Molecular Genetics
BIOL 2540 2017 DRAFT Syllabus
Brown-Pfizer Master of Arts Program in Biology

Class Time: Thursday 3:00 pm – 6:00 pm
Class location: Pfizer campus, Building To Be Determined

Instructors:

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Satisfies Core Requirement for Master of Arts in Biology degree

Course Goals:
‘Molecular Genetics’ represents a set of techniques used by biologists to understand how cells and organisms work. Students will read and discuss examples of how this set of techniques has been applied to make fundamental contributions to our understanding of biological function.

Student Participants:
A background in genetics and coursework in one other area of biology or biochemistry is recommended. However, we will cover background material during each of our discussion sessions so that students are prepared to learn from the primary literature.

Assigned Papers and Reading:
Primary research papers will be discussed during each class. One paper will be chosen as the focus of each of our discussions. The goal is to use these papers to illustrate important concepts and techniques in molecular genetics. Students should be prepared to ask and answer questions about the papers during class – our goal is to have a lively and collegial discussion. Background reading from Griffiths has also been assigned for each discussion. This background reading is meant to help prepare students for our discussions of the primary literature.

Links to each paper and background reading will be posted to Canvas at the beginning of the semester.

Textbook:

Introduction to Genetic Analysis 10th Edition (“Griffiths”)
ISBN: 978-1-4292-2943-8
Griffiths, Wessler, Carroll, Doebley
Published by WH Freeman.
## Discussion and Assignment Schedule *(DRAFT: Subject to Change):*

<table>
<thead>
<tr>
<th>Date</th>
<th>#</th>
<th>Literature Topic</th>
<th>Background Topic</th>
<th>Griffiths Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/26</td>
<td>1</td>
<td>Introduction to Molecular Genetics (MJ/RF)</td>
<td>Course overview</td>
<td>Ch. 1</td>
</tr>
<tr>
<td>2/2</td>
<td>2</td>
<td>Yeast Genetics: The CDC Screen</td>
<td>The Chromosomal Basis of Inheritance</td>
<td>Ch. 3</td>
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<td>Mutation, Repair, and Recombination</td>
<td>Ch. 14</td>
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<tr>
<td>2/9</td>
<td>3</td>
<td>Choosing a model organism: genetics of C. elegans</td>
<td>Patterns of Inheritance</td>
<td>Ch. 2</td>
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<td>Eukaryotic Chromosome mapping by recombination</td>
<td>Ch. 4</td>
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<tr>
<td>2/16</td>
<td>4</td>
<td>Genetics of Development in Drosophila</td>
<td>Large-scale chromosomal changes</td>
<td>Ch. 15</td>
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<td>The genetic basis of Development</td>
<td>Ch. 18</td>
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<tr>
<td>2/23</td>
<td>5</td>
<td>Forward and reverse genetic analysis of ethylene signaling</td>
<td>Gene Isolation and Manipulation</td>
<td>Ch. 11</td>
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<tr>
<td>3/2</td>
<td>6</td>
<td>Modifier Screens</td>
<td>From Gene to Phenotype</td>
<td>Ch. 6</td>
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<tr>
<td>3/9</td>
<td>7</td>
<td><strong>EXAM 1</strong> Map-based cloning of novel genes</td>
<td>Eukaryotic chromosome mapping and recombination</td>
<td>Ch. 4 (review)</td>
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<td>Genomics</td>
<td>Ch. 12</td>
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<tr>
<td>3/16</td>
<td>8</td>
<td>RNAI: Biology and mechanism</td>
<td>Dissection of Gene Function</td>
<td>Ch. 16</td>
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<tr>
<td>3/23</td>
<td>9</td>
<td>Genome Engineering I</td>
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<td>3/30</td>
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<td>no meeting Brown Spring Break</td>
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<tr>
<td>4/6</td>
<td>10</td>
<td>Genome Engineering II</td>
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<tr>
<td>4/13</td>
<td>11</td>
<td>Epigenetics</td>
<td>The Dynamic Genome: Transposable Elements</td>
<td>Ch. 13</td>
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<tr>
<td>4/20</td>
<td>12</td>
<td>Human Genetics</td>
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Office Hours:
We are available by e-mail and will stay after each discussion session to answer questions. Meetings can also be arranged via internet conferencing (i.e. skype).

Assignments:

Exams. (THIS IS A DRAFT - SUBJECT TO CHANGE)

Exam I 3/9/2017 in class 100 Points
Exam II 5/4/2017 in class 100 Points

Pre-Discussion Assignments (100 points total)
This course involves reading and discussing primary literature. Therefore pre-class preparation and class participation are critical to the success of the course. To reinforce preparation, there will be pre-discussion assignments. There are two types of assignment:

1. Quiz (10 minutes at beginning or after class) on the primary paper to be discussed.
2. Two questions about the primary paper submitted through Canvas (no later than 15 minutes prior to class). These questions should address key concepts illustrated in the paper rather than jargon or procedural details.

Grade determination (DRAFT, SUBJECT TO CHANGE):

Final Grades will be calculated out of a total of 300 points.

Exam I 100 Points
Exam II 100 Points
Pre-Discussion Assignments 100 points

Grades will be determined as follows:

85% (255 points) A
75% (225 points) B
60% (180 points) C

Late work/absence policy:
Pre-discussion assignments and quizzes will not be accepted late. If for some reason, it is impossible to complete an exam at the scheduled time, please notify us at least one week before the exam is scheduled/assigned.

Our goal is to work toward two major outcomes:
1. Enhance student critical thinking, problem solving, and application of logic in the context of Genetics. Students will be able to analyze a problem to determine a path to a solution, design a plan to solve the problem, and execute the plan.

2. Students will gain and solidify their understanding of fundamental concepts in classical transmission Genetics, Molecular Biology, Molecular Genetics, and Genomics.

**Accommodating all students**
We are committed to full inclusion of all students. Please inform one of the instructors if you have a disability or other condition that might require some modification of any of these course procedures. You may speak with an instructor after class, during office hours, or by appointment. For more information contact Student and Employee Accessibility Services at 401-863-9588 or SEAS@brown.edu. Students in need of short-term academic advice or support can contact one of the deans in the Dean of the College office.

**Expectations for academic honesty**
Please refer to the Brown University Academic and Student Conduct Codes for details regarding Brown University’s policy on academic integrity and penalties for violating the academic code.