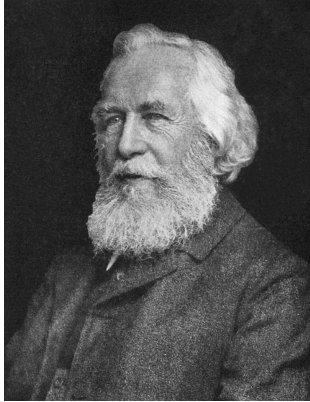


# Syllabus

## Biology 370 - Developmental Biology

### Winter 2018

(current as of 01/17/18)



“Everybody knows that the butterfly emerges from the pupa, and the pupa from a quite different thing called a larva, and the larva from the butterfly’s egg. But, few ... are aware that man, in the course of his individual formation, passes through a series of transformations which are not less surprising and wonderful than the familiar metamorphosis of the butterfly.”

– Ernst Haeckel  
*The Evolution of Man — Volume 1* [1912]

<b>Lecture Instructor:</b>	Gary M. Lange
<b>Office &amp; Phone:</b>	157 Science Building – West [ (989) 964-4336 ]
<b>Web Site:</b>	<a href="http://www.svsu.edu/~gmlange">http://www.svsu.edu/~gmlange</a>
<b>Office Hours:</b>	MW 9:00am – 10:00am TR 10:00am – 11:00am Other hours by appointment
<b>Sections:</b>	LECTURES → MW 11:30am – 12:50pm in room P242  LAB (1A) → MW 10:00am – 11:20am in room SW107 LAB (1B) → MW 1:00pm – 2:20pm in room SW107
<b>Textbook:</b>	<i>Developmental Biology</i> , 11 <sup>th</sup> Edition by Gilbert
<b>Laboratory Manuals:</b>	<i>Developmental Biology: A Guide for Experimental Study</i> 3 <sup>rd</sup> Edition by Tyler  <i>A Photographic Atlas of Developmental Biology</i> 1 <sup>st</sup> Edition by Wright
<b>Electronics:</b>	Avida-ED - Biological Evolution Experimentation Tool at ( <a href="https://avida-ed.msu.edu/app/AvidaED.html">https://avida-ed.msu.edu/app/AvidaED.html</a> )  <i>DevBio Laboratory: vade mecum</i> <sup>3</sup> by Tyler & Kozlowski

Grades in this course shall follow standard SVSU grading procedures (outlined at the end of this syllabus) and shall be formulated from the 3 lecture exams, a CITI Training Exercise, 2 laboratory exams, 2 lab notebook evaluations, a variety of lab research assignments (including two formal presentations), and 1 two-hour final examination during the semester. The final exam is mandatory and will be composed of 50% new material and 50% comprehensive topics. The important

examination dates and due dates for written material are shown in the following chart along with the point distribution:

Lecture Exam #1	February 12 <sup>th</sup>	100pt
Lecture Exam #2	March 19 <sup>th</sup>	100pt
Lecture Exam #3	April 11 <sup>th</sup>	100pt
CITI Training Exercise	January 29 <sup>th</sup>	<i>*See assignment sheet</i>
Lab Exam #1	February 28 <sup>th</sup>	50pt
Lab Exam #2	April 25 <sup>th</sup>	50pt
Lab Notebook Evaluation #1	February 28 <sup>th</sup>	50pt
Lab Notebook Evaluation #2	April 25 <sup>th</sup>	50pt
Live Organism Research Presentation	April 18 <sup>th</sup> or 23 <sup>rd</sup>	50pt
Developmental Evolution Poster	April 25 <sup>th</sup>	25pt
Writings on Trends in Development	various during the semester	25pt
Final Examination	May 2 <sup>nd</sup> (10:30am – 12:20pm)	200pt

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TOTAL = 800pt

### Lecture Topics, Laboratory Topics, and Exam Schedule

WEEK OF	LECTURE TOPICS	LABORATORY TOPICS
Jan. 16 <sup>th</sup>	<b>NO CLASS (Monday) — Martin Luther King, Jr. Day</b> Introduction Mechanisms of Developmental Organization (Topic 1)	<b>NO LAB (Monday) — Martin Luther King, Jr. Day</b> Getting Started (Exercise #1) Embryological Tools (Exercise #2) Using the Compound Microscope (Exercise #3)
Jan. 22 <sup>nd</sup>	Mechanisms of Developmental Patterning (Topic 2)	conclude on Wednesday Getting Started (Exercise #1) Embryological Tools (Exercise #2) Using the Compound Microscope (Exercise #3)
Jan. 29 <sup>th</sup>	Differential Gene Expression: The Gene's Role in Development (Topic 3) The Roles of Cell-to-Cell Communication in Development (Topic 4)	Cellular Slime Molds (Exercise #4)
Feb. 5 <sup>th</sup>	Stem Cells: Their Potential and Their Niches (Topic 5) A Brief Overview of Plant Development (Topic 6)	Plant Development (Supplements) Gametogenesis (Exercise #5)

WEEK OF	LECTURE TOPICS	LABORATORY TOPICS
Feb. 12 <sup>th</sup>	<b>LECTURE EXAM #1 on Monday</b>	Echinoid Fertilization and Development (Exercise #6)
Feb. 19 <sup>th</sup>	Sex Determination (Topic 7) Fertilization: The Beginning of Development in a New Organism (Topic 8)	Sea Urchin Development: Effects of Ultraviolet Radiation (Exercise #7) Development of the Fruit Fly (Exercise #8 – Wednesday)
Feb. 26 <sup>th</sup>	A First Look at Early Development: Rapid Specification in Snails & Nematodes (Topic 9) A Continuation in A First Look at Early Development: Rapid Specification in Snails & Nematodes (Topic 10)	continue Development of the Fruit Fly (Exercise #8 – Monday) <b>Lab Exam #1 and Lab Notebook Evaluation #1 (Wednesday)</b>
Mar. 5 <sup>th</sup>	<b>SPRING BREAK! No Classes.</b>	<b>SPRING BREAK! No Classes.</b>
Mar. 12 <sup>th</sup>	The Genetics of Axis Specification in Drosophila (Topic 11) Amphibians & Fish: Early Development and Axis Formation (Topic 12)	Amphibian Development (Exercise #14)
Mar. 19 <sup>th</sup>	<b>LECTURE EXAM #2 on Monday</b> Birds & Mammals: Early Development and Axis Formation (Topic 13)	continue Amphibian Development (Exercise #14) and also Early Development of the Chick (Exercise #9)
Mar. 26 <sup>th</sup>	Neural Crest Cells & Axonal Specificity (Topic 14) Brain Growth, Neural Crest Cells & Axonal Specificity (Topic 15)	33 Hour Chick Embryo (Exercise #10)
<b>The last day to withdraw from this course to receive a “W” grade this semester is MARCH 30<sup>th</sup>.</b>		
Apr. 2 <sup>nd</sup>	Development of the Tetrapod Limb (Topic 16)	Later Chick Embryos: The Living Embryo and Making Whole Mounts (Exercise #11)
Apr. 9 <sup>th</sup>	Postembryonic Development: Metamorphosis (Topic 17) Post Embryonic Development: Regeneration, and Aging (Topic 18) <b>LECTURE EXAM #3 on Wednesday</b>	Planaria Regeneration (Exercise #13)
Apr. 16 <sup>th</sup>	The Germ Line: Additional Concepts (Topic 19) Medical Aspects of Developmental Biology: Birth Defects, Endocrine Disruptors, and Cancer (Topic 20)	Zebrafish Development (Exercise #15) (Monday) Presentations (Wednesday)
Apr. 23 <sup>rd</sup>	Ecological Developmental Biology: Biotic, Abiotic, and Symbiotic Regulation of Development (Topic 21) Developmental Mechanisms of Evolutionary Change (Topic 22) Other Developmental Topics (Topic 23)	Presentations (Monday) and Cleanup <b>Lab Exam #2 and Lab Notebook Evaluation #2 (Wednesday)</b>  <b>Avida-ED Poster Due</b>

WEEK OF	LECTURE TOPICS	LABORATORY TOPICS
Apr. 30 <sup>th</sup>	<b>FINAL EXAMINATION</b> <b>Wednesday, MAY 2<sup>nd</sup></b> <b>(10:30am – 12:20pm)</b>	—

Please note that while every effort shall be made to follow this scheduled outline strictly, the above outline should be considered tentative. If a problem arises (such as animals not arriving on a particular day, adverse weather conditions that close the school, power outages, typographical errors, etc) subject matter and examination dates may be modified.

A significant percentage of your grade in Biology 370 is determined by your scores on the laboratory practical examinations. Laboratory sessions are a vital part of your learning experience at SVSU, and the laboratory sessions are designed to give you a hands-on experience of the topics you will learn about in lecture. **Laboratory attendance is mandatory.** A great deal of effort, time, and money is used by the Department of Biology to ensure you will have the best laboratory experience possible. However, nothing is as important to your acquisition of knowledge in the laboratory session as is your coming to lab eager to learn.

Safety is a very important issue in any laboratory setting. Your laboratory instructor shall discuss many safety protocols in our first laboratory session. For your safety, it is suggested that you avoid wearing contact lenses in the laboratory session if at all possible. Please notify me if you **MUST** wear contact lenses in the laboratory setting. If you are interested, "Material Safety Data Sheets" (MSDS) are available for your perusal about materials used in this course. The MSDS files are located in the Department of Biology Stockroom (SW132). It is suggested that if you are interested in these forms, that you ask me, your laboratory instructor, or our laboratory technician (Kathleen Pelkki—office in SW159) for further assistance.

The standard SVSU method for determining grades in this course shall be utilized. Grades are computed using the following formula:

A	93% and above
A-	90% – 92%
B+	87% – 89%
B	83% – 86%
B-	80% – 82%
C+	77% – 79%
C	73% – 76%
D	60% – 72%
F	below 60%

If I feel the course should warrant it, I reserve the right to curve the final grading scale for this class. I can guarantee, however, that I will not curve the grading in a downward direction. If all students in the class were to obtain 93% of the points for example, I would be more than happy to give everyone an "A" grade.

### Important Information About Student Conduct

The following is a quote from the SVSU Student Handbook, Code of Student Conduct on Academic Dishonesty, 1.8.1. "No student shall cheat, plagiarize, or facilitate academic dishonesty by another student. Students are responsible for completing all assigned academic work without unauthorized aid of any kind."

### Important Information For Students With Disabilities

Students with disabilities that may restrict their participation in course activities are encouraged to meet with me (and the appropriate laboratory instructor) as soon as possible at the beginning of the semester. Additionally, students with disabilities are encouraged to contact the SVSU Office of Disability Services located in 260 Wickes Hall (964-7000) for more information.

### Information About Make-Up Exams

Due to the sheer number and volume of student requests for make-up exams during Fall 2006, a new make-up exam policy has been in effect since Winter 2007. This policy is designed to help both you (the student) and me (the professor).

You are requested to please take all examinations on the date and time scheduled. If you cannot take an exam as scheduled, you must formally ask for approval to take a make-up exam using the application form available on my website for this course. All **APPROVED** make-up exams will be given **ONLY** on **Friday, April 27<sup>th</sup> between 10:00am and Noon**. These exams will be significantly different from the exams taken during the regularly scheduled times and are NOT ELIGIBLE for any curve given to the scheduled exams.

Applications for approval to take a make-up exam must be received within 72 (business) hours of the scheduled exam. A paper copy of the application for a make-up exam must be turned in to my faculty secretary, Linda Peterson (or her designate), in the faculty office area on 1<sup>st</sup> Floor Science West by the allotted time to be ELIGIBLE. Notification of approval or non-approval will be given within one week.

Please note that it is best to not need a make-up exam unless there are truly dire circumstances that would warrant this option (such as severe health issue of a family member, death of a family member, significant illness, etc.).

### Important Information About The Value of Writing in Science

Writing is an essential pursuit for all students interested in science and/or science related careers. However, writing is often more difficult and challenging in the scientific disciplines due to special techniques that are used and special skills that are often poorly practiced by students prior to enrolling in the University. We are very fortunate, here at Saginaw Valley State University (SVSU) to have the SVSU Writing Center on campus. The SVSU Writing Center is a facility located on the 2<sup>nd</sup> floor of Zahn Library and can be used by all students and faculty who wish help and support with their writing endeavors. I encourage you to utilize this service if you have concerns about your writing assignments.

## Important Information About The Value of Animal Models in Science & Science Education

Because most of you will be continuing your education in your major to eventually become a health care or related career professional, it is important for you to be aware of the high degree of value placed on the use of animals in medical research and education. The following highlights excerpted statements of the Association of American Medical Colleges (AAMC) concerning use of animals in medical research and education:

1. The AAMC strongly affirms the essential and irreplaceable role of research involving live animals in the advancement of biological knowledge, human health and animal welfare.
2. Animals continue to be vital in segments of the medical education continuum (undergraduate, graduate, and continuing medical education), and the AAMC supports this use of animals to meet essential educational objectives.
3. The AAMC has a firm belief that further restrictions on the use of animals in biomedical and behavioral research and education threatens progress in health care and disease prevention.
4. The AAMC supports the continued availability and humane use of animals in scientific research and education.

You will be given the opportunity to participate in this course in laboratory experiences involving living animals. This is an important and valuable privilege, and is an important aspect of your undergraduate education in physiology and anatomy.

## Special Information Concerning Grades

While it is possible I will curve the course grades at the end of the semester, **THE SAFEST WAY TO EARN A GRADE YOU WANT is to obtain AT LEAST the percentage you need from the above chart.** In fact, it is always to your benefit to work to get 100% of the information covered. Please realize that if you desperately wish to obtain a “B-” grade in this course, you should plan on obtaining 80% or better. **DO NOT count on or rely on a curve.** If I were to end up curving the final grades to say “78% and above is a “B-” grade, you would really hate to have obtained only 76%... for this would **not** be a “B-”.

I have had two or three students in the past come to me with just such a predicament as presented above, and they have been very distraught..... they felt that since I was already lenient in lowering the curve two percentage points and that since they were **now ONLY 2%** away from what was a “B-” that I should give them the higher grade. **This sort of situation makes me feel very sad and frustrated.** Being “2%” away from the “B-” grade in the above situation means the students were **14 POINTS** away from the grade desired **AFTER LOWERING THE GRADE PERCENTAGE ALREADY!** I could not lower the grading scale further, though I felt really sad for the students. Please.... IF you want a particular grade... the only way you can be assured of attaining it is to earn the necessary percentage of points listed above in the chart.

## Important Information About the Return of Graded Material

Please note that grading (written materials, laboratory exams, and lecture exams) is an effort that requires time and thought. Therefore, please realize that I will need a **one week time period for lecture exams** and **two weeks for laboratory exams and written materials** in which to grade assignments and tests. ***IF*** I am able to accomplish grading sooner than expected from the above guideline, I will post grades early, but it is likely to take one week for each graded item.

### ***And... a final note:***

Please do not feel intimidated by the large number of rules and regulations presented here in the syllabus. It is my hope that you will find these guidelines helpful, and as the course progresses you will see that the study of human anatomy and physiology is a very exciting and enjoyable pursuit!