

SOIL 515 / LWS 515

Integrated Watershed Management

TERM 1 Sept – Dec 2018

Instructor	Sandra Brown, MCML 229	e-mail: sandra.brown@ubc.ca
Course modules	Distance learning (E-textbook and Canvas)	
Tutorial	Wed 4:30-6:00 (MCML 258)	

Course Overview

Watersheds are effective integrators of environmental processes; combining inherent conditions, the cumulative impacts of land use, and water management to determine the water flow and water quality conditions upon which humans and ecosystems depend.

This course presents a comprehensive overview of watershed science, and the principles of integrated watershed management.

Course Format: This course is offered in a blended online / on-campus learning environment. Students have access to an E-textbook which contains the course material, participate in weekly tutorials on-campus or online discussions, and complete project oriented assignments.

The course has the following components:

- A multimedia textbook that can be accessed online from your desktop and most mobile platforms (iOS, Android) - see "E-Textbook" section below.
- Course information is posted on UBC Canvas, including course announcements, discussion boards, links to resources, review questions, etc.
- Assignments will be posted on UBC Canvas.
- Tutorial session for on-campus students; online moderated discussion sessions for off-campus students.

Course Content

The course covers fundamental aspects of watershed management: a list of topics is provided below. In addition, a number of case studies have been included, which are linked to one or more topics.

- Hydrology and sediment dynamics
- Water quality and aquatic biota
- Land use and its interactions with water
- Water governance and watershed management
- Community-based approaches

Course Schedule (2018W Term 1)

Period		Module (E-Textbook)	Tutorial (Wednesdays 4:30-6:00 pm McMI room 258)	
Week 1	Sept 4-5	Introduction to Watershed Management Methods: stream focus	Sept 5	Overview of course: review papers, project, tutorial sessions Introduction to water and watersheds
Week 2	Sept 6-12	Watershed Science – the hydrological cycle	Sep 12	The hydrological cycle Break out groups, presentations, plenary discussion Watershed signup
Week 3	Sept 13-19	Watershed Science: Water Balances	Sep 19	Water balance Break out groups, presentations, plenary discussion Your watershed assessment – part I
Week 4	Sept 20-26	Watershed science: sediment dynamics	Sep 26	Working session – data sources and analysis
Week 5	Sept 27- Oct 3		Oct 3	Working session – precipitation and hydrologic variability
Week 6	Oct 4-10	Land use and Water	Oct 10	Natural versus anthropogenic impacts: Sumas watershed case study
Week 7	Oct 11-17	Watershed science: water quality	Oct 17	Water Quality Designing a monitoring program – parameters, standards & indices
Week 8	Oct 18-24	Water governance: water use, policy and allocation	Oct 24	Water Use & Allocation Plenary water scarcity
Week 9	Oct 25-31	Community watershed approaches	Oct 31	Community water management – case study Colombia
Week 10	Nov 1-7	Case study watersheds I	Nov 7	Cumulative effects: integrating water and land use management in a watershed context Break out groups, presentations, plenary discussion
Week 11	Nov 8-14	Case study watersheds II	Nov 14	Water & watershed management Break out groups, presentations, plenary discussion
Week 12	Nov 15-21		Nov 21	Working session – presentation prep
Week 13	Nov 22-30	Summary & Review	Nov 28	Student presentations (watershed projects)

Learning Objectives

1. Introduce the framework of watershed-based evaluations. This includes assessment, evaluation and planning techniques used for integrated watershed management.
2. Provide an introduction to the components of watersheds such as: hydrology, water quality, aquatic biota, and land use and human activities that influence these components (with an emphasis on land-water interactions).
3. Cover essential tools and techniques to conduct watershed-based evaluations, including: Geographic Information Systems (GIS) applications, modeling, and combined tools for integrated and interdisciplinary evaluations.
4. Introduce the approaches available and the problems that arise when dealing with complexity, integration, and interdependence.
5. Cover environmental evaluation tools that include single, multiple and cumulative effects of land use on water quantity, quality and biota.
6. Investigate links between land use activities and their interactions and impacts on water resources.
7. Explore the challenges, limitations and options available for policy making and governance.
8. Examine the importance of community-based approaches to watershed management (includes organization, planning, policy options, stakeholder involvement and actions).
9. Obtain a thorough grounding in the complexity of water resources management to be able to address land use issues (agriculture, forestry, mining, hydropower, urbanization, and recreation) and how they affect water quality and quantity in a watershed context.

The course is not intended to cover all aspects of hydrology, water chemistry or aquatic health but will provide an overview of each topic and illustrate the major interrelationships between them and land use activities. At the end of the course, students will have an understanding of the consequences of the main human activities on water resources. They should be able to examine the health of a watershed, diagnose the causes, and make suggestions of options and policies on how to improve the watershed system.

E-Textbook

The main readings for the SOIL 515 course are based upon the Integrated Watershed Management E-textbook. The E-textbook is designed so that it can be accessed through your web browser on your desktop and most mobile devices (iOS, Android). Access to the textbook will be emailed to registered students the first week of classes.

Assessment and Grading

Component	Grading
Assignments – watershed reports (3)	45% of final mark
Review papers (6)	45% of final mark
Course Participation (tutorial / discussion)	10% of final mark

Assignments:

Review papers: There are 6 short (750 word) review papers focused key topics covered in the course. These thematic short papers draw from both the course E-textbook and external literature sources. Due dates will be posted in canvas. Topics include hydrology, water balance, water quality, water use and allocation, cumulative effects and water management.

Reports: There are 3 reports in this course which combined cover the major components of a watershed assessment and an initial assessment of potential management options. These reports are project oriented, building on concepts covered in the course E-textbook and tutorial (or discussion) sessions. Due dates and details will be posted in canvas.

Tutorial participation / discussion: Students are responsible for weekly readings and are expected to participate in discuss topics in-class, to make group and individual presentations, and to present their final watershed assessments (as per the course schedule).

Academic Integrity

Academic honesty is a core value of scholarship. Cheating and plagiarism (including both presenting the work of others as your own and self-plagiarism), are academic offences that are taken very seriously at the University of British Columbia. By registering for courses at UBC, students have initiated a contract with the university that they will abide by the rules of the institution. It is the student's responsibility to inform themselves of the University regulations. Copying directly from the lessons, articles or websites is considered plagiarism, a mark of zero will be given (as a minimum penalty), and serious offenses will be reported to the Associate Dean Academic for review. Please ensure that you understand what qualifies as plagiarism before you hand in your assignment. Never use another author's ideas or phrasing without indicating a source, use quotation marks when quoting, and acknowledge the source. Definitions of Academic Misconduct can be found on the following website:

<http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,54,111,959#10894>

If you are unsure of whether you're properly citing references, please ask your instructor for clarification before the assignment is submitted. Improper citation will result in academic discipline.

Guidelines & grading rubric for LWS 515 / SOIL 515 review papers

- Maximum 750 words (not including references, tables, figures)¹
- Due prior to tutorial (4:30 p.m. Wednesdays) – as topics will be discussed in-class, no late assignments will be accepted. Assignments should be uploaded as one doc or pdf file to canvas.
- Reports must be written in your own words
- Six topics in total; topics assigned 1 week prior to due date (see course schedule)

Grading rubric for LWS / SOIL 515 review papers:

	Excellent	Good	Satisfactory	Unsatisfactory
Problem statement / topic focus (5%)	Introduction clearly and concisely outlines the topic and why it is important	Introduction outlines the topic and its importance	Introduction outlines the topic; relevance unclear	Topic not clearly defined
Depth of content / discussion (50%)	In-depth discussion and elaboration of relevant soil concepts and processes	Demonstrates knowledge of soil concepts	Omission of some pertinent content	Cursory discussion, lacks depth, missing key soil concepts
Integration of knowledge (30%)	Integrates concepts, synthesis of ideas; recognizes complexity	Integrates concepts, synthesis of ideas	Partial synthesis of ideas; inter-relationships not fully developed	Lacks integration
Summary (5%)	Concluding remarks explore implications	Some conclusions not supported	Conclusions not fully documented	Cursory or repetitive
Organization / structure / grammar (5%)	Well written report, flows logically, concepts linked; minimal grammar or spelling errors	Well written report, logical structure, minimal grammar or spelling errors	Well written report, lacks flows, some grammatical errors	Report unorganized, difficult to read; many grammatical / spelling errors
Sources (5%)	Well referenced (5+ citations); 1+ references from refereed journal articles; 3+ current sources ²	Good blend of references including journal articles; 3+ references cited; most references recent	Reliance on textbook, lacks journal article citation; < 3 references listed; many dated references (more than 10 years out of date)	Lacked sufficient references; reliance on textbook or internet sources ³ ; limited use of journal articles

¹ -10% deduction for exceeding the word count

² current sources published within last 10 years

³ internet sources for refereed journal articles or relevant reports is acceptable; consider the credibility of online sources

Guidelines & grading rubric for LWS 515 / SOIL 515 watershed assessment reports

- Maximum 2,500 words excluding Figures, Tables and References
- Submit in docx or pdf format; upload files to canvas
- Specifics for each report provided in canvas
- Reports must be written in your own words
- 3 assessment reports in total; see canvas for due dates

Grading rubric for watershed reports:

	Excellent	Good	Satisfactory	Unsatisfactory
Problem statement / topic focus (5%)	Introduction clearly and concisely outlines the topic and why it is important	Introduction outlines the topic and its importance	Introduction outlines the topic; relevance unclear	Topic not clearly defined
Depth of content / discussion (50%)	In-depth discussion and elaboration of relevant soil concepts and processes	Demonstrates knowledge of soil concepts	Omission of some pertinent content	Cursory discussion, lacks depth, missing key soil concepts
Integration of knowledge (30%)	Integrates concepts, synthesis of ideas; recognizes complexity	Integrates concepts, synthesis of ideas	Partial synthesis of ideas; inter-relationships not fully developed	Lacks integration
Summary (5%)	Concluding remarks explore implications	Some conclusions not supported	Conclusions not fully documented	Cursory or repetitive
Organization / structure / grammar (5%)	Well written report, flows logically, concepts linked; minimal grammar or spelling errors	Well written report, logical structure, minimal grammar or spelling errors	Well written report, lacks flows, some grammatical errors	Report unorganized, difficult to read; many grammatical / spelling errors
Sources (5%)	Well referenced (15+ citations); 5+ references from refereed journal articles; 5+ current sources ¹	Good blend of references including journal articles; 10+ references cited; most references recent	Reliance on textbook or limited journal article citations; 5-10 references listed; many dated references (more than 10 years out of date)	Lacked sufficient references; reliance on textbook or internet sources ² ; limited use of journal articles

¹ current sources published within last 10 years

² internet sources for refereed journal articles or relevant reports is acceptable; consider the credibility of online sources

Grading rubric for SOIL 515 / LWS 515 presentations:

	Excellent	Good	Satisfactory	Unsatisfactory
Visuals / slides (20%)	Clear, graphic, engaging, relevant, uncluttered	Clear, relevant, uncluttered	Relevant, too much information	Unclear, too much information
Message (50%)	Clear, concise message; conveyed the science and its relevance	Clear, concise message; conveyed the science; lacked clarity in why it is important	Clear message; lacked clarity in science and its importance	Key point(s) unclear
Delivery (20%)	Within time, spoke clearly, good eye contact, enthusiastic	Within time, spoke clearly	Roughly within time limit, referred to notes on occasion, lacked eye content	Read notes, over time, hard to hear / spoke to the screen
Questions (10%)	Answered questions well; demonstrated knowledge of the topic	Answered questions well	Answered questions satisfactorily	Struggled with questions