

APPLIED SCIENCE AND MANAGEMENT DIVISION

RRMT 239

Freshwater Ecosystems and Hydrology

3 Credits

Fall, 2020



COURSE OUTLINE

RRMT 239

FRESHWATER ECOSYSTEMS AND HYDROLOGY

3 CREDITS

PREPARED BY: Darrell Otto, Instructor

DATE: September 4, 2020

APPROVED BY: Joel Cubley, Chair, School of Science

DATE: October 2, 2020

APPROVED BY SENATE: Click or tap to enter a date

RENEWED BY SENATE: Click or tap to enter a date



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FRESHWATER ECOSYSTEMS AND HYDROLOGY

Instructor	Darrell Otto	Lectures:	Mon. & Wed. 1030 – 1200h
Office	A2303	Room	A2402 /Online
Telephone	668-8868	Lab:	Thurs.1300-1600h Thurs. 1700-2000h
Email	dotto@yukonu.ca	Room	A2805

COURSE DESCRIPTION

This is a two-component course intended to teach the student habitat assessment techniques for freshwater ecosystems; as well as basic elements of hydrology. The freshwater ecology portion of the course will emphasize the applied aspects of limnology. Laboratory sessions will focus on the collection of data relevant to the physical, chemical and biological variables that influence living organisms and their interactions within these systems. Topics covered include an overview of freshwater as environment, freshwater flora and fauna, population dynamics, community ecology, energy and chemical cycles. The hydrology portion of the course will study how water is distributed, moved and stored on a global scale, followed by a study of processes at smaller scale including precipitation, accumulation, surface and groundwater flow of water and ice together with the associated solution, erosion, transport and sedimentation actions. The course will also look at the conservation and protection of water as a resource for people, and as an essential environmental component.

LEARNING OUTCOMES

On successful completion of this course students will:

- Have a clear understanding of freshwater systems as an environment
- Recognize the diversity of aquatic organisms, their respective trophic levels and interactions.

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- Understand population dynamics, community ecology, energy flow and chemical cycles existing in freshwater systems.
- Have the basic skills necessary to assess freshwater habitats
- Understand fundamental hydrologic principles including the distribution of water and the pathways and mechanisms of water movement, measurement of precipitation and water flow, the watershed as a unit for study and management, water related processes including erosion, solution, transport and deposition.
- Recognize the role of water as a shaper of landscapes and as an essential component of ecosystems.

PREREQUISITES

Second year standing in Renewable Resources Management; BIOL 101 or RRMT 121 are course prerequisites. RRMT 125 and RRMT 149 are recommended, but not essential.

COURSE TRANSFER

This course is accepted for transfer as credit for Renewable Resources 250 – RENR 250 Water Resource Management - at University of Alberta.

COURSE FORMAT

Detailed notes will be provided to students via the course website on Moodle. Lectures will be via video in asynchronous format, at a pace of two (2) one-hour lectures per week. Laboratory exercises intended to reinforce course lecture topics will be held weekly.

There is a **mandatory** lab component to this course. There will be an emphasis on the applied aspects of fieldwork and data collection in conjunction with sample analysis and specimen identification techniques to be completed in the laboratory. Most of the fieldwork will be conducted in the water over the first eight weeks of the course, as weather permits. Lab sessions may be physically demanding, and appropriate clothing is necessary. **Successful completion of the lab component is required to gain credit for this course.** This means you must attend the labs, and receive a passing grade on the combined laboratory reports (30%) and lab exam (10%), as well as being successful on the lecture components to pass the course.

A major written assignment/term paper related to freshwater ecology or hydrology will be required for successful completion of the course.

EVALUATION

The lecture portion of the course will be evaluated by an in-class midterm examination of no more than 80 min. duration on October 14, 2020 during normal lecture time, and a 3-hour final exam set in the examination period on December 14, 2020 at 0900h.

The major assignment/term paper mark will be based on a final report and presentation of your findings.

Marks will be assigned as follows:

Mid-term exam	15%
Lab Reports	30%
Lab Exam	10%
Major Assignment	20%
Final exam	25%
Total	100

REFERENCE TEXTS:

The following textbook is relevant to this course and can be used to reinforce learning materials. A copy is on reserve at the library for you to use short term.

*Wetzel, R.G. Limnology: Lake and River Ecosystems. 3rd Ed. Academic Press San Diego California. 2002.

*Wetzel's book is intended for a more advanced class (usually 4th year level), but it is very comprehensive and considered a primary source for Freshwater Ecology and Limnology students.

Additional reading materials will be supplied or placed on reserve in the library.

PLAGIARISM

Plagiarism is a serious academic offence. Plagiarism occurs when students present the words of someone else as their own. Plagiarism can be the deliberate use of a whole piece of another person's writing, but more frequently it occurs when students fail to acknowledge and document sources from which they have taken material. Whenever the words, research or ideas of others are directly quoted or paraphrased, they must be documented according to an accepted manuscript style (e.g., APA, CSE, MLA, etc.). Resubmitting a paper which has previously received credit is also considered plagiarism. Students who plagiarize material for assignments will receive a mark of zero (F) on the assignment and may fail the course. Plagiarism may also result in dismissal from a program of study or the College.

ACADEMIC ACCOMMODATION

Reasonable accommodations are available for students requiring an academic accommodation to fully participate in this class. These accommodations are available for students with a documented disability, chronic condition or any other grounds specified in section 8.0 of the Yukon College Academic Regulations (available on the Yukon College website). It is the student's responsibility to seek these accommodations. If a student requires an academic accommodation, he/she should contact the Learning Assistance Centre (LAC) at (867) 668-8785 or lassist@yukonu.ca.

YUKON FIRST NATIONS CORE COMPETENCY

Yukon University recognizes that a greater understanding and awareness of Yukon First Nations history, culture and journey towards self-determination will help to build positive relationships among all Yukon citizens. As a result, to graduate from ANY Yukon University program, you will be required to achieve core competency in knowledge of Yukon First Nations. For details, please see www.yukonu.ca/yfnccr.

ACADEMIC AND STUDENT CONDUCT

Information on academic standing and student rights and responsibilities can be found in the current Academic Regulations that are posted on the Student Services/ Admissions & Registration web page.

**RRM 239/REN250 – Freshwater Ecosystems/Hydrology
Proposed Lecture Series – 2020**

Lecture #	Lecture Topics
1	Course Introduction
2	Water as Substance/Water as Environment
3	Water as Environment
4	Single Celled and Colonial Organism
5	Rotifers, Annelids and Arthropods
6	Larger Aquatic Organisms
7	Population Dynamics (changes over time)
8	Species Interactions and Community Structure
9	Community Ecology I
10	Community Ecology II
11	Midterm Exam
12	Community Ecology III
13	Aquatic Ecosystems – Energy Flow
14	Aquatic Ecosystems – Productivity
15	Aquatic Ecosystems – Physiological Ecology
16	Chemical Cycles I – Carbon and Oxygen
17	Chemical Cycles II – Nitrogen and Phosphorus
18	Chemical Cycles III – Silicon and Toxins
19	Water in Landscapes
20	Lake Origins
21	
22	

*A total of 28 lecture periods are available in the semester, but allowances are made for the fact that some lectures will overrun their allotted time due to volume of content.

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RRM239/REN250
Proposed Lab Sessions for Fall 2020

Week of:	Description	Location
Sept. 7	Lab #1 – Pond Life - Algae and Rotifers	Pond/Lab
Sept. 14	Lab#2 – Lake Zooplankton Identification and Density	Lab
Sept. 21	Lab#3 - Overwintering Stream Inverts as Bioindicators	McIntyre Creek/Lab
Sept. 28	Lab #4 – Wetland Classification	Wetland Sites
Oct. 5	Lab#5 - Icy Waters Case History	McIntyre Marsh
Oct. 12	Lab #6 – Small Stream Fish Habitat Assessment	Wolf Creek
Oct. 19	Lab #7 – Stream Discharge	McIntyre Creek
Oct. 26	Lab #7 – Lake Stratification	Lab
Nov. 2	Lab #8 – Sewage Treatment	Lab
Nov. 9	Lab #9 - Constructed Wetlands as Filters	Lab
Nov. 16	Lab #10 – Biological Oxygen Demand	Chem Lab
Nov. 23	Lab #11 – Watershed Drainage Patterns	Chem Lab
Nov. 30	Lab# 12 -	