

Department of Biology Course Outline

SC/BIOL 4061, SC/BCHM 4061, Molecular and Cellular Principles of Animal Development
Winter 2020

Course Description

This course presents a genetic and molecular biological approach to the field of developmental biology. Topics range from unicellular systems, both prokaryotic and eukaryotic, to more complex, multicellular systems

Prerequisites

Prerequisites: SC/BIOL 2020 3.00, SC/BIOL 2021 3.00, SC/BIOL 2040 3.00, SC/BIOL 2070 3.00.

Course Instructors and Contact Information

Course Director: John C. McDermott PhD
 Office: 427b Life Sciences Building
 Office tel. extension: 30344
 Email address: jmcderm@yorku.ca
 Web site: www.yorku.ca/jmcderm/

Schedule

Evaluation

Evaluation

1 Test (prior to Reading week -date: Tues 11 th Feb)	30%
(Policy for missed midterm- mark is allocated to Final Exam)	
1 Short Essay (HARD COPY due date Tues 24 th March by 2.30pm)	30%
(In some cases students may be able to do a class presentation in lieu of the essay assignment on permission of the instructor)	
1 Test (Final in exam period)	40%

Important Dates

Dates of Tests/Exams, Due Dates of Major Assignments, First class, last class, drop date, etc.

NOTE: for additional 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

Required Course Text: (12th edition)

Developmental Biology

Companion web site: www.devbio.com

Scott F. Gilbert and Michael J.F. Barresi

Sinauer Associates, Inc

ISBN 9781605358222 (casebound)

Learning Outcomes

Course Content

Topic outline

- 1) Introduction to Molecular Analysis of Development -Descriptive embryology -Genetics and molecular biology
- 2) Programs and Regulatory Elements in DNA
- 3) Transcriptional Circuits- epigenetic regulation of gene expression- differential gene expression
- 4) Gastrulation and early development- axis specification and formation
- 5) Features of Major Model Organisms- Mouse, Chick, Drosophila
- 6) Techniques for the study of Mouse Development: gene targeting/editing technology
- 7) Receptors, Ligands
- 8) Cell-cell communication, Signaling Networks, Induction and Competence
- 9) Molecular Co-ordination of Cell Division and Differentiation (Myogenesis)
- 10) Focus on Paraxial Mesoderm, Somitogenesis and Patterning
- 11) Cell Death in Development
- 12) Lineage Generation – Embryonic and Adult Stem cell properties and lineage commitment
- 13) Cell Type Specification, Induction of pluripotency in stem cells (iPS) and cell fate programming
- 14) Patterning in 1 and 2 Dimensions
- 15) Molecular and cellular basis of 3D Patterning- Heart development
- 16) Postembryonic development: Regeneration and Aging
- 17) Developmental mechanisms of evolutionary conservation and change

Experiential Education and E-Learning

Other Information

Course Policies

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/>

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 (PDF)

Student Conduct in Academic Situations

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/>