**SIO 121 Biology of the Cryosphere**

Spring 2018 Syllabus

<https://github.com/bowmanjeffs/SIO121>

HSS2152, T&Th, 8-9:20

# Instructor

Jeff Bowman

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Sverdrup Hall 2139, also check 2164

\*IMPORTANT: all email to me must contain “SIO121” in the subject line

# Podcast

<https://podcast.ucsd.edu/default.aspx>

# Grading

5 % In-class quizzes

15 % Annotated bibliography

15 % Mid-term presentation

3 % In-class concept map

25 % Final paper

37 % Final exam

# Textbook

The textbook is required for this course. The text is: Laybourn-Parry, J., Tranter, M. and Hodson, A.J., 2012. *The ecology of snow and ice environments*. Oxford University Press.

**Late work policy**

Late work will not be accepted. Work is accepted by email/online submission until midnight of the due date except where noted in the schedule. Because of this there is really no conceivable reason for not submitting an assignment on time. If you are literally *in a coma due to unforeseen circumstances* an exception will be made.

# Assignments

## In-class quizzes

Each class will start with a short 2-3 question quiz on the previous lecture or reading. If you are unable to attend class you have provide a brief, 500 word summary on the topic of the lecture covered by the quiz. This summary is due by email on the day of the following lecture.

## Annotated bibliography

The annotated bibliography, mid-term presentation, and final paper are all on the same topic. You will provide three possible topics; I will sort the class into groups based on interest. Each group will choose their final topic. The annotated bibliography will consist of a short review of five references. Each review should follow a complete citation in Harvard format, and should be 2-3 paragraphs in length (roughly 1/2 page). There should be NO OVERLAP in annotated references between group members.

## Mid-term presentation

Each group will give a 15-minute presentation on their topic, with 5 minutes of questions. All group members are expected to actively participate in both the preparation and presentation.

## Final paper

The final paper will be a 2000 word paper on your topic. The paper should be well referenced (min 10), and should include one original figure. Discussion and coordination among group members is encouraged, but your papers should be sufficiently distinct that they pass a plagiarism check. Required elements of the paper include: title, abstract, original figure, wordcount.

## Final exam

The final exam will be comprehensive, and consist of a mix of multiple choice and short answer questions.

# Office hours

Office hours will be held from 11-12 on Thursday afternoon. My office is located on the SIO campus at Sverdrup Hall 2139. You can join office hours in person, or via Google Meetings. I will email a link to the Google Meeting just prior to office hours.

# Schedule

The course schedule is subject to change. Always refer to the online version.

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| --- | --- | --- | --- |
| **Date** | **Topic** | **Reading**  **(due this day)** | **Other** |
| April 3 | Course intro, introduction to the cryosphere and biology review | None |  |
| April 5 | Chemical and physical setting - sea ice | 1.1-1.5 (19 pages) |  |
| April 10 | Challenges, opportunities, and adaptations to life at low temperature | - |  |
| April 12 | Chemical and physical setting - glaciers, snow, permafrost | 1.6-1.7 (17 pages) |  |
| April 17 | Sea ice ecology 1 | 4.1 (19 pages) | Three possible topics for your major assignments due today **at the start of class**. If you can’t attend class, please email them to me before class. Groups for midterm presentations will be assigned before Thursday. |
| April 19 | Sea ice ecology 2 | - | Consensus midterm presentation topics due today. You will get some time to discuss in class. A tentative title and abstract is due at the end of class. |
| April 24 | Life in and under snow | Chapter 2 (9 pages) |  |
| April 26 | Permafrost ecology | Chapter 3 (24 pages) | There will be some time for group work on the midterm presentations today. If you have any questions on topics, references, etc., this would be a good time to ask! |
| May 1 | Life in, under, and on glaciers | Chapter 5 (19 pages) |  |
| May 3 | Astrobiology and the cryosphere | Chapter 6 (7 pages) |  |
| May 8 | Aerobiology/Midterm presentations | - | Midterm presentations   1. Group 6 2. Group 2 |
| May 10 | Midterm presentations | - | Annotated bibliography due.  Midterm presentations   1. Group 1 2. Group 3 3. Group 4 4. Group 5 |
| May 15 | Upper trophic levels, TBD | Ducklow, H.W., Fraser, W.R., Meredith, M.P., Stammerjohn, S.E., Doney, S.C., Martinson, D.G., Sailley, S.F., Schofield, O.M., Steinberg, D.K., Venables, H.J. and Amsler, C.D., 2013. West Antarctic Peninsula: an ice-dependent coastal marine ecosystem in transition. *Oceanography*, *26*(3), pp.190-203. | Jeff attending psychrophile genomics conference, guest lecture Dr. Megan Cimino. No office hours today. |
| May 17 | Upper trophic levels, TBD | - | Jeff attending psychrophile genomics conference, guest lecture Dr. Douglas Krause. |
| May 22 | Polynyas | - |  |
| May 24 | The future of the cryosphere  and  Humans and the cryosphere | Berteaux, D., Réale, D., McAdam, A.G. and Boutin, S., 2004. Keeping pace with fast climate change: can arctic life count on evolution?. *Integrative and Comparative Biology*, *44*(2), pp.140-151.  or  Hovelsrud, G.K., Poppel, B., Oort, B.V. and Reist, J.D., 2011. Arctic societies, cultures, and peoples in a changing cryosphere. *AMBIO: A Journal of the Human Environment*, *40*(sup 1), pp.100-110. | Groups will develop and present a concept map for either topic. |
| May 29 | Upper trophic levels: Bottom-up vs. top-down processes and how they are affecting trends in mesopredator (penguins & seals) reproductive success | External reading, TBD | Jeff attending MOSAiC science planning meeting in Potsdam, Guest lecture Dr. Mike Goebel. |
| May 31 | No class! |  | Jeff attending MOSAiC science planning meeting in Potsdam. No office hours today. |
| June 5 | Exploring the cryosphere | - | Late start: 8:20 am! |
| June 7 | Review for final | - | Late start: 8:20 am! |
| Thursday June 14  8-11 | Final |  | Final paper due at exam (hardcopy please) |