

Syllabus for
BIO 431—Developmental Biology Lecture
3.0 Credit Hours
Fall 2012

I. COURSE DESCRIPTION

A study of the ontogeny, morphogenesis, genetic and environmental factors, aggregation, differentiation, hormonal controls, and coordination of both plant and animal development. Prerequisites: One year each of general biology and general chemistry; BIO 370. Corequisite: BIO 431 Lab

II. COURSE GOALS

As one of the biology core curriculum courses, Developmental Biology enables the student to develop an understanding of development as an inexorable process proceeding along an extended time line from the moment of conception until the death of the individual. These developmental processes are largely irreversible and are measured in hours, days, and years, but can be predicted and to some extent influenced. Knowledge of these processes is essential to the student working in the life sciences since they serve as the foundation for such diverse studies as: pest control, genetic counseling and diseases, congenital abnormalities, agricultural production, cancer, and aging.

III. STUDENT LEARNING OUTCOMES FOR THIS COURSE

As a result of successfully completing this course, the student will be able to do the following:

- A. List and discuss the major processes included in the broad category of developmental biology.
- B. Describe protein synthesis as directed by the genes.
- C. Define and distinguish the major morphogenetic processes.
- D. Explain polarity and illustrate the different types found in developing organisms.
- E. Define key developmental biology terminology.
- F. Describe and distinguish between the concepts of preformation and epigenesis.
- G. Graphically and pictorially, compare and contrast oogenesis and spermatogenesis in the vertebrates.
- H. Describe the major processes of gastrulation and relate these to different animal groups.
- I. Outline the sequence of events during fertilization of the vertebrate egg.
- J. List the major derivatives of the three germ layers.

- K. Describe organogenesis of: spinal cord, heart, limbs, digestive tract, and eye.
- L. Describe the traits of cleavage and the different cleavage patterns.
- M. Describe different egg and blastula types in animals.
- N. Discuss the significance of the chordamesoderm and Hensen's node in development of amphibians and chicks, respectively.
- O. Compare and contrast embryonic cells with cancer cells.
- P. Compare and contrast animal and plant development.
- Q. Discuss hormonal control of metamorphosis and puberty.
- R. Discuss the dynamics of the human female reproductive cycle and its hormonal control.
- S. Discuss the regulation of gene expression at five levels (genomic change, transcription, RNA processing, translation, and posttranslation) that cause cell differentiation.
- T. Discuss the varieties of cell-cell interactions and their roles in development.
- U. Discuss various theories of aging mechanisms.

IV. TEXTBOOKS AND OTHER LEARNING RESOURCES

Required Textbooks

Gilbert, S. F. 2010. *Developmental Biology*, 9th edition. Sinauer Associates, Sunderland, Mass. ISBN: 978-0-87893-384-6

Schoenwolf, G.C., Bleyl, S.B., Brauer, P.R., and Francis-West, P.H. 2008. *Larsen's Human Embryology*, 4th edition. Churchill Livingstone. ISBN: 978-0-443-06811-9

V. POLICIES AND PROCEDURES

- A. University Policies and Procedures
 1. Attendance at each class or laboratory is mandatory at Oral Roberts University. Excessive absences can reduce a student's grade or deny credit for the course.
 2. Students taking a late exam because of an unauthorized absence are charged a late exam fee.
 3. Students and faculty at Oral Roberts University must adhere to all laws addressing the ethical use of others' materials, whether it is in the form of print, electronic, video, multimedia, or computer software. Plagiarism and other forms of cheating involve both lying and stealing and are violations of ORU's Honor Code: "I will not cheat or plagiarize; I will do my own academic work and will not inappropriately collaborate with other students on assignments." Plagiarism is usually defined as copying someone else's ideas, words, or sentence structure and submitting them as one's own. Other forms of academic dishonesty include (but are not limited to) the following:

- a. Submitting another's work as one's own or colluding with someone else and submitting that work as though it were his or hers;
- b. Failing to meet group assignment or project requirements while claiming to have done so;
- c. Failing to cite sources used in a paper;
- d. Creating results for experiments, observations, interviews, or projects that were not done;
- e. Receiving or giving unauthorized help on assignments.

By submitting an assignment in any form, the student gives permission for the assignment to be checked for plagiarism, either by submitting the work for electronic verification or by other means. Penalties for any of the above infractions may result in disciplinary action including failing the assignment or failing the course or expulsion from the University, as determined by department and University guidelines.

- 4. Final exams cannot be given before their scheduled times. Students need to check the final exam schedule before planning return flights or other events at the end of the semester.
- 5. Students are to be in compliance with University, school, and departmental policies regarding the Whole Person Assessment requirements. Students should consult the Whole Person Assessment handbooks for requirements regarding general education and the students' majors.
 - a. The penalty for not submitting electronically or for incorrectly submitting an artifact is a zero for that assignment.
 - b. By submitting an assignment, the student gives permission for the assignment to be assessed electronically.

B. Course Policies and Procedures

1. Evaluation Procedures

The students are required to have a working knowledge and an understanding of the material studied in **Bio 431 lecture and Bio 431 laboratory** and this will be evaluated by exams, quizzes and a final examination. Due to the corequisite nature of the laboratory material, students are held responsible for the material in laboratory as the lecture.

<u>Source</u>	<u>Points</u>
5 Quizzes (20pt/each)	100
3 Exams (100 pt/each)	300
Case studies, critiques, etc.	60
<u>Comprehensive final</u>	<u>200</u>
	660

- 2. The student is allowed three absences for illness, emergencies, or for personal reasons. Thereafter each absence will result in a 2% reduction in the total semester points. Students who miss more than 9 class periods will automatically earn an "F" for the semester. Any missed work must be made up within one week of the absence. Late exams will require payment of the late test fee unless the absence was administratively approved.
- 3. All assignments require individualized effort unless indicated otherwise. Any evidence of plagiarism or cheating on assignments will result in a zero for that assignment. Any cheating on a quiz or exam or a repeat plagiarism offence on an assignment will result in an automatically earned "F" for the semester.

4. It is expected that all work be handed in on time. **Late assignments penalized 5% per day for each day late, including weekends.**
5. Whole Person Assessment Requirements
None

VI. CALENDAR

Week	Topic	Chapters
1	Developmental Anatomy	DB Ch 1
2	Developmental Genetics	DB Ch 2
3	Cell-Cell Communication in Development EXAM	DB Ch 3
4	The Saga of the Germ Line Fertilization	DB Ch 4/ 16 LHE Ch 1
5	Early Development in Selected Invertebrates	DB Ch 5
6	Amphibians and Fish EXAM	DB Ch 7
7	Birds and Mammals	DB Ch 8
8	Second Week/Third Week	LHE Ch 2-3
9	Fourth Week/Morphogenesis	LHE Ch 4-5
10	Fetal Development EXAM	LHE Ch 6
11	Skin and Derivatives	LHE Ch 7
12	Musculoskeletal System	LHE Ch 8
13	Central Nervous System	LHE Ch 9
14	Peripheral Nervous System	LHE Ch 10
15	Respiratory System and Body Cavities	LHE Ch 11
16	Heart and Vascular	LHE Ch 12-13

Course Inventory for ORU's Student Learning Outcomes

Developmental Biology Lecture – BIO 431 Fall 2012

This course contributes to the ORU student learning outcomes as indicated below:

Significant Contribution – Addresses the outcome directly and includes targeted assessment.

Moderate Contribution – Addresses the outcome directly or indirectly and includes some assessment.

Minimal Contribution – Addresses the outcome indirectly and includes little or no assessment.

No Contribution – Does not address the outcome.

The Student Learning Glossary at <http://ir.oru.edu/doc/glossary.pdf> defines each outcome and each of the proficiencies/capacities.

OUTCOMES & Proficiencies/Capacities		Significant Contribution	Moderate Contribution	Minimal Contribution	No Contribution
1	Outcome #1 – Spiritually Alive Proficiencies/Capacities				
1A	Biblical knowledge				X
1B	Sensitivity to the Holy Spirit				X
1C	Evangelistic capability				X
1D	Ethical behavior	X			
2	Outcome #2 – Intellectually Alert Proficiencies/Capacities				
2A	Critical thinking	X			
2B	Information literacy	X			
2C	Global & historical perspectives	X			
2D	Aesthetic appreciation		X		
2E	Intellectual creativity	X			
3	Outcome #3 – Physically Disciplined Proficiencies/Capacities				
3A	Healthy lifestyle			X	
3B	Physically disciplined lifestyle				X
4	Outcome #4 – Socially Adept Proficiencies/Capacities				
4A	Communication skills	X			
4B	Interpersonal skills			X	
4C	Appreciation of cultural & linguistic differences				X
4D	Responsible citizenship		X		
4E	Leadership capacity				X