ES250: Introduction to Sustainability Science

Syllabus 2014

Professor T. Holloway
Best way to contact is email (taholloway@wisc.edu)
Office: Room 201A SAGE (Enzyme Institute, 1710 University Ave.)
Office Hours: 2:00 – 3:45 Thursdays or by appointment – please check my website (http://www.sage.wisc.edu/people/holloway/holloway.html) to confirm that hours are usual

TA: Alex Karambelas
Best way to contact is email (karambelas@wisc.edu)
Office Hours: 12:00 - 2:00 Tuesday + 12:00 - 2:00 Wednesday
Exceptions posted on Learn@UW
246 SAGE, Enzyme Institute, 1710 University Ave.

When: Friday 1:20 -3:50
Where: Education L196

Required Texts & Related Materials

• iClicker (http://comets.wisc.edu/clickers/), ~$37.50 ($28.15 used) from the University Bookstore
• Microsoft Excel (standard Windows Office software; freely available on University computers)
Grading:

- 10% Attendance & Daily Participation
- 20% Quizzes
- 20% Homework
- 15% 1st Mid-Term
- 15% 2nd Mid-Term
- 20% Final Exam

The grading system will be implemented through cumulative points with a maximum of 1000 points, and 90+ extra credit points available.

<table>
<thead>
<tr>
<th>Points Range</th>
<th>Grade</th>
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<tbody>
<tr>
<td>900-1000</td>
<td>A</td>
</tr>
<tr>
<td>800-900</td>
<td>B</td>
</tr>
<tr>
<td>700-800</td>
<td>C</td>
</tr>
<tr>
<td>600-700</td>
<td>D</td>
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<tr>
<td>&lt;600</td>
<td>F</td>
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</tbody>
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Approximate Point Breakdown:

In-class participation (100): 15 classes x 6-7 points each = **100 in class points** (0 = absent and/or not participating; full points = full participation)

Quizzes (200): pre-tests 10 class x 20 points each = **200 pre-test points**

Homework (200): 10 assignments x 20 points each = **200 HW points** (graded 20 = check-plus; 15 = check; 10 = check-minus; 0 = less than check-minus). Note, there are 11 assignments; will drop lowest grade. Your final grade will be highest if you complete all homework sets, and we drop the lowest in the final calculation.

Mid-terms (300): 2 exams, 1.5 points per %age point. E.g. 90% = 135 points

Final (200): 2 points per %age point

Flexible Credit Options

**Weston Roundtable Lecture Series: 5 points each, weekly** (Thursdays at 4:15 - 5:15 pm, Room 1106 Mechanical Engineering unless noted otherwise). To get credit, **email your TA** within 24 hours with at least 100 words on the topic “The most interesting thing I learned in this lecture was…” Credit only given to students who attend the full hour session, 4:15 – 5:15 pm. **60 points max**

**Blog Engagement: 10 point "surprise" opportunities** On Learn@UW, there will be a class blog to discuss issues related to energy, air quality, climate, and sustainability. Three or more times over the course of the semester, you will be invited to **email your TA** within 24 hours with at least 100 words on the topic “The most interesting thing I learned from my participation in the class blog was…” Credit only given to students who have posted at least 5 substantive comments (10+ words on topic) between last email opportunity (or start of semester) and in-class announcement of opportunity. **30+ points max**
Other Information

- Academic misconduct is not tolerated at the University of Wisconsin. Please review University policy at [http://students.wisc.edu/saja/misconduct/UWS14.html](http://students.wisc.edu/saja/misconduct/UWS14.html)
- Homework will be accepted up until 1:20 pm on the due date. Turn in assignments at the beginning of lecture, or email T.A. by 1:20. Homework will be graded on a “check, check-plus, check-minus, zero” basis. Late HW will be docked one level in first 24 hours; zero credit after that.
- Readings are to be completed before the class to which they are assigned. Completing all of the readings is essential in order to be prepared for quizzes and in-class discussion.
- All pre-tests must be completed by Thursday midnight prior to class. Zero credit for late pre-tests.
- Make-up exam policy: Students are expected to take the exam at the scheduled time and date. If a student must miss an exam due to illness or a family emergency he or she must contact their T.A. prior to the beginning of the exam and take a make-up exam within one week.
- Missed classes or missed/late homework cannot be made up for any reason. However, students can use extra credit points to help compensate for missed class work.
- Please bring your iclicker to every class except field trips. iclicker information and/or in-class worksheets and/or other methods (e.g. looking around room) will be used for attendance.
- Prof. Holloway will email information to the class regularly. Please check email for class information, including meeting locations for field trips.
Week 1
Skill: Defining Sustainability & Sustainability Science
Content: Energy and Power
Homework due Week 2:
• Read Wolfson, Chapter 1 + Holloway I
• Problem: Holloway I.1 (Global food)
• Quiz 1: Learn@UW

Week 2
[Field Trip to Union South]
Skill: "Back of the Envelope" Problem-Solving
Content: How We Use Energy
Homework due Week 3:
• Read Wolfson, Chapter 2, Ch 9 (intro & 9.1; p. 225-231); Ch. 10 (10.2; p. 268-271 + 274-275... i.e. for now skip “Harnessing Wind Energy”)
• Problems: Holloway I.2 & I.3 (Energy)
• Quiz 2: Learn@UW

Week 3
Skill: Working with Aggregate Metrics, I
Content: Buildings and Energy
Homework due Week 4:
• Read Wolfson, Chapter 5
• Problems: Holloway I.4 (LEED)
• Quiz 3: Learn@UW

Week 4
[Field Trip to Charter St.]
Skill: Working with Aggregate Metrics, II
Content: Electricity
Homework due Week 5:
• Read Wolfson, Chapter 11 + Holloway II
• Problems: Holloway II.1 (w/ MS Excel)
• Quiz 4: Learn@UW

Week 5
Skill: Working with "Big Data", Part I
Content: [No new content; review for Mid-term]
For Week 6: Study for Mid-Term #1

Week 6
Skill: Working with "Big Data", Part II
Content: [No new content; review for Mid-term]
Homework due Week 7:
• Read Wolfson, Chapter 10.3 (p. 275-286)
• Problems: Holloway II.2 (w/ MS Excel) & II.3
• Quiz 5: Learn@UW

Week 7
[Field Trip to WEI]
Skill: Life-Cycle Assessment (LCA)
Content: Biofuels
Homework due Week 8:
• Read Holloway III + Article (online)
• Problems: Holloway III.1
• Quiz 6: Learn@UW

Week 8
Skill: Measurements and Derived Metrics
Content: Air Quality
Homework due Week 9:
• Holloway IV + Articles (online)
• Problems: Holloway IV.1
• Quiz 7: Learn@UW

Week 9
Skill: System Modeling, I
Content: Emissions and Chemical Lifetime
Homework due Week 10:
• Holloway V + Articles (online)
• Problems: V.1, V.2, V.3, V.4

Week 10
Skill: System Modeling, II
Content: Atmospheric Models
Homework due Week 11:
• Study for Mid-Term #2

Week 11
Skill: Simple Earth System Modeling
Content: Satellite Data
Homework due Week 12:
• Watch NOVA Earth from Space
• Read Ch. 1, from Chaos by James Gleick
• Quiz 8: Learn@UW

Week 12
[Field Trip to ALNC]
Content: Climate Basics
Homework due Week 13:
• Read Wolfson, Chapter 13
• Problem V.5 (Planetary temperatures)
• Quiz 9: Learn@UW

Week 13
Skill: Types of Systems
Content: Climate as a System
Homework due Week 13:
• Read Wolfson, Chapter 14 & 15
• Problem II.5 (w/ MS Excel)
• Quiz 10: Learn@UW

Week 14
Skill: Quantifying Risk
Content: Weather and Climate
Homework due Week 15:
• Read Wolfson, Chapter 16
• Problem II.6 (w/ MS Excel)

Week 15
[Conclusion and Review]