



CUMMING SCHOOL OF MEDICINE
GRADUATE COURSE OUTLINE

COURSE TITLE:	Advanced Genetics I		
Course	MDSC641.01		
Pre/Co-Requisites	CMMB 311 or MDSC 341 (or equivalent)		
Faculty	Cumming School of Medicine, Graduate Science Education		
Instructor Name(s)	Paul Mains	Email	mains@ucalgary.ca
Office Location	HSC2235	Office Hours	By appointment
Instructor Email Policy	Instructor will respond within 24 hours		
Telephone No.	403-220-7997		
Class Term, Days	Tuesday/Thursday		
Class Times	9:30 – 10:50		
Class Location	HSC750		

COURSE INFORMATION/DESCRIPTION OF THE COURSE

Historical papers will illustrate the foundations of the fundamental principles of modern transmission genetics. Topics including the chromosomal theory of inheritance, the role of pairing and recombination for chromosomal disjunction during meiosis, cytogenetics, the nature of dominant mutations, genome editing, genetic screens and analysis of developmental pathways. Material covered is drawn from model organisms and humans.

LEARNING RESOURCES/REQUIRED READING

Pubmed links to required reading from the primary will be posted on D2L.

COURSE OBJECTIVES/LEARNING OUTCOMES

This course will give the student a solid background in traditional transmission genetics and will acquaint students with contemporary genetic methods commonly used in model organisms.

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. Percentage/letter grade conversion used for this course is as follows

Grade	Grade Point Value	Percentage Conversion	Graduate Description
A+	4.00	95-100	Outstanding
A	4.00	90-94	Excellent – superior performance showing comprehensive understanding of the subject matter
A-	3.70	85-89	Very Good Performance
B+	3.30	77-84	Good Performance
B	3.00	72-76	Satisfactory Performance
B-	2.70	68-71	Minimum Pass for Students in the Faculty of Graduate Studies
C+	2.30	63-67	All grades below ‘B-’ are indicative of failure at the graduate level and cannot be counted toward Faculty of Graduate Studies course requirements

Assessment Components: The University policy on grading related matters is outlined in the [2019-2020 Calendar](#).

Assessment Methods	Description	Weight %	Due Date and Time
Participation	Asking questions during student talks and attending non-Mains lectures	8	On dates indicated on schedule
Homework	Students can work together	25	9:30 AM of next lecture after assigned
Take home quiz 1	Open book, Student can NOT work together	8	November 19, 9:30 AM
Take home quiz 2	Highest mark on the two quizzes counts for 12%	12	November 22, 5:00 PM
Talk 1	Individuals will be assigned papers	14	See schedule
Talk 2	Individuals will be assigned papers	18	See schedule
Paper	News & Views style, based on Talk 1 or 2	15	3 days after talk 2, 5 PM

ASSESSMENT AND EVALUATION INFORMATION

ATTENDANCE AND PARTICIPATION EXPECTATIONS:

Asking at least two questions during each round of student talks and attending non-Mains lectures

GUIDELINES FOR SUBMITTING ASSIGNMENTS:

Email or hard copy

FINAL EXAMINATIONS:

None

EXPECTATIONS FOR WRITING:

Clarity is most important, followed by brevity. Format and expectations are posted on D2L. Plagiarism will not be tolerated.

LATE AND/OR MISSING ASSIGNMENTS:

Late assignments lose 25% per day

Is a passing grade on a particular component essential to pass the course as a whole?

No

COURSE TIMETABLE			
Course Schedule Date	Topic & Reading	Instructor	Assignments/Due Dates & Times
September 5	Introduction, meiosis and three factor crosses, Page and Hawley 2003	Mains	Homework due 9:30 AM before following lecture
September 10	Worm hermaphrodite genetics, Corsi et al 2015	Mains	
September 12	Genes are on chromosomes and nondisjunction, Bridges 1916, part I	Mains	
September 17	Genes are on chromosomes, Bridges 1916, part II. Inversions and nondisjunction, Sturtevant and Beadle 1936, part I	Mains	
September 19	Inversions and nondisjunction, Sturtevant and Beadle 1936, part II	Mains	
September 24	Trivalent formation and secondary nondisjunction. Worm nondisjunction in brief. Cooper 1948, Xiang 2006, Hodgkin 1979	Mains	
September 26	Human cytogenetics and rearrangements, Feuk et al. 2006	Argiropoulos	
October 1	Yeast genetics	Cobb	

October 3	Mutation, eugenics and society, Muller 1932	Mains	
October 8	Dominant mutations and genetic redundancy, Park and Horvitz 1986, Herskowitz 1988	Mains	
October 10	Human dominant mutations, Wilkie 1994	Parboosingh	
October 15, 17, 22	Student talks	Mains	
October 24	Genetic screens – fish	Huang	
October 29	Mouse knockout technology	Yang	
October 31	Genetic screens – flies	Grewal	
November 5	Reverse genetics: RNAi, morpholinos, genome editing, Fire et al. 1998, Wei et al. 2013	Huang/McGhee	
November 7	Genetic pathways, epistasis and worm sex determination, Roth et al. 2009 (Mains)	Mains	
November 7	Take home quiz 1	Mains	November 19, 9:30 AM
November 19	Take home quiz 1 class discussion	Mains	
November 19	Take home quiz 2	Mains	November 22, 5 PM
November 21	Genetic pathways – Mammalian sex determination, Harley et al 2003	Argiropoulos	
November 26	Genetic pathways – Hox genes, Lewis 1978, Maeda and Karch 2006	Mains	
November 28, December 3, 5	Student talks	Mains	

INTERNET AND ELECTRONIC COMMUNICATION DEVICE INFORMATION

Cell phones must be turned off in class unless otherwise arranged with the instructor.

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-communicationspolicy.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.

Student Recording of Lectures

Audio or video recording of lectures is prohibited except where explicit permission has been received from the instructor.

UNIVERSITY OF CALGARY POLICIES AND SUPPORTS

ACADEMIC ACCOMMODATIONS

Students seeking an accommodation based on disability or medical concerns should

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

INSTRUCTOR INTELLECTUAL PROPERTY

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.

COPYRIGHT LEGISLATION

All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright (www.ucalgary.ca/policies/files/policies/acceptable-use-of-material-protected-by-copyright.pdf) and requirements of the copyright act (<https://laws-lois.justice.gc.ca/eng/acts/C-42/index.html>) to ensure



they are aware of the consequences of unauthorised sharing of course materials (including instructor notes, electronic versions of textbooks etc.). Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Policy.

ACADEMIC INTEGRITY

The Cumming School of 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>

EMERGENCY EVACUATION AND ASSEMBLY POINTS

Assembly points for emergencies have been identified across campus. The primary assembly points for South Campus (Health Science Centre (HSC); Health & Research Innovation Centre (HRIC); Heritage Medical Research Building (HMRB) and Teaching, Research and Wellness (TRW)) are:

- HSC and HMRB: HRIC Atrium (alternate assembly point is Parking Lot 6)
- HRIC: HMRB Atrium (alternate assembly point is Parking Lot 6)
- TRW: McCaig Tower (alternate assembly point is HMRB – Atrium)

APPEALS

If there is a concern with the course, academic matter or a grade, first communicate with the instructor. If these concerns cannot be resolved, students can proceed with an academic appeal, as per Section N of the Faculty of Graduate Studies Calendar. Students must follow the official process and should contact the Student Ombuds Office (<http://www.ucalgary.ca/provost/students/ombuds>) for assistance with this and with any other academic concerns, including academic and non-academic misconduct

THE FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY (FOIP) ACT

This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIP) and students should identify themselves on written assignments (exams and term work.) by their name and ID number on the front page and ID on each subsequent page. Assignments given by you to your course instructor will remain confidential unless otherwise stated before submission. The assignment cannot be returned to anyone else without your expressed permission to the instructor. Grades will be made available on an individual basis and students will not have access to other students' grades without expressed consent. Similarly, any information about yourself that you share with your course instructor will not be given to anyone else without your permission

WELLNESS AND MENTAL HEALTH RESOURCES

The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the excellent mental health resources available throughout the university community, such as



counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre), <https://www.ucalgary.ca/wellnesscentre/services/mental-health-services> and the Campus Mental Health Strategy website <https://www.ucalgary.ca/mentalhealth/>

SUPPORTS FOR STUDENT LEARNING, SUCCESS, AND SAFETY

Student Ombudsman: The Student Ombuds' Office supports and provides a safe, neutral space for students. For more information, please visit www.ucalgary.ca/ombuds/ or email ombuds@ucalgary.ca

Student Union: The SU Vice-President Academic can be reached at (403) 220-3911 or suvpaca@ucalgary.ca; Information about the SU, including elected Faculty Representatives can be found here: <https://www.su.ucalgary.ca>

Graduate Student's Association: The GSA Vice-President Academic can be reached at (403) 220- 5997 or gsa.vpa@ucalgary.ca; Information about the GSA can be found here: <https://gsa.ucalgary.ca>

SAFEWALK

Campus security will escort individuals, day or night, anywhere on campus (including McMahon Stadium, Health Sciences Centre, Student Family Housing, the Alberta Children's Hospital and the University LRT station). Call 403-220-5333 or visit <http://www.ucalgary.ca/security/safewalk>. Use any campus phone, emergency phone or the yellow phone located at most parking lot pay booths. Please ensure your personal safety by taking advantage of this service.