# Embryology - Biology 426
## Syllabus Fall, 2011
4 Units (3 lecture and 1 laboratory) T TH 11-2
Dr. Marcum  Holt 330  Phone 5539
e-mail: bmarcum@csuchico.edu  Office hours T Th 2-3 in Holt 330; F 2-3 in Holt 125

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<th>Date</th>
<th>Topics</th>
<th>References</th>
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| 1  | T  Aug 23| Overview; Textbook Organization; Begin thinking about a topic of interest to you for a literature based research report.  
History of Embryology  
Hydra – early and modern developmental biology of a model organism  
Microscope use: Introduction to tissues | Assignment: Visit Vista, Read the Ethel Browne paper by Howard Lenhoff  
Define: Induction; Organizer |
|    | Th. Aug 25| Stem Cells and Making tissues  
Cells and Tissues  
Embryonic: Epithelial and Mesenchymal  
Adult: Epithelial, Connective, Muscle, Neural  
Hydra Lab | Gilbert: pgs. 566- 570 Handout |
| 2  | T Aug 30  | Quiz 1 on tissue types (10 pts)  
Movies: How Babies are Made  
Great Transformations | Read for Sept 1  
Chap 1 pgs. 5-28  
Developmental Anatomy |
|    | Th. Sept. 1| Comparative development  
Cleavage, Blastoderm formation, gastrulation basics  
Sea urchin movies compare to amphibian and chick and mammal | Same as above – review  
Prepared slides of development |
| 3  | T Sept. 6 | Quiz 2 on comparative development  
Developmental Genetics – just the basics | Chap 2 pgs.31-68  
Developmental Genetics - Overview |
|    | Th. Sept. 8| Cell - Cell Communication  
Historical perspective of cell-cell communication research | Chap 3 pgs. 69-107 |
| 4  | T Sept. 13| Early Development: Cell Specification  
Gametogenesis  
Spermatogenesis  
Oogenesis  
Prepared slides of gametogenesis | Part II Introduction to Specification pgs. 109-119 Lab book |
<p>|    | Th. Sept. 15| Fertilization - Fast and Slow Blocks to polyspermy, egg activation and cytoplasmic specification | Chap 4 Fertilization pgs. 121-158 selected sections |</p>
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<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture</th>
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<tr>
<td>5</td>
<td>T Sept. 20</td>
<td>Exam #1</td>
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|      | Th. Sept. 22 | Amphibians and Fish cleavage, gastrulation, and neurulation  
Prepared slides, amphibians | Chap 7 Early Development and Axis Formation, pgs 241-286  
selected sections  
Lab book |
| 6    | T Sept. 27 | Ectodermal derivatives  
Epidermis, Neural Tube and Neural Crest  
Brain dissection preserved sheep brains | Chap 8 Early Development  
Birds and Mammals  
pgs. 287-300  
selected sections |
|      | Th. Sept. 29 | Ectodermal derivatives continued  
Chick prepared slides 18, 24, 33, 48 hr. | Part III Organogenesis  
Introduction  
Chap 9 and 10 selected sections,  
Lab book |
| 7    | T Oct. 4  | Mesodermal derivatives  
Paraxial, intermediate, and lateral  
Somite regions  
Early heart development – tube formation and twisting  
Endodermal derivatives – gut tube formation, pharynx, and lung buds | Chap 11 and Chap 12  
selected sections,  
Mesodermal Derivatives |
|      | Th. Oct. 6 | Mesodermal derivatives continued: Heart chamber, blood and blood vessel development;  
Redirecting blood flow in the newborn mammal.  
Heart structure  
Heart dissection of fresh pig and/or cow hearts | Chap 12 selected sections  
Lateral Plate Mesoderm and Endoderm |
| 8    | T Oct. 11 | Live chick development  
24 hours  
33 hours | Lab Book |
|      | Th. Oct. 13 | Live chick development  
24 hrs  
33 hrs  
48 hrs  
72 hrs | Lab Book |
| 9    | T Oct. 18 | Chick Development  
5 and 7 days  
Extraembryonic membranes |
<p>|      | Th. Oct. 20 | Review of Organogenesis |</p>
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<th>Date</th>
<th>Day</th>
<th>Event</th>
<th>Notes</th>
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<tr>
<td>10</td>
<td>T Oct. 25</td>
<td><strong>Exam #2 and Lab Practical #2</strong></td>
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| 10    | Th. Oct. 27 | **Anatomy of mouse embryos**  
Begin skeletal prep – osteogenesis | Handout                    |
| 11    | T Nov. 1  | **Face and Pharyngeal Pouches and Arches**  
Ear development  
Development of the Vertebrate Eye  
Begin 10mm Pig Slides | Gilbert pgs. 471-473         |
| 11    | Th. Nov. 3 | **Development of branched organs: lungs**  
Epithelial-mesenchymal interactions  
Continue 10mm Pig and skeletal specimens | Lab Book                   |
| 12    | T Nov. 8  | **Body Cavities, Mesenteries, and Diaphragm**  
Kidney development, Urogenital system  
Continue 10mm Pig and skeletal specimens | Gilbert pgs. 434-442        |
| 12    | Th. Nov. 10 | **Myogenesis and Osteogenesis**  
limb development  
Continue 10mm Pig and skeletal specimens | Chap 13 pgs.485 - 510       |
| 13    | T Nov. 15 | **Blastocyst Isolation**  
Continue 10mm Pig and skeletal specimens | Lab book                   |
| 13    | Th. Nov. 17 | **Exam #3**                      |                            |
| Nov 21-25 | Thanksgiving Vacation |                                  | No Class                   |
| 14    | T Nov. 29 | **Sea Urchins – fertilization and live development** |                            |
| 14    | Th. Dec. 1 | **Sea Urchins - live development continued** |                            |
| 15    | T Dec. 6  | **Skeletal Specimens due 20 pts**  
Optional Reports and Review |                            |
| 15    | Th. Dec. 8 | **Lab Practical #3**                      |                            |
Final Exam  Tuesday Dec. 13th   2:00 – 3:50 p.m.

Grading

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<th>Points</th>
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<tr>
<td>3 Lecture Exams (100 pts each)</td>
<td>300</td>
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<td>Final Exam – Cumulative</td>
<td>50</td>
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<td>Quizzes and Assignments</td>
<td>50</td>
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<td>Lab Practicals  3 (50 pts each)</td>
<td>150</td>
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<tr>
<td>Participation and Attendance</td>
<td>50</td>
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<td>Total Points</td>
<td>600</td>
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Grading: Percent, approximately
93-100 A
90-92 A-
88-89 B+
83-87 B
80-82 B-
78-79 C+
73-77 C
70-72 C-
65-69 D+
55-65 D
54 and lower F

Answers to exam questions must be written legibly. If I can’t read it, the answer won’t be graded.

The participation points will be based on class attendance. Missing more than two classes or significant parts of more than two classes (the third absence) will result in the loss of all 50 points. If you have an excusable absence please see Dr. Marcum ahead of the missed class for a make up assignment. If you miss due to an illness, a doctor’s note is required.

WHAT IS EXPECTED OF A STUDENT
I expect students to study at least 1 hour outside of class for each hour in class. My suggestions for studying this material are:

1. To read material briefly before class, to discern the major topics (skim the details).
2. To read assigned material after class and combine it, where pertinent, with your notes.
3. To rewrite your notes within a few hours of each class and to review them at least once a week.
4. To speak out in class or after class if the material is not clear.
5. To talk to me during my office hours or arrange another meeting time to go over questions you may have.
6. Write up exam questions. I will include as many donated questions as will fit in the exams if they are clear, unambiguous and critical (i.e. good questions)

Remember: What you learn from a course is directly proportional to the effort you invest.

THE MORE YOU LOOK, THE MORE YOU SEE.
Course Learning Objectives: Determined at beginning of semester.

Please note that dropping a course after the end of the fourth week of classes requires a “serious and compelling” reason. Before you request a late drop for this class, you must obtain written documentation of your reason for the withdrawal request. See the catalog for clarification of “serious and compelling”. After May 3, dropping classes is permitted only because of serious accident or illness and with the approval of the dean. An incomplete grade is not an option unless there is a documented serious and compelling reason that the final stages of the coursework cannot be completed. In case of a situation that requires an incomplete, the student and instructor must both sign a form that designates which components of the course must be completed and added to the completed portion of the coursework. In no case are incompletes to be considered options to retake the entire course.