<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Lecturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/15</td>
<td>Organizational Meeting; Fertilization to the midblastula transition</td>
<td>Mary Mullins/Patrick Seale</td>
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<tr>
<td>1/16</td>
<td>Body plan formation: Gastrulation, germ layer formation and morphogenesis <em>(1:30-3:00)</em></td>
<td>Dan Kessler</td>
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<tr>
<td>1/20</td>
<td>Induction of the primary germ layers</td>
<td>Dan Kessler</td>
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<tr>
<td>1/22</td>
<td>Establishment of polarity: Cortical rotation and cytoplasmic determinants</td>
<td>Peter Klein</td>
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<tr>
<td>1/23</td>
<td>Discussion</td>
<td>DK</td>
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<tr>
<td>1/27</td>
<td>Cell lineage and fate maps; introduction to genetics</td>
<td>Mary Mullins</td>
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<tr>
<td>1/29</td>
<td>Classical embryology of insects: Determinants and morphogens before genetics and molecular biology</td>
<td>Mary Mullins</td>
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<tr>
<td>1/30</td>
<td>Discussion</td>
<td>MM</td>
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<tr>
<td>2/3</td>
<td>Creating periodic patterns: The mechanisms revealed after genetics and molecular biology</td>
<td>Mary Mullins</td>
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<tr>
<td>2/5</td>
<td>Establishment of the AP and DV axes in Drosophila</td>
<td>Amin Ghabrial</td>
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<tr>
<td>2/6</td>
<td>Discussion</td>
<td>PS</td>
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<tr>
<td>2/10</td>
<td>The vertebrate dorsal organizer and neural induction</td>
<td>Mary Mullins</td>
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<tr>
<td>2/12</td>
<td>Neural crest and bone development</td>
<td>Shannon Fisher</td>
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<tr>
<td>2/13</td>
<td>Discussion</td>
<td>MM</td>
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<tr>
<td>2/17</td>
<td>Muscle developmental programs and satellite cells</td>
<td>Patrick Seale</td>
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<tr>
<td>2/19</td>
<td>Establishing neuronal identity along the dorsoventral neuraxis</td>
<td>Doug Epstein</td>
</tr>
<tr>
<td>2/20</td>
<td>Discussion</td>
<td>PS</td>
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<tr>
<td>2/24</td>
<td>Early development and genetics of the mouse</td>
<td>Ben Stanger</td>
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<tr>
<td>2/26</td>
<td>Topics in mammalian organogenesis</td>
<td>Ben Stanger</td>
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<tr>
<td>2/27</td>
<td>Discussion (Send out MIDTERM EXAM)</td>
<td>PS</td>
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<tr>
<td>3/3</td>
<td>Branching morphogenesis in organogenesis</td>
<td>Amin Ghabrial</td>
</tr>
<tr>
<td>3/5</td>
<td>Development and genetics of C elegans: vulval specification and Notch signaling</td>
<td>Meera Sundaram</td>
</tr>
</tbody>
</table>
3/6  Left-right patterning  (1:30-3:00)  
MIDTERM EXAM due  
Dan Kessler

3/7-3/15  Spring Break

3/17  Scaling in development  
Matt Good

3/19  Cellular polarity and asymmetric cell division  
Fabrice Roegiers

3/20  Discussion  
MM

3/24  Introduction and history of stem cell field  
John Gearhart

3/26  Principles of stem cells in development  
Chris Lengner

3/27  Discussion  
MM

3/31  Regeneration  
Faye Mourkioti

4/2  Hematopoietic stem cells in the embryo and adult  
Nancy Speck

4/3  Discussion  
PS

4/7  Epigenetics in Development  
Marisa Bartolomei

4/9  Transcriptional memory in development  
Maya Capelson

4/10  Discussion  
PS

4/14  Development and genetics of zebrafish: the germ line  
Mary Mullins

4/16  piRNA regulation in the germ line  
Jeremy Wang

4/17  Discussion  
MM

4/21  Stem cell niches in development  
Steve DiNardo

4/23  Evo-Devo  
Steve DiNardo

4/24  Discussion  
SD

Send out FINAL EXAM

5/1  FINAL EXAM Due
Course directors:
Mary Mullins
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Course faculty:
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Meera Sundaram, sundaram@mail.med.upenn.edu
Jeremy Wang, pwang@vet.upenn.edu

Class Schedule:
Lectures-1:30-3:00 on Tuesday and Thursday in Room 1101 BRB II/III
Discussions-Friday 1:30-2:30, in Room 1101 BRB II/III

Highly Recommended Text:
Developmental Biology (5th or latest edition) by Scott F. Gilbert

Discussions: Each week one research article will be assigned for mandatory reading. One student each week will be required to present background material to the article to the rest of the class and lead the discussion. All students will be involved in presenting the articles at each meeting.

Students not doing a presentation of background material (if more than 12 students are enrolled) will be required to do a “News & Views” paper (only for MM or PS Discussions), which will be due to Mary or Patrick the day of the Discussion. The “News & View” will put the Discussion paper in the context of its field, highlighting the research advance, and should not simply be a summary of the paper. It is a viewpoint, so personal opinions can be included, including your view of potential deficiencies and advances of the article.

Guidance for writing the “News & Views”: 
The main finding presented by the paper should be mentioned in a succinct opening paragraph to attract the attention of those who are not experts in the field.

More detail, background and explanation should follow, including your own views. Finish off with comments on the implications of the new work and on future research directions.

No more than 1000 words; 1 figure (optional). Most readers will have a general scientific background, so specialized terminology should be avoided.

**Exams:**
The midterm and final exams will be take-home written exams in essay format.

**Grading:**
Grades will be based on the background presentation (or N&V paper) (20%), participation in the discussion sessions and attendance (20%), the midterm exam (30%), and the final exam (30%).

**Course Website:**
A course website (https://canvas.upenn.edu/courses/1257755/) is available at the Penn CANVAS site. The website includes the course schedule, syllabus, faculty contact information and discussion papers for download. In addition, course lectures will be posted as Powerpoint files following each lecture.