



VETM*3390 Developmental Biology

Fall 2019

Section(s): C01

Department of Biomedical Sciences

Credit Weight: 0.50

Version 1.00 - September 05, 2019

1 Course Details

1.1 Calendar Description

This course introduces key concepts of veterinary embryology, genomics, and regenerative medicine. A comparative and application-based approach is taken when presenting the course material. The focus is to present issues relevant to veterinary medicine and to apply principles and theories to veterinary practice.

Co-Requisites: All Phase 1 courses.

1.2 Course Description

There are three main topics or sections to the course: embryology, genomics, and stem cells and regenerative medicine. Content related to these overall topics are mainly delivered during lectures by the course coordinator and selected guest lecturers. Course notes and online lecture videos are provided for selected topics to aid student understanding. Student scientific literacy skills will be improved through instruction on how to critically evaluate and review peer-reviewed scientific journal articles. Students will be asked to compile information on one topic of interest in the form of two one-page limit handouts, where one is to be written using proper scientific language while the other will be written using language used by veterinarians when conversing with clients (layman language). All handouts will be made available to the class as supplemental material after they have been scored and will be published without their score or identifying student information.

1.3 Timetable

Timetable is subject to change. Please see WebAdvisor for the latest information.

1.4 Final Exam

Exam time and location is subject to change. Please see WebAdvisor for the latest information.

2 Instructional Support

2.1 Instructional Support Team

Instructor:	Pavneesh Madan Dr.
Email:	pmadan@uoguelph.ca
Instructor:	Lee Niel Dr.
Email:	niell@uoguelph.ca
Instructor:	Anthony Mutsaers Dr.
Email:	mutsaers@uoguelph.ca
Instructor:	Laura Favetta
Email:	lfavetta@uoguelph.ca
Course Co-ordinator:	Sarah Lepage Dr.
Email:	lepages@uoguelph.ca
Telephone:	+1-519-824-4120 x53419
Office:	OVC 3604
	Course Coordinator and Instructor

2.2 Guest Lectures, Tentative Speaker

Dr. Janice Greenwood

IDEXX Canada, Markham, ON, 1-800-667-3411, Janice-greenwood@idexx.com

3 Learning Resources

Genetics/Genomics and Regenerative Medicine:

There is no specific textbook associated with the genomics, stem cells, and regenerative medicine sections. Course notes will be provided for selected specific topics to provide an overview of the topic. Course notes will include references to mandatory or supplemental material for the students to independently read.

Embryology:

Embryology lectures will be based off of information found in Essentials of Domestic Animal Embryology, Hyttel et al, 2010. A copy of this textbook can be requested from Dr. Lepage.

3.1 Recommended Resources

Please refer to CourseLink for recommended websites and articles on genetics, genomics, embryology, and regenerative medicine. (Website)

4 Learning Outcomes

This lecture-based course is designed to introduce key concepts of veterinary embryology, genomics, and regenerative medicine. A comparative and application-based approach is taken when presenting the course material. The focus is to present issues relevant to veterinary medicine and to apply the principles and theories presented in the course to veterinary practice.

The genomics portion of the course presents basic concepts of genetic principles, karyotyping, molecular diagnostic tests for detection of genetic anomalies, and applied genetic technologies. At the end of the course students should have a working understanding of genetic principles and technologies and at a basic level be able to provide genetic counseling to clients regarding animal health, reproduction, production traits, and breed standards. Animal history, diagnosis and/or pedigree information will have to be considered for effective genetic counseling and will be discussed for selected conditions.

The embryology portion of the course presents the basic concepts of embryology and the focus of the content will be on issues that are relevant to veterinary medicine including: early embryonic development, comparative placentation, and major organ system development.

Embryology will be taught in a comparative manner to illustrate key differences in embryological development in common domestic animal species. Students will study the normal cellular and molecular events associated with development. Cases and examples will illustrate abnormal development and teratological defects that are more commonly seen in veterinary practice so that students gain an understanding of how and why development can go awry.

The stem cell and regenerative medicine portion of the course introduces the basic concepts of what a stem cell is, how to source or engineer stem cells, and how stem cells are or can be applied in human and veterinary medicine. Regenerative medicine includes use of tissue- engineering principles and so-called biologics, for example platelet rich plasma. At the end of the course students should be able to advise clients on the potential benefits and risks of these emerging veterinary therapies.

4.1 Course Learning Outcomes

By the end of this course, you should be able to:

1. Interpret karyotypes and pedigree charts.
2. Define and describe the genetic basis of Mendelian and non-Mendelian disorders.
3. Recognize and interpret the chromosomal basis of reproductive problems in domestic animals.
4. Describe the salient features and genetic components of specific conditions.
5. Become familiar with library and web resources for veterinary genetics.
6. Describe new and emerging genomic technologies and how these technologies may be utilized in breeding strategies, husbandry practices and clinical medicine.
7. Understand what stem cells are and how they are isolated or generated.
8. Understand stem cell characterization, maintenance, and differentiation methods.
9. Appreciate how (stem)cell-based therapies are being advocated/explored in veterinary medicine.
10. Appreciate regenerative medicine and tissue-engineering concepts.
11. Identify and define key structural and molecular elements involved in domestic animal development.

12. Understand the developmental sequence of body structures and the functional significance of these structures.
 13. Explain and identify normal embryological anatomy and identify anomalies in development of various tissues through a comparison of normal and abnormal development.
 14. Understand, using a comparative approach, the key differences in embryological development across common domestic animal species.
-

5 Teaching and Learning Activities

Lectures

There are a total of 30 lectures in the course, each 50 minutes in duration. Lecture notes and readings (PowerPoint slides for the lecture) will be posted to CourseLink prior to each lecture as a PDF file, one slide per page, to facilitate note-taking. Before the final exam, some lecture time may be devoted to review the key concepts presented within the course.

Course Notes

Course notes will be provided for selected topics and made available in CourseLink. Students will be expected to review these notes prior to the lectures pertaining to the topics. **The notes contain required reading** and some of the material in the notes are examinable material.

Online Material

Students will be introduced to selected articles, online databases, search engines, and videos. These resources will be for supplemental use or integral to a specific lecture discussion.

Handouts

The handout assignment is an exercise to help develop student critical thinking and communication skills. Students will obtain, synthesize, and critically evaluate information from various sources (online databases, text books, scientific articles, etc.) on a topic of their interest and create two forms of the same handout; one written in scientific language while the other in layman's terms. Appropriate communication is critical, as a practicing veterinarian often has to communicate difficult scientific concepts to a client in a way that they will understand. All handouts will be made available to the class as supplemental material after they have been scored and will be published without their score or identifying information.

6 Assessments

An overall course grade of 50% is required to pass this course.

Please see full details within the undergraduate student calendar found at the following link:

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c10/c10dvm-info.shtml>

6.1 Assessment Details

Midterm Exam (30%)

The midterm will only cover material presented prior to the midterm exam. The test will consist of multiple-choice questions only.

Handouts (10%)

Due: Mon, Mar 30

Drafts due: Midnight, March 13th, 2020

Reviews due: Midnight, March 20th, 2020

Final due date for grading: Midnight, March 30th, 2020

Each student is expected to provide two handouts on the same topic of their interest relevant to the course material presented. The topic must be pre-approved by Dr. Lepage. The same information is provided on both handouts, with the only difference between the handouts being the language used. One handout will use scientific language as one would use between peers, while the other handout will use layman language as a veterinarian would use in conversation with a client. The word limit for each handout is 300, excluding the reference list. The font Times New Roman size 12 must be used.

Final Exam (60%)

The final exam will be cumulative and consist of multiple-choice questions only.

7 Course Statements

7.1 Attendance

Students are expected to come to class on time and turn cell phones to vibrate/silent so as not to disrupt the lecture.

7.2 CourseLink

Will be used extensively throughout VETM*3390. Ensure to visit the site often!

- Course content – Please visit the Content tab for lecture notes, articles, videos, etc.
- Announcements – Last minute changes or special announcements will be posted on main page
- Office hours – Dr. Lepage does not have specific office hours, but is available to meet by appointment. Please email her to arrange an appointment when needed.
- Discussion boards – These forums provide opportunities for students to ask questions and discuss what is being learned in the course. Please direct all course content-related questions to the appropriate forum – odds are that if you have that question then at least one other student in the class does too.

7.3 Electronic Etiquette

Laptop computers and tablets are permitted in the classroom, provided they are being used for coursework only. If a student is using a laptop for unrelated activities such as social media, emailing, or texting, and it is evident that fellow students are being disrupted, Dr. Lepage reserves the right to ask the student to leave the classroom. Dr. Lepage strives to create a positive, fun, and engaging learning environment for all students.

The use of electronic devices during the midterm or final exam is strictly prohibited.

7.4 Email Policy

The University's official method of correspondence with students is through a valid University of Guelph email account. It is the student's responsibility to keep their U of Guelph account active and to check it on a regular basis. All emails from students must include your full

name, student number, and course code. All emails will be replied to within 24-48 hours. Please direct all course content-related questions to the appropriate Discussion Forum – odds are that if you have that question then at least one other student in the class does too.

7.5 Remark Policy

Midterm

Requests for re-evaluation of the midterm must be made, in writing, to Dr. Lepage within one week of return of the midterm. All requests must include appropriate reasoning for why the student deserves additional marks. Please be aware that an **approval for a remark will result in the whole test being remarked. This may result in an increase, decrease, or no change in the original mark of the term test.**

7.6 Religious Observance

Information about the University of Guelph's policy on academic accommodation of religious obligations can be found online.

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current>

7.7 Academic Consideration of a missed assignment

If you find yourself unable to meet course requirements by the deadline due to medical, psychological, or compassionate circumstances please review the regulations on academic consideration in the academic calendar.

Requests for academic consideration must be based on medical, psychological, or compassionate grounds. Requests, together with supporting documentation, should be submitted to the Associate Dean, Students (ADS).

Requests for academic consideration should, whenever possible, be made before the anticipated exam or assignment deadline occurs, not after. In acute situations or emergencies, the ADS's office should be notified as soon as possible after the fact. Where ongoing problems will potentially interfere with a student's coursework, then the student should inform the ADS's office of this situation as early in the semester as possible so that any necessary arrangements can be made.

If the request for academic consideration is approved, the request shall be forwarded to the course coordinator by the ADS and the course coordinator will decide the format that the academic consideration will take.

8 University Statements

8.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

8.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

8.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>

8.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

8.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day.

More information can be found on the SAS website
<https://www.uoguelph.ca/sas>

8.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community—faculty, staff, and students—to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

8.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

8.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars

<https://www.uoguelph.ca/academics/calendars>
