

BIOL 346: Freshwater Ecosystems

January–April 2020

Course Schedule: Mondays and Thursdays 8:30AM – 9:50 AM; Room Elliott 060

Instructor: Hugh MacIntosh, Office: Petch 108, Email: fmacinto@uvic.ca

Office hours: Mondays and Thursdays, 10:00AM – 11:00AM

Course Summary:

This course will provide the basic understanding of the geological, physical, chemical, and biological processes that form and maintain freshwater ecosystems. Both theoretical and applied aspects of freshwater ecology will be covered, and the studies and experiments that have been used to test important theories and applications will be discussed. This course will also cover anthropogenic and environmental threats to and impacts on freshwater ecosystems.

Lectures and class material:

***There is no textbook for this class*.** Instead, I will provide reference reading material that you can use to prepare for or supplement the lectures. I have placed two books (“Limnology” by Jacob Kalff and “Ecology of Freshwaters” by Brian Moss) on reserve in the library for the course. They are good and detailed. Assessment will come from what is covered in lecture

Course Outline and Schedule:

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| Jan 6, 2020 | Describe course outline, marking scheme, introduction to the course, distribution of course materials, introductions |
| Jan 9, 2020 | Lecture-1: Freshwater as a unique and important substance; Inland waters and their catchments. |
| Jan 13, 2020 | Lecture-2: Hydrology and Climate; Origin and Age of Lakes. |
| Jan 16, 2020 | Lecture 3: Lakes and Catchment Morphometry; Rivers and Export of Materials from drainage basins and the atmosphere; Aquatic Systems and their catchments. |
| Jan 20, 2020 | Lecture-4: Light in Freshwater Ecosystems; Part 11: Temperature Cycles, Lake Stratification, and Heat Budget |
| Jan 23, 2020 | Lecture -5: Water movements in lakes and reservoirs; Salinity and Ionic compositions in freshwater ecosystems. |
| Jan 27, 2020 | Lecture-6 Variability of inorganic carbon and pH in freshwater ecosystems and their implications. Variability in dissolved oxygen concentrations and their implications for organisms in freshwater ecosystems. |
| Jan 30, 2020 | Lecture-7: Nutrients (P and N) in freshwater ecosystems: loading and cycling and their implications. |

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| Feb 3, 2020 | Lecture-8: Trace metals in freshwater ecosystems and their implications for ecosystem and human health; Sedimentations of materials in lake ecosystems. |
| Feb 6, 2020 | Midterm exam 1 |
| Feb 10, 2020 | Lecture-9: Phytoplankton in lake ecosystems: their composition, size distribution, seasonality, sedimentation, and implications for the health of lake ecosystems. |
| Feb 13, 2020 | Lecture-10: Bacteria: their role and importance in FW ecosystems. |
| Feb 17-21, 2020 | Reading break |
| Feb 24, 2020 | Lecture-11: Zooplankton: their composition and variability in FW ecosystems and their implications for the structure and function of lake ecosystems. |
| Feb 27, 2020 | Lecture-12: Benthic plants and zoobenthos in Lake ecosystems: their importance in wetlands, their distribution, composition and implications for ecosystem health, eutrophication and health of ecosystems. |
| Mar 2, 2020 | Lecture 13: Fish and water birds in freshwater ecosystem. |
| Mar 5, 2020 | Lecture 14: Acid rain and acidification of lake ecosystems. |
| Mar 9, 2020 | Midterm exam 2 |
| Mar 12, 2020 | Lecture-15: Contaminants in freshwater ecosystems: implications for ecosystem and human health. |
| Mar 16, 2020 | Lecture-16: Reservoir formation for drinking water and hydroelectric production: their implications for reservoir and downstream ecosystems. |
| Mar 19, 2020 | Lecture-17: Uses, abuses and restoration of headwater streams and rivers. |
| Mar 23, 2020 | Lecture 18: Uses, abuses and restoration of standing water. |
| Mar 26, 2020 | Lecture 19: Climate Change and the future of freshwaters. |
| Mar 30, 2020 | Lecture 20: Integration of physical, chemical and biological processes. |
| April 2, 2020 | Final lecture – wrap up and summary |

Course evaluation and distribution of marks:

- A) Mid-term exam 1 (February 6th, 2020; 1.5 Hrs; will cover material from lectures 1-8) – Mid-term exam will emphasize on the understanding of concepts, theories and definitions as well as factual information. **Total marks: 25%**
- B) Mid-term exam 2 (March 9th, 2020; 1.5 Hrs; will cover material from lectures 9-14) – Mid-term exam will emphasize on the understanding of concepts, theories and definitions as well as factual information. **Total marks: 25%**
- C) Final exam (To be scheduled by UVic; will be cumulative, covering material from all– Final Exam will emphasize on the understanding of concepts, theories and definitions as well as factual information. **Total marks: 50%**

Other Information

UVic Grading Scale: A+ (90-100); A (85-89); A- (80-84); B+ (77-79)
B (73-76) B- (70-72); C+ (65-69); C (60-64); D (50-59); F (0-49)

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Diversity: The University of Victoria is committed to fostering inclusive practices in and out of the classroom. As your instructor, I am also highly committed to inclusionary principles that not only tolerate differences in race/ethnicity, age, gender, sexuality, socio-economic status, first language, country of origin, ability, etc. but that welcome these differences as enriching to all members of this course and the wider community. Your diverse positions, identities and experiences will inform much-needed diversity in class discussions.

Feedback: The Course Experience Survey is a useful mechanism to communicate to me. Please give me, and the Department, your feedback.

www.uvic.ca/learningandteaching/faculty/resources/ces/