

DEVELOPMENTAL GENETICS  
 Biology (4540G)  
 Course Outline/Syllabus Winter 2026

**1. Course Information and Prerequisites:**

**Lectures:** N/A

**Tutorials:** N/A

**Labs:** NA

**List of Prerequisites:** The prerequisite for this class is Biology 3338A/B or Biology 3597A/B.

**Prerequisites:** Unless you have either the prerequisites for this course or written special permission from your Dean's Designate (Department/Program Counsellors and Science Academic Counselling) to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees if you are dropped from a course for failing to have the necessary prerequisites.

**2. Instructor Information**

<b>Professor</b>	<b>Email</b>	<b>Office</b>	<b>Phone</b>	<b>Office Hours</b>
Miodrag Grbic	mgrbic@uwo.ca	WSC 342	519-661- 2111 X 67776	12:30-13:30 Mo/Wed in person or zoom and/or other time on demand
<b>GTAs:</b>				

Students must use their Western ([@uwo.ca](mailto:@uwo.ca)) email addresses when contacting their instructors.

**3. Course Description, Learning Outcomes, Schedule, Delivery Mode**

**Course Description:** An overview of the genetic principles applied to the dissection of biological development in select model organisms. Particular emphasis will be placed on morphogens, signal transduction pathways, and genetic dissection of gene function.

### **Learning Outcomes and Objectives:**

By the end of this course, students will be able to:

- 1.) Apply the genetic principles and tools for genetic dissection of developmental processes
- 2.) Apply the basic principles of the cellular mechanisms associated with development, such as morphogens, lateral inhibition and induction.
- 3.) Apply the knowledge of the principles that define model organisms and assessing information found in electronic databases and the primary scientific literature on select model systems used to study development.
- 4.) Read primary scientific papers in the field of developmental genetics at sufficient depth to be able to critically assess and synthesise the information.

**Contingency Plan:** This course will be delivered in-person, however in the unlikely event of any university-declared emergency, some or all of this course may be required to be delivered online, either synchronously or asynchronously. ***The grading scheme will not change.*** Any assessments affected will be conducted online as determined by the professor.

Classes begin: January 5, 2025

Spring Reading Week: February 14 – 22, 2026

Classes end: April 9, 2026

Exam period: April 12 – 30, 2026

## **4. Course Materials**

Course plan (see also course planning description)

### **Lectures tentative schedule:**

Course plan (see also course planning description)

Jan. 5	Lecture 1 introduction to Developmental genetics Tutorial 1 Tutorial example of paper presentation
Jan 7	Lecture 2: Developmental genetics toolkit and concepts part 1 (chapter 1)
Jan. 12	Lecture 3 Developmental genetics toolkit and concepts part 2 (chapter 1) Tutorial 2 Paper assignments

Jan. 14	Lecture 4 Drosophila developmental genetics (Chapter 2)
Jan. 19	Lecture 5 Drosophila developmental genetics (Chapter 2)
	Tutorial 3 Student presentation organization questions/answers
Jan. 21	Lecture 6 Drosophila developmental genetics (Chapter 2)
Jan. 26	Lecture 7 Drosophila developmental genetics (Chapter 2)
	Tutorial 4 Student presentation Group 1
Jan. 28	Lecture 8 Drosophila developmental genetics (Chapter 2)
Feb. 2	Lecture 9 Drosophila developmental genetics (Chapter 2)
	Tutorial 5 Student presentation Group 2
Feb. 4	Lecture 10 Drosophila developmental genetics ((Chapter 2)
Feb. 9	Lecture 11 Vertebrate development : experimental approaches (chapter 3 115-138)
	Tutorial 6 Student presentation Group 3
Feb. 11	Lecture 12 Developmental toolkit in vertebrate embryos signal transduction pathways
Feb. 13	<b>Due date for first assignment</b>
Feb. 14-22	Reading week
Feb. 23	Lecture 13 Developmental toolkit in vertebrate embryos signal transduction pathways
	Tutorial 7 Student presentation Group 4
Feb. 25	Lecture 14 Developmental toolkit in vertebrate embryos signal transduction pathways
Mar. 2	Lecture 15 Developmental toolkit in vertebrate embryos signal transduction pathways
	Tutorial 8 Student presentation Group 5
Mar. 4	Lecture 17 Stem cell specification
Mar. 9	Lecture 18 Stem cell specification
	Tutorial 9 Student presentation Group 6
Mar. 11	Lecture 19 Stem cell specification and applications in medicine
Mar. 16	Lecture 20 Stem cell specification and applications in medicine

Tutorial 10 Student presentation Group 7  
**Due date for second assignment**

Mar. 18	Lecture 21 Germ cell development and mammalian imprinting
Mar. 23	Lecture 22 Tutorial 11 Student presentation Group 8
Mar. 25	Lecture 23 Evolution of development
Mar. 30	Lecture 24 Evolution of development Tutorial 10 Student presentation Group 9
April. 1	Lecture 25 Evolution of development Tutorial 12 Student presentation Group 10 April 12 Lecture 26 Evolution of development

**Final assignment due date: April 14<sup>th</sup> 2026**

The first assignment, second assignment and the Final assignment will be posted on OWL in Jan. The **due date for first assignment is Feb. 13<sup>th</sup>** **due date for second assignment is Mar. 16<sup>th</sup>** and **due date for the final assignment is April. 14th**

**Required Equipment:**



**Stable internet connection**



**Laptop or computer with webcam**



**Working microphone**

**Required Reading, textbook:** Principles of Development / Edition 6 ( Lewis Wolpert, Cheryll Tickle, Alfonso Martinez Arias) **ISBN:** 9780198800569 **Book price:** eTextbook License **\$84.99 CAD** **hard copy: \$140.76** and selected papers from primary literature

All course documents and information (syllabus, lecture files, instructional documents, required readings, etc.) **will be posted to OWL and students are responsible for checking the course OWL site (<http://owl.uwo.ca>) on a regular basis for updates.** If students need assistance with the course OWL site, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk, which can be contacted by phone at 519-661-3800 or ext. 83800.

Personal Response Systems ("Clickers") are not used in this course.

## **5. Methods of Evaluation**

**The overall course grade will be calculated as:**

The overall course grade will be calculated as listed below:

Assignments (1) 25 %

Assignment (2) 25%

Presentation tutorial: 20%: group of 3/4 students preparing ppt presentation of paper from primary literature and broader research area

Final assignment 30%

1) Exams in the form of assignments: In lectures, principles are taught and applied to specific examples; in the assignments, undiscussed developmental examples are given to be analyzed and synthesized with the principles and approaches learned.

2) In the tutorial, primary scientific papers assigned by the instructor are presented by groups of 3 students preparing ppt presentation and critically discussing the paper and broader research field.

### **Use of Generative AI Tools**

There is no university-wide policy governing the use of generative AI tools in coursework or assessments. Generative AI tools (e.g., ChatGPT, Copilot, Gemini) are **prohibited**.

### **General information about missed coursework**

Students must familiarize themselves with the *University Policy on Academic Consideration – Undergraduate Students in First Entry Programs* posted on the Academic Calendar:

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/academic\\_consideration\\_Sep24.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf),

This policy does not apply to requests for Academic Consideration submitted for **attempted or completed work**, whether online or in person.

The policy also does not apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult [Accessible Education](#).

For procedures on how to submit Academic Consideration requests, please see the information posted on the Office of the Registrar's webpage:

[https://registrar.uwo.ca/academics/academic\\_considerations/](https://registrar.uwo.ca/academics/academic_considerations/)

All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline.

All Academic Consideration requests must include supporting documentation; however, recognizing that formal documentation may not be available in some extenuating circumstances, the policy allows

students to make one Academic Consideration request **without supporting documentation** in this course. However, the following assessments are excluded from this, and therefore always require formal supporting documentation:

- Examinations scheduled during official examination periods (Defined by policy)

When a student mistakenly submits their one allowed Academic Consideration request **without supporting documentation** for the assessments listed above or those in the **Coursework with Assessment Flexibility** section below, the request cannot be recalled and reapplied. This privilege is forfeited.

### **Evaluation Scheme for Missed Assessments**

Make-up exams will be organized upon request based on student service approval of Academic Consideration within a week after in class midterm exam.

**In the Faculty of Science, religious holidays and university-sanctioned varsity events (e.g., intercollegiate competitions) are treated as scheduling conflicts. In such cases, instructors will offer an early sitting or a make-up opportunity to affected students.**

For any assessment for which extension is allowed, the last date when submissions will no longer be accepted is 2 days after granted extension.

When a student misses the Final Exam and their Academic Consideration has been granted, they will be allowed to write the Special Examination (the name given by the University to a makeup Final Exam). See the Academic Calendar for details (under [Special Examinations](#)), especially for those who miss multiple final exams within one examination period.

### **Essential Learning Requirements**

Even when Academic Considerations are granted for missed coursework, the following are deemed essential to earn a passing grade.

- a minimum grade on the final assignment (or a minimum average on the midterm test(s) and final assignment) to ensure that students demonstrate sufficient mastery of the learning outcomes

### **[If applicable] Coursework with Assessment Flexibility**

By policy, instructors may deny Academic Consideration requests for the following assessments with built-in flexibility:

#### **Deadline with a No-Late-Penalty Period**

**Assignments.** Students are expected to submit each of the the final assignment by the deadline listed. Should extenuating circumstances arise, students do not need to request Academic Consideration and they are permitted to submit their assignment up to 24 hours past the deadline without a late penalty. Should students submit their assessment beyond 24 hours past the deadline, a late penalty of 10% per day will be applied. Academic Consideration requests may be

granted only for extenuating circumstances that started before the deadline and lasted longer than the No-Late-Penalty Period (24 hours).

## 6. Additional Statements

### **Religious Accommodation**

When conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request an accommodation for their absence in writing to the course instructor and/or the Academic Advising office of their Faculty of Registration. This notice should be made as early as possible but not later than two weeks prior to the writing or the examination (or one week prior to the writing of the test).

Please visit the Diversity Calendars posted on our university's EDID website for the recognized religious holidays:

<https://www.edi.uwo.ca>.

### **Accommodation Policies**

Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/Academic\\_Accommodation\\_disabilities.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf).

### **Academic Policies**

The website for Registrar Services is <https://www.registrar.uwo.ca/>.

In accordance with policy,

[https://www.uwo.ca/univsec/pdf/policies\\_procedures/section1/mapp113.pdf](https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf),

the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at their official university address is attended to in a timely manner.

No electronic devices will be permitted on tests and exams

**Scholastic offences** are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_undergrad.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf).

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the

service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

## **Support Services**

Please visit the Science & Basic Medical Sciences Academic Advising webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic-related matters: <https://www.uwo.ca/sci/counselling/>.

Students who are in emotional/mental distress should refer to Mental Health@Western (<https://uwo.ca/health/>) for a complete list of options about how to obtain help.

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at

[https://www.uwo.ca/health/student\\_support/survivor\\_support/get-help.html](https://www.uwo.ca/health/student_support/survivor_support/get-help.html).

To connect with a case manager or set up an appointment, please contact [support@uwo.ca](mailto:support@uwo.ca).

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Accessible Education at

[http://academicsupport.uwo.ca/accessible\\_education/index.html](http://academicsupport.uwo.ca/accessible_education/index.html)

if you have any questions regarding accommodations.

Learning-skills counsellors at Learning Development and Success (<https://learning.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: <https://www.uwo.ca/se/digital/>.

Additional student-run support services are offered by the USC, <https://westernusc.ca/services/>.