>
<td>8</td>
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<tr>
<td>6</td>
<td>Oct. 13</td>
<td>Insolation Control of Monsoons</td>
<td>9</td>
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<tr>
<td>7</td>
<td>Oct. 20, 22</td>
<td>Insolation Control of Ice Sheets, Orbital Scale Variation of CO₂</td>
<td>10</td>
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<tr>
<td>8</td>
<td>Oct. 27, 29</td>
<td>Orbital Scale Feedbacks, Last Glacial Maximum,</td>
<td>12</td>
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<tr>
<td>9</td>
<td>Nov. 3</td>
<td>Last Deglaciation</td>
<td>13</td>
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<tr>
<td>10</td>
<td>Nov. 10, 12</td>
<td>Millennial Variations of the Climate, Human and Preindustrial Climates</td>
<td>15</td>
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<tr>
<td></td>
<td></td>
<td>Final Paper Due Nov. 12 6-Page Signature Project Due</td>
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<tr>
<td>11</td>
<td>Nov. 17, 19</td>
<td>The Hockey Stick (Last Millenium) Climates since 1850</td>
<td>17</td>
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<tr>
<td>12</td>
<td>Nov. 24</td>
<td>Causes of the 20th Century Warming</td>
<td>18</td>
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<tr>
<td>13</td>
<td>Dec. 1</td>
<td>Future Climate Change</td>
<td>20</td>
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<tr>
<td>14</td>
<td>Dec. 3, Dec. 8</td>
<td>Student Presentations Review</td>
<td></td>
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<tr>
<td>15</td>
<td></td>
<td>Final EXAM Dec 17 8:00-10:30 am Chapter 1-20</td>
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