BIOLOGY 438 A01 (CRN 10432)
NUTRIENT CYCLING AND PROKARYOTES
September 7– December 4 2023
COURSE OUTLINE

PROFESSOR:
RÉAL ROY, Ph.D.
Office: Cunningham 048a email realroy@uvic.ca

LECTURES
Monday, Thursday 8:30-9:50
MAC D288

OFFICE HOURS:
Monday, 10:00 am to 12:00 am
CUN 048 or
Zoom Meeting Room (send email request)
https://uvic.zoom.us/j/4695576594?pwd=Z0VxbTk4WmF1TEFyZHZjWHlzYnRzUT09

COURSE DESCRIPTION

An introduction to prokaryotes (bacteria and archaea) and their role in nutrient cycling in forests, lakes and oceans. Diversity and evolution of populations and communities of prokaryotes and their role in the major biogeochemical cycles: carbon, nitrogen, sulfur. Genetic, biochemical, physiological and ecological aspects of processes such as nitrogen fixation and methanogenesis; design of experimental approaches to assess cycling of elements in forests, lakes and oceans by prokaryotes.

LEARNING OUTCOMES

At the end of this course you will be able to:
1) Define, explain and analyze populations of prokaryotes in various natural systems.
2) Define, explain and analyze the contribution of prokaryotes to various communities.
3) Explain how prokaryotes contribute to the functioning of ecosystems by analyzing the contribution of prokaryotes in
   a. the cycling of carbon
   b. the cycling of nitrogen.
4) Design observational and experimental approaches to study prokaryotes in various ecosystems:
   a. Soil and sediment
   b. Freshwater and marine systems
   c. Extreme environments.
5) Understand connection between the diversity of prokaryotes and their fundamental contributions to energy transfer and material cycling in natural ecosystems.
6) Evaluate critically primary literature published in the area of microbial ecology.

EVALUATION

**Required**
1. Midterm 1: 30% September 28 8:30-9:30 am CLE A102
2. Midterm 2: 30% November 2nd 8:30-9:30 am CLE A102
3. Final: 40% (in December during exam period): TBA

All examinations will be conducted on-line using Brightspace in a designated room at UVic. **Students missing the midterm for illness need to notify me by email prior to the examination. A remedial examination will be scheduled as soon as possible after the midterm.**

**Facultative**
4. Bonus Assignments (to prepare midterms and final exams and up to 5% of final marks):
   Some example of the past
   
   1. Reading of articles like:

   2. Critical presentation of a scientific article.
      1) 2-page summary and critique of a published article.
      2) Powerpoint presentation (5 minutes, 5 slides maximum)

   3. Mount Douglas Park Microbial Communities and Nutrient cycling.
      1) Powerpoint presentation: 10 slides: 5 different communities

Assignments are facultative but intended to prepare for the midterm and final examinations. Examinations may even include some questions from the assignments. Students are therefore encouraged to do the assignments. Bonus points may also be given after the final examination for completion of the assignments.

**IMPORTANT:** assignments must be submitted at the time specified to be counted as bonus marks.
Grading scheme: A+ (90-100%), A (85-89.5%), A- (80-84.5%), B+ (77-79.5%), B (73-76.5%), B- (70-72.5%), C+ (65-69.5%), C (60-64.5%), D (50-59.5%), F (<50%, after final)

ATTENDANCE

Attendance to lecture is expected (attendance sheet will be circulated from time to time to record a sample of attendance).

Attendance to evaluations (midterms and final examination) is also recorded and required for marking of evaluation.

RECORDING OF LECTURES ON ECHO 360

This course is delivered in a face-to-face format. Zoom lectures may be done if for some reason (illness) I cannot come to campus to give the lecture.

I intend to record the lectures using Echo 360. But I cannot guarantee a recording in case of technical problems.

If lectures have been recorded, they will be available upon request for students who missed a lecture for illness or another legitimate reason.

NO CLASSES ON THANKSGIVING AND READING BREAK.

THE DEPARTMENT OF BIOLOGY DOES NOT OFFER SUPPLEMENTAL FINAL EXAMS.

ABSENCE TO THE EXAMS FOR HEALTH PROBLEM WILL BE GRANTED ONLY WITH THE SUBMISSION OF A DOCTOR'S NOTE.

UVic is committed to promoting, providing and protecting a supportive and safe learning and working environment for all its members.

Territorial Acknowledgement
We acknowledge and respect the lək̓ʷəŋən peoples on whose traditional territory the university stands and the Songhees, Esquimalt and W̱SÁNEĆ peoples whose historical relationships with the land continue to this day.

Attendance and absences
Medical documentation for short-term absences is not required for the Fall 2021 term (approved by Senate). Attendance is important. Students who can not attend due to illness are asked to notify their instructors immediately. If illness, accident, or family affliction causes a student to miss the final exam or to fail to complete any assignment by the end of the term students are required to submit a request for academic concession.

- Policies regarding undergraduate student academic concessions and deferrals are also detailed on the Undergraduate Records. Students must submit a submit a Request for Academic Concession.

Academic Integrity
Students are required to abide by all academic regulations set as set out in the University calendar, including standards of academic integrity. Violations of academic integrity (e.g. cheating and plagiarism) are considered serious and may result in significant penalties.
Class recording (Echo360)
Be aware that sessions in this course may be recorded to allow students who are not able to attend to watch later. The recording will be posted in Brightspace. Students who have privacy concerns can contact me and will have the option to limit their personal information shared in the recording. If you have other questions or concerns regarding class recording and privacy please contact privacyinfo@uvic.ca.

Transcription & Captioning
Auto-generated transcription and captioning is enabled in this course. Please be aware that automated transcription and captioning is at best 70-90% accurate and by nature will include error. This depends on the subject matter, speaker, audio quality etc. Words prone to error include specialized terminology and proper names. Students are asked to refer to the audio feed for clarification of any errors. If you find transcription or captioning that is offensive, please contact your instructor and/or teaching assistant so that they are aware. If you require captions as part of an academic accommodation, please contact CAL.

Copyright
All course content and materials are made available by instructors for educational purposes and for the exclusive use of students registered in their class[1]. The material is protected under copyright law, even if not marked with a ©. Any further use or distribution of materials to others requires the written permission of the instructor, except under fair dealing or another exception in the Copyright Act. Violations may result in disciplinary action under the Resolution of Non-Academic Misconduct Allegations policy (AC1300).

Online conduct
The University of Victoria is committed to promoting critical academic discourse while providing a respectful and supportive learning environment. All members of the university community have the right to this experience and the responsibility to help create such an environment. The University will not tolerate racism, sexualized violence, or any form of discrimination, bullying or harassment.
Please be advised that, by logging into UVic’s learning systems or interacting with online resources, and course-related communication platforms, you are engaging in a university activity.
All interactions within this environment are subject to the university expectations and policies. Any concerns about student conduct may be reviewed and responded to in accordance with the appropriate university policy. To report concerns about online student conduct: onlineconduct@uvic.ca

Mental Health
A note to remind you to take care of yourself. Diminished mental health can interfere with optimal academic performance. Do your best to engage in self-care and maintain a healthy lifestyle this semester. This will help you achieve your goals and cope with stress. All of us benefit from support during times of struggle. You are not alone. The source of symptoms might be related to your course work; if so, please speak with me. However, problems with other parts of your life can also contribute to decreased academic performance. The UVic Student Wellness Centre provides cost-free and confidential mental health services to help you manage personal challenges that impact your emotional or academic well-being.
LECTURE TOPICS (Tentative: Not all topics may be covered depending on the time available)

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<thead>
<tr>
<th>Date</th>
<th>Topics</th>
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<tbody>
<tr>
<td>Th</td>
<td>Sept. 7  Introduction</td>
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<tr>
<td>M</td>
<td>Sept. 11 1. Ecosystem Energetics</td>
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<td>Th</td>
<td>Sept. 14</td>
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<td>M</td>
<td>Sept. 18 2. Decomposition and Nutrient Cycling</td>
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<td>Th</td>
<td>Sept. 21</td>
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<td>M</td>
<td>Sept. 25 3. Hubbard Brook: A Model Ecosystem</td>
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<td>Th</td>
<td>Sept. 28  MID-TERM EXAM 1 (30%)</td>
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<td>M</td>
<td>Oct. 2   Day for Truth and Reconciliation: No class</td>
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<td>Th</td>
<td>Oct. 5   4. Biogeochemical Cycles</td>
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<td>Oct. 9   Thanksgiving: No class</td>
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<td>Th</td>
<td>Oct. 12  5. Microbial Systematics and Methods</td>
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<td>Th</td>
<td>Oct. 19  7. Carbon Cycle: Respiration (bioremediation)</td>
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<td>Th</td>
<td>Nov. 2   MID-TERM EXAM 2 (30%)</td>
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<td>Nov. 6   Remembrance Day &amp; Reading Break: No class</td>
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<td>Th</td>
<td>Nov. 9</td>
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<td>M</td>
<td>Nov. 13  Remembrance Day &amp; Reading Break: No class</td>
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<td>Th</td>
<td>Nov. 16  11. Nitrogen Cycle: Nitrogen fixation</td>
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<td>M</td>
<td>Nov. 20  12. Nitrogen Cycle: Nitrification</td>
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<td>Th</td>
<td>Nov. 23  13. Nitrogen Cycle: Denitrification</td>
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<td>M</td>
<td>Nov. 27</td>
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<td>Th</td>
<td>Nov. 30</td>
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<td>M</td>
<td>Dec. 5   LAST CLASS</td>
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<td>Dec.</td>
<td>FINAL EXAMINATION (40%)</td>
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RECOMMENDED TEXTBOOK AND REFERENCES

Recommended textbook


Other references

General textbooks


**Hubbard Brook Ecosystem Study**

**Other textbooks**

**Taxonomy**

**Genetic diversity**

**Biogeochemical cycling**

**Nitrogen cycle**
Soil Microbiology

Aquatic Microbiology

Fermented Food

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