



**CUMMING SCHOOL OF MEDICINE
GRADUATE COURSE OUTLINE**

COURSE TITLE: Genome Replication, Transcription and RNA Processing in Eukaryotes			
Course	MDGE 722		
Pre/Co-Requisites	Course Coordinator Permission		
Faculty	Cumming School of Medicine, Graduate Science Education		
Instructor Name(s)	Dr. James D. McGhee Dr. Susan P. Lees-Miller	Email	jmcghee@ucalgary.ca leesmill@ucalgary.ca
Office Location	Dr. McGhee: HS 2237 Dr. Lees-Miller: HRIC 2A22	Office Hours	By Appointment only
Instructor Email Policy	Emails from students will receive responses within two business days, or ASAP under normal circumstances.		
Telephone No.			
Class Term, Days	Fall 2019,		
Class Times	15:00-16:30, T/R		
Class Location	Sep 5, 10, 17, 24, Oct. 1: HS G732 Sep 12: HS G737 Sep 19: HS G748 Sep 26: PGME area (HM G26)		

COURSE INFORMATION/DESCRIPTION OF THE COURSE
MDGE722 will discuss the detailed structure and basic biochemical features of DNA, as it is folded and as it functions inside the eukaryotic nucleus. Topics will include how the 2-metre long human genome is packaged by “chromatin”, how transcription factors are able to choose particular DNA sequences and how this choice leads to active transcription of specific genes, how various classes of transcribed RNA are synthesized and processed, and how the entire genome is replicated in eukaryotic cells. Discussions will begin with detailed 3D structures of the various macromolecules, will emphasize how these structures then give rise to the important biochemical features of transcription and replication, and will attempt to explain the biological complexity and specificity that emerge from these processes.
LEARNING RESOURCES/REQUIRED READING
None

COURSE OBJECTIVES/LEARNING OUTCOMES
<ul style="list-style-type: none"> • Understand how information is coded in structural features of DNA and patterns of DNA sequence • Understand how the conformation of the genome is experimentally probed inside the eukaryotic nucleus • Understand how genome packaging is controlled by the large variety of “chromatin” proteins

- ☐ Understand how transcription factors interact with DNA to select individual genes for transcription
- ☐ Understand how bound transcription factors interact with and engage downstream machinery, i.e. co-regulators / mediators, chromatin modifiers and remodelers, general transcription factors and ultimately RNA Polymerase II.
- ☐ Understand the basic types and properties of RNA molecules, including rRNA, tRNA, mRNA and non-codingRNAs
- ☐ Understand how pre-mRNA is processed in the nucleus and exported to the cytoplasm
- ☐ Understand the current models of eukaryotic DNA replication and control of replication

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
Examination	Oral Examination #1	30%	Tues Sept 17 th -- 15:00 to 17:00
2 x Mock Letter of Intent	(2 x LOI, 1 page maximum each) for the Mock Written Grant Proposal	5% 5%	LOI#1: Due Mon Sept 16 th 4 pm LOI#2: Due Monday Sept 30 th 4pm



Examination	Oral Examination #2	30%	Tues Oct 1st --15:00 to 17:00
Mock Written Grant Proposal	(5 pages maximum, in style of NSERC or Cancer Research Society), with relative success based on the assessment of creativity and scientific rigour.	30%	Tues Oct 8 th , 4pm

ASSESSMENT AND EVALUATION INFORMATION

ATTENDANCE AND PARTICIPATION EXPECTATIONS: The 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 conduct themselves in a mature and courteous manner during ALL lectures. Students are expected to frame their comments and questions to lecturers in respectful and appropriate language, always maintaining sensitivity towards the topic.

To be successful, students are expected to attend ALL CLASSES and take notes during class, and should not rely solely on material supplied by the instructors. Missing two or more lectures may jeopardize your ability to pass / achieve a good grade this course.

GUIDELINES FOR SUBMITTING ASSIGNMENTS: Assignments must be submitted according to the specific instructions provided to you by the instructor at the beginning of the course.

FINAL EXAMINATIONS: There are no Registrar-Scheduled final examinations for this course.

EXPECTATIONS FOR WRITING: 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 2018-19 Calendar), writing is emphasized, and the grading thereof in determining a student's mark in this course. The University of Calgary 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). 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.

LATE AND/OR MISSING ASSIGNMENTS: As a general rule, late assignments will not be accepted and will automatically receive a mark of zero. Students who miss a quiz/test will receive a mark of zero unless the instructor has been notified prior to the start of the class. There will be NO exceptions to this policy.

It is the agreement of all Faculty involved in MDGE courses that extensions will NOT be granted. 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. Traffic jams and late or full buses are common events in Calgary and are NOT acceptable reasons for late arrivals to class or examinations. 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>). In this case, alternative arrangements will be made.

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
Thurs Sept 5 th -- 15:00 to 16:30	DNA Structure and Chromatin	McGhee	
Tues Sept 10 th -- 15:00 to 16:30	Eukaryotic Transcription # 1	McGhee	
Thurs Sept 12 th -- 15:00 to 16:00	Eukaryotic Transcription # 2	McGhee	
To be determined	One-hour tutorial	McGhee + Lees-Miller	
Mon Sept 16 th	LOI#1 Due		LOI#1 Due
Tues Sept 17th -- 15:00 to 17:00	Oral Exam; 15 mins per student	McGhee + Lees-Miller	Oral Exam
Thurs Sept 19 th --15:00 to 16:30	RNA Structure and Function	Lees-Miller	
Tues Sept 24 th -- 15:00 to 16:30	Synthesis, Processing and Export of mRNA	Lees-Miller	
Thurs Sept 26 th --15:00 to 16:00	Eukaryotic DNA Replication	Lees-Miller	
To be determined	One-hour tutorial	McGhee + Lees-Miller	
Mon. Sept 30 th	LOI #2 Due		LOI#2 Due
Tues Oct 1st --15:00 to 17:00	Oral Exam; 15 mins per student	McGhee + Lees-Miller	Oral Exam
Tues Oct 8 th (NO LECTURE)	Written Assignment Due (NO LECTURE)		Mock Grant Due

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 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/. 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



(library.ucalgary.ca/files/library/guidance_for_students.pdf). 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 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.