

MDSC 341
Principles of Human Genetics

Instructor:

Dr. William Brook
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Associate Professor, Dept. of Biochemistry and Molecular Biology, Dept. of Medical Genetics

Office Hours/Policy on Answering Student Emails

Meetings with the instructor are available after lecture or by appointment. Teaching assistants are not available outside of scheduled tutorial time. All questions regarding course material should be directed to the appropriate instructor.

Students may contact the course instructor by email. Please type MDSC 341 as the subject. The instructor will endeavour to respond within 2 working days.

Teaching Assistants:

Lisa Deliu	lpdeliu@ucalgary.ca
Jasper Greysso-Wong	jgreysso@ucalgary.ca
Lindsay Phillips	lindsay.phillips@ucalgary.ca
Arsheen Rajan	arsheen.rajan1@ucalgary.ca

Time and Location:

Lectures

Days/Time: Tuesdays, Thursdays 3-4.20 PM*
Location: Online by Zoom, please connect through D2L.

(There will be no lecture on October 22 because of the Midterm Exam).

The instructor will provide lecture slides prior to class in either pdf or PowerPoint form on D2L. The lectures will be delivered synchronously by Zoom and there will be grades awarded for participation in in-class exercises and assignments. Lectures will also be recorded and available for viewing, but not download, on the Yuja platform.

* Lectures on September 8 and 10 will run from 3 to 5.30 PM.

Tutorials

Days/Time: **Tuesdays**, 4:30 – 5:50 pm, Sept. 15, 22, 29, Oct. 6, 13, 27, Nov. 3, 17, 24, Dec. 1;
Thursdays, 4:30 – 5:50 pm, Sept. 17, 24, Oct. 1, 8, 15, 29, Nov. 5, 19, 26, Dec. 3;
Location: Online by Zoom, please connect through D2L.

Students will be assigned to one of 8 tutorial groups; TAs will facilitate the tutorials using the Zoom platform. The purpose of the tutorial sessions is to provide students with the opportunity to use genetic vocabulary, and apply the knowledge gained in lectures to solve genetic problems. This will require preparation prior to the tutorial. Grades will be awarded for participation. It is in your best interest to come prepared and participate actively in these sessions.

Prerequisite/Co-Requisite:

Biology 241 and 243, or Biology 231, and enrolment in the BHSC Honours program, or consent of the Instructors.

Antirequisite:

Credit for both Biology 311 and Medical Science 341 will not be allowed.

Course Description:

Introduction to principles in human genetics including Mendelian and chromosomal basis of inheritance, chromosomal abnormalities, pedigree analysis, mutations, and molecular, metabolic, population and clinical genetics. Studies of model organisms and genomics will be included as required. Incorporates problem-based learning to establish analytical skills in genetics.

Overarching Theme

Genetics is the study of biological information, how it is stored, replicated, used and passed on to the next generation. Genetics plays an ever-increasingly important role in medicine and our world today. It is now recognized that genetics is important not only in rare monogenic disorders but in common disorders such as cancer, diabetes and cardiovascular disease (multifactorial diseases), in the way we react to drugs, other therapies and the environment (pharmacogenomics, envirogenetics) and in the aging process.

The purpose of this course is to provide the student with a foundation in genetics, including Mendelian and chromosomal basis of inheritance, chromosomal abnormalities, pedigree analysis, mutations, and molecular, metabolic, population and clinical genetics. Studies of model organisms and genomics will be included as required. Incorporates problem-based learning to establish analytical skills in genetics.

Global Objectives

The goals of the course are to:

- ◆ Promote active learning, critical thinking and an inquiry approach to genetics
- ◆ Provide students with opportunities to develop and practice problem-solving skills
- ◆ Integrate Mendelian principles, molecular biology, and human genetics

Course Learning Outcomes

By the end of this course, students will be able to:

- ◆ Utilize genetic terminology correctly
- ◆ Explain the underlying basis of inheritance
- ◆ Illustrate how DNA provides the genetic blueprint for cellular structures and processes
- ◆ Predict the implications of genetic variation
- ◆ Discuss how genes contribute to health and disease
- ◆ Solve a variety of genetic problems
 - ◆ Break down the information provided in the question
 - ◆ Identify the mode of inheritance
 - ◆ Interpret experimental results that utilize modern genetic techniques

- ◆ Generate an answer
- ◆ Defend the answer or explain how the answer was obtained

Required Textbook

- ◆ Required: Hartwell, Goldberg, Fischer, Hood. Genetics: from genes to genomes 6th edition. The 5th edition is a reasonable alternative and used copies may be available. However, students who choose to use the 5th edition will be responsible for identifying the corresponding chapters and page numbers for suggested readings and problems. Either the online access or hardcopy are acceptable.

Online Access \$100.30 for six months: Printable online edition, includes access to more practise questions and SmartBook (an enhanced reading format). You may buy directly from McGraw Hill with this link:

<https://connect.mheducation.com/class/w-brook-mdsc-341---fall-2020>

(You may try this for free for two weeks)

- **Hardcopy** \$199.95: Available at the Medical School Bookstore and the Main Campus Bookstore.
- ◆ The study guide and solutions manual for the 6th edition will be available to download in .pdf format on the course D2L site.

A Note regarding readings

A list of required text readings for all course sections will be posted on D2L and additional links and documents will be made available, where possible. Suggested readings have been chosen to inform you and support the lecture material. **Students are encouraged to complete assigned readings BEFORE each lecture.** Instructors will proceed in class on the assumption that students have read completely the assigned readings. Students should be aware that many of the readings they will be assigned may be of an unfamiliar nature and style. **Students should allot sufficient time to allow for several reads of the assigned material.**

Learning Technology Requirements

Brightspace (by D2L) is located on the University of Calgary server and will be used extensively for communication with students. **It is the student's responsibility to ensure that they receive all posted communications and documents and that they receive emails sent by instructors or fellow students through D2L.** Only your @ucalgary.ca email address may be linked to D2L. Please ensure that you are regularly checking your @ucalgary.ca account.

In order to successfully engage in learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- A computer with a supported operating system, as well as the latest security and malware updates;
- A current and updated web browser;
- Webcam (built-in or external);
- Microphone and speaker (built-in or external), or headset with microphone;
- Current antivirus and/or firewall software enabled;
- Broadband internet connection;
- Access to either a scanner or a digital camera to submit exam answers.

Most current laptops will have a built-in webcam, speaker and microphone

A laptop, desktop, tablet or mobile device is required for D2L access. If you need help accessing or using D2L, please visit the Desire2Learn resource page for students: <http://elearn.ucalgary.ca/d2l-student/>.

Evaluation

The University policy on grading and related matters is described in section F of the 2020-2021 Calendar.

Students will be assessed by a combination of assignments and exams as well as participation in tutorial and lecture. While writing skills are not directly being evaluated, your ability to write legibly and communicate your answer (including correct use of the genetic terms introduced in the course) impacts your evaluation. Illegible answers will not be marked; this includes very small handwriting or poorly scanned documents.

In determining the overall grade in the course, the following weights will be used:

In Class Assignments and Participation (5%)

Top Hat questions and a small number of short exercises will be completed during lectures. Participation in lectures will be assessed using the Top Hat platform. For all in-class Top Hat questions, marks will be awarded for answering. An explanation of Top Hat grading will be posted on D2L. **Course access for TOPHAT is 412869. Please use a TopHat account linked to your @UCalgary e-mail address.**

Tutorials (15%)

The tutorials provide an opportunity for students to work through problems and learn essential concepts in genetics with the assistance of a teaching assistant and in small groups. Each week prior to tutorial, students will be given access on D2L to 1) a brief online quiz about the tutorial topic and 2) the in-class problems for the tutorial. The quiz must be completed by the end of Monday before tutorials. Students will be allowed two attempts of the quiz with the highest score being awarded. During the tutorial, the teaching assistants will lead the students through the in-class problems and additional exercises. The tutorials are interactive and students will be graded for participation. Students are **strongly** encouraged to attempt the problems prior to tutorial although this is not mandatory.

Online quizzes	5%
Participation	10%

Problem Sets (20%)

Four assignments will be posted on D2L that will be based on the concepts covered in lecture and tutorial. These assignments are to be completed individually and the answers must be uploaded to D2L on the due date indicated. Assignments will be assessed by the TAs. Marks will be given for both the answer and work. All work shown **must** support the answer provided. Late **assignments** will not be accepted and illegible assignments will not be marked.

<u>Problem set</u>	<u>Assigned</u>	<u>Due</u>	<u>Weight</u>
Gene Expression and Mendelian Genetics	Sep 17	Oct 2	5%
Meiosis and Genetic Mapping	Oct 2	Oct 16	5%
Human Molecular Genetics	Oct 30	Nov 12	5%
Gene Regulation and Cancer Genetics	Nov 19	Dec 3	5%

Exams (60%)

Exams will be **closed-book** and **online**, administered on the D2L platform. They will be accessible during a 24-hour time window. They will be timed and must be completed once they are opened. They will consist of short answer and problem-solving questions and will be similar to the assignments, recommended questions from the text, and tutorial questions. Part marks will be given for work shown. Some answers will be in diagram form and must be either digitally photographed or scanned and uploaded to D2L (please see learning technology requirements).

	Dates	Material Covered	Weight
Midterm	October 22 3-hour online exam 24- hour availability from 3 PM.	Material, assignments and readings up to and including October 8 plus Tutorials 1-5	30%
Final Exam	TBA – final exam period	The remainder of the material, assignments, readings, and tutorials not covered on the midterm exam	30%

A Note regarding Writing Assignments:

Writing skills are important to academic study in all disciplines. In keeping with the University of Calgary's emphasis on the importance of academic writing in student assignments (section E.2 of 2020-21 Calendar), writing is emphasized, and the grading thereof in determining a student's mark in this course. The Bachelor of Health Sciences values excellence in writing. Competence in writing entails skills in crafting logical, clear, coherent, non-redundant sentences, paragraphs and broader arguments, as well as skills with the mechanics of writing (grammar, spelling, punctuation). Sources used in research papers must be properly documented. The University of Calgary offers a number of instructional services through the Students' Success Centre's Writing Support Services (<http://www.ucalgary.ca/writingsupport/>) for students seeking feedback on assignments or seeking to improve their general writing skills. Students are **strongly encouraged** to take advantage of these programs.

Grading Scheme:

Letter Grade	Description	Percentage
A+	Outstanding performance	96-100
A	Excellent performance	90-95
A-	Approaching excellent performance	85-89
B+	Exceeding good performance	80-84
B	Good performance	75-79
B-	Approaching good performance	70-74
C+	Exceeding satisfactory performance	65-69
C	Satisfactory performance	60-64
C-	Approaching satisfactory performance	57-59

D+	Marginal pass	54-56
D	Minimal pass	50-53
F	Did not meet course requirements	0-49

Missed Components of Term Work:

Late assignments will not be accepted and will automatically receive a mark of zero. Students who miss a tutorial or in class assignment will receive a mark of zero unless the instructor has been previously notified. There will be NO exceptions to this policy.

It is the agreement of all Faculty involved in MDSC341 that **extensions will NOT be granted** on any assignment. The only exceptions to this are those in keeping with the University Calendar (debilitating illness, religious conviction, or severe domestic affliction) that are received in writing and with supporting documentation. Please note that while absences are permitted for religious reasons, students are responsible for providing advance notice and adhering to other guidelines on this matter, as outlined in the University Calendar (<https://www.ucalgary.ca/pubs/calendar/current/e-4.html>).

Course Evaluations and Student Feedback

Student feedback will be sought at the end of the course through the Universal Student Rating of Instruction (USRI) and a qualitative student evaluation. Students are welcome to discuss the process and content of the course at any time with the instructor. Students may also address any concerns they may have with Dr. Ebba Kurz, Associate Dean (Undergraduate Health and Science Education) in the Cumming School of Medicine (kurz@ucalgary.ca).

Guidelines for Zoom Sessions

Zoom is a video conferencing program that will allow us to meet at specific times for a 'live' video conference, so that we can have the opportunity to meet each other virtually and discuss relevant course topics as a learning community.

To help ensure Zoom sessions are private, do not share the Zoom link or password with others, or on any social media platforms. Zoom links and passwords are only intended for students registered in the course. Zoom recordings and materials presented in Zoom, including any teaching materials, must not be shared, distributed or published without the instructor's permission.

The use of video conferencing programs relies on participants to act ethically, honestly and with integrity; and in accordance with the principles of fairness, good faith, and respect (as the Code of Conduct). When entering Zoom or other video conferencing sessions, you play a role in helping create an effective, safe and respectful learning environment. Please be mindful of how your behaviour in these sessions may affect others. Participants are required to use names officially associated with their UCID (legal or preferred names listed in the Student Centre) when engaging in these activities. Instructors/moderators can remove those whose names do not appear on class rosters. Non-compliance may be investigated under relevant University of Calgary conduct policies. If participants have difficulties complying with this requirement, they should email the instructor of the class explaining why, so the instructor may consider whether to grant an exception, and on what terms. For more information on how to get the most out of your zoom sessions visit: <https://elearn.ucalgary.ca/guidelines-for-zoom/>.

If you are unable to attend a Zoom session, please contact your instructor to arrange an alternative activity (where available). Please be prepared, as best as you are able, to join class in a quiet space that will allow you to be fully present and engaged in Zoom sessions. Students will be advised by their instructor when they are expected to turn on their webcam (such as for group work, presentations, etc).

The instructor may record online Zoom class sessions for the purposes of supporting student learning in this class – such as making the recording available for review of the session or for students who miss a session. Students will be advised before the instructor initiates a recording of a Zoom session. These recordings will be used to support student learning only.

Attendance

Synchronous participation at all lectures and tutorials is expected of all students.

Conduct During Lectures and Tutorials

The virtual classroom should be respected as a safe place to share ideas without judgement - a community in which we can all learn from one another. Students are expected to frame their comments and questions to lecturers in respectful and appropriate language, always maintaining sensitivity towards the topic. Students, employees, and academic staff are also expected to demonstrate behaviour in class that promotes and maintains a positive and productive learning environment.

As members of the University community, students, employees and academic staff are expected to demonstrate conduct that is consistent with the University of Calgary Calendar, the Code of Conduct and Non-Academic Misconduct policy and procedures, which can be found at <https://www.ucalgary.ca/policies/forms/title>.

Students are expected to take notes during class and should not rely solely on material supplied by the instructors.

Use of Internet and Electronic Communication Devices in Class

The Bachelor of Health Sciences program aims to create a supportive and respectful learning environment for all students. Laptop and/or mobile devices are to be used in a manner appropriate to the course and classroom activities. Research studies have found that inappropriate/off-topic use of electronic devices in the classroom negatively affects the learning of others during class time.

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-policy.pdf>.

UNIVERSITY OF CALGARY POLICIES AND SUPPORTS

Copyright

All students are required to reach the University of Calgary policy on Acceptable Use of Material Protected by Copyright (<https://www.ucalgary.ca/policies/files/policies/acceptable-use-of-material-protected-by-copyright-policy.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 unauthorized 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 <https://www.ucalgary.ca/pubs/calendar/current/k.html>.

Instructor Intellectual Property

Course materials created by instructors (including course outlines, presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the instructor. 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 Accommodations

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The Student Accommodations policy is available at <https://ucalgary.ca/student-services/access/prospective-students/academic-accommodations>. Students needing an accommodation based on disability or medical concerns should contact Student Accessibility Services (SAS) in accordance with the Procedure for Accommodations for Students with Disabilities (<https://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities.pdf>). 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.

SAS will process the request and issue letters of accommodations to instructors. For additional information on support services and accommodations for students with disabilities, visit www.ucalgary.ca/access/.

Academic Misconduct

The University of Calgary is committed to the highest standards of academic integrity and honesty. The University of Calgary has created rules to govern all its members regarding the creation of knowledge and the demonstration of knowledge having been learned.

Academic Misconduct refers to student behaviour that compromises proper assessment of a student's academic activities and includes (but is not limited to): cheating, fabrication, falsification, plagiarism, unauthorized assistance, failure to comply with an instructor's expectations regarding conduct required of students completing academic assessments in their courses, and failure to comply with exam regulations applied by the Registrar.

For information of the Student Academic Misconduct Policy and Procedures, please visit; <https://ucalgary.ca/policies/files/policies/student-academic-misconduct-policy.pdf>
<https://ucalgary.ca/policies/files/policies/student-academic-misconduct-procedure.pdf>

Additional information is available on the Academic Integrity website at: <https://ucalgary.ca/student-services/student-success/learning/academic-integrity>.

Recording of Lectures

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

Freedom of Information and Protection of Privacy Act

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

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 I of the University Calendar. Students must follow the official reappraisal/appeal process and may contact the Student Ombuds' Office (<http://www.ucalgary.ca/ombuds>) for assistance with this and with any

other academic concerns, including academic and non-academic misconduct. Students should be aware that concerns about graded term work may only be initiated **within 10 business days** of first being notified of the grade. <https://www.ucalgary.ca/pubs/calendar/current/i-2.html>

Media recording for lesson capture

The instructor will use Zoom recordings to capture the delivery of lectures. These recordings are intended to be used for lecture capture so that students may review lectures. The recordings will not be used for any other purpose. Although the recording device will be fixed on the Instructor, it is likely that incidental student participation may be recorded. Students who are concerned about issues of privacy have the option of asking questions through the Zoom chat function and/or leaving their cameras turned off during lecture.

Sexual Violence Policy

The University recognizes that all members of the University Community should be able to learn, work, teach and live in an environment where they are free from harassment, discrimination, and violence. The University of Calgary's sexual violence policy guides us in how we respond to incidents of sexual violence, including supports available to those who have experienced or witnessed sexual violence, or those who are alleged to have committed sexual violence. It provides clear response procedures and timelines, defines complex concepts, and addresses incidents that occur off-campus in certain circumstances. Please see the policy available at <https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf>

Resources for Support of Student Learning, Success, Safety and Wellness

Student Success Centre	http://www.ucalgary.ca/ssc/
Student Wellness Centre	http://www.ucalgary.ca/wellnesscentre/
Distress Centre	http://www.distresscentre.com/
Library Resources	http://library.ucalgary.ca

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 (<https://www.ucalgary.ca/wellnesscentre/services/mental-health-services>) and the Campus Mental Health Strategy (<http://www.ucalgary.ca/mentalhealth/>).

Student Ombuds' Office

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

BHSc Student Faculty Liaison Committee (SFLC)

The BHSc SFLC, with elected representatives from all majors, serves to raise issues of interest to BHSc students to the program administration, including items pertaining to curriculum, scheduling and events. A list of current representatives can be found on the BHSc website.

Student Union (SU) Information

The SU Vice-President Academic can be reached at (403) 220-3911 or suypaca@ucalgary.ca; the SU representatives for the Cumming School of Medicine can be reached at medrep1@su.ucalgary.ca or medrep2@su.ucalgary.ca.

Student Success Centre

The Student Success Centre provides services and programs to ensure students can make the most of their time at the University of Calgary. Our advisors, learning support staff, and writing support staff assist students in enhancing their skills and achieving their academic goals. They provide tailored learning support and advising programs, as well as one-on-one services, free of charge to all undergraduate and graduate students. For more information visit: <https://www.ucalgary.ca/student-services/student-success>

Emergency Evacuation/Assembly Points

As part of the University of Calgary Emergency Evacuation plan, students, faculty, and staff should locate the closest Assembly Point in case of Fire Alarm. Safety signage is posted throughout the campus showing the locations and the possible route to these locations. All students, faculty, and staff are expected to promptly make their way to the nearest Assembly Point if the Fire Alarm is activated. No one is to return into campus facilities until an all clear is given to the warden in charge of the Assembly Area. For more information, see <https://www.ucalgary.ca/emergencyplan/building-evacuation/assembly-points>

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.

MDSC 341, Fall 2019 Lecture/Reading Schedule (Subject to Change!)
 Course Schedule and Recommended Reading (Hartwell et al Genes to Genomes, 6th ed.).

	Tuesday	Thursday
Week 1	September 8	September 10
Lecture	Intro/DNA, Replication, Mutation, Mutagenesis and Repair	Gene expression
Reading	Ch.6, p.187-201; Ch.12, p.419-423. Ch. 7, p. 220-239, Ch. 6, p. 203-207.	Ch.7, p.250-255; Ch.8, p.271-272, 280-297.
Week 2	September 15	September 17
	Mendelian Genetics	Mendelian Genetics II
	Ch. 2, p.20-36; Ch. 3, p.46-68.	Ch. 3, p.46-68; Ch. 4, p.115-116, 118-122.
Tutorial 1	DNA, mutation and Gene expression	DNA, mutation and Gene expression
Week 3	September 22	September 24
Lecture	Chromosome Structure, Meiosis and Chromosome Theory	Sex Chromosomes and Aneuploidy
Reading	Ch. 4, p. 90-93, 98-109, 113-115	Ch. 4, p. 94-97, 111-113, 116-118 Ch. 12, p. 423-426; Ch. 13, p. 460-470;
Tutorial 2	Mendelian Genetics	Mendelian Genetics
Week 4	September 29	October 1
Lecture	Linkage, chromosome exchange, and mapping	Mapping and Chi Square
Reading	Ch. 5, p. 134-153	Ch. 5, p.153-156.
Tutorial 3	Meiosis and Aneuploidy	Meiosis and Aneuploidy
Week 5	October 6	October 8
Lecture	Chromosome Rearrangements	Mutation and gene function
Reading	Ch. 12, p.410-413; Ch. 13, p.437-453	Ch. 7, p. 239-241; Ch. 8, p.247-250
Tutorial 4	Linkage and Mapping	Linkage and Mapping
Week 6	October 13	October 15
	Genetic Variation	Detecting Genetic Variation I
	Ch.11 p.365-370 ; Ch.13 p.453-455	Ch.11 p.371-376; Ch.9 p.317-322, p.327-330
Tutorial 5	Rearrangements	Rearrangements
Week 7	October 20	October 22
	Detecting Genetic Variation II	Midterm exam
	Ch.11 p.376-379	<i>Lecture material up to and including October 8, tutorials 1-5</i>
4.30-6 PM	Mid-term Q/A	

Week 8	October 27	October 29
Lecture	Sequencing Genomes	Mapping Disease Genes
Reading	Ch.11 p.354-355, p.380-391	Ch.9 p.322-326, p.344-346; Ch.11 p.380-385
Tutorial 6	Detecting Genetic Variation	Detecting Genetic Variation
Week 9	November 3	November 5
Lecture	Gene Regulation 1	Gene Regulation 2
Reading	Ch. 14, p. 499-502; Ch. 16, p. 549-562; Ch. 12, p. 414-418.	Ch. 17, p. 584-594, p. 600-608.
Tutorial 7	Genetic variation/Sequencing	Genetic variation/Sequencing
Week 11	November 17	November 19
Lecture	Cell Cycle and Cancer I	Cell Cycle and Cancer II
Reading	Ch. 20, p. 682-684; p. 687-694	Ch. 20, p. 684-687; p.694-702.
Tutorial 8	Gene regulation	Gene regulation
Week 10	November 24	November 26
Lecture	Non-Mendelian Genetics: Imprinting	Non-Mendelian Genetics: Dynamic and Mitochondrial Mutations
Reading	Ch.17 p.594-599	Ch.7 p.229-230; Ch.15 p.522-525, 535-540
Tutorial 9	Cell Cycle, Cancer	Cell Cycle, Cancer
Week 12	December 1	December 3
Lecture	Student Selected Topic 1	Student Selected Topic 2
Reading	t.b.a.	t.b.a.
Tutorial 10	Non-Mendelian genetics	Non-Mendelian genetics
Week 13	December 8	
	Student Selected Topic 3	
Reading	t.b.a.	