1. Course Number: VBMS 7***
   Course Title: Developmental Molecular Biology
   Credit Hours: 3
   Corequisites: none
   Prerequisites: Eukaryotic Molecular Biology (VBMS7520)
   Grading Method: Letter grade

2. Date Syllabus Prepared: Revised April 18, 2006

3. Texts or Major References
      Massachusetts, 2006.
   b) Current Literature, assigned weekly.

4. Course Description
   Genetic mechanisms by which eukaryotes differentiate from single cells to complex multicellular
   organisms will be covered. Important examples of biomedical dysfunction will be used to
   illustrate developmental pathways. Current literature will be used extensively.

5. Course Objectives
   This course is designed as an advanced offering in a series of proposed graduate level
   courses in molecular biology and genetics primarily for M.S. and Ph.D. students in Biomedical
   Sciences (BMS). Developmental Genetics will present the fundamental aspects of control of
   cellular processes such as interactions between cells and differentiation of cells into organized
   tissues. This course will include important examples of biomedical dysfunction to illustrate
   these concepts. The material in this course will build upon that presented in Eukaryotic Genetics
   and be presented at an advanced level not suitable for undergraduates. The course will focus on
   a mechanistic approach to understanding these processes and will require considerable effort and
   participation from the student, including the discussion of weekly literature assignments and
   presentation of some class lectures.

6. Course Content and Schedule
   Format
   The format of this course will consist of 2 hours of lecture each week and 1 hour of
   discussion each week. The lecture will follow the syllabus. The discussions will utilize selected
   papers from the current literature to both enhance the topics covered in lecture and emphasize the
   mechanisms behind the important concepts. Papers that emphasize novel concepts, technology,
   and ideas will be presented, evaluated and interpreted by the students in the class. These
   discussion hours are generally more intensive than lecture, and therefore warrant the allotted
   credit hours. The students enrolled will be assigned lecture topics to present and will select the
   journal articles to be discussed.

7. Course Requirements/Evaluation
The course will include a final exam that will focus on the student’s ability to synthesize the material presented and to solve problems not previously discussed. Additionally, data analysis and interpretation will be stressed. The student will be required to prepare a 10 page essay on a topic relating to the mechanisms of cell and developmental biology of the student’s choosing (with the consent of the course coordinator). The student will be expected to conduct a review of the current literature in the topic area, evaluate the data presented, and draw supportable conclusions based on that data. Students will be expected to prepare and present lectures and select journal articles for discussion as assigned by the course instructor during the course. Students are expected to participate in class by being prepared (eg. having read the assignments), asking relevant questions and providing appropriate comments and discussion. All students will be assessed by letter grade based on the following formula.

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class participation</td>
<td>30%</td>
</tr>
<tr>
<td>Class Presentations/lectures</td>
<td>20%</td>
</tr>
<tr>
<td>Research paper</td>
<td>20%</td>
</tr>
<tr>
<td>Final examination</td>
<td>30%</td>
</tr>
</tbody>
</table>

Faculty will be evaluated yearly using the standard College of Veterinary Medicine Graduate Course Assessment form.

**Special Accommodations**

Students requiring special accommodations should make an appointment to discuss the Accommodations Memo with the course director as soon as possible. If a student does not have an Accommodations Memo, they are directed to contact The Program for Students with Disabilities (1244 Haley Center, 844-2096).

8. **Class Policy Statement**

   This course is a graduate level course, and as such students are expected to be current with class materials at all times. Thus the course director reserves the right to provide oral or written quizzes and include the grades for these in the grades for Class presentation and Midterm examinations. Attendance is not mandatory.

   Academic integrity and honesty are of the highest importance. Documented cheating of any type will not be tolerated and will result in failure of the class and referral for appropriate University disciplinary action. Cheating includes, but is not limited to, copying the work of other individuals in the class, using source material on closed book exam questions, and plagiarism (use of published material without proper citation).

9. **Justification for Graduate Credit**

   This course represents the continuation of Molecular Genetics I and provides a focus on eukaryotic molecular genetics that is essential to students in the graduate programs in Biology, Biomedical Sciences, Animal and Dairy Sciences, Pharmacology, Fisheries and Allied Aquaculture and Human Science.
Course Topics

1. Introduction To Gene Function And Development
2. Oocyte RNA Distribution
3. Establishment Of Polarity In The Embryo
4. Segmentation Gene Expression
5. Determination And Cell Fate Mapping
6. Induction, Competence And Intercellular Communication
7. Male Vs. Female Parental Gene Input In Developmental Programming (Imprinting)
8. Homeobox Gene Structure And Expression
9. Embryonic Tissue Morphogenesis
10. Myod/Id - Model Of Tissue Morphogenesis In Skeletal Muscle
12. Sex Determination
13. Embryonic Stem Cell Biology & Potency
14. Emerging Questions And Directions In Mammalian Development

Textbook: Developmental Biology, Gilbert, Eighth Edition