Contact Information

Instructor:    Dr. Bryan Thines  
Office:        Thompson Hall 223G  
Phone:         (253) 879-3797  
E-mail:        bthines@pugetsound.edu  
Research Lab:  Thompson Hall 220

Class Meeting Times:  Tues and Thurs 9:30 – 10:50am
Office Hours:  by appointment

Expected student learning outcomes

The overall objectives of this course are for you to acquire knowledge of core concepts in Molecular Biology and to develop an in-depth understanding of experimental strategies in this field. Upon completion of this course, you will:

1. Be able to explain the multitude of ways that cells use nucleic acids as information molecules and mechanisms by which information flow is controlled
2. Understand and utilize connections between discovery-based and hypothesis-driven molecular research methods
3. Be able to analyze and critique data from original scientific research articles in this field
4. Be able to design controlled experiments that test specific hypotheses using methods in molecular biology
5. Be able to implement common molecular biology methods in the laboratory
6. Have in-depth understanding of how scientific research proposals are written and evaluated
**Textbook**

A textbook for this course is optional, and most Molecular Biology textbooks would be appropriate. In the past, I have used:


***Readings and laboratory protocols will be posted on Canvas***

**Contacting the Instructor**

**e-mails:** I will answer e-mails within 24 hours of receiving them. If you have questions about class, lab, careers, or just about anything else, **it is best to come and talk to me in person.**

**Class Procedures**

**Attendance during lecture is required. Please be on time.**

_Molecular Biology_ is an upper division class and so there will be an emphasis on methodology, experimental design, interpretation and critiquing of data, and formulating questions of significant scientific importance. There will be two different types of class meetings: 1) typical lecture format that covers core concepts in Molecular Biology (ie. transcription), and 2) discussion of a paper from the primary research literature. Tuesdays will be dedicated to paper discussions, while Thursdays will be lecture format.

**Coming prepared to lecture will significantly enhance the learning experience in this course.** Lecture outlines, learning objectives, discussion questions, and all reading will be posted on Canvas prior to lecture. Typically, reading will entail short textbook sections, review articles, and papers from the primary research literature. Discussion questions will be posted ahead of time for the days that we discuss papers from the primary research literature. Please work through these questions as you read the paper and come ready to share your answers.

For paper discussions, it is expected that you come to class ready to discuss the paper in a small group (2-4 students). Each group will then be responsible for leading class discussion for one figure that day.
Required Work and Assessment of Learning

The class components below will be worth the following percentages of your total grade:

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes (10 x 25 points)</td>
<td>250</td>
<td>Given in lab, covers lecture/lab from previous week(s)</td>
</tr>
<tr>
<td>Research Proposal</td>
<td>250</td>
<td>Additional details provided throughout semester. Materials will also be located in the “Research Proposal” folder on Canvas</td>
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<tr>
<td>Lab (pre-labs / writing)</td>
<td>250</td>
<td>See weekly lab folders and “General Lab Information” folder on Canvas</td>
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Grading scale:  
93-100% A  
90-92% A-  
87-89% B+  
83-86% B  
80-82% B-  
77-79% C+  
73-76% C  
70-72% C-  
67-69% D+  
63-66% D  
60-62% D-  
<60% F

Quizzes: There will be 11 quizzes worth 25 points each given in during lab almost every week (see lab schedule). The lowest score will be dropped. Quizzes will cover lecture material, paper discussion, and lab topics from the week prior. Make-up quizzes will only be allowed with notification the Dean of Students in event of a personal crisis, or physician’s note in event of illness. Because there are two different lab sections taking similar quizzes, it is absolutely critical that you DO NOT discuss the quiz with your peers until Thursday. You will be asked to sign an honesty statement with every quiz.

YOU MAY NOT STUDY FOR THE QUIZ IN LAB—YOU MUST COME PREPARED

Research proposal: An original written research proposal will take the place of a final exam. You will write this proposal over the course of the semester, with various due dates for different sections. Additional information will be provided and specific guidelines and rubrics will be posted for each assignment.
Lab: Your lab grade will be compiled from a formal lab report (written in sections) and prelabs (see lab schedule). Prelabs will be assigned for almost every lab. Additional information will be provided on your first day of lab.

Please purchase a lab notebook and safety goggles prior to the first lab session. The notebook can be a composition book (graph paper pages are recommended) or a spiral-bound notebook. The notebook does not need to have carbon copy pages.

Academic Integrity

The university's academic integrity policy is clear and comprehensive. It is available online [http://www.pugetsound.edu/student-life/student-resources/student-handbook/academic-handbook/academic-integrity/] and in the printed Academic Handbook. You are responsible for understanding what constitutes plagiarism and other forms of academic dishonesty. **If you have a question as to whether something constitutes plagiarism, ask!** Academic integrity is vital to your work as a student, including in this course. **Cheating, plagiarism, and other forms of academic dishonesty will NOT be tolerated.** Contact me with any other questions regarding academic integrity.

Behavior Expectations

I expect you to behave in an appropriate manner while attending this class. Use your common sense, but here are a few guidelines:

During class and lab I expect you to be working on materials for this course only.

*Personal technology*—please be respectful of others in class:

Switch your phone off before coming to class. **Refrain from using email or text messaging during class.** You may not touch or use your phone/laptop/tablet in any way during an exam. You may not listen to an iPod, phone, or similar device during class or during an exam.

You may not make audio recordings of our class or lab sessions without prior consent from me.

If you leave the room during an exam, your paper will be collected and you will not be permitted to return to the exam.

Lack of respect for diversity will not be tolerated in the class. Diversity encompasses age, life experiences, profession, race, religion, gender, lifestyle,
social class, learning style, ethnicity, philosophy of life, sexual orientation, personality, mental and physical challenges, customs, and values, among others.

You may bring food and/or drinks to class as long as the consumption of food and/or drinks is not a distraction to others.

ABSOLUTELY NO FOOD OR DRINK is allowed in the laboratory. Food and/or drinks can be kept outside the lab door. Wash your hands prior to consuming food or drink.

Telephones located in classrooms and labs are for staff use and medical/safety emergencies only (no personal calls).

Bereavement Policy

Upon approval from the Dean of Students’ Office, students who experience a death in the family, including parent, grandparent, sibling, or persons living in the same household, are allowed three consecutive weekdays of excused absences, as negotiated with the Dean of Students. For more information, please see the Academic Handbook.

Accessibility and Accommodation

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Peggy Perno, Director of the Office of Accessibility and Accommodation, 105 Howarth (253.879.3395). She will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential. Please notify me well in advance should you require accommodation in the class or lab.

Emergency Response Procedures

Please review university emergency preparedness and response procedures posted at www.pugetsound.edu/emergency/. There is a link on the university home page. Familiarize yourself with hall exit doors and the designated gathering area for your class and laboratory buildings.

If building evacuation becomes necessary (e.g. earthquake), meet your instructor at the designated gathering area so she/he can account for your presence. Then wait for further instructions. Do not return to the building or classroom until advised by a university emergency response representative. If confronted by an act of violence, be prepared to make quick decisions to protect your safety. Flee the area by running away from the source of danger only if you can safely do so. If this is not possible, shelter in
place by securing classroom or lab doors and windows, closing blinds, and turning off room lights. Lie on the floor out of sight and away from windows and doors. Place cell phones or pagers on vibrate so that you can receive messages quietly. Wait for further instructions.
Schedule  (Note: this schedule is tentative and subject to change)

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<tr>
<th>DATE</th>
<th>TOPIC</th>
<th>Proposal Writing - due Thursdays IN CLASS</th>
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<tbody>
<tr>
<td>Jan. 22</td>
<td>Introduction</td>
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<td>24</td>
<td>DNA and chromosome structure</td>
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<td>29</td>
<td>DNA repair</td>
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<td>31</td>
<td>Genomes: repetitive sequences and transposons</td>
<td>Idea Exploration, Part A</td>
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<td>Feb. 5</td>
<td>Structural aspects of transcription</td>
<td>Idea Exploration, Part B</td>
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<td>7</td>
<td>Gene regulation: transcription factors and regulatory elements</td>
<td>Annotated Bibliography</td>
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<td>28</td>
<td>RNA processing</td>
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<td>12</td>
<td>Chromatin dynamics</td>
<td>Background and Significance</td>
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<td>14</td>
<td>The three-dimensional genome</td>
<td>Specific Aims</td>
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<td>26</td>
<td>The three-dimensional genome</td>
<td>SPRING BREAK</td>
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<tr>
<td>Apr. 2</td>
<td>DNA methylation and the methylome</td>
<td>Research Design and Methods</td>
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<td>4</td>
<td>Long noncoding RNAs</td>
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<td>9</td>
<td>Small noncoding RNAs</td>
<td>Full Draft</td>
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<tr>
<td>11</td>
<td>Gene editing and CRISPR</td>
<td>Peer Reviews</td>
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<td>16</td>
<td>Proposal Presentations</td>
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<td>23</td>
<td>Proposal Presentations</td>
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<td>May 7</td>
<td>Proposal Presentations</td>
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