**Dr. Chris Hoagstrom**
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**Office Hours** Wed. 9:30 to 10:20 AM, Thurs. 8:30 to 10:20 AM, Fri. 7:30 to 8:20 AM & by appointment

**CLASS MEETINGS:**

**Lecture & Lab location:** SL 430; **Lecture time:** MWF, 8:30 - 9:20 AM; **Lab time:** M 1:30 - 4:20 PM

**TEXTS:**

1. Twain M. 2009. Life on the Mississippi. Library of America, New York, New York, USA.
2. Utah Division of Water Resources. 2009. Weber River basin, planning for the future. Utah Division of Water Resources, Salt Lake City, Utah, USA.
    a. Download: http://www.water.utah.gov/planning/waterplans.asp
    b. *Print a copy to bring to class*
3. Allan JD, Castillo MM. 2007. Stream ecology, structure and function of running waters, second edition. Springer, Dordrecht, the Netherlands.
4. Bowden C. 2003. Killing the hidden waters. University of Texas Press, Austin, Texas, USA.

**COURSE OBJECTIVES:**

1. Students will understand how water management in the Weber River basin affects ecological processes
2. Students will engage in ecological thought in the context of freshwater biology
3. Students will practice science communication via reading, writing, & discussion
4. Students will demonstrate proficiency in writing and presentation in the course portfolio

**GRADING:**

- **Attendance** (138 points total [2 points per lecture period, 1 point for being present & ready to start on time, another for enthusiastic, focused, & polite in-class participation; 4 points per lab period, 1 point for being present & ready to start on time, up to 3 more for enthusiastic, focused, & polite participation)
- **In-class writings** (150 points): 15 weekly in-class writing activities, 10 points each
- **Management relevance essays** (110 points): 11 homework essays in which you will explain how water management in the Weber River basin affects ecological processes described in textbook chapters 2 through 12 in Allan & Castillo (2007; one essay per chapter, 10 points each)
    - Essays must be 12-point font, double spaced, less than two pages in length, page margins 1 inch on all sides
    - Essays will be graded based on substance and clarity (see rubric)
        - Was an ecological effect of water management relevant to the chapter identified and adequately described?
- **Course portfolio** (202 points): the portfolio will demonstrate semester-long learning:
    - Top-5 essays revised and expanded (100 points)
    - Laboratory project (102 points): PowerPoint poster – longitudinal transition of the rainbow trout population (abundance, population structure) and aquatic insect assemblage (diversity, abundance) in Burch Creek, South Ogden, Utah

**THE FINAL GRADE OF EVERY STUDENT WILL BE BASED ON 600 TOTAL POINTS USING THE GRADING SCALE:**

| GRADE | E | D- | D | D+ | C- | C | C+ | B- | B | B+ | A- | A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | < 60 | 60-63 | 63- 67 | 67-70 | 70-73 | 73-77 | 77-80 | 80-83 | 83-87 | 87-90 | 90-93 | ≥ 93 |
| POINTS | < 359 | 360-377 | 378-401 | 402-419 | 420-437 | 438-461 | 462-479 | 480-497 | 498-521 | 522-539 | 540-559 | ≥ 558 |

***STUDENTS WITH DISABILITIES:*** *Students with disabilities must contact WSU Services for Students with Disabilities (SSD): internet http://departments.weber.edu/ssd/ or email ssd@weber.edu*

***STUDENT CONDUCT:*** *Students should act in accordance with the WSU student code: http://documents.weber.edu/ppm/6-22.htm*

**Management relevance essay grading rubric**

| Item | Description | Points Available |
|---|---|---|
| 1. Synthesis | Homework assignments ask you to synthesize information. You must come up with your own thoughts and express them in an original manner. Evidence of effort to understand subject matter and write effectively will be rewarded. Sincere effort includes proof reading and editing. | 3 |
| 2. Clarity | Clarity is perhaps the most difficult aspect of communication. Make sure your meaning is evident. For example, explain a difference rather than stating there is one. Interpret and explain phrases or terms rather than just repeating them. Statements that mention an issue, but do not describe it or explain its importance leave the reader "hanging". If a concept or statement is worth bringing up, it is worth explaining and its relevance to your point must be clear. | 3 |
| 3. Paraphrase | Avoid using quotations. Although it does take effort to select important quotes, it requires much more to restate the author's message in your own words. The goal of assigned exercises is to stimulate independent learning. You indicate achievement by proving ownership of the concepts and their implications via your writings. | 1 |
| 4. Follow instructions | Follow instructions literally. | 1 |
| 5. Filler | Unfocused ramblings that do not have a point or do not contribute to your explanation are filler. They lengthen the paper but do not contribute to the message. Avoid them. | 1 |
| 6. Grammar | Grammar should be acceptable. Avoid incomplete sentences and make sure verbs and subjects agree. Check spelling, etc. | 1 |
| **Total** | | **10** |

**Lecture schedule**

| Class | Assignment | Activity | Date |
|---|---|---|---|
| 1 | Course introduction | Syllabus, Worster 1983, Jordan et al. 2009, Discussion, in-class writing | 23 Aug |
| 2 | Twain: "The 'Body of the Nation'" through "Continued | | 25 Aug |
| 3 | Twain: "Completing my Education" through "A Catastrophe" | | 27 Aug |
| 4 | UDWR: Acknowledgements through Chapter 3 | Discussion, in-class writing | 30 Aug |
| 5 | UDWR: Chapters 4 through 6 | | 1 Sep |
| 6 | UDWR: Chapters 7 and 8 | | 3 Sep |
| | Labor Day | No class | 6 Sep |
| 7 | Allan & Castillo: Preface and Chapter 1 | Discussion, in-class writing | 8 Sep |
| 8 | Allan & Castillo: Chapter 2 – management relevance essay due | | 10 Sep |
| 9 | | Discussion, in-class writing | 13 Sep |
| 10 | Allan & Castillo: Chapter 3 – management relevance essay due | | 15 Sep |
| 11 | | | 17 Sep |
| 12 | Allan & Castillo: Chapter 4 – management relevance essay due | Discussion, in-class writing | 20 Sep |
| 13 | | | 22 Sep |
| 14 | Allan & Castillo: Chapter 5 – management relevance essay due | | 24 Sep |
| 15 | | Discussion, in-class writing | 27 Sep |
| 16 | Allan & Castillo: Chapter 6 – management relevance essay due | | 29 Sep |
| 17 | | | 1 Oct |
| 18 | Allan & Castillo: Chapter 7 – management relevance essay due | Discussion, in-class writing | 4 Oct |
| 19 | | | 6 Oct |
| 20 | Allan & Castillo: Chapter 8 – management relevance essay due | | 8 Oct |
| 21 | | Discussion, in-class writing | 11 Oct |
| 22 | Allan & Castillo: Chapter 9 – management relevance essay due | | 13 Oct |
| | Fall Break | No class | 15 Oct |
| 23 | | Discussion, in-class writing | 18 Oct |
| 24 | Allan & Castillo: Chapter 10 – management relevance essay due | | 20 Oct |
| 25 | | | 22 Oct |
| 26 | Allan & Castillo: Chapter 11 – management relevance essay due | Discussion, in-class writing | 25 Oct |
| 27 | | | 27 Oct |
| 28 | Allan & Castillo: Chapter 12 – management relevance essay due | | 29 Oct |
| 29 | | Discussion, in-class writing, Andress & Taylor lecture (5th) | 1 Nov |
| 30 | Allan & Castillo: Chapter 13 | | 3 Nov |
| 31 | Beechie et al. 2010 | | 5 Nov |
| 32 | Minckley et al. 2003 | Discussion, in-class writing, Paxman lecture (12th) | 8 Nov |
| 33 | Allan & Castillo: Chapter 14 | | 10 Nov |
| 34 | | | 12 Nov |
| 35 | Roach et al. 2008 | Discussion, in-class writing, Hoagstrom lecture (17th) | 15 Nov |
| 36 | Hoagstrom 2009 | | 17 Nov |
| | Desert Fishes Council | No class | 19 Nov |
| 37 | Deacon et al. 2007 | Discussion, in-class writing, Matyjasik lecture (24th) | 22 Nov |
| 38 | Vörösmarty and Sahagian 2000 | | 24 Nov |
| | Thanksgiving | No class | 26 Nov |
| 39 | Bowden: Part 1, Chapters 1 – 2 | Discussion, in-class writing | 29 Nov |
| 40 | Bowden: Part 1, Chapters 3 – 5 | | 1 Dec |
| 41 | Bowden: Parts 2 & 3 | | 3 Dec |
| | Final interview - between 3:30 – 5:20 or by appointment | 20 min. | 6 Dec |

## COURSE PORTFOLIO (total of 202 points)

**Top-5 essays (100 points total):** (5 essays, 20 points each)**:** each student must prepare five essays based on selected (pick your favorite) in-class writing assignments.

- Essays will include 3 components:
  - Summary of relevant material from class notes, discussion, and textbook materials (6 points),
  - Personal reflections or insights and a cohesive, defensible conclusion (7 points),
  - Proper spelling, grammar, punctuation, and incorporation of information from a scientific (peer-reviewed) journal article published since 1 January 2009 (7 points)
    - Article must be cited in-text in a proper scientific format that is consistent among all essays and a full reference must be provided following each essay.
- ***Essays can be turned in at any time prior to the final due date for review or for final grading. Final versions of essays are due at the time of the final exam*** **(**W, 8 Dec., 8:30 AM**).**
- ***Essays must be double spaced using a 12-point font and 1-in margins. Each essay should not exceed 4 pages in length (including reference).***

**Laboratory project (102 points)**

**Goal:** Collect and analyze field data and compile poster for presentation at WSU Undergraduate Research Symposium (Spring Semester and elsewhere if desired)

1. Questions:
   a. How do habitat conditions and fish populations change with increasing elevation in Burch Creek?
   b. How do changes in habitat and fish populations correspond with changes in insect assemblages?
      i. Insect density
      ii. Insect assemblage composition
      iii. Stonefly abundance, size, and taxon
2. Organization
   a. Students will work as a team to complete necessary activities
      i. At least one student volunteer will be needed to present poster at the Weber State University Undergraduate Research Symposium, spring semester 2011
         1. http://www.weber.edu/OUR/symposium
      ii. All students will be listed as coauthors, assuming valid participation
         1. Students must be present for all labs to be a valid participant
      iii. Students may also wish to pursue publication of findings in ERGO, the Weber State University undergraduate research journal
         1. http://www.weber.edu/OUR/ergo
3. Field work
   a. Air temperature, water conductivity & temperature
   b. Preliminary average wetted width
   c. Fish sampling – electrofishing 100 m
   d. Habitat sampling – 20 cross sections spaced one preliminary wetted width apart: wetted width, max depth
   e. Invertebrate sampling – Surber sampling every other cross section alternating from thalweg to shoreline farthest from thalweg (10 separate samples to compare within-reach versus among-reach variation)
4. Lab work
   a. Insect sorting to family
   b. Measure stonefly body length (excluding cerci)
   c. Data entry

d. Data analysis
    i. Similarity of habitat – ANOVA comparisons with confidence intervals of width * depth (volume), width/depth (cross section), conductivity, temperature (standardized by air temperature?)
    ii. Similarity of rainbow trout populations –
        1. Summary – trout density and size structure by reach
        2. Density – linear regression (density versus elevation, volume, cross section, conductivity, temperature)
        3. Relative abundance of length groups (10 mm?) – cluster analysis of Sørensen's Index with Flexible Beta clustering method
            a. Linear regression of longitudinal change in similarity versus longitudinal change in elevation, volume, cross section, conductivity, temperature)
    iii. Similarity of insect assemblages –
        1. Summary – insect assemblage composition and density by taxon by reach
        2. Density – linear regression (density versus elevation, volume, cross section, conductivity, temperature, trout density)
        3. Relative abundance of taxa – cluster analysis of Sørensen's Index with Flexible Beta clustering method by
            a. Linear regression of longitudinal change in similarity versus longitudinal change in elevation, volume, cross section, conductivity, temperature, trout density)
        4. Stonefly density, size, and taxon –
            a. Density – linear regression (density versus elevation, volume, cross section, conductivity, temperature, trout density, insect density)
            b. Size – linear regression (size versus elevation, volume, cross section, conductivity, temperature, trout density, insect density, stonefly density if uncorrelated with insect density)
            c. Taxon – cluster analysis of Sørensen's Index with Flexible Beta clustering method
                i. Linear regression of longitudinal change in similarity versus longitudinal change in elevation, volume, cross section, conductivity, temperature, trout density, insect density, stonefly density if uncorrelated with insect density)

e. Readings
    i. Each student will be responsible for finding and summarizing two readings related to laboratory work. Summaries will be shared with classmates during lab discussions and potentially incorporated into the poster presentation.

5. Outcomes
    a. Abstract for submission to Weber State University Undergraduate Research Symposium
    b. PowerPoint poster presentation
6. Grading
    a. Grades will be based on:
        i. participation in all lab work including finding useful references and fruitfully contributing to in-lab discussions
        ii. quality of the abstract and poster presentation
        iii. interviews during finals week on 6 December or by appointment to discuss laboratory findings and procedures one on one

**Laboratory Schedule**

| Date | Topic | Location |
|---|---|---|
| 23 August | Introduction – laboratory project introduction and discussion, Harvey (1992) | SL430 – Burch Creek |
| 30 August | Sampling | Burch Creek – 1600 m |
| 6 September | No lab – Labor Day | |
| 13 September | Sampling | Burch Creek – 1750 m |
| 20 September | Sampling | Burch Creek – 1900 m |
| 27 September | Sampling | Burch Creek – 2050 m |
| 4 October | Sampling | Burch Creek – 2200 m |
| 11 October | Sampling or data entry | Burch Creek – 2350 m or SL430 |
| 18 October | Data entry, invert. sorting, readings Group 1 | SL430 |
| 25 October | Data entry, invert. sorting, readings Group 2 | SL430 |
| 1 November | Data entry, invert. sorting, readings Group 3 | SL430 |
| 8 November | Data entry, invert. sorting, readings Group 4 | SL430 |
| 15 November | Data analysis | SL430 |
| 22 November | Poster preparation | SL430 |
| 29 November | Poster preparation | SL430 |

**** Students who miss class or lab are responsible for finding out what was missed ****

**** Students should visit with the instructor during the semester with regard to past or future performance, once the semester is over it is too late ****

**** Use of cell phones, computers, or other electronic devices is prohibited during class time ****

**** Disruptive students may be asked to leave ****

**** All assignments are due at the beginning of class on the due date as hard copies ****

**** Opportunities to make-up missed assignments are only available in cases of unavoidable, higher-priority conflict (notification in advance) or verifiable emergency ****

******** There is no extra credit. ********