Course Number: FRSHWTR-504
Quantitative Freshwater Analysis

year: 2014

Instructor: Dr. James T. Waples
Office: Rm 179E (old building), Rm 2017 (new building)
Contact Information: 414-382-1700 (jwaples@uwm.edu)
Office Hours: TBD
Course Meeting: Tuesday 3:30 PM -6:10 PM
Location: School of Freshwater Sciences, Great Lakes WATER Institute
Final Exam: TBD

Course Description

This course is designed to give graduate students and advanced undergraduate students a fundamental set of tools for the quantitative analysis of environmental data sets, with an emphasis on the calculation of reservoirs, residence times and rates in aquatic systems. The course will be devoted to the analysis of datasets, familiarization with key software programs (including spreadsheets, graphing, spatial interpolation, and quantitative image analysis software), and basic problem solving with box models. Graduate and undergraduate students will both be required to complete a problem set each week. All students will be required to prepare and orally present findings using techniques and tools presented in class.

Learning Outcomes

The course is designed such that students will:

- Be familiarized with basic software programs that are commonly used in the quantitative analysis of environmental data.
- Learn the fundamentals of data display (i.e., graphing) and analysis.
- Develop the ability to calculate reservoirs, residence times and rates in aquatic systems.

On completion of the course, students should be able to:

- Demonstrate a proficiency in: the use of spreadsheets, 2D and 3D graphing, spatial interpolation and quantitative image analysis.
- Combine data sets to determine reservoirs, residence times and rates in aquatic systems.
- Demonstrate an understanding of the data required to answer a specific environmental question.
- Construct a simple box model.
Resources

Class Website. The course will use a Desire 2 Learn (D2L)-based website in order to coordinate the class, communicate information, and also to deliver assignments and feedback. Details are provided at the end of the syllabus. Please check the website and your email frequently because you are responsible for all announcements and changes to the syllabus posted there. If you need assistance with D2L, you can:

- send an email to help@uwm.edu
- pick up a phone and call 229-4040 (or 4040 on a campus phone)
- go to Bolton 225 (this lab is not open all day -- check for specific hours)
- if you are calling from outside the 414 or 262 area codes, call 1-877-381-3459

The Library. Library work will be an important part of the course and essential to complete the assignment. In particular, the course will make use of the primary scientific literature (i.e. journal articles). Note: the internet is useful, but it is not a substitution for the library.

Class Notes: Homework assignments and related material will be available on the D2L site.

Students with Special Needs: Students with special needs should arrange to speak with me during the first week of classes so we can best accommodate your learning style. Note University Policies: Students with disabilities. Verification of disability, class standards, the policy on the use of alternate materials and test accommodations can be found at the following: http://www.uwm.edu/Dept/DSAD/SAC/SACltr.pdf

The Writing Center welcomes writers at all skill levels, inexperienced through advanced, freshmen through graduate students. FYI--over 1/3 of the students who visited in the past 4 yrs were juniors, seniors or grad students. Whether still exploring a reading, brainstorming, drafting or revising, writers can benefit from talking one with one of our well-qualified and well-trained tutors. Make appointments online 24/7: http://www.writingcenter.uwm.edu

Required Readings


Recommended Readings


Course Requirements and Grading
<table>
<thead>
<tr>
<th></th>
<th>Undergraduate</th>
<th>Graduate</th>
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</thead>
<tbody>
<tr>
<td>Problem sets</td>
<td>70%</td>
<td>40%</td>
</tr>
<tr>
<td>Advanced problem sets</td>
<td>NA</td>
<td>30%</td>
</tr>
<tr>
<td>Oral presentation</td>
<td>10%</td>
<td>10%</td>
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<tr>
<td>Writing assignments</td>
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**Graduate Students:** Graduate students will be required to complete an additional problem set.

**Computer:** WiFi enabled laptop computers with software for in-class exercises will be issued to each student for the duration of the semester.

**Topics Covered (tentative!)**


**Meeting 2**  Visualizing your data and the quest for a perfect graph (1)

**Meeting 3**  Visualizing your data and the quest for a perfect graph (2)

**Meeting 4**  A field exercise…

**Meeting 5**  Data interpolation and grid manipulation: calculating inventories (1)

**Meeting 6**  Data interpolation and grid manipulation: calculating inventories (2)

**Meeting 7**  Making sausage (1): student calculations and 5 minute presentations.

**Meeting 8**  Another field exercise…

**Meeting 9**  Rates and residence times: basic calculations (1)

**Meeting 10**  Rates and residence times: basic calculations (2)

**Meeting 11**  The Box Model (1)

**Meeting 12**  The Box Model (2)
Meeting 13  The Box Model (3)

Meeting 14  Making sausage (2): student calculations and 5 minute presentations.

Meeting 15  Alternative tools: student calculations and 5 minute presentations.

Course Policies

Attendance: Some of the material for this course will be made accessible through the D2L website. This material is meant to help the student prepare for class, but it does not replace the material presented in class.

Late assignments will be downgraded for each day past the due date.

Academic Misconduct: In this course, you are expected to perform to the best of your ability in an honest manner. Cheating, plagiarism, or other acts of misconduct will result in a severe penalty to you, as per University of Wisconsin System Chapter 1.

Other University Policies: Various policies related to this course can be found on the Secretary of the University’s website at http://www4.uwm.edu/secu/SyllabusLinks.pdf