



UNIVERSITY OF CALGARY
FACULTY OF SCIENCE
DEPARTMENT OF BIOLOGICAL SCIENCES
COURSE OUTLINE

1. **Course:** BIOL 311, Principles of Genetics -- Fall 2018

Instructor Name	Email	Phone	Office	Hours
L01: (MWF 11:00 - 11:50 in MFH 162)				
David Hansen	dhansen@ucalgary.ca	403-220-7496	BI238B	TBA
Isabelle Barrette-Ng	mibarret@ucalgary.ca	403-220-6240	BI 430A	Please use the following link to book an appointment with me: https://isabellebarretteng.youcanbook.me
Steven Zimmerly	zimmerly@ucalgary.ca	403-220-7933	Biological Sciences 319C	Send an email to set up an appointment
L02: (MWF 13:00 - 13:50 in ICT 102)				
David Hansen	dhansen@ucalgary.ca	403-220-7496	BI238B	TBA
Isabelle Barrette-Ng	mibarret@ucalgary.ca	403-220-6240	BI 430A	Please use the following link to book an appointment with me: https://isabellebarretteng.youcanbook.me
Steven Zimmerly	zimmerly@ucalgary.ca	403-220-7933	Biological Sciences 319C	Send an email to set up an appointment

Welcome to BIOL 311!

We are looking forward to studying genetics with you this semester.

Your BIOL 311 Teaching team

Course and laboratory coordinator: Dr. Isabelle Barrette-Ng

Course Site:

D2L: BIOL 311 L01 and L02 - (Fall 2018) - Principles of Genetics

Department of Biological Sciences:

Office: BIO 186
Phone: 403 220-3140
Email: biosci@ucalgary.ca

Note:

Students must use their U of C account for all course correspondence.

2. **Requisites:**

See section [3.5.C](#) in the Faculty of Science section of the online Calendar.

Prerequisite(s): Any two of Biology 231, 233, 241 and 243.

Notes: Successful completion of Biology 311 is required for admission to all the specialty programs offered by the Department. Students are urged to complete this course in their second year to ensure timely completion of the program.

3. **Grading:**

The University policy on grading and related matters is described in [F.1](#) and [F.2](#) of the online University Calendar. In determining the overall grade in the course the following weights will be used:

Component(s)	Weighting %	Dates
Lecture Assignments	6%	There will be two assignments, each worth 3%. One will cover the first half of the semester and will be assigned in early October. The other will cover the second half of the semester and will be assigned in late November. Further details will be provided on each assignment in class.
Midterm Exam	32% (2 hours)	The midterm exam will be held on Saturday, October 27, 2018 from 1-3 PM in ST 140 and ST 148.
Final Exam	32% (2 hours)	The final exam will cover material from the last half of the course and will be scheduled by the Registrar's Office between December 10 and 20, inclusive.
Laboratory	30%	Various lab components have predetermined weighting to a total of 30% as specified in the Lab Manual. Please see pages 4-6 inclusive of the document called "Introduction to the labs" for a complete list of due date for each lab component. You can find this document in the Labs folder on D2L.

CLASSROOM PERFORMANCE SYSTEM:

In the lecture component of this course, we will use the Top Hat Monocle classroom performance system, where you will be asked to use a cell phone to text answers to questions during class. The use of the Top Hat Monocle system is **optional**, but highly recommended to enhance learning in the classroom. If you answer 80% or more of the in-class questions, your lowest grade on one of the lecture assignments will be replaced by 100%. If you answer less than 80% of the in-class questions, a grade of 0 will be assigned for this course component, and the grade for the lowest lecture assignment will not be replaced.

Should you wish to use Top Hat Monocle, it is your responsibility to ensure that your participation is being properly recorded by the system. In the event of any discrepancy, you must contact the administrators of the Top Hat Monocle system to have them corrected. Correction of any discrepancies must be done prior to 5 PM MST on December 7, 2018.

If you wish to participate, you need to have a cell phone with which you can send text messages, and you need to register for an account with Top Hat Monocle. Account registration is free. You must only register for the lecture section in which you are officially registered. Questions answered through registration in the improper lecture section will not be counted. Further details on how to register for an account are available from D2L.

If you are unable to use the Top Hat Monocle system, please contact Dr. Barrette-Ng within the first week of class to make alternate arrangements.

Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

The conversion between a percentage grade and letter grade is as follows.

	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Minimum % Required	95 %	90 %	85 %	80%	76%	72 %	68 %	64%	60%	55 %	50 %

This course has a registrar scheduled final exam.

4. Missed Components of Term Work:

The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in [Section 3.6](#). It is the student's responsibility to familiarize himself/herself/themselves with these regulations. See also [Section E.3](#) of the University Calendar.

If you miss a laboratory exercise, laboratory quiz, or the midterm exam, the only documentation that will be accepted in BIOL 311 is a completed **Physician/Counsellor Statement Form**, which can be downloaded from the following website: <https://www.ucalgary.ca/registrar/files/registrar/phycoun.pdf>. This form must be completed by your physician or counsellor and brought to Dr. Barrette-Ng's office within 48 hours of the date of your absence.

If you miss the final exam, please contact the Registrar's Office. Please see <https://www.ucalgary.ca/registrar/exams/deferred-exams> for reasons that will be accepted by the Registrar's Office to defer a final exam as well as the procedure to apply for a deferred exam.

5. Scheduled out-of-class activities:

There are no scheduled out of class activities for this course.

6. Course Materials:

Required Textbook(s):

Anthony J. Griffiths, Susan R. Wessler, Sean B. Carroll, John Doebley, *Introduction to Genetic Analysis, 11th Edition (10th Edition is also acceptable)*: W.H. Freeman & Company, A Macmillan Education Imprint .
R.O. Flagg, *Carolina Drosophila Manual, 5th edition*: Carolina Biological Supply Company .

7. Examination Policy:

Non-programmable calculators are permissible during examinations.

Students should also read the Calendar, [Section G](#), on Examinations.

8. Approved Mandatory and Optional Course Supplemental Fees:

There are no mandatory or optional course supplemental fees for this course.

9. Writing across the Curriculum Statement:

For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of the work. See also [Section E.2](#) of the University Calendar.

10. Human & living organism studies statements:

Students will not participate as subjects or researchers in human studies.

See also [Section E.5](#) of the University Calendar.

STUDIES IN THE BIOLOGICAL SCIENCES INVOLVE THE USE OF LIVING AND DEAD ORGANISMS. Students taking laboratory- and field-based courses in these disciplines can expect involvement with and experimentation on such materials. Students perform dissections on dead or preserved organisms in some courses. In particular courses, students experiment on living organisms, their tissues, cells, or molecules. Sometimes field work requires students to collect a variety of living materials by many methods, including humane trapping.

All work on humans and other animals conforms to the Helsinki Declaration and to the regulations of the Canadian Council on Animal Care. The Department strives for the highest ethical standards consistent with stewardship of the environment for organisms whose use is not governed by statutory authority. Individuals contemplating taking courses or majoring in one of the fields of study offered by the Department of Biological Sciences should ensure that they have fully considered these issues before enrolling. Students are advised to discuss any concern they might have with the Undergraduate Program Director of the Department.

Students are expected to be familiar with [Section SC.4.1](#) of the University Calendar.

11. Reappraisal of Grades:

A student wishing a reappraisal, should first attempt to review the graded work with the Course coordinator/instructor or department offering the course. Students with sufficient academic grounds may request a reappraisal. Non-academic grounds are not relevant for grade reappraisals. Students should be aware that the grade

being reappraised may be raised, lowered or remain the same. See [Section I.3](#) of the University Calendar.

1. **Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within **15 days** of either being notified about the mark, or of the item's return to the class. If the student is not satisfied with the outcome, the student shall immediately submit the Reappraisal of Graded Term work form to the department in which the course is offered. The department will arrange for a re-assessment of the work if, and only if, the student has sufficient academic grounds. See sections [I.1](#) and [I.2](#) of the University Calendar
2. **Final Exam:** The student shall submit the request to Enrolment Services. See [Section I.3](#) of the University Calendar.

If you have any concerns about the grading of a laboratory assignment, please first discuss the issue with your G.T.A. **24 hours** after the assignment has been returned to you. Using the form entitled "Request for re-evaluation of term work for BIOL 311" (available from D2L), please prepare a written summary of your concerns related to the grading of your work, and then submit it to your G.T.A. To have your work re-evaluated, you must submit to your G.T.A. the completed request form along with your original, graded assignment within 15 days of the date when the graded work was originally handed back. If you still have concerns about the grading of your work following the re-evaluation by your G.T.A., you may submit the form completed by you and your G.T.A., along with your original, graded assignment, to Dr. Barrette-Ng.

12. OTHER IMPORTANT INFORMATION FOR STUDENTS:

- a. **Mental Health** 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 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, [Mental Health Services Website](#)) and the Campus Mental Health Strategy website ([Mental Health](#)).
- b. **SU Wellness Center:** The Students Union Wellness Centre provides health and wellness support for students including information and counselling on physical health, mental health and nutrition. For more information, see www.ucalgary.ca/wellnesscentre or call [403-210-9355](tel:403-210-9355).
- c. **Sexual Violence:** The University of Calgary is committed to fostering a safe, productive learning environment. The Sexual Violence Policy (<https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf>) is a fundamental element in creating and sustaining a safer campus environment for all community members. We understand that sexual violence can undermine students' academic success and we encourage students who have experienced some form of sexual misconduct to talk to someone about their experience, so they can get the support they need. The Sexual Violence Support Advocate, Carla Bertsch, can provide confidential support and information regarding sexual violence to all members of the university community. Carla can be reached by email (svsa@ucalgary.ca) or phone at [403-220-2208](tel:403-220-2208).
- d. **Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under [Section K](#). Student Misconduct to inform yourself of definitions, processes and penalties. Examples of academic misconduct may include: submitting or presenting work as if it were the student's own work when it is not; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; collaborating in whole or in part without prior agreement of the instructor; borrowing experimental values from others without the instructor's approval; falsification/fabrication of experimental values in a report. **These are only examples.**
- e. **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on [assembly points](#).
- f. **Academic Accommodation Policy:** Students needing an accommodation because of a disability or medical condition should contact Student Accessibility Services in accordance with the procedure for accommodations for students with disabilities available at [procedure-for-accommodations-for-students-with-disabilities.pdf](#).

Students needing an accommodation in relation to their coursework or to fulfill requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Associate Head, Undergraduate of the Department of Biological Sciences, Heather Addy by email addy@ucalgary.ca or phone 403 220-6979. Religious accommodation requests relating to class, test or exam scheduling or absences must be submitted no later than **14 days** prior to the date in question. See [Section E.4](#) of the University Calendar.

- g. **Safewalk:** Campus Security will escort individuals day or night (See the [Campus Safewalk](#) website). Call [403-220-5333](tel:403-220-5333) for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.
- h. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). Students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information, see [Legal Services](#) website.
- i. **Student Union Information:** [VP Academic](#), Phone: [403-220-3911](tel:403-220-3911) Email: suvpaca@ucalgary.ca. SU Faculty Rep., Phone: [403-220-3913](tel:403-220-3913) Email: sciencerep@su.ucalgary.ca. Student Ombudsman, Email: suvpaca@ucalgary.ca.
- j. **Internet and Electronic Device Information:** Unless instructed otherwise, cell phones should be turned off during class. All communication with other individuals via laptop, tablet, smart phone or other device is prohibited during class unless specifically permitted by the instructor. Students that violate this policy may be asked to leave the classroom. Repeated violations may result in a charge of misconduct.
- k. **Surveys:** At the University of Calgary, feedback through the Universal Student Ratings of Instruction ([USRI](#)) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.

TENTATIVE SCHEDULE FALL

Date	Topics	Chapter	Lecturer
September 7	Explanation of course outline, exams schedule, labs, percentage weights and reading assignments. Example of genetic analysis		Everyone
September 10	Autosomal inheritance, sex-linked inheritance, cytoplasmic inheritance, pedigree analysis	2	Dr. Hansen
September 12	Independent assortment of genes	3	Dr. Hansen
September 14		3	Dr. Hansen
September 17		3	Dr. Hansen
September 19	Linkage, recombination, genetic mapping, chi-square, multiple cross-overs	4	Dr. Hansen
September 21		4	Dr. Hansen
September 24		4	Dr. Hansen
September 26		4	Dr. Hansen
September 28	Bacterial and viral genetics	5	Dr. Zimmerly
October 1		5	Dr. Zimmerly
October 3		5	Dr. Zimmerly
October 5	Gene Interactions: Dominance, epistasis, biosynthetic pathways	6	Dr. Zimmerly
October 8	No Lecture- Thanksgiving		
October 10			Dr. Zimmerly
October 12		6	Dr. Zimmerly
October 15		6	Dr. Zimmerly
October 17	Large-scale chromosomal changes	17	Dr. Zimmerly
October 19	Large-scale chromosomal changes	17	Dr. Zimmerly
October 22	What is a gene and how can genetic variability be introduced? A review of the Central Dogma and the structure of DNA	Portions of 1, 7	Dr. Barrette-Ng
October 24	Detecting genetic variability in the human genome - a look at PCR, DNA sequencing and gel electrophoresis	Portions of 10 and 14	Dr. Barrette-Ng

October 27	MIDTERM EXAM FROM 1-3 PM in ST140 and ST148		
October 26	Genetic variability and DNA polymorphisms – an overview of the different classes of DNA polymorphisms and methods used for their detection	Portions of 10, 16 and 18	Dr. Barrette-Ng
October 29			
October 31	Do all DNA polymorphisms have phenotypic consequences?	Portions of 14, 16, 18	Dr. Barrette-Ng
November 2	Case studies on DNA polymorphisms, ancestry and disease	Portions of 18	Dr. Barrette-Ng
November 5	Genetic variability and the control of gene expression in prokaryotes: How a nutritional signal controls expression of the lac operon	Portions of 11	Dr. Barrette-Ng
November 7	Genetic variability and the control of gene expression in prokaryotes: How a nutritional signal controls expression of the lac operon	Portions of 11	Dr. Barrette-Ng
November 9	Genetic variability and the control of gene expression in eukaryotes: How a nutritional signal controls expression of the GAL system	Portions of 12	Dr. Barrette-Ng
November 12-16	No lectures - midterm break		
November 19	Introducing genetic variability through genetic engineering and the manipulation of DNA	Portions of 10	Dr. Barrette-Ng
November 21	Inheritance and genetic variability: is it all in the genes?	Portions of 12	Dr. Barrette-Ng
November 23	Control of gene expression and the process of development in eukaryotes	Portions of 13	Dr. Barrette-Ng
November 26	Gene regulation, development and RNA? An overview of miRNA	Portions of 8 and 13	Dr. Barrette-Ng
November 28	The story of jumping genes – introduction to transposable elements	Portions of 15	Dr. Barrette-Ng
November 30	Altering the message – the genetics of cancer	Portions of 16	Dr. Barrette-Ng
December 3	Inheritance of complex traits Curing genetic diseases? An overview of genetic therapies	Portions of 10 and 19	Dr. Barrette-Ng
December 5	Medical Genetics		
December 7	Ethical issues in genetics- cloning, genetic testing, gene therapy, prenatal diagnosis and pre-implantation genetic testing		
December 10-20	Final exam scheduled by Registrar. This will be a comprehensive Final Exam covering all material in the course, but with emphasis on topics covered since mid-term		

Department Approval:

Electronically Approved

Date: 2018-08-23 16:12

Course Outcomes

- describe, using diagrams, the similarities and differences in chromosome behaviour between mitosis and meiosis
- illustrate how chromosomal behaviour in meiosis underlies Mendel's laws
- identify the inheritance pattern of traits by using pedigree analysis and an understanding of chromosome behavior in meiosis.
- determine gene linkage and calculate genetic map distances by analyzing inheritance patterns using appropriate statistical methods
- describe the epistatic relationship between genes in a given process based on phenotypic inheritance patterns
- illustrate how different alleles of a gene can form using the physicochemical properties of nucleic acids and the molecular anatomy of genes in prokaryotes and eukaryotes
- compare and contrast the regulation of gene expression in prokaryotes and eukaryotes
- design experiments to evaluate the effects, if any, of mutations on gene expression
- identify techniques that can be used to alter the genetic information in a given piece of DNA, and describe how they

can be used for gene therapy

- evaluate data mined from online databases to propose a hypothesis describing the molecular basis for a genetically-inheritable disease