

SC/BIOL 4061,SC/BCHM 4061 Molecular and Cellular Principles of Animal Development. Winter term, 2021 OUTLINE

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Course will be administered through eClass: all course materials, directions and links re synchronous and asynchronous lectures will be available through eClass.

Note- In the event of an eClass outage direction/materials will be provided at alternate web page www.yorku.ca/jmcderm/.

The general format/plan for this course is to have a synchronous lecture during the scheduled Tues class period (1-2.30pm) where students can attend through zoom link (the lecture will also be recorded for those who cannot attend). Short (3-5min) breaks will be interjected in synchronous lectures to allow students to review material and also comment/ask questions through chatline. The Thurs class will be a pre-recorded (asynchronous) lecture made available by the scheduled start time for that class (1.00 pm). Follow up/discussion of material from the Thurs asynchronous lecture will be undertaken at the beginning of the following synchronous Tues lecture. Format is somewhat flexible although we will endeavour to follow this plan as much as possible.

Topic outline

- 1) Introduction to Molecular Analysis of Development
- 2) Programs and Regulatory Elements in DNA
- 3) Transcriptional Circuits- mechanisms of 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
- 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 and cell fate programming
- 14) Patterning in 1 and 2 Dimensions
- 15) Molecular and cellular basis of 3D Patterning
- 16) Postembryonic development: Regeneration and Aging
- 17) Developmental mechanisms of evolutionary conservation and change

Evaluation

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| 1 Test (prior to Reading week: Tues 9 th Feb, 2021, 1 hr fixed period in class time, open book)
(Policy for missed midterm- mark is re-allocated to Final Exam). | 30% |
| 1 Short (10 page, double-spaced) Essay (due date Tues 30 th March, 2021 by 5.0pm) | 30% |
| 1 Test (Final in exam period- 2 hour fixed period, open book) | 40% |

Detailed format for tests will be clarified in advance. In general the tests will be short essay style, open book for a fixed time period.

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)

Online access is available through the Oxford Learning link:

<https://learninglink.oup.com/students>

The 10th or 11th edition of the textbook will suffice although the 12th edition is preferable.