**Embryology - Biology 426**  
*Syllabus Fall, 2012*  
4 Units (3 lecture and 1 laboratory)  T TH 11-2  
Dr. Marcum  Holt 330  Phone: 898-5539  
email: bmarcum@csuchico.edu  Office hours T 4:00-5:00; Th 2-3 in Holt 330; F 12-1 in Holt 273

<table>
<thead>
<tr>
<th>Wk</th>
<th>Date</th>
<th>Topics</th>
<th>References</th>
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</thead>
</table>
| 1  | Tues Aug 28 | slides of vertebrate tissues | Assignment for Sept 4:  
1. Read the Ethel Browne paper by Howard Lenhoff  
2. Gilbert: pgs. 566-570  
Define: Induction, Organizer  
Body axis polarity  
Gradient |
|    | Th. Aug 30 | Movies                                                                 | Read for Sept 4:  
Chap 1 pgs. 5-28  
Developmental Anatomy |
| 2  | Tu Sept. 4 | Live Hydra and Prepared slides of hydra                                | Handout                                                                   |
|    | Th. Sept. 6 | Movies, Prepared slides                                                 | Same as above – review  
Prepared slides of development |
| 3  | Tu Sept. 11 | Urchin prepared slides                                                  | Chap 2 pgs.31-68  
Developmental Genetics - Overview |
|    | Th. Sept. 13 | Eye Dissection; Origin of the parts                                     | Chap 3 pgs. 69-107 |

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<tr>
<td>4</td>
<td>Tu Sept. 18</td>
<td>EXAM #1</td>
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|    | Th. Sept. 20 | Early Development: Cell Specification  
Spermatogenesis  
Oogenesis  
Prepared slides of gametogenesis | Part II  Introduction to Specification  pgs. 109-119 |
|    | Tu Sept. 25 | Live Urchins  
/prepared slides | Chap 4 Fertilization  pgs. 121-158  
selected sections  
Lab book |
|    | Th. Sept. 27 | Live urchins continued  
/prepared slides | Chap 5 Early Development  
selected pages  
Lab book |
| 5  | Tu Oct 2  | Prepared slides                          
Comparative Development Overview  
Cleavage, Gastrulation, Neurulation  
Prepared slides – urchins, amphibians  
Chick prepared slides 18, 24, 33, 48 | Chap 5, selected pages  
Chap 7 selected pages  
Chap 8 selected pages |
|    | Th. Oct. 4 | Ectodermal derivatives  
Epidermis, Neural Tube and Neural Crest  
Brain dissection (the linear brain)  
preserved sheep brains  
Chick Prepared slides: 33, 48 continued | Part III Organogenesis  
Chap 9 The Stem Cell Concept  
Chap 10 Ectoderm  
selected pages  
Lab book |
| 6  | Tu Oct 9 | Mesodermal derivatives  
Paraxial, intermediate, and lateral  
Somite regions  
Early heart development – tube formation and twisting  
Mesodermal derivatives continued: Heart, blood, and blood vessel development;  
Endodermal derivatives – gut tube formation, pharynx, and lung buds | Chap 11 Paraxial and Intermediate Mesoderm  
selected pages  
Chap 12 Lateral Plate Mesoderm and the Endoderm  
selected pages  
Lab book |
|    | Th. Oct. 11 | Extraembryonic Membranes  
Live chick development  
24 hours  
33 hours  
48 hours | Chap 12 selected sections  
Lateral Plate Mesoderm and Endoderm  
Lab book |

8 T Oct. 16 Extraembryonic Membranes continued
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<tr>
<td>1</td>
<td>Th. Oct. 18</td>
<td>Live chick development</td>
<td>Lab Book</td>
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<tr>
<td>9</td>
<td>T Oct. 23</td>
<td>polished Chick Prepared slides - amphians</td>
<td>Chap 5, selected pages</td>
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<td>Cleavage, Gastrulation, Neurulation</td>
<td>Chap 7 selected pages</td>
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<td>Prepared chick prepared slides</td>
<td>Chap 8 selected pages</td>
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<td>Lab Practical #2</td>
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<td>10</td>
<td>T Oct. 25</td>
<td>Anatomy of mouse embryos osteogenesis</td>
<td>Handout</td>
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<td>Begin skeletal preparation – double staining</td>
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<td>11</td>
<td>T Nov. 1</td>
<td>Axis Specification</td>
<td>Chap 6 selected pages</td>
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<td>Prepared 10 mm Pig slides</td>
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<td></td>
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<td>Inductive Interactions – the Organizer Revisited</td>
<td>Chap 7 starting with pg. 252</td>
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<td>Prepared 10 mm Pig slides continued</td>
<td>Chap 8 starting with pg. 295</td>
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<td></td>
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<td>Face and Pharyngeal Pouches and Arches</td>
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<td>Ear development</td>
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<td>Development of the Vertebrate Eye</td>
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<td>Prepared 10 mm Pig slides continued</td>
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<td>12</td>
<td>T Nov. 6</td>
<td>Development of branched organs: lungs Epithelial-mesenchymal interactions</td>
<td>Chap 9 pgs. 359-365</td>
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<td></td>
<td>Continue 10mm Pig and skeletal specimens</td>
<td>Chap 12 pgs. 471-473</td>
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<td></td>
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<td>Heart Development</td>
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<td>Heart structure</td>
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<td>Heart dissection of fresh pig and/or cow heart</td>
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<td>Redirecting blood flow in the newborn mammal.</td>
<td>Chap 12 pgs. 474-480</td>
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<td>Chap 12 pgs. 446-458</td>
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<td>Nov. 8</td>
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<tr>
<td>12</td>
<td>T Nov. 13</td>
<td>Body Cavities, Mesenteries, and Diaphragm Kidney development, Urogenital system</td>
<td>Chap 11 pgs. 434-442</td>
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<td>Nov 15</td>
<td><strong>Exam #3</strong></td>
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<td>Nov 19-23</td>
<td><strong>Thanksgiving Vacation</strong> No Class</td>
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| 13 T Nov. 27 | Myogenesis and Osteogenesis  
Development of the Tetrapod Limb  
Continue 10mm Pig and skeletal specimens |
| Th. Nov. 29 | Cytoplasmic Specification  
Continue 10mm Pig and skeletal specimens |
| 14 T Dec. 4 | Mice and equipment for Blastocyst isolation  
Blastocyst Isolation  
Lab book |
| Th. Dec. 6 | **Lab Practical #3**                                                 |
| 15 T Dec. 11 | Individual Reports all prepared to go on this date  
Individual Reports continued |
| Th. Dec. 13 | Individual Reports continued |

**Final Exam: Thursday, Dec. 20th 10:00 – 11:50 p.m.**

**Grading**

<table>
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<th>Component</th>
<th>Points</th>
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<tr>
<td>3 Lecture Exams (100 pts each)</td>
<td>300</td>
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<tr>
<td>Final Exam – Cumulative</td>
<td>100</td>
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<td>Quizzes (some announced - some not announced)</td>
<td>100</td>
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<tr>
<td>Lab Practicals 3 (50 pts each)</td>
<td>150</td>
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<td>Individual Report: presented orally and submitted in written form</td>
<td>50</td>
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**Total Points** 700

**Participation and Attendance: Extra Credit points - added to total score** + 50

**Class Policies for Embryology, Biology 426:**

Answers to exam questions must be written legibly. If I can’t read it, the answer won’t be graded.
Attend class, be punctual, and come prepared, having completed assignments or reviewed previous material before class. If your schedule is tight this semester and you will be late (or plan to miss class) due to:

- work issues,
- parking issues,
- other classes,
- personal and or social issues,

then you should consider taking this class another semester.

The participation points will be based on class attendance, and attention to full participation in the laboratory exercises and discussions. 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. Since this class is a laboratory based course, missing 4 class periods will constitute a failing grade. 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.

Americans with Disabilities Act:
“If you need course adaptations or accommodations because of a disability or chronic illness, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Please also contact Disability Support Services (DSS) as they are the designated department responsible for approving and coordinating reasonable accommodations and services for students with disabilities. DSS will help you understand your rights and responsibilities under the Americans with Disabilities Act and provide you further assistance with requesting and arranging accommodations.”

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 take notes and rewrite them 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).

What you learn from this course is directly proportional to the effort you invest.

THE MORE YOU LOOK, THE MORE YOU SEE.
Course Learning Objectives: To Be Determined by students 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 Sept 21, 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.