University of Guelph
College of Biological Science
Department of Integrative Biology

COURSE OUTLINE

Introduction to Aquatic Environments (BIOL*3450)
Fall 2015

Course description

This course provides an introduction to the structure and components of aquatic ecosystems, how they are regulated by physical, chemical and biological factors, and the impact of humans on these environments and their biota.
Credit weighting: 0.5
Prerequisites: (BIOL*1040 or BIOL*1070), CHEM*1050, (1 of ZOO*2700 or BIOL*2060 is strongly recommended)

Teaching team

Professor	Dr. Kevin McCann, Office - Scie 2472, ksmccann@uoguelph.ca, ext. x56861 Office hours: by appointment.
Teaching assistants	Not known yet.

Course schedule

Lectures	1:30 - 2:30 AM, mondays, wednesdays and fridays, Location: AA Thornbrough 1200

Learning Outcomes

By the end of this course, students should be able to address the following goals and perform the following skills:

Conceptual Goals

1. Explain how the concepts of stratification and mixing structures many aquatic systems. Synthesize and combine in your explanation the conditions and processes that both cause and disrupt stratification in water and how this affects river, lake and ocean properties that govern life.

2. Identify and compare examples of ecologically relevant processes that operate on scales as small as molecules (or short term) up to large planetary scales (or long term) and synthesize how these affect life in water in different aquatic ecosystems.

3. Explain the origins of water on earth, its presence in a set of major and minor reservoirs, how/why water moves among those reservoirs, and in so doing affects climate and weather, and creates a variety of different aquatic environments.

4. Describe the formation of ocean basins, lakes and rivers with respect to plate tectonics, glaciation, other geological and biotic processes and provide evidence supporting different origin theories.

5. Describe successional processes that cause lakes, rivers and oceans to change over time, and discuss the evidence of these processes.

6. Explain how local landscapes affect life in lakes, rivers and coastal ecosystems. Explain 'connectivity' and how this supports unusually high productivity and biodiversity in certain aquatic systems.

7. Explain how the molecular features of water give it a special set of physical and chemical properties that cause many larger scale processes with important biological effects.

8. Explain how trophic interactions govern the flow of energy and nutrients in aquatic communities that influence population abundance, mediates material flow, and structures aquatic communities.

Skills Goals

9. Extract, interpret and/or create complex graphical information that represents important physical and chemical properties of aquatic environments and use these to infer important processes that structure these ecosystems.

10. Communicate in writing effective reports that summarize your analysis and understanding of how physical, chemical and biotic conditions affect life in aquatic systems.

Course Resources

Textbook — Ecology of aquatic systems, 2ed.; M. Dobson and C. Frid 2009

CourseLink — Biol*3450 will make use of the UoG course website on D2L (via CourseLink), including reading materials and links to online quizzes. Announcements of course news, deadlines etc, will also be displayed on the Biol*3450 CourseLink website, reflecting deadlines here. Please check it regularly.

Undergraduate Calendar is the source of all information about UoG procedures, policies and regulations.
See: http://www.uoguelph.ca/registrar/calendars/undergraduate/current/

Course Content

The course is designed to introduce and begin to integrate the major processes that affect life in water. Lectures will introduce aquatic environments, their origins, physical and chemical properties and structure, major groups of aquatic life and the processes that regulate life in waters. Lectures will highlight important causal linkages between the physical, chemical and biological properties of different aquatic systems often using case studies.

Lectures are designed to give a general overview of concepts that supplement and highlight text readings by the student. Factual material from the reading materials will be evaluated with on-line quizzes designed to encourage students to keep up on readings. Two take home assignments will focus more on synthesizing processes to make inferences about conditions that regulate life in water.

Tests will be designed to test your critical thinking skills in addition to recalling basic information. The two mid-terms will integrate a mix of multiple choice and short answer written questions. Interpreting and creating graphs that reflect important aquatic processes is an important requirement. Minor arithmetic skills will also be required to calculate aspects of aquatic systems. The final will be similar in

design and integrate your knowledge about processes that regulate life in all aquatic systems. Formula sheets will be provided where necessary. You will be required to develop a deeper understanding of concepts about the processes that organize physical, chemical and biotic aspects of aquatic environments. The first mid-term will cover material presented from the start of class up to the midterm 1. The second mid-term will cover material presented after the first midterm. The final will cover in some detail material presented after the midterm, but will also require synthetic comparing and contrasting of material across all types of aquatic systems presented throughout the course.

General lecture schedule

Week	Topics	Chapter Readings (additional readings may be assigned)
1	Intro. global water cycle; ocean circulation; water chemistry. Aquatic biodiversity patterns	CH.1 CH.2
2	Aquatic life styles; community features; Physical ecology	CH.2
3	Intro. rivers: Flow; Disturbance; Biotics; Energy flow; Connectivity	CH.3
4	Intro. lakes: Origins; structure; Energy flow; Biotic interactions	CH.7
5	Lake: endemism; succession; artificial	CH.7
6	Intro. wetlands: Conditions; Productivity; Succession: Function; Degradation	CH.8
7	Intro. estuaries: Structure; Biodiversity; productivity; Degradation	CH.4
8	Intro. coastal seas: Exposure and substrates; Energy flow; Zonation; Biotic interactions	CH.5
9	Intro. open ocean: Vertical structure; Light and nutrients; Productivity	CH.6
10	Open ocean: Biodiversity; Movement; unique communities	CH.6
11	Open ocean: Latitude and seasonal effects; Long scale cycles ENSO; Life cycle and tectonics; Management of scale	CH.6
12	Aquatic systems overview	CH.9

Methods of Assessment

Assessment				
Form of Assessment	Weight of Assessment	Due Date of Assessment	Course Content /Activity	Learning Outcome Addressed
4 quizzes	2.5% each = 10%	Sept. 17 Oct. 1 Oct.22 Nov. 19	Chapter readings	1-8
Assignment 1	15%	Sept. 26	Lectures, Readings	1, 7
Midterm Test 1	15%	Oct. 10	Lectures, Readings	1 - 7
Midterm Test 2	15%	Nov. 5	Lectures, Readings	
Assignment 2	15%	Nov. 17	Lectures, Readings	1, 2, 7 - 11
Final Exam	30%	Dec. 1	Lectures, Readings	1, 2, 4, 8

While this is an introductory course that provides a broad overview of aquatic environments, students are expected to demonstrate understanding at the 3000 level. Assessment is often based on students practicing synthetic skills that combine your understanding of how physical and chemical properties from molecular to planetary scales govern aquatic environments and aquatic life. Independent reading of assigned text chapters and scientific papers is an important component that will supplement lecture materials and assignments. The A-student will be able to causally link disparate physical and chemical processes at different scales to biological effects.

Important Dates

Sept. 5	First day of class
Sept. 17	Online Quiz 1 opens 12:01 AM (3 days)
Sept. 26	Assignment 1 due (Given out in class Sept. 19)
Oct. 1	Online Quiz 2 opens (3 days)
Oct. 10	Midterm 1 (in class)
Oct. 22	Online Quiz 3 opens (3 days)
Oct. 30	Course drop deadline (40th day classes)
Nov. 5	Midterm 2 (in class)
Nov. 17	Assignment 2 due (Given out in class Nov. 10)
Nov. 19	Online Quiz 4 opens (3 days)
Nov. 27	Thanksgiving monday make-up day (final exam prep.)
Dec. 1	Final Exam 11:30AM - 1:30PM (Location: TBA)

Course and University Policies

Grading

All assignments are due in class by the end of the period unless consideration is agreed to in advance of the deadline by the instructor. Late penalty is 10% for reports handed in between end of class and 11:59 PM on the date due. Late penalty is 10% per each additional 12 hr period starting at 12:01 AM, including weekends.

Chapter quizzes: The four online quizzes will test basic knowledge from the chapter readings. They will be taken through the CourseLink website under the Quiz tab. Each quiz is time-sensitive and will be available for 3 days starting at 12:01 AM on the dates noted above. You will sign-in and then complete the quiz in one sitting. Details will be presented in class and on the course website.

Assignments: You will have one week to complete each of the two assignments. Details will be presented in class and on the course website. Assignments are to be performed and reported as your individual work. Please see university academic misconduct guidelines below.

Midterm and Final Tests: Are in scheduled class or exam times.

When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact, and be prepared to provide supporting documentation. See the undergraduate calendar for information on regulations and procedures for Academic Consideration: http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml

Consideration may be granted at the instructors discretion. Please note that consideration for medical, compassionate or university-related conflicts (e.g., varsity sports) may require additional discussion with your program counsellor. Consideration is generally more likely when the student proactively advises the instructor of issues well in advance of deadlines.

Accessibility

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Student Accessibility Services (SAS) as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 56208 or email csd@uoguelph.ca or see the website: http://www.uoguelph.ca/csd/

Academic Misconduct

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from

responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisort.

The Academic Misconduct Policy is detailed in the Undergraduate Calendar:
http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml

E-mail Communication
As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

Drop Date
The last date to drop one-semester courses, without academic penalty, is the 40th class day: **Oct. 30** 2014. To confirm the actual date please see the schedule of dates in the Undergraduate Calendar. For regulations and procedures for Dropping Courses, see the Undergraduate Calendar:
http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml

Copies of out-of-class assignments
Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

Recording of Materials
Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Campus Resources

The Academic Calendar is the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs:
http://www.uoguelph.ca/registrar/calendars/index.cfm?index

If you are concerned about any aspect of your academic program:

- make an appointment with a program counsellor in your degree program. http://www.bsc.uoguelph.ca/index.shtml or https://www.uoguelph.ca/uaic/programcounsellors

If you are struggling to succeed academically:

- There are numerous academic resources offered by the Learning Commons including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills. You can also set up individualized appointments with a learning specialist. http://www.learningcommons.uoguelph.ca/

If you are struggling with personal or health issues:

- Counselling services offers individualized appointments to help students work through personal struggles that may be impacting their academic performance. https://www.uoguelph.ca/counselling/
- Student Health Services is located on campus and is available to provide medical attention. https://www.uoguelph.ca/studenthealthservices/clinic

- For support related to stress and anxiety, besides Health Services and Counselling Services, Kathy Somers runs training workshops and one-on-one sessions related to stress management and high performance situations. http://www.uoguelph.ca/~ksomers/

If you have a documented disability or think you may have a disability:

- The Centre for Students with Disabilities (CSD) can provide services and support for students with a documented learning or physical disability. They can also provide information about how to be tested for a learning disability. For more information, including how to register with the centre please see: https://www.uoguelph.ca/csd/