



# **ANSC\*6240 Topics in Animal Genetics and Genomics**

Winter 2019

Section(s): C01

Department of Animal Biosciences

Credit Weight: 0.50

Version 1.00 - January 09, 2019

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## **1 Course Details**

### **1.1 Calendar Description**

Current literature and classical papers pertaining to quantitative genetics, animal breeding and animal genomics are reviewed in detail through presentation, discussion and critical analysis.

### **1.2 Course Description**

Current literature and classical papers pertaining to quantitative genetics, animal breeding and animal genomics are reviewed in detail through presentation, discussion and critical analysis.

### **1.3 Timetable**

Lectures: Wednesdays and Fridays from 10:00 to 11:20 am, ANNU 101

Lab schedule and location: Thursdays from 1:30 to 2:30 pm, ANNU 102

### **1.4 Final Exam**

none

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## **2 Instructional Support**

## 2.1 Instructional Support Team

<b>Instructor:</b>	Dan Tulpan
<b>Email:</b>	dtulpan@uoguelph.ca
<b>Telephone:</b>	1-519-824-4120 x52482
<b>Office:</b>	ANNU 127
<b>Office Hours:</b>	Wednesdays from 13:00-14:00 pm

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## 3 Learning Resources

### 3.1 Recommended Text

J. Xiong, Essential Bioinformatics, Cambridge University Press, 2012, ISBN: 9780511806087, <https://doi.org/10.1017/CBO9780511806087>

### 3.1 Recommended Lab Manual

C. Jamison, Perl Programming for Biologists, Wiley and Sons, 2003.

### 3.1 Other Resources

- Course notes will be used during the course (both available in the course's webpage).
  - Extra pertinent information, such as papers, chapters of books, etc. will be accordingly recommended.
  - Students are advised to take their own notes during lectures.
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## 4 Learning Outcomes

### 4.1 Course Learning Outcomes

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

1. Understand bioinformatics data formats and types, and be able to manipulate them using computer programming.
2. Perform and understand sequence alignments, gene predictions, phylogenetics and omics analyses.
3. Appreciate differences among bioinformatics methods and algorithms for both data curation and data analyses.
4. Be able to integrate different biological data sets via programming.
5. Discuss the relative merits of methods and designs used in bioinformatics and

computational biology.

6. Be able to contribute to a team project and perform various types of data analyses.
  7. Accurately and effectively communicate scientific analyses in written form.
  8. Have a proficient command terminology common in bioinformatics and computational biology.
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## 5 Teaching and Learning Activities

The course will cover major topics and methods in bioinformatics and computational biology for animal sciences. Topics include alignments, phylogenetics, genomics, data mining, databases, DNA, RNA and protein structures, DNA sequence analysis, data curation, pipeline construction and data visualization. This is a project-based course and will have a computational component and possibly a lab component focused on bioinformatics programming, too (depending on resource availability).

### 5.1 Lecture

#### Block 1

**Topic(s):** Biological data and databases

#### Block 2

**Topic(s):** Bioinformatics Programming

#### Block 3

**Topic(s):** Sequence alignments.

#### Block 4

**Topic(s):** Gene and promoter prediction

#### Block 5

**Topic(s):** Molecular phylogenetics

#### Block 6

**Topic(s):** Structural bioinformatics

#### Block 7

**Topic(s):** OMICS

### Block 8

**Topic(s):** Machine learning in bioinformatics

## 5.2 Labs

Computer lab: Perl programming (please bring your own laptop)

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## 6 Assessments

### 6.1 Marking Schemes & Distributions

Name	Scheme A (%)
Assignment 1	6
Assignment 2	6
Assignment 3	6
Assignment 4	6
Assignment 5	6
Project presentation	30
Project report	40
Total	100

### 6.2 Assessment Details

**Assignment 1 (6%)**

**Due:** Tue, Jan 22

**Learning Outcome(s):** 1,2

**Assignment 2 (6%)**

**Due:** Tue, Feb 5

**Learning Outcome(s):** 1,2,3

**Assignment 3 (6%)**

**Due:** Tue, Feb 26

**Learning Outcome(s):** 1,2,3,4

**Assignment 4 (6%)**

**Due:** Tue, Mar 12

**Learning Outcome(s):** 1,2,3,4,5

**Assignment 5 (6%)**

**Due:** Tue, Mar 26

**Learning Outcome(s):** 1,2,3,4,5,6,7,8

**Project presentation (30%)**

**Due:** Fri, Apr 12

**Learning Outcome(s):** 1,2,3,4,5,6,7,8

**Project report (40%)**

**Due:** Thu, Apr 18

**Learning Outcome(s):** 1,2,3,4,5,6,7,8

## 6.3 Additional Notes

The project presentation will be 30 minutes long and will have a 5-10 minutes questions period. Presentation slides will be made available to the instructor and students two days in advance.

The project report will be structured as a journal article using the template of the **IEEE/ACM Transactions on Computational Biology and Bioinformatics journal** and will be submitted approx. one week after the presentation (**April 18, 2018 at or before noon**). This will allow students to integrate feedback from presentations into reports. While groups of up to 4 students can work on the same project, the reports will be written individually. The topic of each project will be decided between students and shared with the instructor on the week of February 25, 2019. Alternatively, the instructor can also provide project topics to students who cannot decide.

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## 7 Course Statements

### 7.1 Grading Policies

All assignments must be submitted by 5:30 pm of the due date. Late assignments will receive zero (0) marks.

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## 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

Courses that are one semester long must be dropped by the end of the fortieth class day; two-semester courses must be dropped by the last day of the add period in the second semester. The regulations and procedures for course registration are available in the Undergraduate and Graduate 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>

## 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>