Syllabus
Biology 140 UBC Vancouver

GOALS OF BIOLOGY 140

The goals of Biology 140 are to enable students to participate in the scientific process, emulating as closely as possible the fundamental steps research scientists follow. The main goals of this course are for the students to be able to:

- participate in the process of science and demonstrate scientific thinking.
- acquire, organize, evaluate and integrate information about a biological system.
- practice scientific skills, by making observations, recording and analyzing data, and using lab equipment as appropriate.
- communicate as appropriate for the biological sciences.
- work as part of a team to design, perform and communicate the results of a scientific experiment.

TEACHING APPROACH IN BIOL 140

In this laboratory course you will be actively involved in the scientific process and your Lab Instructor will facilitate your learning by providing instructions for activities outlines in the lab workbook and by guiding class discussions. The instructions and questions in the workbook are designed to guide you through the scientific processes of observation, developing scientific questions, and designing an experiment.

You will work in a group for parts of this course. This is to help develop your group work skills, but also emulates real life, since scientists typically work as part of a team. In your groups you should discuss a question and explore possible ideas before asking your instructor for help. Biology 140 instructors are trained to help you discover ways of finding answers yourself, so don’t become frustrated if they do not give you direct answers. One goal of the course is for you to practice thinking like a scientist, which involves trying to answer questions for which there may be no sure answers. Attempting to answer them is what the science of biology is all about.

COURSE REQUIREMENTS

Academic requirements: all students in Biology 140 must have completed Grade 11 or 12 Biology, or BIOL 111 or BIOL 112. If you have concerns regarding previous course credits or the appropriate prerequisite courses contact the Course Coordinator or Biology Program Assistant

Kathy Nomme, BIOL 140 Lab Coordinator: nomme@zoology.ubc.ca,
Tammy Tromba, Biology Program Assistant: tromba@zoology.ubc.ca
**Required text:** the Biology 140 Workbook is required. Each week you will need to complete all exercises and answer the questions within the manual. The completion of the work will be checked and stamped.

**Laptop computers:** may be required for in lab during various activities. Ensure that at least one member of your group will be able to bring theirs to lab.

**Recommended reference text:** Freeman, S., Harrington, M. and Sharp, J. 2015. Biological science, 2nd Canadian Edition custom edition for UBC 2015-16 Pearson Education Inc., San Francisco, CA. This is the same text used for Biology 121 and can be a useful reference, but is not essential. Older editions are fine.

**Biology 140 Connect site:** on the site you will find course materials, quizzes, announcements and other relevant information. To log in, go to [http://www.connect.ubc.ca](http://www.connect.ubc.ca) and use your CWL to login. Under your list of courses, select the Biology 140 link.

**Piazza:** this on-line site is intended for students to interact with peers. Students can ask questions, discuss their understanding of concepts and ask for clarification of ideas. Peers will respond with their suggestions. This site will be lightly monitored by one of the course Lab Faculty to ensure information is accurate.

**EVALUATION**

Your Biology 140 grade will be calculated as follows:

- **Field study:** Informal lab meeting presentation (group) 5%
- **Lab experiment:**
  - Research paper: Introduction section (individual, 12%) 45%
  - Methods & Results section (group, 8%)
  - Discussion section (individual, 20%)
  - Oral presentation of experimental research (group, 5%)
- **Assignments:**
  - Five online quizzes (individual, total 5%) 13%
  - Scientific Explanation assignment (individual, 6%)
  - Experiment Plan worksheet (group, 2%)
- **Participation:**
  - Completion of each lab (5% total) 7%
  - Peer evaluation of contribution (2%)
- **Final exam** 30%
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<tr>
<th>Lab no.</th>
<th>Topics and in-lab activities</th>
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<tbody>
<tr>
<td>No labs</td>
<td><em>First week of term students check in and buy workbook</em></td>
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| Lab 1   | **Investigations in Biology**  
1. Questions in Biology  
2. Investigating the effects of abiotic factors on intertidal organisms (Chris Harley video)  
3. Field sampling (Tower Beach/Bamfield)  
   Key out common intertidal organisms  
4. Field notes and abiotic data to collect and record  
5. Your research animal/organism |
| Lab 2   | **Intertidal field study at Tower Beach (Science One students in Bamfield)**  
1. Collecting data  
2. Discussion questions |
| Lab 3   | **Using data as scientific evidence**  
1. Scientific investigation scenarios activity  
2. Dealing with field data  
3. Constructing a scientific explanation  
4. Guidelines for working as a group |
| Lab 4   | **Lab meeting presentation and measuring animal behaviour**  
1. Lab meeting presentations  
2. Closer observations of your research species  
   (Science One hold lottery for experimental species)  
3. Measuring behavioural responses of your research animal |
| Lab 5   | **Thanksgiving Monday holiday** |
|         | **OPEN LAB - Lab Faculty available in WESB 215,223** |
|         | **Develop your research question and plan your investigation using literature**  
Complete worksheet and email to Instructor by end of regular lab period. |
| Lab 6   | **Experiment Design**  
1. Experimental design critique activity  
2. Planning and designing your experiment  
   Students explain experimental plan  
   Order equipment  
3. Preparation of your Introduction assignment |
| Lab 7   | **Experimental Trial 1**  
1. General procedure for experimental Trial 1 |
| Lab 8 | **Experiment Trial 2**  
| 1. General procedure for experiment Trial 2  
| Submit complete copy of data to instructor  
| 2. Evaluating Trial 2  
| 3. Preparation of Methods and Results, 1 per group |
| Lab 9 | **OPEN LAB - Lab Faculty available in WESB 215,223**  
| **Methods & Results and Practice**  
| 1. Complete and finalize the Methods and Results Assignment  
| 2. Practice preparing figures, describing data and answering questions on experimental design  
| 3. Prepare to share your experimental findings (Oral discussion) |
| Lab 10 | **Remembrance Day holiday Mon Nov 13**  
| **Reschedule Monday classes A-> Tues pm, B-> Wed pm**  
| **‘Discussion’ planning and development**  
| 1. Dissecting a Biol 140 Discussion  
| 2. Developing an outline for your discussion  
| 3. Developing your Oral Discussion |
| Lab 11 | **Oral discussion**  
| 1. Oral discussion (students answer questions as feedback)  
| 2. Incorporating feedback into the outline for your written discussion |
| Lab 12 | **Scientific investigations in review**  
| 1. Scientific Investigations in review  
| 2. Research in a different context - Beaty Museum collections  
| 3. Evaluation (course, instructor, peers)  
| 4. Final exam information |
| TBA | Final Exam to be announced by UBC on the SSC |