Syllabus for Bios 320 Developmental Biology—Spring 2015
10-10:50 am MWF, 2BH 305 (305 Burnham Hall), CRN 35618 (3 credits)
Prerequisite: Bios 220 Mendelian and Molecular Genetics

Instructors: Peter Okkema, 4052 MBRB, 413-7445, okkema@uic.edu
Teresa Orenic, 4220 MBRB, 355-1452, torenic@uic.edu

i-clickers are also required

Course objectives: Bios 320 is a challenging course that covers a wide range of topics from classical embryological analyses through modern molecular analyses of development. In this course, students will learn the methods and reasoning scientists use to study animal development. Students will obtain a working knowledge of the developmental mechanisms in invertebrate and vertebrate animals, an understanding of how these mechanisms evolve to produce distinct body patterns, and an appreciation for the societal & medical relevance of these mechanisms.

Note: Chapter and page references are from Wolpert and Tickle, 4th edition. Students are responsible for material from both lectures and assigned reading. Announcements and lecture notes will be posted on the Blackboard course site.

<table>
<thead>
<tr>
<th>Week</th>
<th>Lectures</th>
<th>Topics and general reading list</th>
<th>Instructor</th>
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| 1    | Jan. 12, 14, 16 | • History and basic concepts (Ch. 1 pp. 1-21)  
• Cell differentiation (Ch. 10. pp 365-375)  
• History and basic concepts (Ch. 1 pp. 21-33)  | Okkema |
| 2    | Jan. 19: Martin Luther King Day  
Jan. 21, 23 | • Introduction to developmental genetics  
• Development of the Drosophila body plan (Ch. 2, pp. 35-87)  | Okkema |
| 3    | Jan. 26, 28, 30 | • Development of nematodes, sea urchins, and ascidians (Ch. 6, pp. 215-250)  
• Distribute papers for vulval development journal club  | Okkema |
| 4    | Feb. 2, 4, 6 | • Vertebrate development I: life cycles and experimental techniques (Ch. 3 pp. 93-100)  
• Wednesday 2/4: small group discussion of papers  
• Friday 2/6: In-class discussion of journal club papers  | Okkema |
| 5    | Feb. 9, 11, 13 | • Vertebrate development I: life cycles and experimental techniques (Ch. 3 pp. 103-125)  
• Wednesday 2/11—Quiz 1 (50 points)  | Okkema |
| 6    | Feb. 16, 18, 20 | • Monday 2/16: Written paper on vulval development due  
• Vertebrate development II: axes and germ layers (Ch. 4 pp. 128-167)  | Okkema |
| 7    | Feb. 23, 25, 27 | • Vertebrate development III: patterning the early nervous system and the somites (Ch. 5 pp. 173-186)  | Okkema |
| 8    | Mar. 2, 4, 6 | • Vertebrate development III (cont’d)  
• Wednesday, March 4—Exam 1 (100 points)  
• Vertebrate development III (cont’d, Ch. 5 pp. 187-202)  | Okkema/Orenic |
### Bios 320—Developmental Biology

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<tr>
<th>Date</th>
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<th>Instructor</th>
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| 9     | Mar. 9, 11, 13  | • Organogenesis (Ch. 11):  
• Drosophila limb (Ch. 11 pp. 435-443)  
• Vertebrate limb (Ch. 11 pp. 411-435)  
• Vertebrate and insect eye (Ch. 11 pp. 445-451)  
• Vasculogenesis and heart (Ch. 11 pp. 456-459) | Orenic     |
| 10    | Mar. 16, 18, 20 | • Development of the nervous system (Ch. 12):  
• Drosophila embryonic CNS (Ch. 12 pp. 468-473)  
• Vertebrate CNS (Ch. 12 pp. 473-484)  
• Axonal guidance (Ch. 12 pp. 484-489, 493-497) | Orenic     |
|       | Mar. 23-27     | • Spring break—Have fun!                                                |            |
| 11    | Mar. 30, Apr. 1, 3 | • Monday 3/30: Small group discussion of axonal guidance paper (Yang et al, 2009)  
• Wednesday 4/1: In-class discussion of paper  
• Friday 4/3: Growth and postembryonic development (Ch. 13) | Orenic     |
| 12    | Apr. 6, 8, 10  | • Growth and postembryonic development (cont’d)  
• Growth, cell proliferation, organ size, body size (Ch. 13 pp. 505-517)  
• Growth of long bones (Ch. 13 pp. 517-519)  
• Cancer (Ch. 13 pp. 520-522)  
• Aging and senescence (Ch. 13 pp. 527-531)  
• Friday 4/10: Written paper on axonal guidance due | Orenic     |
| 13    | Apr. 13, 15, 17 | • Regeneration (Ch. 14)  
• **Wednesday, April 16--Quiz 2 (50 points)** | Orenic     |
| 14    | Apr. 20, 22, 24 | • Evolution and development (Ch15)                                       | Orenic     |
| 15    | Apr. 27, 29, May 1 | • Medical relevance of development:  
• Stem cells and regenerative medicine (Ch. 10 pp. 399-405)  
• Gene therapy (from class notes)  
• Genetic disorders (from class notes)  
• **Friday, May 2--Exam 2 (100 points)** | Orenic     |

**Final Exam (100 points): time & date to be announced**

**Important academic deadlines:** January 23: last day to drop without receiving W. March 20: last day for undergraduate students to use optional late drop and receive a grade of W.

**Grading Policy:**

- Final grades will be calculated based on 640 points total score:

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
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<tbody>
<tr>
<td>Exams</td>
<td>300</td>
</tr>
<tr>
<td>Quizzes</td>
<td>100</td>
</tr>
<tr>
<td>Journal clubs &amp; papers</td>
<td>100</td>
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<tr>
<td>Shared blog entries</td>
<td>100</td>
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<tr>
<td>i-clicker responses</td>
<td>40</td>
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</table>

**Total** 640 points

- Exams 1 & 2 and the Final Exam are each worth 100 points. Each of these exams will count toward your final grade, and they will contribute 300 total points.
- Quizzes 1 & 2 are each worth 50 points, and they will contribute 100 total points to your final grade.
Under exceptional circumstances, make-ups for missed exams/quizzes will be given at the discretion of the instructor. You must have an acceptable reason and notify the instructor before the exam/quiz date. Make-ups may be given as written or oral exams/quizzes and are often more difficult than the in class exams/quizzes.

Please carefully review your exams and quizzes after they have been returned to you. Requests for regrades must be submitted no later than one week after an exam/quiz was returned to the class. Please do not alter or make any marks on your exam/quiz before turning it in for a regrade. Any exam/quiz handed in for questions on grading, other than addition errors, may be regraded in its entirety and could result in either an increase or decrease in your score.

Journal clubs & papers

- Dr. Okkema and Dr. Orenic will each supervise one journal club examining papers from the scientific literature. Each of these assignments will be worth 50 points, and they will contribute 100 total points to your final grade.

Shared discussions

- Approximately every week, Dr. Okkema and Orenic will ask questions on Blackboard that each student will answer as a post on Blackboard. We encourage you to discuss these assignments with your classmates before posting, and we will provide time in class to begin these discussions. After you submit your post, you will be able to read and comment on your classmates’ posts. Our questions will target important concepts and example exam questions, and the class’s posts and comments will create a shared knowledge-base and will remain available throughout the semester so you can review them before exams. Of course, any comments that you make on another student’s blog should be constructive and expressed in a civil manner.

i-clicker responses

- We will be using i-clickers to ask questions during lectures, and you will receive up to 20 points each from Dr. Okkema and Dr. Orenic for your answers to these questions. Ten points will be “participation points” for responding to ≥75% of the i-clicker questions during our lectures. You will also earn 10 additional points for correctly answering ≥50% of these questions. Our goal is to get immediate feedback on your understanding of the material we cover, so we can help you understand key concepts in the course.

Tips for doing well in this course: This course covers a lot of material, and it is difficult to catch up if you fall behind. It requires a solid understanding of genetics, and we require the prerequisite BIOS 220 (Mendelian and Molecular Genetics). Below are some common sense strategies successful students have used in this course.

- Attend lectures
- Read and study the book chapters before lectures
- Download and read lecture notes before lectures, and bring the notes to class to mark up with your own comments
- Take all the exams and quizzes, and take advantage of all the opportunities to earn points (blogs, i-clickers, etc.)
- Ask questions in class, with your classmates, and in conferences with the instructors, if you do not understand the material
- Form a study group with some of your classmates. Teaching each other is the most effective method for learning difficult material
- Study throughout the semester, and don’t try to cram for the exams – there is too much information to cram.
Use your UIC email address when contacting the instructors. For reasons of privacy and state laws, you must email us from your UIC email. Thanks.

**Attendance policy:** Students are strongly encouraged to attend every lecture. Credit will be given for i-clicker responses to in-class questions, and, importantly, we have found that students who attend lectures perform far better on quizzes and exams than those who do not attend lectures.

**Policy for missed or late work:** Students will receive zero credit for missed assignments. Late assignments may be accepted by the instructor on a case-by-case basis, but students will receive a reduced grade. Contact Dr. Okkema or Orenic by the scheduled due date to explain why your assignment will be late, and to arrange a new due date. See above for information on missed exams or quizzes.

**Academic honesty:** No acts of cheating will be tolerated in this course. The penalties for cheating incidents at UIC are severe and may result in dismissal from the university. Those found to be cheating in any way on quizzes or examinations will be given a zero grade for that quiz or examination, and may be referred to the Dean's office for further disciplinary action. Plagiarism in written assignments will also result in a zero grade for that assignment.

**Disability accommodation:** Students with disabilities who require accommodations for access and participation in this course should register with the Disability Resource Center (DRC) at 312-413-2183 (v) or 312-413-0123 (TTY). Consult with Dr. Okkema and Dr. Orenic to make appropriate arrangements.

**Religious holidays:** Students who wish to observe their religious holidays shall notify the faculty member by the tenth day of the semester of the date when they will be absent unless the religious holiday is observed on or before the tenth day of the semester. In such cases, the student shall notify the faculty member at least five days in advance of the date when he/she will be absent. The faculty member shall make every reasonable effort to honor the request, not penalize the student for missing the class, and if an examination or project is due during the absence, give the student an exam or assignment equivalent to the one completed by those students in attendance. If the student feels aggrieved, he/she may request remedy through the campus grievance procedure: http://www.uic.edu/depts/oae/docs/ReligiousHolidaysFY20122014.pdf

**Grievance procedures:** UIC is committed to the most fundamental principles of academic freedom, equality of opportunity, and human dignity involving students and employees. Freedom from discrimination is a foundation for all decision making at UIC. Students are encouraged to study the University's “Nondiscrimination Statement”. Students are also urged to read the document “Public Formal Grievance Procedures”. Information on these policies and procedures is available on the University web pages of the Office of Access and Equity: www.uic.edu/depts/oae.

Good luck with the semester!