

UNIVERSITY OF VICTORIA
Department of Biology & School of Earth and Ocean Sciences

BIOL/EOS 311: BIOLOGICAL OCEANOGRAPHY - Syllabus
Fall 2016 (201609) – A01

Course Instructor: Dr. Diana Varela
Email: dvarela@uvic.ca
Office/Phone: Bob Wright Centre (BWC) A333; 250-472-5425
Office Hours: by appointment

Course Objectives: The objective of this course is to introduce the field of biological oceanography and explore how interactions between biology, chemistry and physics regulate the structure, function and productivity of marine ecosystems. Although we will consider a variety of marine ecosystems, we will focus primarily on planktonic systems.

Lectures: Tuesday, Wednesday and Fridays 11:30 AM -12:20 PM
Bob Wright Centre (BWC) A104

Optional Textbook: “**Biological Oceanography - An Introduction**” (2nd edition) by Lalli & Parsons is freely available online through the UVic library:
<http://www.sciencedirect.com/science/book/9780750633840>. It is also available at the UVic Bookstore. The reserve section in the library will hold some relevant material, including a copy of the 1st edition of this textbook.

The following site will also help in your research for course assignments:
<http://libguides.uvic.ca/BiologicalOceanography>

Laboratories: Labs will be held in the Petch building (PCH) 107 and begin on Tuesday September 13th. All lab sections are full so you can only attend the section in which you are officially registered. There will also be a six-day research cruise on UVic’s research vessel, the RV *John Strickland*, between **September 27th – October 2nd**. Each student is required to participate in one full-day of the cruise. Data collected on these trips will form the basis for subsequent laboratory analyses and assignments. More information on the *Strickland* trips and lab exercises will be provided during lecture and labs throughout the term.

There is no formal lab manual. Lab handouts, guidelines for lab reports and lecture notes will be posted on CourseSpaces as required. It is your responsibility to check CourseSpaces regularly and before every lecture and lab.

Laboratory Personnel:

Senior Laboratory Instructor: Sarah Thornton, sarahjt@uvic.ca
Teaching Assistants: Maeva Perez, maeperez@uvic.ca
Theresa Venello, venellot@uvic.ca
Lucianne Marshall, lucimm@uvic.ca

Marking Scheme:

Lecture Component (60%):	
Midterm Exam I (Tue Oct 11)	12.5%
Midterm Exam II (Fri Nov 04)	12.5%
Final Course Exam	35%
Laboratory Component (40%):	
See mark break-down in lab schedule	40%
<hr/> Final Course Mark	<hr/> 100%

Students must achieve a passing grade ($\geq 50\%$) in BOTH the lecture component ($\geq 30/60$) and laboratory component ($\geq 20/40$) to pass the course.

Grading Scheme:

A+	90 - 100%	B+	77 - 79%	C+	65 - 69%	F	0 - 49%
A	85 - 89%	B	73 - 76%	C	60 - 64%	N	0 - 49%
A-	80 - 84%	B-	70 - 72%	D	50 - 59%		

F: Unsatisfactory performance, wrote final exam and completed course requirements, no supplemental.

N: Did not write exam or complete course requirements by the end of term, no supplemental.

Freedom of information legislation allows the instructors to post full student numbers and grades, with names stripped out. Students have the right to refuse grade posting but must inform the instructor in writing at the beginning of the course. Final grades will be made available no sooner than one week after the Final Exam.

Examinations:

- Students are required to write all Exams. If you must miss any Exams for a *valid well-documented reason* (illness, accident, family affliction or official sporting commitments as a UVic athlete), you must notify Dr. Varela as soon as possible and provide *suitable* written documentation (original note from a medical doctor, counselor or UVic coach). If you are excused from the missed Exams, you will have the Final Exam count for 47.5% of the final course mark if you miss Midterm Exam I or II, or 60% if you miss Midterm Exams I and II. If you are not excused from the missed Exam/s, you will receive a zero for the exam/s you miss.
- The Final Course Exam cannot be written early under any circumstances. However, it can be deferred in cases of illness, accident, family crisis, or official commitments as a UVic athlete. If you miss or expect to miss the Final Exam for any of these reasons, please notify the course instructor, Dr. Varela, as soon as possible. When you are able to do so, you must request a Deferred Final Exam at Records Services on a *Request for Academic Concession* form.
- Travel plans are not a valid reason for missing exams or assignments, even if plans have been made and tickets purchased for you without your knowledge. Specifically, the date for the BIOL/EOS 311 Final Exam will not be known until the final exam schedule is posted later in the term. The last day for final exams this term is Monday December 19th. You are safe to make travel arrangements for *after* that date.
- Students must obtain a passing grade in the laboratory component to be permitted to write the Final Exam.
- Exams will contain a combination of definitions, plus several short and longer (e.g. multi-part or essay) questions. The Final Exam will include all of the course material covered in lectures and laboratories since the beginning of the course.
- All course materials (*i.e.* instructor commentaries, class discussions and figures, posted notes, readings and lab materials) are fair game for Midterm and Final Exams. The textbook readings may help you to supplement the lecture material and provide you with additional insight and illustrations, and in-depth explanations.
- Students who require special arrangements for testing should contact the Resource Centre for Students with a Disability (RCSD) to register and request academic accommodations *at the beginning of the term (during the first two weeks of classes)*. <http://www.uvic.ca/services/rcsd/>
- No supplemental examinations or additional course work (for extra marks) are offered in this course.

Course Experience Survey (CES)

Towards the end of term, as in all other courses at UVic, you will have the opportunity to complete a confidential course experience survey regarding your learning experience. The survey is vital to providing feedback regarding the course and the instructor's teaching, as well as to help the department improve the overall program for students in the future. Results are available to course instructors only after final grades have been submitted.

When it is time for you to complete the survey, you will receive an email inviting you to do so, or you can go directly to <http://ces.uvic.ca>. You will need to use your UVic Netlink ID to access the survey, which can be done on your laptop, tablet or mobile device. Please consider this important activity.

Academic Regulations:

Please read the appropriate section of the 2016-2017 University of Victoria Undergraduate Calendar (<http://web.uvic.ca/calendar2016-09/undergraduate-201609.pdf>), particularly the General, Undergraduate and Faculty of Science sections, regarding your rights and obligations. It is the student's responsibility to attend to ADD/DROP dates published in the Calendar and posted on the Undergraduate Records website. Students must not assume they will be dropped automatically from any course they do not attend.

Be sure to check the **important dates** in page 7 of Calendar and in <http://web.uvic.ca/calendar2016-09/general/dates.html>

It is also the students' responsibility to check their records and registration status (<http://www.uvic.ca/registrar/>). In addition, students need to check the Calendar course descriptions for all currently registered courses and transfer credit to check for duplicate or mutually exclusive (DUP or M/X) courses that would result in denial of course credit and/or influence eligibility for student loans.

Plagiarism and cheating are considered very serious offenses subject to disciplinary action. It is your responsibility to understand the University's policy on **academic integrity**. Please check the University's Policy on Academic Integrity in the Calendar:

<http://web.uvic.ca/calendar2016-09/undergrad/info/regulations/academic-integrity.html>

and the UVic library's website on plagiarism:

<https://www.uvic.ca/library/research/citation/plagiarism/index.php>

Academic integrity is intellectual honesty and responsibility for academic work that you submit individually or as group work. It involves commitment to the values of honesty, trust, and responsibility. It is expected that students will respect these ethical values in all activities related to learning, teaching, research, and service. Therefore, plagiarism and other acts against academic integrity are serious academic offences.

The responsibility of the institution

Instructors and academic units have the responsibility to ensure that standards of academic honesty are met. By doing so, the institution recognizes students for their hard work and assures them that other students do not have an unfair advantage through cheating on essays, exams, and projects.

The responsibility of the student

Plagiarism sometimes occurs due to a misunderstanding regarding the rules of academic integrity, but it is the responsibility of the student to know them. If you are unsure about the standards for citations or for referencing your sources, ask your senior lab instructor or the course instructor. Depending on the severity of the case, penalties include a warning, a failing grade for an assignment/exam, a failing grade for the course, a record on the student's transcript, or a suspension.

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

LECTURE SCHEDULE

BIOL/EOS 311 - 201609

Lectures are held in BWC A104

Date Range	Lecture Topics	
Sep 7 – Sep 23	Introduction to the course	
	The abiotic marine environment	
	Key players: Phytoplankton	
	Key players: Zooplankton	
	Biological oceanographic sampling methods	
	Factors regulating primary production: Light	
Sep 27– Oct 2	STRICKLAND FIELD TRIPS – No lectures or labs this week	
Oct 4 – Oct 7	Factors regulating primary production: Light (cont.)	
	Oceanographic data analysis and presentation*	
	Factors regulating primary production: Nutrients	
Oct 11 (Tuesday)	MIDTERM EXAM I – 50 minutes	
Oct 12 – Nov 2	Factors regulating primary production: Nutrients (cont.)	
	The role of micronutrients in marine productivity	
	Plankton blooms and global primary production	
	Key players: Microbes and viruses	
	Underwater observatories: Ocean Networks Canada (ONC) **	
	Regulation of secondary production	
Nov 4 (Friday)	MIDTERM EXAM II – 50 minutes	
	Oceanography of anoxic and hypoxic basins	
	<i>No lectures or labs - Reading Break / Statutory Holiday</i>	
	Nov 15 – Dec 2	Coastal and open ocean ecosystems
		Seamount ecosystems
		Mid-water and deep-sea ecosystems
Fisheries oceanography		
Atmosphere-ocean interactions and effects on marine ecosystems		
Polar marine ecosystems		
No date yet (between Dec 5 – 19)	FINAL EXAM – 3 hours	

* This lecture will provide the tools required for the successful completion of relevant course assignments and reports. **Do NOT miss it!**

** This lecture will provide information required for the ONC lab. *Don't miss it either.*

LABORATORY SCHEDULE

BIOL/EOS 311 – 201609
Laboratories are held in PCH 107

Date	Lab Exercise	Mark Breakdown (% of course mark)
Sep 7 – 9	No labs	
Sep 13 - 16	Lab 1: Marine Plankton Diversity and Abundance; Introduction to Zooplankton Field Gear	In-class assignment-1 (1.5%)
Sep 20 - 23	Lab 2: Preparation for Strickland Cruise: <ul style="list-style-type: none"> • Introduction to Study Area, Sampling Design and Cruise Logistics • Demonstration of Oceanographic Field Gear • Graphing of past CTD data 	In-class assignment-2 (1.5%)
Sep 27 – Oct 2	Lab 3: Field Trips - STRICKLAND CRUISE	
Oct 3 (Monday)	Annotated Bibliography Assignment DUE*	Take-home assignment-1 (5%)
Oct 4 – 7	Lab 4: Analysis of Strickland Samples: Zooplankton Biomass and Composition	In-class assignment-3 (1.5%)
Oct 11 – 14	Lab 5: Analysis of Strickland Samples: <ul style="list-style-type: none"> • Phytoplankton Biomass • Nutrient Chemistry I 	In-class assignment-4 (1.5%)
Oct 18 – 21	Lab 6: Analysis of Strickland Samples: <ul style="list-style-type: none"> • Nutrient Chemistry II 	In-class assignment-5 (1.5%)
Oct 25 – 28	Lab 7: Students' Oral Presentations on Current Topics in Biological Oceanography	<i>In-class presentation</i> (5%)
Nov 1 – 4	Lab 8: Ocean Networks Canada (ONC) – Buoy Profiling System	Take-home assignment-2 due Monday Nov 14th

Date	Lab Exercise	Mark Breakdown (% course mark)
Nov 8 - 11	No labs (Reading break)	
Nov 14 (Monday)	ONC Lab Assignment DUE*	Take-home assignment-2 (2.5%)
Nov 15 - 18	Lab 9: Graphing tutorial	
Nov 22 – 25	<i>No formal labs, but lab instructors available during lab hours for consultations on Strickland Data Integration and Discussion</i>	
Nov 28 (Monday)	Strickland Project DUE*	Take-home assignment-3 (20%)
Nov 29 – Dec 2	No labs	

*** NOTE:** For All Take-Home assignments:

- Due at **4:00 PM** on the dates specified above.
- **Hardcopies and** electronic copies are required and must be identical. They are **both** due by the deadline.
- Hardcopies must be handed in to the SEOS Office (BWC A405).
- Electronic copies must be submitted to the assignment dropbox on CourseSpaces.
- Late submissions are penalized by 10% per day (note that the weekend counts).

INFORMATION ABOUT THE LABORATORY COMPONENT

BIOL/EOS 311 labs aim to provide you with:

- *Exposure to various principles in biological oceanography*
- *Opportunities to learn some techniques used in biological oceanography*
- *Skills in data acquisition, presentation, and interpretation*
- *Skills in presenting and discussing scientific information in written and oral formats*
- *Opportunities to develop critical thinking and time management skills.*

All lab exercises will be posted on CourseSpaces prior to your lab session. We will assume you have read over each lab exercise, both the introduction and procedure sections, and any related material posted prior to the start of each lab. You are expected to bring a hardcopy of these lab exercises to your lab session.

Grading Scheme Summary

The lab portion of BIOL/EOS is worth 40% of the final course grade. The grade will be calculated as follows:

Assignments	% of final course mark
5 In-Class Assignments	7.5%
3 Take-Home Assignments	
Annotated Bibliography	5%
ONC Lab Report Data Analysis/Graphing	2.5%
Strickland Data Report – Graphs and Discussion	20%
1 In-Class Oral Presentation	5%
TOTAL LAB	40%

Details and Deadlines

All assignments must be completed to get credit for this course. In particular, failure to complete any of the take-home assignments will result in a grade of N.

Please pay attention to details and deadlines in the laboratory schedule. **Late assignments will be penalized by 10% per day**, unless there is a valid excuse with appropriate documentation (please refer to 'Academic Concessions' in the UVic academic calendar). However, even if there is a valid documented excuse for submitting a late assignment, the take-home assignments must still be completed and submitted to get credit for this course.

Your assignments must be submitted as hardcopies and also in electronic format. Hardcopies of assignments must be handed in to the drop box in the SEOS Office (SCI A405) before 4 PM on the due date. Do not submit assignments to anyone else and do not slide them under our office doors. Electronic copies must be submitted to the assignment dropbox on CourseSpaces. Both hard and electronic copies must be identical and are both due by the specified deadline.

Challenges and queries pertaining to assignments and presentations will only be considered **for one week** after receiving your grade. Please be advised that if you request your work to be remarked, the assessment of the remarked work will be the final mark (not the higher or the average of the two marks). Please make sure to discuss any concerns with the laboratory instructor (TA) who assessed your work first. If you still have concerns afterwards, please feel free to contact the senior laboratory instructor (Sarah Thornton) or the course instructor, Dr. Diana Varela.

Laboratory Attendance

Participation in your weekly lab section is mandatory.

If you miss a laboratory exercise or in-class assignment without providing a valid reason and proper documentation, you will receive zero on any assignment based on that exercise.

In case of illness or family crisis, you can be excused only if you have the proper *original* written documentation such as a medical doctor's or professional counselor's note. An original note from University Health Services can also be accepted. Absence due to commitments as a UVic athlete (during official varsity events) or other official University-related events is accepted, but only with an original signed letter in advance from your team's coach. Notes related to laboratory absences should be provided to the Senior Laboratory Instructor, Sarah Thornton, sarahjt@uvic.ca.

Absences due to family occasions (reunions, weddings, etc.) are not valid excuses for missed laboratories or assignments, so please do not expect concession in these cases. There is no opportunity to make up a missed exercise in future weeks.

You may only attend the section for which you are registered.

Participation in one full-day oceanographic field trip is mandatory (no exceptions). You will be asked to sign up for one full-day trip, which will take place during the week of **September 27th (Tuesday) - October 2th (Sunday)**. You will be informed when sign up starts.

The Laboratory Instructor's Role

The laboratory instructor's (aka TA's) role is primarily to teach and assist in your development of laboratory skills, familiarize you with the operation of equipment and make you aware of safety-related issues.

Instructors are not required to explain the exercise in detail at the beginning of each session. However, the instructors are willing to help direct your thinking about any questions you may have. They are not required to provide direct answers to questions on assignments.

If you have a concern about any aspect of the laboratories, you must discuss it first with your TA. If you are uncomfortable doing this or your concern is not resolved satisfactorily, please feel free to discuss it with the senior laboratory instructor, Sarah Thornton. You can make an appointment by e-mail. You can also contact the course instructor, Dr. Diana Varela.

Getting Extra Help: You are welcome to contact your laboratory instructor by email if you need additional help with take-home assignments. If they are unable to answer your queries by email they may set up a time and place to meet with you. Therefore, when contacting your lab instructor by email please include suitable times in your schedule for such meetings. However, the lab instructors reserve the right to set up fixed office hours.

Lab Assignments and Presentations

In-Class Assignments

During the BIOL/EOS 311 labs, you will complete in-class assignments. These assignments may consist of presenting the data collected during the lab, analysis of previously collected data and/or answering questions. These assignments will be due at the end of your lab session unless otherwise specified.

Take-Home Assignments

During this course, you will conduct a research project that comprises the collection of oceanographic data and samples in the field, the description of the study sites based on published literature, the analysis of samples in the lab, and the analysis and interpretation of the data. Two of your take-home assignments are directly based on this data project.

Detailed guidelines and assessment criteria for each one of the following take-home assignments will be provided in CourseSpaces. The following is just a brief summary:

Take-Home Assignment-1: Annotated Bibliography

You will be asked to find several published papers about the oceanography of the study region, and write a concise summary of each source and assess its relevance to the Strickland project.

Take-Home Assignment-2: ONC Buoy Profiler Lab

This is a short assignment based on the ONC lab (Lab 8). While all previous labs had an in-class assignment, we're allotting a bit more time for this assignment. The tasks in this lab will help prepare you for the graphing and analysis needed for your Strickland Project.

Take-Home Assignment-3: Strickland Project

This is the longest and most challenging of your assignments in which you will graph all the Strickland data collected in a concise and well-organized manner, and describe the trends observed. Then you'll interpret trends and compare your findings to those in the published literature. Be sure to start this work **early**. Do not leave it to the last minute!

Oral Presentation

You and a partner will give an oral presentation during the labs held on the week of October 25 - 28 that will expand on topics covered during this course. Dr. Varela will provide topics for you to choose from and starting reading materials in CourseSpaces. Topic and partner signups will occur during Lab 4 (Oct 4-7).

Laboratory and Field Safety

Your safety is your responsibility. The course staff, the Department of Biology and the School of Earth and Ocean Sciences provide the necessary conditions and equipment to help ensure your protection from potentially dangerous situations, but ultimately you play the largest role in protecting yourself and your lab partners.

1. Wear protective laboratory clothing, (*i.e.* lab coats, safety glasses) in the laboratory as required (Labs 1, 4-6). Specifically, bring your lab coats to the Nutrient Chemistry labs, Parts I and II (you will be reminded by the TA in advance). Lab coats must not be worn outside the laboratory. Safety glasses must be worn during the Analysis Labs. Bring your own (or borrow our slightly scratched older ones).
2. Wear shoes with closed toes and heels, and non-slip soles for all Analysis Labs (Labs 1, 4 - 6). Students wearing inappropriate shoes may be denied entry to the lab.
3. Protective gloves will be available for use during the labs. Please notify your lab instructor if you are allergic to latex so that we can provide you with an alternative glove type. Be sure to remove gloves prior to touching community items such as taps or doorknobs. Dispose of used gloves as directed by your instructor.
4. Eating, drinking, or storing food are not permitted in the laboratory.
5. Mouth pipetting is prohibited. When using a pipettor, the tips must be discarded by using the tip ejector and into the appropriate waste containers.
6. Long hair must be tied back in experimental settings.
7. Hands must be washed before leaving the laboratory and at any time after handling materials known or suspected to be contaminated.
8. Wipe up any spills immediately. Consult the lab instructor as to any clean up or disposal of chemicals, potential biological hazards, or sharps (broken glass, used razor blades, etc.).
9. Exercise extreme caution when working on the UVic research vessel (Strickland). *Pay close attention and follow all safety rules that will be explained to you during the lab previous to the cruise and at the start of your field day.*
10. If a student has a medical condition such as diabetes, epilepsy or allergies, which might require intervention on the part of the course staff, the student should inform the course instructor at the beginning of the course (this information will be kept in complete confidence).

Academic Integrity

Please note that submitting other people's work as one's own, whether that of a fellow student or a published author, in whole or in part, is considered plagiarism. Committing this offence, whether or not one is caught, is inexcusable.

To avoid possible accusation of violating academic integrity, understand that:

1. Although laboratory partners are encouraged to work together in order to improve their understanding of the topics, each student must write up all individual assignments independently. Students must have the permission of the instructor before sharing data, text, or other work with **any other student**. Students must not allow others to duplicate their work without the instructor's permission. Duplicate or group assignments are not permitted without the instructor's permission. Do not provide access to your work to others. If another student submits all or parts of your assignment as his or her own, you may both be investigated for violating academic integrity.
2. Regardless of the type of information sources (books, journal articles, websites, etc.) you access (e.g. in order to provide background information or to support your arguments), **your assignment must be written in your own words. Do not copy sentences or parts thereof from the source and paste them into your assignment. Do not quote, merely re-arrange or substitute the occasional word in source material, as this does not constitute original work.**
3. Properly credit any source you use by citing it within the body of the text as well as providing the full reference in the 'References' section at the end of your assignment. Please SEE NEXT PAGE on "How to Properly Reference Scientific Materials in all your Assignments for this course".
4. Provide sufficient information for the marker to check your sources. Failure to do this could raise suspicion.
5. **Instructors of this course reserve the right to use plagiarism detection software or other platforms to assess the integrity of student's work.**
6. Carefully read the section on "Academic Regulations" in page 3 of this Course Syllabus.

How to Properly Reference Scientific Materials in all your Assignments for this course

Scientific references must be cited in the main body of an assignment *and* listed at the end of an assignment.

To see how scientific references should be cited in your assignment, check the *Journal of Geophysical Research – Oceans* or *Global Biogeochemical Cycles* (both are published by the AGU and have the same requirements). Go to <http://publications.agu.org/author-resource-center/text-requirements/reference-format/> for instructions or look at some recent articles in the journals: <http://agupubs.onlinelibrary.wiley.com/agu/jgr/journal/10.1002/%28ISSN%292169-9291/>, and <http://agupubs.onlinelibrary.wiley.com/agu/journal/10.1002/%28ISSN%291944-9224/>

In-text citations should be given using the surname of the author (*in italics*) and the year of publication [*Author*, Year]. If there are three or more authors, use the *et al.* construction [*Author et al.*, Year].

The full citation for each reference at the end of your report should follow the format for *JGR-Oceans*. Some examples are given below (see the online *Author Instructions* for more details: click in 'submit an article', and then click on 'Author Instructions'):

Journal articles:

Post, D.M., J.F. Kitchell, and J.R. Hodgson (1998), Interactions among adult demography, spawning data, growth rate, predation, overwinter mortality, and the recruitment of largemouth bass in a northern lake, *Can. J. Fish. Aquat. Sci.*, 55, 2588-2600.

Journal articles with DOI:

Tremblay, J.E., D. Robert, D.E. Varela, C. Lovejoy, G. Darnis, R.J. Nelson and A.R. Sastri (2012), Current state and trends in Canadian Arctic marine ecosystems: I. Primary production, *Climatic Change*, 115, 161-178, doi:10.1007/s10584-012-0496-3.

Entire Books:

LeBlond, P.H., and L.A. Mysak (1978), *Waves in the ocean*, Elsevier, New York.

Chapter of a book:

Healey, M.C. (1980), The ecology of juvenile salmon in Georgia Strait, British Columbia, in *Salmonid ecosystems of the North Pacific*, edited by W.J. Neil and D.C. Himsworth, pp. 203-229. Oregon State University Press, Corvallis, OR.

Technical Reports:

Smith, J.E. (1981), Catch and efforts statistics of the Canadian groundfish fishery on the Pacific coast in 1980, *Can. Tech. Rep. Fish. Aquat. Sci. No. 1032*.

Website citation:

Quinion, MB. (1998) Citing online sources: advice on online citation formats [online]. Available from <http://www.worldwidewords.org/articles/citation.htm> [accessed on 12 June 2015].