
Developmental Biology
Biology 666 – Fall 2016
Class Meetings: Tuesdays & Thursdays
Meeting Time: 10:00 – 11:15 AM
Meeting Place: SEB 1242

COURSE DESCRIPTION

Course Overview:

Biol 666 is intended for biological-sciences graduate students who wish to learn about the general processes and mechanisms that occur during development of complex multicellular animals, with an emphasis on model organisms. Students will learn key principles of embryonic development and lifelong tissue renewal, with an emphasis on model invertebrates and vertebrates. Students will build on concepts learned in prerequisite courses, and demonstrate their understanding gained in this course by leading class discussions of original research papers that investigate the processes of gene function and regulation, cell signaling, and tissue interactions during embryonic development and tissue self-renewal.

Biol 666 is an intensive course in which students will be expected to read background material from the textbook, and also to critically read both assigned and independently researched papers from the scientific literature. In order to expand critical thinking skills, students will lead in-class discussions of selected developmental biology research papers, as well as demonstrate their ability to apply the concepts learned to current research areas through a written literature review paper.

Course Format:

Developmental Biology is a 3-credit, 400/600, composite course comprised of advanced undergraduates (enrolled in Biol 466) and beginning graduate students (enrolled in Biol 666). Both sets of students will participate in the class. However, grades will be assigned using two different sets of criteria so that 466 and 666 students are evaluated using standards appropriate to their academic standing.

Most class meetings will consist of a lecture to introduce the genetics, cells biology, and experimental embryology components that comprise the science of developmental biology. Five class meetings are dedicated to a guided discussion of an assigned research paper, which relates to topics covered in the course. A few remarks about the research paper will be included in the previous lecture. Each Biol 666 student will be expected to lead 1 or 2 of these discussions, depending on the number of students in the course. Presenters will be expected to perform independent literature research in order to understand the background and the status of the field at the time of publication. They will then guide the Biol466 students in discussion of the most important experiments and data. The papers have been preselected by the instructor, but 666 students will have some flexibility in choice of presentation date(s) or paper(s) in a meeting with the instructor.

Learning Outcomes:

Successful completion of this course will require the abilities to think logically, read critically, and communicate effectively, as well as to integrate and apply a knowledge base to understand how a fertilized egg develops into a mature animal. Students who successfully complete this course will demonstrate their understanding of the following concepts, through their discussion of research papers, their written literature review papers, and in their application of these concepts in their answers to questions on the exams:

- The cellular and tissue-based events of fertilization, cleavage, gastrulation, neurulation, organogenesis, gametogenesis, aging, and tissue renewal, which comprise the life cycle.
- The concepts of cellular competence, induction, specification, commitment and differentiation, as they relate to both embryonic development and adult tissue renewal.
- The concepts of embryonic patterning and axis formation, using examples from an invertebrate system that include genes known to act in patterning events.
- The evolutionarily conserved roles for major gene families in fundamental events of developmental biology.
- The continuing contributions of differential gene expression and tissue interactions to the formation of the major organ systems in vertebrates from the embryonic tissues of ectoderm, mesoderm, endoderm, and germline.
- The interconnection between developmental biology and biomedical research in stem cell and cancer biology.
- The contribution of hypotheses, experimental design, and data interpretation to current advances reported in the scientific literature.

Prerequisites:

Molecular Genetics (UNLV Bio304), Molecular Biology (UNLV Bio405) or Biochemistry (UNLV Chem 474); Cell Biology/Cell Physiology is recommended.

Required Class Materials:

1) ***Developmental Biology* by Scott Gilbert and Michael Barresi, 11th Edition will be used by instructor**

The publisher offers options to purchase a hardcopy or electronic version of the textbook (Publisher URL: <http://www.sinauer.com>). **An inexpensive alternative is to rent the text from Amazon.**

Please note that that the 11th edition of the text has additions, deletions, and rearrangements to the content compared to the 10th edition, and differs extensively from earlier editions.

The instructor cannot guarantee that **earlier versions of the text will be sufficient** for the course.

2) Access to a networked computer that can be used for RELIABLE access to Webcampus, downloading and printing PDF files, accessing the companion website for the textbook, and performing independent research through the UNLV Library web site. Note that UNLV provides networked computers in various locations on campus, so that inability to access WebCampus will not be accepted as an excuse for failure to complete assigned work.

3) Original research articles and other materials downloaded from the course WebCampus site.

Required Reading Assignments:

- Occasionally, a topic cannot be sufficiently covered in the time available for lectures. In these cases, students will be directed to learn from the textbook, and specific pages of the text will be assigned.
- For 5 class sessions, the student must read the assigned research paper, which will be posted 5 - 7 days earlier on WebCampus.
- Students must independently pursue any supplemental reading that is needed to understand each assigned research paper, and also read more extensively to prepare for their in-class presentation of a research paper.
- Students must perform independent literature research and reading in order to prepare the written review paper for the course.

Recommended Textbook References:

- **Portions of 1 to 3 chapters of the textbook are listed in the syllabus for each lecture class. Students are advised to read the CODA at the end of the chapter BEFORE the lecture, and the listed readings AFTER lecture, so that the large amount of information in the text is manageable.**
- Students are warned that Developmental Biology is an active area of scientific research, and **the instructor does not always agree with the textbook authors' interpretation or presentation. Please ask, if you encounter a topic where the text differs from the lecture.**

Class Materials on WebCampus:

A WebCampus page has been created for this course, and will be used to list the syllabus, announcements, lecture materials, and distribute PDF files of research papers. It will also be used to report grades for exams and written assignments. Research articles will be posted at least one week prior to the class discussion. Any other materials will be posted within 2 days after they are covered in lecture.

Login instructions are available at (<http://webcampus.nevada.edu>). In addition to providing notes, WebCampus provides a confidential means of communicating with your instructor and for viewing grades. Please note that the instructor will not accept e-mails from students not using their RebelMail accounts or the Webcampus system. Students who are having problems using WebCampus should call the Student Computing Support Center (895-0761).

Grading:

Final grades are based on the combined numerical scores from one midterm and one final exam, the written paper, the presentation of research papers for class discussions, and a written critique of each student's discussion leadership. Scores for each student assessment will be posted on Webcampus. Only students presenting the proper login information will have access to this information from this secure website.

Fall 2016 Calculation of Biol 666 Course Grades (may change depending on number of 666 students):

| |
|---|
| Midterm Exam = 100 points (25%) |
| Literature review paper = 100 points (25%) |
| Final Exam = 100 points (25%) |
| Paper discussion: introduction and leadership = 80 points (20%) |

Critique of student leadership in paper discussion = 20 points (5%)
with reference to student training in teaching
TOTAL = 400 points (100%)

The instructor calculates the course grades using an Excel spreadsheet, and not using the Webcampus Grade Center. Final course grades are posted to MyUNLV approximately 10 days after the final exam.

Midterm Exam:

The midterm exam will be an in-class, timed exam consisting of short, medium and long answer questions, with 75 minutes allotted for completion. Some questions will be derived from any assigned textbook reading, research paper, and lecture material covered in class to that point, but answers will require some synthesis or application of information covered. Others will require a consideration of data presented, proposal of a hypothesis, and a suggested approach to test the hypothesis. **ALL STUDENTS MUST TAKE THE MIDTERM AT THE SCHEDULED DATE AND TIME, listed on the class schedule.** Only those students presenting official documentation for an excused absence (see below) will be allowed to take the exam at a different date and time. If a student misses the exam without the documentation for an official excuse, he/she will receive a zero for the midterm grade. Makeup exams will include essay questions.

Final Exam:

The final will be a timed exam administered during finals week. It will consist of a long answer and essay questions, and will comprise 25% of the total class grade. The answers will require application or synthesis of information derived from the textbook reading, lecture material and research papers covered throughout the entire class to that point. **THE INSTRUCTOR WILL SCHEDULE THE BIOL666 FINAL AT A DIFFERENT TIME, BUT ON THE SAME DAY, AS THE BIOL466 EXAM. Do not make travel or research plans based on the final exam time of the course schedule.**

Students who present official documentation for an excused absence during the final will be required to take an incomplete grade in the course and to make up the exam in early June.

Written Literature Review:

Each Biol 666 student will be required to write a paper reviewing current research in an area of developmental biology. Each student will discuss potential topics with the instructor, and select a developmental biology topic that is not covered in class, and which may be relevant to the student's own research project. This paper will follow "real life" guidelines for review papers, supplied by a respected developmental biology journal ("Development"). The instructions and rubric for this paper will be supplied to the students in mid-February.

The research paper will be due at the time of the Biol466 student's second in-class midterm exam. Biol 466 students will be required to read your "review manuscript", and write a 1 page, constructive critique of their "manuscript." The 466-students' reviews will be evaluated by the instructor, and then provided to the graduate student after the end of the semester.

The instructor will independently evaluate the papers according to their breadth of coverage of the recent (~last 5 years) research literature, their synthesis of concepts from the course, ease of reading for the Biol 466 students, grammar, and logical structure. Biol666 students are strongly encouraged to make an appointment with the UNLV Writing Center as they

begin to formulate the organization of their paper: <http://writingcenter.unlv.edu/>

Writing resource centers consider this type of paper a "research paper." An outstanding resource on "safe practices" for avoiding plagiarism is on the Purdue Online Writing Lab: <https://owl.english.purdue.edu/owl/resource/589/03/>

Past students have discovered that paraphrasing too closely to another authors' own words, sentence structure and paragraph flow can lead to unintended consequences. The instructor runs your submitted paper through a plagiarism "detector" provided by Turnitin, which identifies such passages, and the related text (online websites or published sources).

Leading Class Discussions of Research Papers:

Each Biol 666 student will lead 1-3 of the research paper discussions for the combined course. The Biol 666 student discussion leader is expected to develop a complete understanding of the assigned research paper prior to leading the class discussion, to prepare an introduction and to field questions from the class. This includes 1) background reading to understand the prior state of the field before the paper was published, and the dominant models/hypotheses at the time, 2) understanding the choice of the model organism used, and its advantages or disadvantages with respect to the research topic and methodologies, and 3) understand the methods used, how to interpret the results, appropriate controls, and potential pitfalls. The in-class discussion is not intended to be a display of the Biol 666 student's mastery of the subject. Instead, **the Biol666 student is expected to develop their leadership and teaching skills by initiating, supporting and extending Biol 466 students' discussion without overpowering it.**

Critique of Biol666 Student Discussion Leadership:

At the end of the course, Biol 666 students will submit a written critique of each students' presentation and discussion leadership, including their own. The critique should include a reflection on the introduction to the area of research, the techniques of the paper, and the types of questions provided for student responses. The critique of the students' own presentation might include a reflection on what the student would do differently in the future, and how the presentation challenged the students' abilities or preconceived ideas about the preparation of the Biol 466 students.

Recording Class Activities:

Lectures may be captured with an audio recording device ONLY. Such recordings are permitted ONLY FOR PERSONAL USE. The instructor DOES NOT grant permission to post such recordings online or to make them public in any way. Video recording is NOT permitted.

Discussion classes, review sessions, and office hours MAY NOT be recorded in any way.

COURSE and UNLV POLICIES

Electronic Correspondence:

By UNLV policy, faculty and staff should e-mail students' Rebelmail accounts only.

Rebelmail is UNLV's official e-mail system for students. It is one of the primary ways students receive official university communication such as information about deadlines, major campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the university. Students' e-mail prefixes are listed on class rosters. The

suffix is always @unlv.nevada.edu. **Emailing within WebCampus is acceptable.** The instructor is not obligated to read and response to electronic messages from students using non-University accounts.

Effective use of the subject line will ensure a timely response to your email. **Start your subject line with “Biol466-“ followed by a succinct indication of your topic.** Thoughtful use of the subject line is often seen by employers and post-graduate schools as evidence of maturity and professionalism on the part of the sender.

Excused Absences:

Attendance for each discussion class is required, and an unexcused absence will result in a **ZERO** for class participation and or the scheduled exam on that day. Attendance at lecture classes is strongly advised, and students receive a modest amount of credit for attendance. Only three scenarios typically qualify as excused absences:

(1) **Religious Holidays Policy** – Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to **notify the instructor within the first 14 calendar days of the course, i.e. by September 11, 2016, of his or her intention to participate in religious holy days which do not fall on state holidays or periods of class recess. For additional information, please visit:**

<http://catalog.unlv.edu/content.php?catoid=6&navoid=531>.

(2) **Medical or legal emergencies:** The student must provide **written documentation of an absence due to a medical or legal emergency on official letterhead by a physician OR legal authority within 7 days of the missed class.** Such documents are easily verified and will only be accepted if the date in question occurred on the same day as the class meeting that was missed.

(3) **Professional interviews or scientific conferences:** The student must provide **written documentation for a professional interview related to his/her career development** such as a professional school/job interview or the attendance of an important scientific meeting. An **official itinerary, travel documents, and/or meeting registration confirmation** will be required for a multi-day excused absence. This information must be provided to the instructor prior to the class meeting, or within 7 days of receipt, whichever comes first.

With an excused absence, a missed exam may be rescheduled; missed discussion classes are described on pp 4-5. Students who miss more than **THREE** class periods, even with excused absences, may be encouraged to drop the class.

****Fall 2016 Election Debate Week:** UNLV has a website to obtain information about closures, parking disruptions, and shuttle services during the week of the Presidential Debate at UNLV: <http://unlv.edu/2016debate> Students are encouraged to stay informed and plan ahead for significant delays in arrival to class on Tues. Oct 18 (research paper discussion day) and Thurs. Oct 20. As of August 19, our class meetings are not affected by UNLV infrastructure operations for the debate. Students are expected to attend these classes, unless participating in an Official UNLV activity related to the debate. Participants in official UNLV activities should request documentation from the UNLV representative who organized the activity. **Students who participate in other organized or ad hoc political activities are advised to do so at times that will not impact class attendance on these dates.**

Incomplete grades:

The grade of I – Incomplete – can be granted when a student has satisfactorily completed three-fourths of course work for that semester/session but for reason(s) beyond the student’s control, and acceptable to the instructor, cannot complete the last part of the course, and the instructor believes that the student can finish the course without repeating it. The incomplete work must be made up before the end of the following regular semester for undergraduate courses. Graduate students receiving “I” grades in 500-, 600-, or 700-level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the time indicated, a grade of F will be recorded and the GPA will be adjusted accordingly. Students who are fulfilling an Incomplete do not register for the course but make individual arrangements with the instructor who assigned the I grade. **Incompletes cannot be used to “rescue” a failing performance in the course.**

Academic Misconduct:

Academic integrity is a legitimate concern for every member of the campus community; all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility and professionalism. By choosing to join the UNLV community, students accept the expectations of the Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling in UNLV assume the obligation to conduct themselves in a manner compatible with UNLV’s function as an educational institution. An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another, from the Internet or any source, without proper citation of the sources. See the Student Academic Misconduct Policy (approved December 9, 2005) located at: <http://studentconduct.unlv.edu/misconduct/policy.html>.

All exams and written assignments are to be done individually. Evidence to the contrary will be deemed as academic misconduct. The instructor maintains a zero-tolerance policy on academic dishonesty, which is a very serious offense that can result in a grade of “F” for the entire course, and other possible disciplinary actions. Any student caught cheating in an assigned exercise will receive a grade of ZERO for that assignment and an academic misconduct report will be filed with the Office of Student Conduct for inclusion as part of the student’s permanent academic record.

Additional information regarding UNLV’s policies on academic misconduct can be found at (<http://studentlife.unlv.edu/judicial/misconductPolicy.html>). The following actions are examples of academic dishonesty:

- Copying another student’s work and submitting for a graded written assignment.
- Working together on a take-home test or homework when specifically prohibited by the professor.
- Looking at another student’s paper during an exam.
- Looking at your notes when prohibited.
- Using an electronic device or the internet to find answers during an exam.
- Taking an exam copy out of the classroom (either in person or by using electronic means) when prohibited.
- Placing notes on an external surface that can be accessed during the exam.
- Giving your work to another person to be copied as the others’ submitted work.
- Giving someone answers to exam questions during the exam.
- After taking an exam, informing a person of questions that appeared on the exam.

- Giving or selling a term paper or class work to another student.
- Copying homework answers from a textbook and handing them in for a grade.
- Quoting text or other works on an exam, term paper or homework without using quotation marks and citing the original source.
- Handing in a paper purchased from a term paper service or from the Internet.
- Handing in another person's paper as your own.
- Taking a paper from an organization's files and handing it in as your own.
- Passing information from an earlier class to a later class.
- Having someone take your test for you.
- Changing a graded paper and requesting that the paper be re-graded.
- Transferring a computer file from one person's account to another.

Plagiarism can take several forms. The most obvious form of plagiarism is the purchase of prepared papers from another student or from commercial term paper companies and the submission of such papers as one's own work. Another example is using the words or ideas of another, from the Internet or any source, without proper citation of the primary sources and/or webpages. I use a strict definition of plagiarism that includes the presentation of another person's writing without quotation marks (i.e. representing it as part of your own work), even when you cite the original publication.

To avoid any question of plagiarism in your own written work, be sure to follow the tips provided by the UNLV Writing Center:

<http://writingcenter.unlv.edu/writing/plagiarism.html>

Copyright:

The University requires all members of the University Community to familiarize themselves with and to follow copyright and fair use requirements. **You are individually and solely responsible for violations of copyright and fair use laws. The university will neither protect nor defend you nor assume any responsibility for employee or student violations of fair use laws.** Violations of copyright laws could subject you to federal and state civil penalties and criminal liability, as well as disciplinary action under University policies. Additional information can be found at: <http://www.unlv.edu/provost/copyright>.

Classroom Conduct:

The University requires that all students behave in class and in libraries in ways that do not interfere with the right of other students to learn or of instructors to teach. Behaviors such as talking or sharing personal online material, late and/or disruptive arrival, early and/or disruptive departure, having a cell phone ring, surfing the web, interacting with web entertainment or games, or any other actions that compromise the classroom learning environment is extremely rude. **The instructor maintains a zero-tolerance policy on these activities and will single the student out if they occur!** First-time offenders may be embarrassed, but serial offenders face stiffer consequences, which may include ejection from the classroom. Students should be aware that they are not anonymous in this class and that inappropriate behavior will be dealt with as such.

It is important to remember that the instructor wants the students to do well in this class. A student should visit office hours or make office appointments if he/she is having trouble comprehending the course material or studying for the exam or assignments. These problems, if

corrected early, can often help the student avoid receiving a grade that does not reflect his/her efforts and expectations for the class.

Because this class encompasses so much material, it is important that it starts promptly at 10:00 AM. If a student is unavoidably late, please be considerate of classmates when entering the room after instruction has begun. Students will be marked absent on paper discussion days if they arrive after their breakout group has been called for individual responses.

Disability Resource Center (DRC):

The UNLV Disability Resource Center (SSC-A 143, <http://drc.unlv.edu/>, 702-895-0866) provides resources for students with disabilities. If you feel that you have a disability, please make an appointment with a Disabilities Specialist at the DRC to discuss what options may be available to you. If you are registered with the UNLV Disability Resource Center, bring your Academic Accommodation Plan from the DRC to me during office hours so that we may work together to develop strategies for implementing the accommodations to meet both your needs and the requirements of the course. Any information you provide is private and will be treated as such. To maintain the confidentiality of your request, please do not approach me before or after class to discuss your accommodation needs.

Tutoring and Coaching:

The Academic Success Center (ASC) provides tutoring, academic success coaching and other academic assistance for all UNLV undergraduate students. For information regarding tutoring subjects, tutoring times, and other ASC programs and services, visit <http://www.unlv.edu/asc> or call 702-895-3177. The ASC building is located across from the Student Services Complex (SSC). Academic success coaching is located on the second floor of the SSC (ASC Coaching Spot). Drop-in tutoring is located on the second floor of the Lied Library and College of Engineering TEB second floor.

UNLV Writing Center:

One-on-one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, located in CDC-3-301. Although walk-in consultations are sometimes available, students with appointments will receive priority assistance. Appointments may be made in person or by calling 895-3908. The student's Rebel ID Card, a copy of the assignment (if possible), and two copies of any writing to be reviewed are requested for the consultation. More information can be found at: <http://writingcenter.unlv.edu/>

Transparency in Learning and Teaching:

The University encourages application of the transparency method of constructing assignments for student success. Please see these two links for further information:

<https://www.unlv.edu/provost/teachingandlearning>

<https://www.unlv.edu/provost/transparency>

Students should note that lectures and classroom announcements contain substantial amounts of information about the purpose of assigned activities for this course-- the skills that will be practiced and the value of content knowledge that will be gained.

Library Resources:

Students may consult with a librarian on research needs. For this class, the subject librarian is https://www.library.unlv.edu/contact/librarians_by_subject. UNLV Libraries provides resources to support students' access to information. Discovery, access, and use of information are vital skills for academic work and for successful post-college life. Access library resources and ask questions at <https://www.library.unlv.edu/>.

Final Examinations:

The University requires that final exams given at the end of a course occur at the time and on the day specified in the final exam schedule. See the schedule at: <http://www.unlv.edu/registrar/calendars>.

SAMPLE