



# VETM\*3120 Veterinary Histology and General Pathology

Fall 2019

Section(s): C01

Department of Biomedical Sciences

Credit Weight: 0.75

Version 1.00 - September 05, 2019

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## 1 Course Details

### 1.1 Calendar Description

A lecture and laboratory course emphasizing the gross and microscopic organization of the tissues and organs of domestic animals in various physiological states. A comparative approach is used to highlight normal and abnormal gross anatomy and histology to understand how disease affects gross and microanatomical organ structure and function. The lecture and laboratory components are well integrated to provide students with an excellent hands-on experience in histology and pathology.

**Co-Requisites:** All Phase 1 courses.

### 1.2 Course Description

This course addresses the histology and general pathology of tissues. The course utilizes in-class lectures, laboratories, and virtual content. Correlations between morphology and function of the various cells and tissues comprising organ systems will be discussed.

### 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.

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## 2 Instructional Support

### 2.1 Instructional Support Team

**Instructor:** Brenda Coomber Dr.  
**Email:** bcoomber@uoguelph.ca  
**Telephone:** +1-519-824-4120 x54922  
**Office:** OVC 3645  
 Histology Section Coordinator and Instructor

**Instructor:** Geoffrey Wood Dr.  
**Email:** gewood@uoguelph.ca  
**Telephone:** +1-519-824-4120 x54632  
**Office:** PAHL 3827  
 General Pathology Section Coordinator and Instructor

**Instructor:** John S. Lumsden Dr.  
**Email:** jsl@uoguelph.ca  
**Telephone:** +1-519-824-4120 x54453  
**Office:** PAHL 3839  
 General Pathology Instructor

**Instructor:** Jeff Caswell Dr.  
**Email:** jcaswell@uoguelph.ca  
**Telephone:** +1-519-824-4120 x54555  
**Office:** PAHL 3828  
 General Pathology Instructor

**Instructor:** Nathalie Lemieux  
**Email:** nrlemieu@uoguelph.ca  
**Telephone:** +1-519-824-4120 x54670  
**Office:** PAHL 1814  
 Please contact in relation to Pathology CourseLink materials.

**Lab Technician:** Jodi Morrison  
**Email:** jmorris7@uoguelph.ca  
**Telephone:** +1-519-824-4120 x54958  
**Office:** OVC 3660  
 Histology Laboratory Technician/Instructor

## 3 Learning Resources

Histology and General Pathology sections have online course notes, lectures, labs and associated documents. Please visit CourseLink to view and download the notes and lectures.

There is no required textbook for the course. There are several textbooks available for viewing in the laboratory, but here are a few suggested textbooks if you wish to purchase one of your own:

### 3.1 Recommended Resources

**Ross and/or Pawlina Histology: A Text and Atlas, 6th or 7th Edition (Textbook)**  
 6th Edition ISBN: 978-0-7817-7200-6 (Authors: Ross and Pawlina)

7th Edition ISBN: 978-1-4511-8742-7 (Author: Pawlina)

**Eurell and Frappier Dellmann's Textbook of Veterinary Histology, 6th Edition (Textbook)**  
ISBN: 978-0-7817-4148-4

**J. Zachary Pathologic Basis of Veterinary Disease, 6th Edition (Textbook)**  
ISBN: 978-0323357753

## 3.2 Additional Resources

**Digitized images of the microscopic slides you will view in lab are available online through Virtual Microscopy by Aperio (Website)**

<http://www.myobjective.cloud/>

- Click on the folder labelled UoGuelph
- Then click on the OVC folder
- Finally, click on the folder labeled VETM3120

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## 4 Learning Outcomes

Students will study the normal histology associated with cells, tissues, and organs as well as examine the abnormal histology associated with diseased or pathological tissues and organs. Through consideration of both the normal and abnormal structure of tissues and organs, the fundamental relationship between structure (anatomy) and function (physiology) will be considered, in order for students to gain an understanding of the fundamental importance of structure that allows normal physiology, and how anomalies in structure adversely affect the normal functioning of a tissue or organ.

The first part of the course is devoted to an introduction to histology. In this part of the course, students will learn about the histology of the basic tissue types and build on this knowledge to understand the histological structure of organ systems, including the cardiovascular, respiratory, digestive, and immune systems. The laboratories in this part of the course provide students an excellent hands-on experience in normal histology.

The second part of the course is devoted to General Pathology, with consideration of histopathology. This portion of the course will be presented in three units comprising 12 modules, with each module consisting of a lecture and a lab. In parallel will be 7 gross pathology wet labs that provide case-based context for these disease processes as well as experience in identification, description, and interpretation of lesions in tissues and integration with other aspects of the case.

### 4.1 Course Learning Outcomes

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

1. Identify and define key structural and histological features of tissues and organs.
  2. Explain and identify normal histology and histopathology of tissues through a comparison of normal and abnormal tissues.
  3. Understand, using a comparative approach, the key species differences in histology of organs.
  4. Accurately and effectively communicate scientific ideas through group discussion.
  5. Identify and accurately describe the histological characteristics of a normal and abnormal peripheral blood smear in various domestic animal species.
  6. Describe and explain the mechanisms of tissue/organ repair, by which cells, organs, tissues, and animals attempt to maintain homeostasis in the face of insults and the common outcomes, should those homeostatic mechanisms fail.
  7. Examine tissue specimens and identify the abnormalities present (specific to the gross pathology wet labs).
  8. Recognize artifacts in tissue specimens (specific to the gross pathology wet labs).
  9. Describe pathologic changes in terms of the colour, shape, size, texture, extent, and distribution; using both common English words as well as pathologic terms, in a concise and organized manner (specific to the gross pathology wet labs).
  10. Predict the histologic characteristics and the histologic changes that accompany the macroscopic lesions (specific to the gross pathology wet labs).
  11. Based on examination of tissue specimens or photographs, describe the most likely pathologic processes occurring in the tissue (such as necrosis, fibrosis, inflammation, neoplasia, etc.), and at a basic level infer the most likely causes or etiologies (specific to the gross pathology wet labs).
  12. Formulate appropriate morphologic diagnoses (specific to the gross pathology wet labs).
  13. Based on the observed lesions as well as available clinical information and principles of anatomy, physiology, and pathology, explain how the causative agent (bacterium, toxin, mechanical injury, etc.) led to development of the observed tissue changes, the likely functional significance and clinical sequelae, and how the lesion might change over time (specific to the gross pathology wet labs).
  14. Recognize anatomic structures within tissues, and correlate the gross appearance with knowledge of histologic structures and physiologic processes (specific to the gross pathology wet labs).
  15. At a basic level, perform a necropsy examination (specific to the gross pathology wet labs).
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## 5 Teaching and Learning Activities

### Lectures

There are 25 lectures scheduled for the histology section of the course within the Fall semester, where some lecture time is devoted to active learning and review prior to testing. The General Pathology section of the course includes 13 lectures scheduled within the Winter semester, including discussion of the histopathology of disease. This time will be utilized in different ways, including traditional lectures, group discussion, and active learning. Lecture notes will be posted to CourseLink prior to each lecture as a PDF file, one slide per page, to facilitate note-taking.

### Histology Laboratories

There will be 14 laboratories within the histology section of the course scheduled within the Fall semester. During these laboratories time will be spent visualizing and discussing the histology of tissues and organs and notable species differences in tissue and organ structure.

### Gross Pathology Wet Labs

In a series of six 1-hour laboratories, students will study tissue specimens that illustrate important principles of general pathology. In addition, there will be one 3-hour laboratory to learn the technique of postmortem examination. The three major objectives are to develop an ability to describe and interpret observable lesions in diseased tissues, to develop observational and interpretive skills, and to develop an ability to apply the principles of general pathology to case interpretation. Development of these skills will progress through **sequential stages** as follows:

1. Identify normal structures within the tissue, and identify the abnormalities
2. Objectively describe the changes in tissues, in common English words
3. Introduce pathologic/medical descriptive terms to descriptions
4. Recognize artefactual changes in tissues
5. Infer likely disease processes, including the pathologic process and chronicity
6. Construct morphologic diagnoses
7. Infer the likely diagnosis or etiology, and suggest the clinical appearance and clinical pathologic findings that would result from the lesion
8. Synthesis: apply the content of the general pathology modules in the context of pathologic case materials

Please see the Phase 1 schedule for date, time, and room information regarding lectures and laboratories.

## 5.1 Lecture

- Topics:** Lecture #1 - Introduction
- Topics:** Lecture #2 - Histotechnique and Ultrastructure
- Topics:** Lecture #3 - Basic tissue I - Epithelium
- Topics:** Lecture #4 - Exocrine Glands
- Topics:** Lecture #5 - Basic tissue II - Connective Tissue
- Topics:** Lecture #6 - Connective Tissue: Blood & Bone Marrow
- Topics:** Lecture #7 - Basic tissue III - Muscle
- Topics:** Lecture #8 - Basic tissue IV - Nerve tissue
- Topics:** Lecture #9 - REVIEW
- Topics:** Lecture #10 - Cardiovascular I
- Topics:** Lecture #11 - Cardiovascular II
- Topics:** Lecture #12 - Gastrointestinal System I
- Topics:** Lecture #13 - Gastrointestinal System II
- Topics:** Lecture #14 - Integument
- Topics:** Lecture #15 - Urinary System I
- Topics:** Lecture #16 - Urinary System II
- Topics:** Lecture #17 - REVIEW

- Topics:** Lecture #18 - Respiratory System I
- Topics:** Lecture #19 - Respiratory System II
- Topics:** Lecture #20 - Liver I
- Topics:** Lecture #21 - Liver II
- Topics:** Lecture #22 - Endocrine Glands
- Topics:** Lecture #23 - Immune System I
- Topics:** Lecture #24 - Immune System II
- Topics:** Lecture #25 - REVIEW
- Topics:** Lecture #26 - Death & disorders of perfusion I
- Topics:** Lecture #27 - Death & disorders of perfusion II
- Topics:** Lecture #28 - Death & disorders of perfusion III
- Topics:** Lecture #29 - Gross wet lab lecture
- Topics:** Lecture #34 - IIT I
- Topics:** Lecture #35 - IIT II

<b>Topics:</b>	Lecture #36 - IIT III
<b>Topics:</b>	Lecture #37 - IIT IV
<b>Topics:</b>	Lecture #38 - IIT V
<b>Topics:</b>	Lecture #30 - Neoplasia I
<b>Topics:</b>	Lecture #31 - Neoplasia II
<b>Topics:</b>	Lecture #32 - Neoplasia III
<b>Topics:</b>	Lecture #33 - Neoplasia IV

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## 6 Assessments

### 6.1 Assessment Details

#### Histology Term Tests (7%)

There will be **2 formative tests within the Histology section** of the course. The first term test is worth 3% and the second term test is worth 4%. These term tests are not cumulative. See Phase 1 schedule for dates and times.

The histology term tests are structured in two parts:

- Bell-ringer - images of histological sections are projected using PowerPoint for 2 minutes. During this time students will answer questions pertaining to the image shown. These questions may involve identification of tissue type, specific structures, histological features, species, or can include a functional correlate question.
- Short Answer - these questions involve short written answers where you must

apply your knowledge gained from lecture and lab.

### **Histology Midterm (9%)**

The midterm for the histology section is cumulative and includes all lecture and laboratory material delivered to date. The format of the midterm will remain the same as the two formative term tests for the Histology section of the course. See Phase 1 schedule for date and time.

**It is required that a student achieves at least 60% on the histology midterm exam in order to pass this section of the course without condition.** There is NO resit for the Histology Midterm. Students who achieve less than 60% on the Histology Midterm must arrange to meet with Dr. Coomber before the second week of the W20 semester. At this meeting they will be given a written assignment to be completed **one week** after the meeting. On the date due, the assignment will be due **by 5pm by email or paper copy, whichever the student prefers. No late assignments will be accepted.** See academic consideration for a missed assignment within the Course Policies below.

- If the student's performance on the assignment is deemed acceptable, the student will be assigned the original midterm score achieved. If the student's performance on the assignment is deemed unacceptable, further assessment will be required and could be in the form of an oral examination of laboratory material. Once completed successfully, the student will be assigned the original midterm score achieved. The course coordinator will review the status of students that do not successfully complete the conditional assessment and determine if they are eligible to write the final exam.

### **Histology Laboratory Quizzes (2%)**

There will be 6 short quizzes consisting of a few images for identification, and short answers about function. These will be held during the laboratory and will be graded on a **pass/fail** system with a threshold of 50%. These quizzes will be in two groups of three. Students will receive 0.5% for each passed quiz, up to a maximum of 1% for each group. Thus, students must pass 2 of 3 quizzes from each group to receive the maximum for this activity. Students are strongly encouraged to write all 6 quizzes, as they are helpful formative self-tests. For students with approved academic consideration missed quiz marks will be pro-rated if more than 2 quizzes are missed.

### **General Pathology Term Tests (14%)**

There are **2 formative tests within the General Pathology section** of the course, each worth 7%. There is also a **Pathology Written Assignment** that is counted as part of the grade for the second formative test in General Pathology (Term Test 4). See Phase 1 schedule for dates and times.

**It is required that a student achieves at least 60% on each of the General Pathology formative tests in order to pass this section of the course without condition.** Students that do not achieve this grade will complete a re-sit of the exam. Please see the Phase 1 schedule for the scheduled re-sit exams.

- If a student achieves at least 60% on the re-sit:  
The original score achieved on the midterm is assigned.
- If a student achieves less than 60% on the re-sit:  
The student will be required to meet with Dr. Wood. During this meeting the student will receive feedback on their performance in the general pathology section of the course.  
The student will also receive a written assignment to be completed **one week** after the meeting. On the date due, the assignment will be due **by 5pm by email or paper copy, whichever the student prefers. No late assignments will be accepted.** See academic consideration for a missed assignment within the Course Policies below.  
If the student's performance on the assignment is deemed acceptable, the student will be assigned the original formative test score achieved. If the student's performance on the assignment is deemed unacceptable, further assessment will be required and could be in the format of a written test, oral examination, written paper, or other acceptable format of assessment. Once completed successfully, the student will be assigned the original formative test score achieved. The course coordinator will review the status of students that do not successfully complete the conditional assessment and determine if they are eligible to write the final exam.

#### **Gross pathology wet labs midterm (2%)**

There is a midterm examination in the form of a traditional bell-ringer exam, emphasizing lesion detection and description, and to a limited extent interpretation. The midterm will be based on visual examination of gross pathology specimens or photographs. See Phase 1 schedule for date and time.

There is no minimum pass requirement or resit for this midterm.

#### **Gross pathology wet labs final (6%)**

See Phase 1 schedule for date and time.

The **final gross pathology wet lab exam's** content emphasizes lesion detection, description, and interpretation of fresh tissue specimens and/or photographs. The final exam will be

based on visual examination of gross pathology specimens and/or photographs during a traditional bell-ringer format. **A grade of at least 60% must be obtained on the Gross Pathology wet lab final exam to pass the course.** See notes below.

**Final gross pathology wet lab exam notes:**

If a grade of <60% is obtained on the Gross Pathology wet lab final exam, the student is required to take the resit wet lab examination (structured similarly to the gross pathology wet lab final exam).

If the wet lab resit exam is passed (>60%) then the original wet lab exam grade achieved will be assigned and the course will be assessed as passed (P).

If the wet lab resit exam is not passed (<60%) then a failing grade of 49% will be assigned for the entire course and submitted to the academic review committee.

**Final Exam (60%)**

See Phase 1 schedule for date and time.

The **summative final examination** for the course is **worth 60%** of the course grade and is comprehensive, including histology **and** general pathology content. The exam content is divided 50:50 between histology and general pathology. The format of this examination will include a bell-ringer portion (via PowerPoint) and a written examination, where the bell-ringer portion is worth 20% and the written portion is worth 40% of the total 60% that this examination is worth. See notes below.

**Final exam notes:**

If the overall course grade, including both formative and summative components, is <50% you will have failed the course and your grade will be submitted to academic review.

## 7 Course Statements

### 7.1 Safety and Biosecurity - General Pathology Section

The tissues being handled are from clinical cases and may present an infection hazard, both to students and for spread of disease within the hospital.

- For labs held in room 1811/1835 (Gross rounds room) and 1830 (Necropsy/post-mortem room), wear the grey lab coats that are provided in

those rooms. For labs held in room 1813 (Wet lab), please bring and wear your own lab coat and deposit in the laundry after each lab. Do not wear these lab coats outside of the laboratory, including when you go to the washroom.

- Disposable gloves are provided and must be worn for touching specimens.
- Wear **closed-toed footwear** as it is necessary to walk on a disinfecting mat. Open-toed footwear such as sandals is not permitted in these laboratories.
- When labs are in room 1830 (Necropsy/post-mortem room), **CSA- approved safety glasses** are required because of splash hazards during the necropsy procedure. Students are encouraged to bring their own safety glasses, but a supply of shared safety glasses will be made available for use during the labs.
- **Wash hands with soap** and use alcohol spray before leaving the lab.
- Students that are **immunosuppressed because of infection, disease, or prescription medications, or pregnant** should inform the instructors or course coordinators. Privacy legislation protects you from invasive questioning about your medical history, but we do want to be safe. If you have reason to believe you are at increased risk of infection, please consult your physician or Health Service for advice. If accommodations are required, please bring them to the attention of the instructor and/or the course coordinators.

#### **General laboratory safety pertaining to these laboratories**

- Access to the laboratories is limited to students registered in the course. Visitors are not allowed. All students participating in these laboratories must have proof of a protective antibody titre against rabies.
- Food or drink is not permitted in the laboratory. Do not apply cosmetics (eg. lip balm) or adjust contact lenses in the laboratory. Do not put your pen in your mouth!
- Open wounds, cuts and scratches should be covered with a waterproof dressing.
- Report immediately any injuries or incidents to the instructor. He/she will provide first aid, and show you how to fill out the necessary incident-report form.

During the lecture that introduces the gross pathology wet labs, each student is required to sign a form confirming their review and understanding of these safety instructions. This is required before attending the first wet lab, and students missing the introductory lecture should contact the instructor (B. Plattner) well in advance of the first wet lab.

## 7.2 Attendance

It is expected that students attend all scheduled lectures and laboratories in addition to viewing all material available on CourseLink. In addition, it is expected that students arrive on time and turn cell phones to vibrate/silent so as not to disrupt the lecture, laboratory, or other students.

## 7.3 CourseLink

CourseLink will be used extensively throughout VETM\*3120. Ensure to visit the site often! If there are last minute updates or class cancellation, this will be posted to the site.

- Course content – All lecture slides, lecture notes, laboratory manuals, and other content will be posted within the Content tab
- Announcements – Last minute changes or special announcements will be posted within the Newsfeed
- Discussion boards – These forums provide opportunities for students to ask questions and discuss what is being learned in lecture and lab. 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! The discussion boards will be monitored regularly and students are encouraged to answer each other's questions.

## 7.4 Electronic Etiquette

Laptop computers are permitted in the classroom, however, research has shown that these devices can be disruptive to the classroom environment if students are not engaging in course-related activities (such as note-taking). Please be considerate of your fellow peers and use laptops for course-related activities only while in the classroom. 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, one of the course instructors reserves the right to ask the student to leave the classroom. We strive to create a positive, fun, and engaging learning environment for all students.

The use of electronic devices during tests or final exams is strictly prohibited.

## 7.5 Email Policy

All emails will be replied to within 48 hours. Please direct all course content-related questions to the appropriate Discussion Forum instead of emailing questions to the instructor or TA.

## 7.6 Remark Policy

Term Tests and Midterms

Requests for re-evaluation of a test must be made, in writing, to the appropriate section coordinator (Dr. Coomber or Dr. Lumsden) within one week of return of the test. Only tests that are written in pen will be considered for re-marking. 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 test.**

## 7.7 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>

## 7.8 Academic Consideration of a missed assignment

If circumstances arise which affect a student's academic performance, support may be available in the form of academic consideration. Examples of academic consideration can include, but are not limited to, the deferral of a test or an extension of an assignment deadline. For information on academic consideration, see:

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

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).

# 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>

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