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| **COURSE # and TITLE:** | | | |
| **Term** | Winter 2021 | | |
| **Pre/Co-Requisites** | Approval by instructors | | |
| **Faculty** | VETERNIARY MEDICINE, OFFICE OF GRADUATE EDUCATION | | |
| **Instructor Name (s)** | Jocelyn Poissant | **Email** | Jocelyn.poissant@ucalgary.ca |
| **Instructor Email Policy** |  | | |
| **Office Location** |  | **Office Hours** | By appointment |
| **Telephone No.** | 403-703-1807 | | |
| **TA Name** | NA | **Email** | NA |
| **Class Term/ Days** | 1.5h twice a week, Wednesday and Friday or as agreed upon by instructors and participants | | |
| **Class Times** | 9am-10:30am or as agreed upon by instructors and participants | | |
| **Class Location** | Online (Zoom) | | |

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| **COURSE INFORMATION/ DESCRIPTION OF THE COURSE** |
| In this course students will be introduced to key concepts in population and quantitative genetics and their relevance to our understanding of human and animal health. The course will focus on the theory and application of quantitative genetics and genomics in free-living populations, livestock, and companion animals. Multiple topics including basic concepts and definitions, forces underlying changes in allele frequencies, components of phenotypic values and variances, inbreeding and coancestry, effective population size, estimation of quantitative genetic parameters, artificial selection, natural selection, and genomic analysis of quantitative traits wil be covered. Students will become familiar with key concepts through directed readings, hands-on practicals, and critical assessments of the literature. |
| **LEARNING RESOURCES/REQUIRED READING** |
| **Required Readings, Textbooks, and Learning Materials (available at the UCalgary Bookstore)**  Students will need their own copy of:  *Quantitative genetics* by Armando Caballero, 2020, Cambridge University Press, which can be purchased for approximately $50 on Amazon.  R and R Studio installed on their own laptop computer.  **Technology Requirements**  Students will need to provide their own laptop computer and have an effective internet connection for online course delivery. |

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| **COURSE LEARNING OUTCOMES** |
| At the end of this course, students will be able to:  1) Understand and explain key concepts in population and quantitative genetics, including forces responsible for changes in allele frequencies, the estimation of quantitative genetic parameters, individual variation, inbreeding, and genome-wide association studies.  2) Explain how population and quantitative genetics concepts can be applied to tackle complex problems in evolutionary biology, wildlife health, human health, and animal breeding.  3) Critically present and discuss key concepts and methods in population and quantitative genetics.  4) Synthesise knowledge and identify gaps in the scientific literature. |

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| **ASSESSMENT COMPONENTS** (examples are below to be modified for each course) | | | |
| Assessment Method | Description | Weight | Aligned Course  Learning Outcome |
| Presentations | Each student will give two presentations worth 20% each over the duration of the course.  The first presentation will consist of an overview of weekly reading assignment, a brief overview of at least two research papers related to the weekly assignment, and a discussion of the relevance of the material to animal health.  Over the course students will have to become familiar with some of the analytical tools used by population and quantitative genetics researchers by replicating analyses presented in two published papers (selected by each student and approved by the instructors). Students will then present their analyses to the group through an oral presentation. | 40% | 1-4 |
| Discussion | Each week, students will critically discuss the content of the weekly reading and practical assignments. | 30% | 1-4 |
| Final Assignment | Each student will write a review paper following the guidelines of a target scientific journal (such as Trends in Genetics; selected by each student and approved by the instructors) on a topic related to the content of the course. The topic can be related to a student’s own graduate research project. | 30% | 1-4 |

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| **ASSESSMENT AND EVALUATION INFORMATION** | | | |
| **Assessment**  **Methods** | **Description** | **Weight**  **%** | **Due Date and**  **Time** |
| Presentations | Each presentation will be judged for content (50%; clarity of information and argument, thoughful engagement with the material, relevant and clear use of examples, quality of discussion on link with animal health), visual aids (20%; clear and well organised slides, effective use of animations if appropriate), delivery (20%; smooth transition from slide to slide and one idea to the next, voice projection and pacing, engagement, enthusiasm), and adherence to guidelines including time limits (10%). | 40% | TBD |
| Group discussions | Students will be judged for active participation in group discussions (40%), evidence of completion and engagement with weekly assignments (30%), relevance and accuracy of contributions (20%), and creativity (10%). | 30% | Throughout the course |
| Final paper | The final paper will be allocated for content (40%; clarity, accuracy and relevance of information and arguments), quality of presentation and adherence to guidelines (30%), use and breath of references (20%), and creativity (10%). | 30% | April 22 2020 at 5pm |

Students will need to pass all assessment components to pass the course.

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| **ASSESSMENT AND EVALUATION INFORMATION** |
| **ATTENDANCE AND PARTICIPATION EXPECTATIONS**  Students are expected to attend all classes and contribute actively to group discussions.  **GUIDELINES FOR SUBMITTING ASSIGNMENTS**  The final assignment must be submitted by email by April 22 2020 at 5pm.  **FINAL EXAMINATIONS**  There are no exams.  **EXPECTATIONS FOR WRITING**  Students are expected to write the final assignment on their own, and use appropriate referencing where needed (following scientific writing standards).  **LATE ASSIGNMENTS:** What happens if students fail to submit their assignments? What happens if they are late – do they fail? Do they lose a percentage of their mark per 24 hour period, etc.  Late assignments will not be accepted without adequate justification. In the absence of adequate justification, 20% will de deducted from the total mark per 24 hour period. |

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| **UNIVERSITY OF CALGARY GRADUATE GRADING SYSTEM** |

Cut Points for Grades:

This course adheres to the grading system outlined in the University of Calgary, Faculty of Graduate Studies Calendar. Grades of A+ and A are not distinguished in the calculation of GPAs.

As a guide, the proposed Veterinary Medical Sciences percentile grades are included:

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| Grade | Grade Point Value | Percentage Conversion | Graduate Description |
| A+ | 4.00 | 97-100 | Outstanding |
| A | 4.00 | 90-96 | Excellent – superior performance showing  comprehensive understanding of the subject matter |
| A- | 3.70 | 85-89 | Very Good Performance |
| B+ | 3.30 | 80-84 | Good Performance |
| B | 3.00 | 75-79 | Satisfactory Performance |
| B- | 2.70 | 70-74 | Minimum Pass for Students in the Faculty of  Graduate Studies |
| C+ | 2.30 | 67-69 | All grades below ‘B-“ are indicative of failure at the graduate level and cannot be counted toward Faculty of Graduate Studies course requirements. A student who receives a grade of “F” will normally be required to withdraw unless the program recommends otherwise. |

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| **COURSE SCHEDULE DETAILS** |

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| **Course Schedule Date** | **Topic & Reading** | **Assignments/Due Dates** |
| Week 1 | Chapter 1: Continuous variation |  |
| Week 2 | Chapter 2: Forces of change in the allele frequencies |  |
| Week 3 | Chapter 3: Components of Phenotypic Values and Variances |  |
| Week 4 | Chapter 4: Inbreeding and Coancestry |  |
| Week 5 | Chapter 5: Effective Population size |  |
| Week 6 | Chapter 6: Estimation of Genetic Values, Variances and Covariances |  |
| Week 7 | Chapter 7: Mutation |  |
| Week 8 | Chapter 8: Consequences of Inbreeding |  |
| Week 9 | Chapter 9: Artificial Selection |  |
| Week 10 | Chapter 10: Natural Selection |  |
| Week 11 | Chapter 11: Genomic Analysis of Quantitative traits |  |
| Week 12 | Presentations | Presentation of data analysis assignments |
| Week 13 | Free time to complete final paper. |  |
| Week 14 | Free time to complete final paper. |  |
| Week 15 | Final paper due | Final assignment due |

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| **INTERNET AND ELECTRONIC COMMUNICATION DEVICE INFORMATION** |
| The use of laptop and mobile devices is acceptable when used in a manner appropriate to the course and classroom activities. Students are to refrain from accessing websites that may be distracting for fellow learners (e.g. personal emails, Facebook, YouTube).  Students are responsible for being aware of the University’s Internet and email use policy, which can be found at https:/[/www.ucalgary.ca/policies/files/policies/electronic-communications-](http://www.ucalgary.ca/policies/files/policies/electronic-communications-) policy.pdf |
| **MEDIA AND RECORDING IN LEARNING ENVIRONMENTS** |
| **Media recording for lesson capture**  The instructor may use media recordings to capture the delivery of a lecture. These recordings are intended to be used for lecture capture only and will not be used for any other purpose. Although the recording device will be fixed on the Instructor, in the event that incidental student participation is recorded, the instructor will ensure that any identifiable content (video or audio) is masked, or will seek consent to include the identifiable student content to making the content available on University approved platforms.  **Media recording for assessment of student learning**  The instructor may use media recordings as part of the assessment of students. This may include but is not limited to classroom discussions, presentations, clinical practice, or skills testing that occur during the course. These recordings will be used for student assessment purposes only and will not be shared or used for any other purpose.  **Media recording for self-assessment of teaching practices**  The instructor may use media recordings as a tool for self-assessment of their teaching practices. Although the recording device will be fixed on the instructor, it is possible that student participation  in the course may be inadvertently captured. These recordings will be used for instructor self- assessment only and will not be used for any other purpose.   |  | | --- | | **UNIVERSITY OF CALGARY POLICIES AND SUPPORTS** |   **ACADEMIC ACCOMMODATION**  Students seeking an accommodation based on disability or medical concerns should contact Student Accessibility Services; SAS will process the request and issue letters of accommodation to instructors. For additional information on support services and accommodations for students with disabilities, visit [www.ucalgary.ca/access/](http://www.ucalgary.ca/access/) . Students who require an accommodation in relation to their coursework based on a protected ground other than disability should communicate this need in writing to their Instructor. The full policy on Student Accommodations is available at <http://www.ucalgary.ca/policies/files/policies/student-accommodation-policy.pdf> .  **IMPORTANT INFORMATION**  Any research in which students are invited to participate will be explained in class and approved by the appropriate University Research Ethics Board  **COPYRIGHT**  It is the responsibility of students and professors to ensure that materials they post or distribute to others comply with the Copyright Act and the University’s Fair Dealing Guidance for Students (<https://libanswers.ucalgary.ca/loader.php?fid=8678&type=1&key=4477530344f51b38ba5c07a13e494128>). Further information for students is available on the Copyright Office web page ( <https://library.ucalgary.ca/copyright> )  **A NOTE REGARDING INSTRUCTOR INTELLECTUAL PROPERTY**  Generally speaking, course materials created by professor(s) (including course outlines, presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the professor (s). These materials may NOT be reproduced, redistributed or copied without the explicit consent of the professor. The posting of course materials to third party websites such as note sharing sites without permission is prohibited. Sharing of extracts of these course materials with other students enrolled in the course at the same time may be allowed under fair dealing  **ACADEMIC INTEGRITY**  The Faculty of Veterinary Medicine expects intellectual honesty from its students. Course participants should be aware of University policies relating to Principles of Conduct, Plagiarism and Academic Integrity. These are found in the printed Faculty of Graduate Studies Calendar, or online under Academic Regulations in the Faculty of Graduate Studies Calendar, available at Faculty of Graduate Studies Academic Regulations  **ACADEMIC MISCONDUCT**  For information on academic misconduct and its consequences, please see the University of Calgary Calendar at http://www.ucalgary.ca/pubs/calendar/current/k.html  **FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY**  Student information will be collected in accordance with typical (or usual) classroom practice.  Students’ assignments will be accessible only by the authorized course faculty. Private information related to the individual student is treated with the utmost regard by the faculty at the University of Calgary |