

## Department of Biology Course Outline

SC/BIOL 4450 4.00 Animal Development  
Winter 2021

### Course Description

Fertilization, cleavage, differentiation and development in selected animals. Three lecture hours, four labs. One term. Four credits.

### Prerequisites

SC/BIOL 2020 3.00, SC/BIOL 2021 3.00, SC/BIOL 2030 4.00, SC/BIOL 2040 3.00, SC/BIOL 2070 3.00.

### Course Instructors and Contact Information

Course Director: Dr. Terrance Kubiseski

Life Sciences Building, Rm 329C  
416-736-2100 x 40519  
[tkubises@yorku.ca](mailto:tkubises@yorku.ca)

Office Hours: Please email for an appointment.

TAs:

Amanvir Virdi: [amanvir@my.yorku.ca](mailto:amanvir@my.yorku.ca)  
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### Schedule

Lectures: Tuesday and Thursday, 10:00 - 11:30 AM for synchronous lectures. Lectures will be recorded and available on eClass.

Labs: Monday to Thursdays: will be delivered online and asynchronously.

### Technology Requirements

High speed internet and ability to stream online lectures, access to Zoom, Proctortrack requirements.

## Evaluation

Midterm: 25% of overall mark  
Laboratory: 30% of overall mark  
Final Exam: 45% of overall mark

The exams will be administered on eClass and will use Crowdmark. The final exam is cumulative (see below).

Exam Format: Due to unusual nature of course, the Final Exam format has not been completely decided. It may consist of an online exam with short and long answer questions with possibility of some multiple-choice questions (most likely). If so, I will be using ProctorTrack to ensure academic integrity (<https://registrar.yorku.ca/proctortrack-faq>). However, I am considering an open book, take home final exam. Final format will be decided early in the term. We cannot provide "extra credit" assignments.

Final course grades may be adjusted to conform to Program or Faculty grades distribution profiles.

## Important Dates

First Class: Tuesday, January 12<sup>th</sup>.

Final Class: Thursday, April 8<sup>th</sup>.

Midterm: Thursday, February 11<sup>th</sup>.

Final Exam: Dates/times for exams are scheduled and published by the Registrar's Office (RO).

Last day to drop course without receiving a grade: March 18, 2021

Last day to submit course work: April 12, 2021

Course Withdrawal Period (withdraw from a course and receive a "W" on the transcript): March 13<sup>th</sup> to April 12<sup>th</sup>.

NOTE: for additional information and important dates such as holidays, refer to the "Important Dates" section of the Registrar's Website at <http://www.yorku.ca/yorkweb/cs.htm>

## Resources

Recommended texts:

Scott F. Gilbert. Developmental Biology, 12<sup>th</sup> edition, 2020. On reserve in the library...8<sup>th</sup>, 9<sup>th</sup> and 10<sup>th</sup> editions are acceptable. eBook is available.

For laboratory: S.J. Wright. A Photographic Analysis of Developmental Biology. 1<sup>st</sup> Edition. 2005. Morton Publishing Co.

Website: <https://eClass.yorku.ca>; will include PDF file of slides presented before lectures.

## Learning Outcomes

(i) To gain background on the history of development research and learn about modern techniques used to investigate developmental biology.

(ii) To learn the pattern of development for a number of invertebrate and vertebrate organisms.

(iii) To understand how the genome is involved in regulating developmental processes.

- (iv) To understand the development of specific organs and organ systems in vertebrates.
- (v) To understand the medical implications of current developmental biology research.
- (vi) To gain experience in fundamental laboratory techniques used in developmental biology.

## Course Content

The following topics will be covered in lecture although there may be alterations at the discretion of the course director.

1. Introduction, basic questions and approaches
2. Experimental embryology and developmental genetics
3. Gametogenesis and fertilization
4. Cell-cell communication in development
5. Cleavage and gastrulation
6. *C.elegans* development; cell lineage and apoptosis
7. Early development of the frog tadpole
8. Early development of the chick embryo
9. The development of the ectoderm, neural crest cells and axon guidance
10. Development of the paraxial mesoderm
11. Patterning of the limb
12. Regeneration
13. Medical Implications of developmental biology
14. Aging
15. Genetics of sex determination, compensation and dosage

## Experiential Education and E-Learning

This course uses a course website (eClass). Some teaching videos/programs related to course topics will be provided.

## Other Information

All in-class information (even material not written on lecture slides) is testable material in the midterm and final exams.

In order to be fair and consistent with regards to the entire class, individual grades are not negotiable. We cannot provide “extra credit” assignments. Marks for assignments and tests will not be “rounded” or “bell-curved”. Contact the Course Director about marks **ONLY** if there is a clear error in your grade (calculation, clerical, etc.) within **ONE** week of the test score being made available to you.

## Course Policies

1. If you miss an exam (midterm or final) with a legitimate reason, please contact the course director by email within 24 hours.
2. In the event of a missed midterm with a valid reason, the weight of this midterm will be transferred to the final exam. **No makeup exam will be available for the midterm.** In the event of a missed final exam with a valid reason, **one** deferred final exam will be offered during the Biology deferred exam period in

the spring of 2021. **PLEASE NOTE THAT THE DEFERRED FINAL EXAM MAY BE OF DIFFERENT FORMAT FROM ORIGINAL FINAL EXAM.** If the deferred exam is missed, the student will be required to petition the course. Exams and other assessments may be conducted with the aid of an online proctoring service.

3. In order to be fair and consistent to the entire class, individual grades are not negotiable. Contact me about marks **ONLY** if there is a clear error in your mark (calculation, clerical, etc.) as soon as possible at tkubises@yorku.ca.

4. Lectures will be delivered synchronously and will be available as recorded sessions on eClass. **Absolutely** no cell phones are allowed during the midterm or the final exam.

5. Laboratories will be delivered on-line and can be completed asynchronously. Please refer to the lab manual for further course policies regarding the laboratories.

## University Policies

### Academic Honesty and Integrity

York students are required to maintain the highest standards of academic honesty and they are subject to the Senate Policy on Academic Honesty (<http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/>). The Policy affirms the responsibility of faculty members to foster acceptable standards of academic conduct and of the student to abide by such standards.

There is also an academic integrity website with comprehensive information about academic honesty and how to find resources at York to help improve students' research and writing skills, and cope with University life. Students are expected to review the materials on the Academic Integrity website at - <http://www.yorku.ca/academicintegrity/>.

**Important:** A note from the Faculty of Science Committee on Examinations and Academic Standards: Numerous students in Faculty of Science courses have been charged with academic misconduct when materials they uploaded to third party repository sites (e.g. Course Hero, One Class, etc.) were taken and used by unknown students in later offerings of the course. The Faculty's Committee on Examinations and Academic Standards (CEAS) found in these cases that the burden of proof in a charge of aiding and abetting had been met, since the uploading students had been found in all cases to be willfully blind to the reasonable likelihood of supporting plagiarism in this manner. Accordingly, to avoid this risk, students are urged not to upload their work to these sites. Whenever a student submits work obtained through Course Hero or One Class, the submitting student will be charged with plagiarism and the uploading student will be charged with aiding and abetting.

Note also that exams, tests, and other assignments are the copyrighted works of the professor assigning them, whether copyright is overtly claimed or not (i.e. whether the © is used or not). Scanning these documents constitutes copying, which is a breach of Canadian copyright law, and the breach is aggravated when scans are shared or uploaded to third party repository sites.

### Access/Disability

York University is committed to principles of respect, inclusion and equality of all persons with disabilities across campus. The University provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation related to teaching and evaluation methods/materials. These services are made available to students in all Faculties and programs at York University.

Students in need of these services are asked to register with disability services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are encouraged to schedule a time early in the term to meet with each professor to discuss your accommodation needs. Please note that registering with disabilities services and discussing your needs with your professors is necessary to avoid any impediment to receiving the necessary academic accommodations to meet your needs.

Additional information is available at the following websites:  
Counselling & Disability Services - <http://cds.info.yorku.ca/>

Counselling & Disability Services at Glendon - <http://www.glendon.yorku.ca/counselling/personal.html>  
York Accessibility Hub - <http://accessibilityhub.info.yorku.ca/>

### **Ethics Review Process**

York students are subject to the York University *Policy for the Ethics Review Process for Research Involving Human Participants*. In particular, students proposing to undertake research involving human participants (e.g., interviewing the director of a company or government agency, having students complete a questionnaire, etc.) are required to submit an *Application for Ethical Approval of Research Involving Human Participants* at least one month before you plan to begin the research. If you are in doubt as to whether this requirement applies to you, contact your Course Director immediately.

### **Religious Observance Accommodation**

York University is committed to respecting the religious beliefs and practices of all members of the community, and making accommodations for observances of special significance to adherents. Should any of the dates specified in this syllabus for an in-class test or examination pose such a conflict for you, contact the Course Director within the first three weeks of class. Similarly, should an assignment to be completed in a lab, practicum placement, workshop, etc., scheduled later in the term pose such a conflict, contact the Course director immediately. Please note that to arrange an alternative date or time for an examination scheduled in the formal examination periods (December and April/May), students must complete an Examination Accommodation Form, which can be obtained from Student Client Services, Student Services Centre or online at

[http://www.registrar.yorku.ca/pdf/exam\\_accommodation.pdf](http://www.registrar.yorku.ca/pdf/exam_accommodation.pdf) (PDF)

### **Student Conduct in Academic Situations**

Students who miss the final exam and would like an opportunity to write it must request and obtain deferred standing. A Deferred Standing Agreement form must be completed and submitted with appropriate supporting documentation (such as an Attending Physician's Statement for illness) to the professor or Biology Undergraduate Office. Senate Policy requires that "Normal requests for deferred standing must be communicated within one week following a missed examination, or on the last day to submit course work". The policy and forms for obtaining deferred standing may be found at <http://www.registrar.yorku.ca/exams/deferred/index.htm>

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect. Moreover, it is the responsibility of the instructor to maintain an appropriate academic atmosphere in the classroom and other academic settings, and the responsibility of the student to cooperate in that endeavour. Further, the instructor is the best person to decide, in the first instance, whether such an atmosphere is present in the class. The policy and procedures governing disruptive and/or harassing behaviour by students in academic situations is available at -

<http://secretariat-policies.info.yorku.ca/policies/disruptive-andor-harassing-behaviour-in-academic-situations-senate-policy/>