

OKLAHOMA BAPTIST UNIVERSITY

DEVELOPMENTAL BIOLOGY

BIOL 4044

SPRING 2011

COURSE/CATALOG DESCRIPTION

Considers animal and plant ontogeny and morphogenesis; role of genetic and environmental factors on growth and development, experimental investigation of animal and plant development; differentiation, morphogenesis (molecular, cellular, multicellular); hormonal and other biochemical mechanisms of control and coordination; the role of DNA and RNA in development.

COURSE OBJECTIVES

In keeping with the overall goals of the Science Division, this course is designed to provide students with the opportunity to enhance their understanding of complex biological subject matter and to develop the skills necessary for independent and critical analysis of complex phenomena, data, and observations encountered in the scientific endeavor. In this multidisciplinary approach, our academic exploration will include but will not be limited to analysis of anatomical, physiological, ecological, evolutionary, genetic, and cellular systems in plants, animals, and microbes. Emphasis will be placed on developing students' skills in inquiry-based problem solving, design and execution of experiments, interpretation of experimental data, and presentation of experimental results in both written and oral format. Moreover, it is the intent of this course to enhance the students' understanding of the interconnectedness of the sciences by relating the major concepts of chemistry, earth/space sciences, and physics, to the Biological sciences; and to emphasize and apply mathematical concepts, including statistics and pre-calculus to investigations in biology and the analysis of data. Finally, it is the goal of this course to provide an environment in which the students can explore the relatedness of historical, sociological, technological, and ethical issues and developments to the study of contemporary Biology.

CLASS DATES

Section A:	Tues., Thurs.,	9:30 – 10:45am	Wood Sci. Bldg. Room 118
Laboratory:	Fri.,	2:00 – 5:00pm	Wood Sci. Bldg. Room 109

INSTRUCTOR

Bradley Jett, Ph.D. [course coordinator]
Dale Utt, Ph.D. [course coordinator]
Office: WSB 119B
Phone: 405-878-2043
Office Hours: T 11am – 1pm; W 1pm – 3pm; R 12-1pm
Email: brad.jett@okbu.edu

CREDIT HOURS

4 Credits

TEXTBOOKS TO PURCHASE

“Developmental Biology” Latest Edition, by Gilbert.

PREREQUISITES

BIOL 4014 or CHEM 3054

DAILY ASSIGNMENTS, CLASSROOM DISCUSSIONS AND CHAPTER PRESENTATIONS

Students will be required to submit an outline of each chapter at the beginning of the class period in which the chapter is to be discussed. Students will be assigned responsibility for leading the classroom discussion on selected material from each chapter. Assuming the role of instructor, they will present this material to the class in a timely and engaging manner. You will be expected to call upon your arsenal of tricks to facilitate learning (i.e., steal techniques from every effective teacher you have ever had) to help us in class to master the concepts of the topic for which you are assigned leadership responsibilities. Remember, though, that the medium may not be the message. Students are encouraged to remember that this is not a lecture-oriented course, and the most effective presentations of assigned material will stimulate questioning and discussion among the audience. The class presentation must be carefully prepared and skillfully presented, as students will be rated on the effectiveness of their presentations.

PAPERS

Each student will be expected to prepare TWO papers summarizing findings from recent journal articles to supplement the textbook. These reports on the journal articles are expected to be carefully crafted and demonstrate that you thoroughly understand the content of the article. They must go beyond merely restating the abstract of conclusions and show that you have critically thought about the hypothesis being tested and are able to relate it to the concepts we have been discussing in class.

Guidelines for papers are as follows:

- Paper should be 4-6 pages, typed, double-spaced, 12-point font.
- These papers must cite at least THREE current (< 2 years old) scientific journal articles. Other sources may be cited, such as reputable internet sites, news articles, etc. Penalties will be assessed if THREE, recent scientific journal articles are not used.
- Plagiarism will result in severe penalties, as outlined in University regulations pertaining to academic misconduct, a minimum of which will be zero credit for the paper.
- Only papers turned in by the listed deadlines will be graded. Therefore, you are encouraged to develop your ideas early.

LABORATORY

Each student will be required to keep a laboratory notebook in which he/she will carefully document weekly experiments. Periodically, we will visit interactive Developmental Biology Websites as well as examine material contained in the CD-ROM "Vade Mecum" which accompanies the Gilbert textbook. For laboratory sessions not specifically involving an experimental project, the laboratory notebook will serve as a record of notes, Internet addresses, etc. which may be a valuable resource for the student in preparation of papers and projects. Although a specific experiment may not be scheduled for a specific laboratory session, each student will be required to outline or describe how the laboratory time was spent each week. Embryological slides typical of those described in Atlas of Descriptive Embryology: Fifth Edition, by Mathews will also be examined. Such slides may include specimens relating to

Gametogenesis	The Unincubated Chick Blastoderm
Maturation and Fertilization in <i>Ascaris</i>	The Notochordal Process Chick Embryo
Sea Urchin Development	The 4-5-Somite Chick Embryo
Starfish Development	The 13-Somite Chick Embryo

Development of Amphibians	The 2-day Chick Embryo
Early development of the Frog	The 3-Day Chick Embryo
The 4-mm Frog Embryo	The 3 1/2 Day Chick Embryo
The 6-7-mm Frog Tadpole	The 5-6-mm Pig Embryo
The 10-mm Frog Tadpole	The 10-mm Pig Embryo
Gametogenesis in chickens	Human Uterus and Placenta

GRADING

Items which will be evaluated in order to determine final academic performance will include: 1) attendance, 2) quality and completeness of submitted chapter outlines, 3) quality of preparation and skill of presentation of assigned chapter material, 4) quality of assigned papers, 5) submission of papers by posted deadlines, 6) laboratory participation, 7) quality and completeness of laboratory notes regarding weekly projects, 8) periodic quizzes and/or additional writing/reading assignments. Final course grades of A (90-100%), B (89-80%), C (79-70%), D (69-60%), or F (59-0%), will be determined and calculated using points earned vs. points possible.

You realize, of course, that we have been moving in a progression toward greater independence of learning with each course over the past four years. This course in many ways is the capstone course of our curriculum. Not only will it be necessary to draw from each course you have taken in order to understand the content of this course, but also you are expected to adopt the mode of self-directed continuous learning in which the instructor assumes less importance. You have made great progress toward that goal. We will still play the role as prompter, but we should be increasingly irrelevant in the process. The last vestige of our responsibilities is that, as the persons the institution has entrusted with certifying your credentials, we must keep tabs and assure ourselves that you are indeed accomplishing your stated goals. If this means that we must revert to old formats to ensure that you are performing at the level that previous students in this course were expected to perform then we will use those formats.

ATTENDANCE

The Oklahoma Baptist University attendance policy will be followed according to guidelines published in the Student Handbook.

STUDENTS WITH DISABILITIES

Oklahoma Baptist University complies with Section 504 of the Rehabilitation Act and with the Americans with Disabilities Act. Students with disabilities who need special accommodations must make their requests and submit documentation to the Director of Student Services. The Student Services office is located in the Geiger Center, Room 101.

ADDITIONAL IMPORTANT ACADEMIC INFORMATION FOR OBU STUDENTS

Please refer to the following link,

http://www.okbu.edu/academics/forms/syllabus_attachment_spring11.pdf for important information regarding class attendance policies academic policies and expectations, tutoring information, library hours, important dates and holidays, inclement weather policies, chapel attendance policies, and more.

COURSE SCHEDULE

DATE	ASSIGNMENT	TOPIC
Jan 25	Chapter 1	Developmental Biology: The Anatomical Tradition
Jan 27	Chapter 2	Life Cycles and the Evolution of Developmental Patterns
Feb 1	Chapter 3	Principles of Experimental Embryology
Feb 3	Research Article	Discussion of Research Article
Feb 8	Chapter 5	The Paradigm of Differential Gene Expression
Feb 10	Chapter 6	Cell-Cell Communication in Development
Feb 15	Chapter 7	Fertilization: Beginning a New Organism
Feb 17	Video	Fertilization Video [PAPER #1 DUE AT BEGINNING OF CLASS]
Feb 22	Chapter 8	Early Development in Selected Invertebrates
Feb 24	Lab Work	Microscope Exercise
Mar 1	Book Discussion	In-class discussion
Mar 3	Book Discussion	In-class discussion
Mar 8	Chapter 10	Early Development and Axis Formation in Amphibians
Mar 10	Lab Work	Microscope Exercise
Mar 15, 17	SPRING RECESS	
Mar 22	Chapter 11	The Early Development of Vertebrates: Fish, Birds, and Mammals
Mar 24	Chapter 14	Paraxial and Intermediate Mesoderm [PAPER #2 DUE AT BEGINNING OF CLASS]
Mar 29	Research Article	Discussion of Research Article
Mar 31	Lab Work	Microscope Exercise
Apr 5	Chapter 15	Lateral Plate Mesoderm and Endoderm
Apr 7	Chapter 16	Development of the Tetrapod Limb
Apr 12	Research Article	Discussion of Research Article
Apr 14	Chapter 17	Sex Determination
Apr 19	Chapter 18	Metamorphosis, Regeneration, and Aging
Apr 21	Chapter 19	The Saga of the Germ-Line
Apr 26	Lab Work	Microscope Exercise
Apr 28	Chapter 22	Environmental Regulation of Animal Development
May 3	Chapter 23	Developmental Mechanisms of Evolutionary Change
May 5	REVIEW DAY	REVIEW DAY

FINAL EXAM, TUESDAY, MAY 10, 8:00am-10:00am