**Geography 525: Seminar on Paleoclimate & Global Change**  
**Fall 2015 Syllabus**

**Instructor:** Dr. Anna E. Klene  
**Class Time:** T&H 2:10-3:30 pm, 217 Stone Hall  
**E-mail:** anna.klene@umontana.edu  
**Office hrs:** W 2-3 pm & by appt., 216 Stone Hall

**Optional Texts:**  

**Moodle:** Access the login page from UM’s homepage. Enter your NetID and password.

**Objectives:** By the end of this course, you should know the major controlling factors of climate through time, be familiar with reconstruction methods, appreciate the impacts of climate on previous civilizations, and evaluate our current understanding of future climate challenges.

**Tentative Schedule**

<table>
<thead>
<tr>
<th>Week</th>
<th>Tuesday</th>
<th>Thursday</th>
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<tr>
<td><strong>September</strong></td>
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| Week 1 | 1 – Introduction & Review Climate Basics  
R: 1 & 2 | 30 – Methods  
R3: Archives, Data & Models |
| Week 2 | 8 – Planetary Evolution  
R4 & SciNews Article | 10 – Tectonic-Scale Change & Snowball Earth – R5 & Hoffman & Schrag article |
| Week 3 | 15 – Last 100 Million Years  
R6 & 7 | 17 – Orbital-Scale (Milankovitch Cycles)  
R8 & article |
| Week 4 | 22 – Glacial Responses  
R9 & EPICA article & Cowie 4.6.1 | 24 – Last Glacial Maximum  
R13 & Cowie 4.6.4 (first part) |
| Week 5 | 29 – Deglaciation  
R14 & Strong & Hills paper | 1 – Ice Ages – Broecker & Denton articles  
**Paper Topic Due** |
| **October** | | |
| Week 6 | 6 – Millennial Oscillations  
R15 | 8 – Mid-Holocene Dust Event  
Linden Chps & Davis & Thompson |
| Week 7 | 13 – The Anthropocene  
R16 & Ruddiman, 2005 & Cowie 4.6.4b | 15 – Climate since 1000  
R17 & Thompson Pop. Press Articles |
| Week 8 | 20 – MWP & LIA – Zhang et al., Kerr, & Büntgen et al., Tan et al., & B1 | 22 – Collapse: Past Societies  
Prologue & Montana & Okonski article |
| Week 9 | 27 – Collapse: Greenland Norse  
Chp. 6, 7, & 8 | 29 – Year Without A Summer  
Oppenheimer article |
| Week 10 | 3 – Drought in US – Stahle et al. & Cook et al. (only pg 93-116, 132) | 5 – new case study  
TBA |
| Week 11 | 10 – Climate since 1850  
R18 & 19 & B2 | 12 – Future Climates – Cowie Chp 5.2.3 & 5.3 & R20:  
**Paper Outline Due** |
| Week 12 | 17– Future impacts & unknowns  
Cowie Chp 6.5 | 19 – Human Ecology & Climate Change  
Cowie Chp 7.1 |
| Week 13 | 24 – Sustainability & Policy  
Cowie Chp 8.1 & 8.5 | 26 – Thanksgiving Holiday |
| **November** | | |
| **December** | | |
| Week 14 | 1 – Guest Speaker: Dr. F.A. Heinsch: Climate Solutions | 3 – Heinsch cont. –Nature paper |
| Week 15 | 8 – Final Presentations | 10 – Final Presentations  
**Papers Due Friday by 5pm** |

**Exams**  
TBA – AGU Conference in San Francisco
1. Course Outline - KEEP and use the attached outline to maintain continuity throughout the course.

2. Reading Assignments - The required reading assignments form the basis of class discussion in seminars. Typically at least one chapter and often 2 lengthy readings will be assigned for each class.

3. Student-led Discussions – Almost every day, one student will be assigned to provide a handout summarizing the main points of that reading and to lead a discussion of that piece. The handout and discussion leadership will be graded.

4. Term Paper – Each student will prepare a paper on some topic related to global change. It is recommended the topic be a potential thesis project or cover a subject that may be useful for future employment. The paper will be an ~ 8-10 page literature review. It is important not just summarize the literature, but also evaluate the different sources as it is an essential component of the scientific process.

5. Class Presentations – All students will give a presentation on their paper. This presentation (~ 12 min.) will review the student’s topic, findings, and major conclusions. All of these presentations should be well planned, well illustrated, and given in a formal manner. Grading will reflect the presentation as well as the content.

6. Participation – A participation grade will be given for days with discussions and reflect how much the student contributed to the discussion. Completing the readings is expected prior to class. This is not an attendance grade however, so in the case of a family emergency, please see the instructor.

7. Academic Dishonesty - The university policy for cheating is clearly addressed on the website http://www.umt.edu/studentaffairs/sccacademicconduct.htm. Students cheating will be reported to the proper offices and receive a failing grade for the course.

8. Reasonable Accommodation - The university policy on students with disabilities is clearly addressed on the website http://www.umt.edu/dss/default.htm. Students who need assistance should contact the instructor immediately so that appropriate forms and procedures can be completed.

9. Final Course Grade – At the end of the course, the distribution will be examined and letter grades assigned at approximately: A=>90%, B=80-90%, C=70-80%, D=60-70%, etc. The “+/-” grading system will be used. There will be no extra credit of any kind.

Grading:

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
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<tr>
<td>Student-led Discussions</td>
<td>60 (30 pts x 2)</td>
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<tr>
<td>Video Review</td>
<td>10</td>
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<tr>
<td>Participation</td>
<td>30</td>
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<tr>
<td>Paper Topic &amp; Description</td>
<td>10</td>
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<tr>
<td>Paper Outline</td>
<td>10</td>
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<tr>
<td>Final Paper</td>
<td>60</td>
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<tr>
<td>Paper Presentation</td>
<td>20</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>200 pts.</strong></td>
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*** This syllabus may be modified as necessary during the course. Ask the instructor if you have any questions about when materials are due. **